



Delmar's

FUNDAMENTAL & ADVANCED

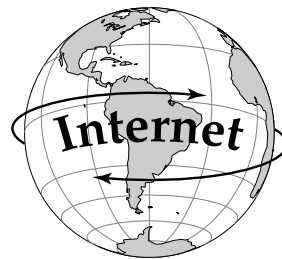
NURSING SKILLS

Online Services

Delmar Online

To access a wide variety of Delmar products and services on the World Wide Web, point your browser to:

<http://www.DelmarNursing.com>
or email: info@delmar.com



A service of Thomson Learning™

Delmar's

FUNDAMENTAL & ADVANCED

NURSING SKILLS

**Gaylene Bouska Altman
RN, PhD**

Director, Learning Lab
Faculty
School of Nursing
University of Washington
Seattle, Washington

**Patricia Buchsel
RN, MSN, FAAN**

Clinical Instructor
School of Nursing
University of Washington
Seattle, Washington

**Valerie Coxon
RN, PhD**

Affiliate Assistant Professor
School of Nursing
University of Washington
Seattle, Washington
Chief Executive Officer
NRSPACE Software, Inc.
Bellevue, Washington



Delmar
Thomson Learning™

3HARAP

NOTICE TO THE READER

Publisher does not warrant or guarantee any of the products described herein or perform any independent analysis in connection with any of the product information contained herein. Publisher does not assume, and expressly disclaims, any obligation to obtain and include information other than that provided to it by the manufacturer.

The reader is expressly warned to consider and adopt all safety precautions that might be indicated by the activities herein and to avoid all potential hazards. By following the instructions contained herein, the reader willingly assumes all risks in connection with such instructions.

The publisher makes no representation or warranties of any kind, including but not limited to, the warranties of fitness for particular purpose or merchantability, nor are any such representations implied with respect to the material set forth herein, and the publisher takes no responsibility with respect to such material. The publisher shall not be liable for any special, consequential, or exemplary damages resulting, in whole or part, from the readers' use of, or reliance upon, this material.

Delmar Staff:

Business Unit Director:	William Brottmiller
Executive Editor:	Cathy L. Esperti
Editorial Assistant:	Darcy M. Scelsi
Executive Marketing Manager:	Dawn Gerrain
Executive Production Manager:	Karen Leet
Project Editors:	Patricia Gillivan and Christopher C. Leonard
Production Coordinator:	James Zayicek
Art/Design Coordinator:	Timothy J. Conners
Cover Design:	Timothy J. Conners

Copyright © 2000

Delmar is a division of Thomson Learning. The Thomson Learning logo is a registered trademark use herein under license.

Printed in Canada

1 2 3 4 5 6 7 8 9 10 XXX 05 04 03 02 01 00 99

For more information, contact Delmar, 3 Columbia Circle, PO Box 15015, Albany, NY 12212-0515; or find us on the World Wide Web at <http://www.delmar.com>

All rights reserved Thomson Learning © 2000. The text of this publication, or any part thereof, may not be reproduced or transmitted in any form or by any means, electronics or mechanical, including photocopying, recording, storage in an information retrieval system, or otherwise, without prior permission of the publisher.

You can request permission to use material from this text through the following phone and fax numbers. Phone: 1-800-730-2214; Fax: 1-800-730-2215; or visit our Web site at <http://www.thomsonrights.com>

Library of Congress Cataloging-in-Publication Data

Altman, Gaylene.

Delmar's fundamental and advanced nursing skills book / Gaylene Altman, Patricia Buschel, and Valerie Coxon.

p. cm.

Includes bibliographical references and index.

ISBN 0-7668-0715-0

I. Nursing Handbooks, manuals, etc. I. Buschel, Patricia. II. Coxon, Valerie. III. Title. IV. Title: Fundamentals and advanced nursing skills book.

[DNLM: 1. Nursing Care—methods. 2. Nursing Process. WY 100 A468d 1999]

RT51 .A628 1999

610 .73—dc21

DNLM/DLC

for Library of Congress

99-32852

CIP



DEDICATION

Dr. Altman would like to dedicate this book and express a special thanks to her husband, Len, and her three children, Jonathan, Matthew, and especially Katherine, who exhibited patience and understanding during this project, and to all the staff and clients at the numerous health facilities who made this project possible.

Patricia Buchsel would like to dedicate this book to professional nurses, health care providers, and clients who will benefit from the application of knowledge represented in this book.

Dr. Coxon would like to dedicate this book and express her thanks to the many people who made this project possible—contributing authors, the staff of NRSPACE Software, and especially to Keith Goodman and Karrin Johnson for their unyielding sense of humor and energy under fire.

CONTENTS

<i>Contributing Authors</i>	x		
<i>Reviewers</i>	xii		
<i>Preface</i>	xiii		
<i>Acknowledgments</i>	xviii		
<i>About the Authors</i>	xix		
CHAPTER 1 • PHYSICAL ASSESSMENT	1		
1-1 Physical Assessment	2		
1-2 Taking a Temperature	28		
1-3 Taking a Pulse	40		
1-4 Counting Respirations	47		
1-5 Taking Blood Pressure	53		
1-6 Weighing a Client, Mobile and Immobile	61		
1-7 Measuring Intake and Output	68		
1-8 Breast Self-Examination	74		
1-9 Collecting a Clean-Catch, Midstream Urine Specimen	82		
1-10 Testing Urine for Specific Gravity, Ketones, Glucose, and Occult Blood	89		
1-11 Performing a Skin Puncture	96		
1-12 Measuring Blood Glucose Levels	101		
1-13 Collecting Nose, Throat, and Sputum Specimens	108		
1-14 Testing for Occult Blood with a Hemocult Slide	116		
CHAPTER 2 • SAFETY AND INFECTION CONTROL	121		
2-1 Handwashing	122		
2-2 Proper Body Mechanics and Safe Lifting	127		
2-3 Assisting with Ambulation and Safe Falling	137		
2-4 Donning and Removing Clean and Contaminated Gowns and Gloves	144		
2-5 Donning a Cap and Mask	150		
2-6 Removing Contaminated Items	155		
2-7 Applying Sterile Gloves via the Open Method	162		
2-8 Surgical Scrub	168		
2-9 Applying Sterile Gloves and Gown via the Closed Method	174		
2-10 Applying Restraints	179		
2-11 Emergency Airway Management	189		
2-12 Administering Cardiopulmonary Resuscitation (CPR)	195		
2-13 Performing the Heimlich Maneuver	209		
2-14 Responding to Accidental Poisoning	219		
2-15 Emergency Client Transport	224		
CHAPTER 3 • PATIENT CARE AND COMFORT	235		
3-1 The Effective Communication Process	236		
3-2 Guided Imagery	245		
3-3 Progressive Muscle Relaxation	251		
3-4 Therapeutic Massage	258		
3-5 Applying Moist Heat	264		
3-6 Warm Soaks and Sitz Baths	270		
3-7 Applying Dry Heat	275		

6-7	Applying a Condom Catheter	687	7-14	Ventilating the Client with an Ambu Bag	878
6-8	Inserting an Indwelling Catheter: Male	693	7-15	Inserting the Pharyngeal Airway	885
6-9	Inserting an Indwelling Catheter: Female	701	7-16	Maintaining Mechanical Ventilation	890
6-10	Routine Catheter Care	709	7-17	Suctioning Endotracheal and Tracheal Tubes	896
6-11	Obtaining a Residual Urine Specimen from an Indwelling Catheter	713	7-18	Maintaining and Cleaning Endotracheal Tubes	903
6-12	Irrigating a Urinary Catheter	717	7-19	Maintaining and Cleaning the Tracheostomy Tube	909
6-13	Irrigating the Bladder Using a Closed-System Catheter	724	7-20	Maintaining a Double Cannula Tracheostomy Tube	915
6-14	Removing an Indwelling Catheter	732	7-21	Plugging the Tracheostomy Tube	922
6-15	Catheterizing a Noncontinent Urinary Diversion	737			
6-16	Maintaining a Continent Urinary Diversion	743			
6-17	Pouching a Noncontinent Urinary Diversion	749	CHAPTER 8 • CIRCULATORY	925	
6-18	Administering Peritoneal Dialysis	754	8-1	Performing Venipuncture (Blood Drawing)	926
6-19	Administering an Enema	762	8-2	Starting an IV	934
6-20	Digital Removal of Fecal Impaction	775	8-3	Inserting a Butterfly Needle	941
6-21	Inserting a Rectal Tube	781	8-4	Preparing the IV Bag and Tubing	948
6-22	Irrigating and Cleaning a Stoma	786	8-5	Setting the IV Flow Rate	954
6-23	Changing a Bowel Diversion Ostomy Appliance: Pouching a Stoma	792	8-6	Assessing and Maintaining an IV Insertion Site	960
			8-7	Changing the IV Solution	965
CHAPTER 7 • OXYGENATION	799		8-8	Discontinuing the IV and Changing to a Heparin Lock	971
7-1	Administering Oxygen Therapy	800	8-9	Administering a Blood Transfusion	977
7-2	Assisting a Client with Controlled Coughing and Deep Breathing	809	8-10	Assessing and Responding to Transfusion Reactions	985
7-3	Assisting a Client with an Incentive Spirometer	814	8-11	Assisting with the Insertion of a Central Venous Catheter	991
7-4	Administering Pulmonary Therapy and Postural Drainage	819	8-12	Changing the Central Venous Dressing	997
7-5	Administering Pulse Oximetry	823	8-13	Changing the Central Venous Tubing	1003
7-6	Measuring Peak Expiratory Flow Rates	829	8-14	Maintaining a Central Venous Catheter	1008
7-7	Administering Intermittent Positive-Pressure Breathing (IPPB)	837	8-15	Measuring Central Venous Pressure (CVP)	1013
7-8	Assisting with Continuous Positive Airway Pressure (CPAP)	843	8-16	Drawing Blood from a Central Venous Catheter	1020
7-9	Preparing the Chest Drainage System	848	8-17	Infusing Total Parenteral Nutrition (TPN) and Fat Emulsion through a Central Venous Catheter	1026
7-10	Maintaining the Chest Tube and Chest Drainage System	858	8-18	Removing the Central Venous Catheter	1035
7-11	Measuring the Output from a Chest Drainage System	865	8-19	Inserting a Peripherally Inserted Central Catheter (PICC)	1040
7-12	Obtaining a Specimen from a Chest Drainage System	869	8-20	Administering Peripheral Vein Total Parenteral Nutrition	1049
7-13	Removing a Chest Tube	873			

8-21	Hemodialysis Site Care	1056	10-5	Applying a Pneumatic Compression Device	1229
8-22	Using an Implantable Venous Access Device	1062	10-6	Applying Abdominal, T-, or Breast Binders	1235
8-23	Caring for an Implanted Venous Access Device	1069	10-7	Applying Skin Traction—Adhesive and Nonadhesive	1241
8-24	Obtaining an Arterial Blood Gas Specimen	1075	10-8	Assisting with the Insertion of Pins or Nails	1248
8-25	Assisting with the Insertion and Maintenance of an Epidural Catheter	1081	10-9	Maintaining Traction	1255
CHAPTER 9 • SKIN INTEGRITY AND WOUND CARE		1089	10-10	Assisting with Casting—Plaster and Fiberglass	1261
9-1	Bandaging	1090	10-11	Cast Care and Comfort	1267
9-2	Applying a Dry Dressing	1098	10-12	Cast Bivalving and Windowing	1273
9-3	Applying a Wet-to-Damp Dressing (Wet to Dry to Moist Dressing)	1104	10-13	Cast Removal	1278
9-4	Applying a Transparent Dressing	1111	10-14	Assisting with a Continuous Passive Motion Device	1283
9-5	Applying a Pressure Bandage	1116	10-15	Assisting with Crutches, Cane, or Walker	1289
9-6	Changing Dressings around Therapeutic Puncture Sites	1122	CHAPTER 11 • SPECIAL PROCEDURE		1299
9-7	Irrigating a Wound	1131	11-1	Administering an Electrocardiogram	1300
9-8	Packing a Wound	1136	11-2	Magnetic Resonance Imaging (MRI)	1306
9-9	Cleaning and Dressing a Wound with an Open Drain	1144	11-3	Assisting with Computed Tomography (CT) Scanning	1310
9-10	Dressing a Wound with Retention Sutures	1151	11-4	Assisting with a Liver Biopsy	1315
9-11	Obtaining a Wound Drainage Specimen for Culturing	1158	11-5	Assisting with a Thoracentesis	1322
9-12	Maintaining a Closed Wound Drainage System	1163	11-6	Assisting with Abdominal Paracentesis	1330
9-13	Care of the Jackson-Pratt (JP) Drain Site and Emptying the Drain Bulb	1169	11-7	Assisting with a Bone Marrow Biopsy/Aspiration	1336
9-14	Removing Skin Sutures and Staples	1176	11-8	Assisting with a Lumbar Puncture	1343
9-15	Preventing and Managing the Pressure Ulcer	1183	11-9	Assisting with Amniocentesis	1350
9-16	Managing Irritated Peristomal Skin	1193	11-10	Assisting with Bronchoscopy	1356
9-17	Pouching a Draining Wound	1199	11-11	Assisting with Gastrointestinal Endoscopy	1366
CHAPTER 10 • IMMOBILIZATION AND SUPPORT		1205	11-12	Assisting with a Proctosigmoidoscopy	1376
10-1	Applying an Elastic Bandage	1206	11-13	Assisting with Arteriography	1382
10-2	Applying a Splint	1212	11-14	Positron-Emission Tomography Scanning	1389
10-3	Applying an Arm Sling	1218	REFERENCES		1395
10-4	Applying Antiembolic Stockings	1224	INDEX		1401

CONTRIBUTING AUTHORS

Patricia Abott, RN, MSN, ARNP

University of Washington Medical Center
School of Nursing, University of Washington
Seattle, WA

Sharon Aronovitch, RN, PhD, CETN

Regents College
Albany, NY

Dale D. Barb, MHS, PT

Academic Coordinator of Clinical Education
Department of Physical Therapy
Wichita State University
Wichita, KS

Susan Weiss Behrend, RN, MSN

Fox Chase Cancer Center
Philadelphia, PA

Bethaney Campbell, RN, MN, OCN

University of Washington Medical Center
Seattle, WA

Curt Campbell

Integrated Health Services of Seattle
Seattle, WA

Nancy Chambers, RN, BSN

University of Washington Medical Center
Seattle, WA

Jung-Chen (Kristina) Chang, RN, MN

University of Washington
School of Nursing
Seattle, WA

Cheryl L. Cooke, RN, MN

Student Services Coordinator
University of Washington
School of Nursing
Seattle, WA

Gayle C. Crawford, RN, BSN

Staff Nurse
University of Washington Medical Center
Seattle, WA

Eleonor U. de la Pena, BS

Northwest Asthma and Allergy Center
Seattle, WA

Jeanne Erickson, RN, MSN, AOCN

University of Virginia Cancer Center
Portsmouth, VA

Tom Ewing, RN, BSN

Hematology-Oncology
University of Washington Medical Center
Seattle, WA

Stacy Frish, RN, BSN

University of Washington Medical Center
Seattle, WA

Eva Gallagher, RN, BSN

Methodist Hospital
Minneapolis, MN

Susan Boyce Gilmore, MN, RN, CCRN

Lecturer, Biobehavior Nursing and Health Systems
University of Washington
School of Nursing
Seattle, WA

Hsiu-Ying Huang, RN, PhD

University of Washington
School of Nursing
Seattle, WA

Kimberly Hudson, RN, BSN

University of Washington Medical Center
Seattle, WA

Karrin Johnson, RN

Health Care Project Manager
NRSPACE Software, Inc.
Bellevue, WA

Kimberly Sue Kahn, RN, MSN, FNP-C, CS, AOCN

University of Virginia
Portsmouth, VA

Catherine H. Kelley, RN, MSN, OCN

Chimeric Therapies, Inc.
Palatine, IL

Carla A. Bouska Lee, PhD, ARNP C, FAAN

Clarkston College
Omaha, NE

Kathryn Lilleby, RN

Clinical Research Nurse
Fred Hutchinson Cancer Research Center
Seattle, WA

Joan M. Mack, RN, MSN, CS

Nebraska Medical Center
Omaha, NE

Patricia McDowell, RPPT

University of Washington Medical Center
Seattle, WA

Peter C. Meyer, RRT

University of Washington Medical Center
Seattle, WA

Marianne Frances Moore, RN, MSN

Clarkson Hospital
Omaha, NE

Claretta D. Munger, MSN, CPNP, ARNP

Newman Grove, NE

Susan Randolph, RN, MSN, CS

Manager, Transplant Services
Coram Healthcare
Parkerburg, WV

Sally Ann Rinehart, RN, BSN

Nursing Lab Supervisor
Pacific Lutheran University
Tacoma, WA

Susan Rives, RN, BSN, OCN

CARE Center Coordinator
Martha Jefferson Hospital
Charlottesville, VA

Barbara Sigler, RN, MNEd, CORLN

Technical Publications Editor
Oncology Nursing Press, Inc.
Formerly: Clinical Nurse Specialist in
Otolaryngology—Head and Neck Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA

Pam Talley, MN, CNS

University of Washington
School of Nursing
Seattle, WA

Hsin-Yi (Jean) Tang, RN, MS

University of Washington
School of Nursing
Seattle, WA

Samuel C. Taylor, RN

Assistant Nurse Manager, Orthopedics
Harborview Medical Center
Seattle, WA

Robi Thomas, MS, RN, AOCN

Clinical Nurse Specialist for Oncology and the Pain Center
St. Mary's Mercy Medical Center
Grand Rapids, MI

Nancy Unger, RN, MN, MPH

University of Washington
Seattle, WA

Chandra VanPaepeghem, RN, BSN

University of Washington Medical Center
Seattle, WA

Debra A. Bovinett Wolf, RN, BSN, MPH

Roosevelt Pain Center
University of Washington Medical Center
Seattle, WA

Maryellen Zinsley, RN, BSN

University of Washington Medical Center
Seattle, WA

REVIEWERS

Martha B. Spear, RN, MSN: Harrisburg Area Community College, Harrisburg, PA

Brenda Cherry, RN, MSN, CCRN: DeKalb College, Decatur, GA

Melinda Hamilton, RN, MSN: Pensacola Community College, Pensacola, FL

Joan C. Oliver, EdD, RN: Mt. Hood Community College, Gresham, OR

Sandra E. Crowell, MSN, BSN: Wilcox College of Nursing, Middletown, CT

Deborah J. Gutshall, MSN, CRNP: Harrisburg Area Community College, Harrisburg, PA

Marie H. Ahrens, MS, RN: University of Tulsa, Tulsa, OK

Diana Prouty, RN, MS: St. Luke's College, Kansas City, MO

Kathy Campbell: Maria College, Albany, NY

Carol Fowler Durham, RN, MSN: University of North Carolina—Chapel Hill, Chapel Hill, NC

Verlene Meyer, RN, MN: Walla Walla College, Portland, OR

Mary Moriarty Tarbell, MSN, RN: Springfield Technical Community College, Springfield, MA

Marie Ostoyich, RN, MS, CDE: Hudson Valley Community College, Troy, NY

Laura Downes, PhD, MSN, BSN, RN: Springfield Technical Community College, Springfield, MA

Cynthia Horvath, RN: Glens Falls Hospital, Glens Falls, NY

Clare Lamontagne, RN, MS: Springfield Technical Community College, Springfield, MA

Martha Nelson, RN, BSN, CETN, CCM: Florida Community College, University of North Florida, Jacksonville, FL

Mary C. Doyle, BS, MS, CCRN: Maria College, Troy, NY

Teri Boese, MS, RN: The University of Iowa, Iowa City, IA

PREFACE

The face of our nation's client population is changing and will continue to do so more dramatically in the future. The cumulative effects of sophisticated technology, an aging population of clients with chronic disease and long-term sequelae, and an increasingly diverse cultural population challenge nurses today. *Fundamental & Advanced Nursing Skills* has been developed as a text and guideline to perform the skills used in daily nursing practice. It is intended for nursing students, registered nurses, licensed practical nurses, physician assistants, nurse practitioners, certified aids, medical assistants, and any health care worker performing the skills encompassed in this book. Practice parameters for the advanced nursing skills may vary between states and among institutions, as set forth in state and institutional practice guidelines. This book can be used as text to acquire new skills, as a how-to manual to utilize skills, as a procedure manual in a facility, as a manual to familiarize a health care worker reentering health care, or as a training manual within a facility. Rather than merely providing a step-by-step implementation, this text can be used to stimulate the reader to learn underlying rationale, analyze expected outcomes of treatment, formulate sound bases for implementation, and develop critical thinking skills.

This book contains 202 nursing skills divided into 11 chapters that cover basic and advanced nursing procedures. The practitioner can follow the procedural manual type steps presented for each skill to improve competence and comfort levels in performing skills. Standards of nursing practice are maintained in each skill. Research-based knowledge has been incorporated

into nursing interventions, especially where controversy may exist.

UNIVERSAL PRECAUTIONS

The procedures outlined in this book present universal precautions in a general sense. Universal precautions are mandated by either Occupational Safety and Health Administration (OSHA) guidelines or by the Centers for Disease Control (CDC) in appropriate instances. Universal precautions, as defined by the CDC, are a set of precautions designed to prevent transmission of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other bloodborne pathogens when providing health care.

Under universal precautions, blood and certain body fluids of all clients are considered potentially infectious for HIV, HBV, and other bloodborne pathogens. However, implementing universal precautions does not eliminate the need for other isolation precautions, such as droplet precautions for influenza, airborne isolation for pulmonary tuberculosis, or contact isolation for methicillin-resistant *Staphylococcus aureus*. Universal precautions apply to blood, other body fluids containing visible blood, semen, and secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids. Universal precautions do not apply to feces, nasal secretions, sputum, sweat, tears, urine, and vomitus unless they contain visible blood. Universal precautions do not apply to saliva except when visibly contaminated with blood or in the dental setting where blood contamination of saliva is predictable.

Gloves

Following universal precautions, gloves should be worn:

- for touching blood and body fluids requiring universal precautions, mucous membranes, or nonintact skin of all clients, and
- for handling items or surfaces soiled with blood or body fluids to which universal precautions apply.

Gloves are changed after contact with each client. Hands and other skin surfaces must be washed immediately, or as soon as client safety permits, if contaminated with blood or body fluids requiring universal precautions. Hands should be washed immediately after gloves are removed. Gloves will reduce the incidence of blood contamination of hands during phlebotomy, but they cannot prevent penetrating injuries caused by needles or other sharp instruments. In addition, the following general guidelines apply:

- Use gloves for performing phlebotomy when the health care worker has cuts, scratches, or other breaks in his or her skin.
- Use gloves in situations where the health care worker judges that contamination with blood may occur (e.g., when performing phlebotomy on an uncooperative client).
- Use gloves for performing finger and/or heel sticks on infants and children.
- Use gloves when persons are receiving training in phlebotomy.

Masks and Gowns

Masks and protective eyewear or face shields should be worn by health care workers to prevent exposure of mucous membranes of the mouth, nose, and eyes during procedures that are likely to generate droplets of blood or body fluids requiring universal precautions. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or body fluids requiring universal precautions.

Needles and Other Sharp Objects

All health care workers should take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices. Precautions apply during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needlestick injuries, needles should not be recapped by hand, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles,

scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal. Puncture-resistant containers should be located as close as practical to the use area. All reusable needles should be placed in a puncture-resistant container for transport to the reprocessing area.

Infection Control

General infection control practices should further minimize the already minute risk of a salivary transmission of HIV. These infection control practices include the use of gloves for digital examination of mucous membranes and endotracheal suctioning, handwashing after exposure to saliva, and minimizing the need for emergency mouth-to-mouth resuscitation by making mouthpieces and other ventilation devices available for use in areas where the need for resuscitation is likely. Although universal precautions do not apply to human breast milk, gloves may be worn by health care workers in situations where exposures to breast milk might be frequent (e.g., in breast milk banking).

NURSING PROCESS

Each skill is presented using the Nursing Process: Assessment, Diagnosis, Planning, Expected Outcomes, Implementation, and Evaluation. The nursing process is a systematic method whereby nurses can make clinical decisions and delineate a course of action based on analysis of available data. The nursing process is continual and cyclic. Evaluation of the outcome incorporates a feedback loop leading to further assessment, decision making, and implementation of care.

North American Nursing Diagnosis Association (NANDA)

The diagnosis section of the text is based on NANDA's standardized list of nursing diagnoses. Using the input of practicing clinicians, NANDA has developed and refined a standardized list of diagnostic labels for use in the nursing process. Using the standardized list as a guideline, the practitioner interprets the assessment data and derives a diagnosis. The standardized diagnoses help guide client treatment by allowing the practitioner to identify rationales for client care and anticipate potential problems.

DOCUMENTATION AND CHARTING

Documentation provides a legal record of the client's status and care provided. This record is often used as a

means for quality assurance, utilization review of hospital practices and statistical analysis of client outcomes in areas of infection control, medical, surgical and nursing practices. Legal documentation of the client's status and care can be used in a court of law to verify client and health care practices.

Charting includes sheets of documentation of facts on forms such as flow sheets, including vital signs, fluid intake and output, intravenous records; medication administration records and assessment checklists and descriptive information. Charting format varies between facilities. Some examples of types of charting are the nurse's notes organized around subjectively, objectively, assessment and planing (SOAP), notes organized around client problems or problem-oriented medical record (OMR), or notes organized around body Systems (Systems charting), or combinations of formats. The legal requirements for charting are dictated by state laws, professional requirements, Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and individual facility requirements. Most facilities have committees who approve and delineate guidelines for charting.

Client information should be recorded directly on the chart; thereby, avoiding errors in transferring information. For accuracy many facilities place daily chart forms at the bedside so information can be recorded promptly. Forms generally include flow sheets, assessment forms, and medication records of varying complexity. Specialized forms include coma scales, seizure precautions reports, and level of consciousness recording. Care maps and treatment plans for routine specialized care are used when the client is expected to recover in a predictable pattern with expected advances each day. Certain forms, such as consent and insurance forms, must be signed by clients or their legal guardian.

Many hospitals have incorporated computerized charting. Often computers are located in client's rooms for immediate charting and retrieval of information. Many large facilities have adopted computerized systems for administration and charting of medications, laboratory results, and diagnostic testing. Guidelines and strategies for minimizing the risks of computerized charting are essential. Once computer entries are part of the permanent chart, they cannot be deleted; however, policies exist whereby mistaken entries or incorrect information can be explained.

With standard hard copy documentation, guidelines create consistency between facilities. Some examples of consistency are the use of black ink, correction by drawing a single line and marking the

error, noting the time of each entry, charting the omission of medications and treatments, and signing entries with initial of first name and complete last name plus title.

CLINICAL PRACTICE GUIDELINES FOR PERFORMING A PROCEDURE

In order to utilize this text to maximize learning, the authors have provided guidelines to follow before beginning the procedure and after the procedure.

Before the Procedure

- Practice the procedure with supervision in a clinical setting.
- Read the client's chart.
- Review the treatment plan or verify orders as necessary.
- Review the procedure.
- Assess the client and determine the appropriateness of procedure.
- Take into consideration the client/family's cultural and social background when deciding what to teach and when eliciting feedback.
- Employ the aid of an interpreter if there is a language barrier.
- Use visual aids such as flip charts, models, videos, if available, to explain procedure to client/family.
- If family members are to be involved, plan to instruct when they are present, if possible.
- Client and/or family members should be provided with a written set of instructions to take home with them if needed.
- Plan the procedure.

After the Procedure

- Assess the client and his response to the procedure.
- Document the client's response.
- Change the treatment plan as appropriate.

SPECIAL FEATURES/UNIQUENESS

Step-by-Step Format. The implementation section is presented in a step-by-step format with rationales for each intervention included. The skill is broken down into simple, easy-to-follow steps with rationales explaining the underlying reasons for each intervention. This allows even the novice to perform the skill and understand why each step is necessary. The steps presented provide specific directions for performing each skill. However, institutional policies, client con-

IMPLEMENTATION—ACTION/RATIONALE

ACTION	RATIONALE
1. Organize equipment.	1. Promotes efficiency.
2. Review client history (see Figure 1-1-3).	2. The first step of holistic assessment. Provides important clues to focus on or follow up during physical assessment.

continues

VARIATIONS

- Geriatric Variations:**
 - Elderly clients may become confused or agitated following the use of general anesthesia. Be prepared for possible confusion and the need for frequent reorientation to time and place.
 - Elderly clients may be at risk for respiratory complications prior to surgery and may require a vigorous pulmonary toilet.
- Pediatric Variations:**
 - Children recovering from anesthesia may not always understand directions. Physical restraint or client repeated instructions may be necessary.
 - If the child's parent is available and supportive, have the parent sit with the child as he comes out of anesthesia to provide emotional comfort.
 - Children may suffer from postanesthesia excitement. They may be confused, delirious, uncooperative, or combative. Be sure to have enough help available. Restraints may be necessary.
- Home Care Variations:**
 - Teach the client and caregiver about what will happen when client returns home (e.g., follow-up care and appointments, caring for the wound, medication administration, returning to normal levels of activity, and assessing for short- and long-term complications of the surgery).
- Long-Term Care Variations:**
 - People with multiple surgeries may develop anticipatory fear. Assess the client for history and discuss the procedure.

> NURSING TIPS

- Do not raise the client's head until you have determined the type of surgery and anesthesia used. Some procedures require the client to lie flat for several hours.
- Be sure to have emergency resuscitation equipment handy as well as functioning suction and oxygen.
- The motion of moving the client to a room may cause vomiting.
- Position the patient to keep the airway clear and have suction available.
- Provide regular updates to family and friends to provide comfort during stressful times. What may be routine to the nurse can be a frightening experience for family members.
- A client may forget things he was told while recovering from anesthesia. Be prepared to explain more than once.

COMMON ERRORS—ASK YOURSELF

Possible Error:
Not encouraging the client to cough and deep breathe due to complaints of surgical site pain.

Ask Yourself:
How do I prevent this error?

Prevention:
Following general anesthesia the lungs are not re-expanded properly and some of the inhaled anesthetic lingers. Having the client deep breathe and cough helps the anesthesia clear from the lungs faster and complications such as pneumonia and atelectasis can be prevented.

- 24. Protects skin.
- 25. Avoids accidents and maintains cleanliness.
- 26. Reduces the transmission of microorganisms.



REAL WORLD ANECDOTES

Mr. Facundo was a middle-aged, grossly obese male with type II diabetes. Mr. Facundo lived independently and worked full time. Because of his size, he was unable to reach his feet to wash them or to perform foot care. When he went to see his endocrinologist, he complained of pain in his feet. The endocrinologist referred Mr. Facundo to a podiatrist. The podiatrist noted that Mr. Facundo's feet were heavily callused and covered in dead skin. While trimming the calluses from Mr. Facundo's feet with a razor blade, the podiatrist's hand slipped and cut Mr. Facundo's foot. Because of Mr. Facundo's diabetic peripheral vascular disease, the cut failed to heal properly and became infected, requiring extensive treatment to prevent necrosis and the need for amputation.

> EVALUATION

- The client's hands and feet are clean and odor free, with soft, hydrated skin.
- The client experiences maximized functional ability of hands and feet.
- The client is comfortable and relaxed.

> DOCUMENTATION

Nurses' Notes

- Record the time and date care was performed.
- Note any unusual findings, open areas, or significant changes.

> CRITICAL THINKING SKILL

Introduction (see Figure 4-12-6)

Mr. Espinosa is a 75-year-old obese man with Alzheimer's, hypertension, and a family history of diabetes. Although he has not been diagnosed with diabetes, he does have symptoms of peripheral vascular disease. He kidded about his "wooden" ankle and feet, noting some pain but little feeling in them. His provider had not instructed him in foot care, usually addressing the more

global, multiple concerns. His nurse neighbor was chatting one day midwinter in the yard with him when Mr. Espinosa mentioned that he thought he probably needed to go inside and change his socks. The nurse noticed him feeling his socks with his fingers to check for moisture. When she asked whether he could feel the cold and moisture, he admitted he could not feel it on his feet. She asked if his doctor had instructed him in foot care and how to take care of his feet if he could not



Figure 4-12-6 Clients may have feet in poor condition with skin breakdown, decreased sensation, or poor circulation.

dition, environmental setting, and other variables may prompt modification of the interventions presented. When modifications are made, adherence to standards of practice and universal precautions must be maintained. Assess and evaluate the client throughout the procedure, modifying the interventions as needed to maintain client safety and security. Rationales provide the scientific basis for each implementation. The rationale enables both the practitioner and client to understand the reason for each implementation, and thus the need to comply with protocols.

Real-life Photographs. The focus of this text is to present reality-based information with photographic examples from current clinical practice, rather than staged or rehearsed scenarios.

Real World Anecdotes. Client situations drawn from experiences of the contributors or other practitioners add to the immediacy and practicality of the book.

Critical Thinking Skills. This boxed feature offers performance-related scenarios to foster learning, decision making, and analytic thinking. These scenarios often help the reader anticipate possible negative outcomes involved in performing a skill and provide alternatives to avoid unwanted results.

Skill Variations. Variations for each skill are presented for geriatric and pediatric age groups, as well as home care and long-term care settings, to allow for adaptation of the skills to various situations. For example, geriatric clients may require extra communication skills due to difficulty hearing or understanding. Pediatric clients may need psychosocial assessment of fear or anxiety, or require different sizes of equipment in the skill.

Common Errors and Nursing Tips. These are presented to assist in improving client outcomes. These sections are presented by experienced nurses to aid and guide the novice practitioner through performing the skills, help develop competency, and prevent unwanted outcomes.

Equipment Needed. A list of common equipment needed is provided as an organizational tool to assist in preparation and set-up. The equipment required may vary between institutions.

Estimated Time for Completion. The estimated time to complete a skill is identified to assist in planning and scheduling. The estimated time of completion should

be used only as a general guide. Many factors, such as the skill of the practitioner, client cooperation, or degree of client illness, may affect the time required to accomplish a skill.

Client Education Needed. Client teaching should be routinely incorporated when performing skills. Client education is essential in promoting personal health responsibility and compliance. Education should be considered a routine part of most interventions. Informed clients are often less anxious, more cooperative, provide better histories, and more proactive regarding their health care.

CONCLUSION

The skills in this text were written with current practice and standards in mind. Nursing practice should not be considered static. Even though minimum standards dictate the basis to practice, ongoing research leads to changes and advancements in practice. With this in mind, it is imperative to note skill implementation will vary with individual experience and expertise, and will vary between institutions depending on internal outcomes measures and research. How a skill is performed may change or be further delineated as new research, and the knowledge is applied to hands-on care.

ACKNOWLEDGMENTS

The authors would like to acknowledge the tireless efforts and contributions of many people on the staff of Delmar, especially Cathy Esperti, Pat Gillivan, Tim Conners, Jim Zayicek, Christopher Leonard, and Lisa Santy.

Authors across the country shared their experience and knowledge in writing the skills in this book. We would like to give them our heartfelt thanks for a job well done.

Individuals in the photographs, both nurses and clients, have our gratitude and respect for agreeing to be part of this project. Nurses, practitioners, clients, and families allowed our cameras to record them giving and receiving care in the health care milieu.

We would also like to acknowledge the contributions of the staff at NRSPACE Software who, in conjunction with development of a software-based product using this material, provided photography, organization, and editing support.

Special thanks to:

Kathy Lilleby, RN, for her willingness and professionalism in taking on challenges as a contributing author and as an assistant to the authors in critiquing and editing skills.

Gaylene Altman, RN, PhD, who coordinated the filming efforts and helped to capture the realism that can only be obtained in real-life scenarios.

Pamela Talley, MN, CNS, and Hsin-Yi (Jean) Tang, RN, MS, doctoral students at the University of Washington, for their enthusiastic assistance in filming these skills.

NRSPACE Software Staff

Valerie Coxon, RN, PhD

Keith Goodman

Karrin Johnson

Teri Reed

Maja Butler

CEO

Project Management/
Photography

Editing/Photography/
Project Coordinator

Photography

Editing Assistant

Photography

Photography for this project was provided by NRSPACE Software, Bellevue, WA.

ABOUT THE AUTHORS

Gaylene Bouska Altman, RN, PhD

Gaylene Bouska Altman is currently the director of the Learning Lab and on the faculty at the University of Washington. Her role includes teaching and coordinating hands-on skills for the nursing courses. She holds a diploma in nursing from Marymount College, Salina, Kansas; a BSN from the University of Kansas, Lawrence; and both an MN and PhD from the University of Washington, Seattle. With more than 25 years of teaching experience, she has taught at both the undergraduate and graduate levels. Besides predominantly teaching at the University of Washington, Dr. Altman has also taught at Seattle University, Seattle Pacific University, and Catholic University (Washington, DC). With a background as an intensive care and coronary care nurse, she has taught courses ranging from fundamental to advanced practice. Her main emphasis has been to develop critical thinking strategies through case presentations. Dr. Altman was one of the pioneers in initiating coronary care units and a mobile coronary care system in the 1970s, in the state of Washington. Furthermore, she helped develop some of the early quality assurance programs implemented throughout the state. Dr. Altman's work has been published in numerous textbooks and journals. She has delivered presentations throughout the country and maintains membership in several professional organizations.

Patricia Buchsel, RN, MSN, FAAN

Patricia C. Buchsel earned a Bachelor of Science in Nursing from Seattle University, Seattle, Washington and a Master's degree in Nursing from Seattle Pacific University in Seattle, Washington. She was the Director

of Nursing at the Fred Hutchinson Cancer Research Center in Seattle for over 12 years and continues to be an active consultant in this field. She has lectured nationally and internationally, authored five textbooks, numerous chapters, and monographs on this subject. Her current interest is in symptom management of the oncology patient. Patricia has over 25 years experience as an educator, clinician, administrator, and consultant.

Patricia is a member of the Sigma Theta Tau, the American Nurses Association, the Oncology Nursing Society, and the American Bone Marrow and Blood Transplantation Society. She is recognized as a member of Outstanding Young Women of American and recently was named as Seattle University's Alumna of the Year. Currently, Patricia is an oncology consultant with a specialty in symptom management. She is also a clinical instructor at the University of Washington.

Valerie Coxon, RN, PhD

Valerie Coxon is currently the CEO for NRSPACE Software, Inc., Bellevue, Washington. NRSPACE produces multimedia education software for the health care field. Dr. Coxon is affiliate assistant professor at the University of Washington School of Nursing. She holds BSN, MN, and PhD degrees from the University of Washington. Her expertise includes psychophysiological nursing, management of the stress response, and the expanding role of computers in education and at the patient bedside. Since 1990 she has developed text, Internet, and multimedia software for research and education in the health sciences. NRSPACE Software developed the multimedia software that supplements this text.

Physical Assessment

- Skill 1-1** Physical Assessment
- Skill 1-2** Taking a Temperature
- Skill 1-3** Taking a Pulse
- Skill 1-4** Counting Respirations
- Skill 1-5** Taking Blood Pressure
- Skill 1-6** Weighing a Client, Mobile and Immobile
- Skill 1-7** Measuring Intake and Output
- Skill 1-8** Breast Self-Examination
- Skill 1-9** Collecting a Clean-Catch, Midstream Urine Specimen
- Skill 1-10** Testing Urine for Specific Gravity, Ketones, Glucose, and Occult Blood
- Skill 1-11** Performing a Skin Puncture
- Skill 1-12** Measuring Blood Glucose Levels
- Skill 1-13** Collecting Nose, Throat, and Sputum Specimens
- Skill 1-14** Testing for Occult Blood with a Hemocult Slide

SKILL 1-1

Physical Assessment

Claretta D. Munger, MSN, CPNP, ARNP,
and Valerie Coxon, RN, PhD

KEY TERMS

Assessment	Inspection
Auscultation	IPPA
Baseline	Palpation
Examination	Percussion
Health assessment	Physical



> OVERVIEW OF THE SKILL

A dynamic health assessment is the foundation of all nursing care and physical assessment is part of every holistic health evaluation. Assessment is the first step of the nursing process. It involves the orderly collection of objective information about the client's health status. Objective data are observable, measurable, and verifiable by more than one person. A fundamental systematic approach is used based on a combination of head-to-toe and body systems assessments, which are expanded as appropriate to the client's situation and setting. By using a systematic approach, you ensure that signs are not overlooked and that time is used efficiently. Through the process of data collection, meaningful information, including health status, actual and potential health problems, and areas of focus for priority health promotion, is identified. The process of physical assessment is utilized in outpatient, inpatient, and/or home health services.

A complete yet organized assessment is obtained by using a combination of head-to-toe and body-systems approach in conjunction with the use of the four basic techniques, inspection, palpation, percussion, auscultation (IPPA):

- **Inspection:** Observation (see, smell); actually starts during the health history and continues throughout the exam; always comes first (before you touch or listen), but continues concurrently

with PPA as well. Note general observations and then specifics of each area proceeding from the outside to the inside.

- **Palpation:** Touching; light (1 cm), then deep (4 cm), and rebound (deep with quick release). Assesses position, texture, size, consistency, fluid, crepitus, form, structure, vibration, or temperature.
- **Percussion:** Tactile sensation and sound (to 5 cm deep); direct or indirect with fingertip pad or fist; more solid: higher pitch, softer intensity, shorter duration; more air: lower pitch, louder intensity, longer duration; expected percussion notes: tympanic (gastric bubble), hyperresonant (emphysematous lungs), resonant (healthy lung), dull (liver), flat (muscle).
- **Auscultation:** Listening direct (naked ear) and indirect (acoustical stethoscope or Doppler amplification). Analyzes intensity, pitch, duration, quality, and location. The bell analyzes low-pitched sounds and the diaphragm analyzes high-pitched sounds.

A combined body systems and body area approach focuses assessment by groupings:

- **General Appearance:** Examine appearance in the following groups: (1) skin, hair, and nails; (2) head, face, and lymphatic; (3) eye, ear, nose, mouth, and throat; (4) neck and upper extremities; (5) chest, breasts, and axillae; (6) thorax and

lungs/respiratory system; (7) heart and cardiovascular system; (8) abdomen/GI system; (9) genitalia/GU system and anus.

- Lower Extremities: Musculoskeletal system (MJB: muscles, bones, joints, and back assessment).
- Neurological: Reflex, sensory, cranial, cerebral, cerebellar, neurodevelopmental, neuropsychiatric. Internal genitalia, rectum, and prostate examinations are usually included in advanced assessment and will not be addressed here.

The IPPA organization can be combined by cephalo-caudal (head-to-toe), general-to-specific,

medial-to-lateral, and external-to-internal approaches within each category. The physical assessment is always correlated with the health history as well as with other assessments, such as laboratory or diagnostic data and/or developmental, psychosocial, family, and cultural assessment data. The nurse must also consider her own understanding of anatomy and physiology, basic nursing skills, and the nursing process. The educational preparation and clinical expertise of the nurse may, therefore, influence the extent to which the nurse participates in the physical assessment process.

> ASSESSMENT

1. Assess the environment, resources, and the client's medical condition on how complete and systematic the examination can be to **reduce the possibility of overlooking important findings**.
2. Assess the client's history of previous physical assessments and the availability of previous data to **provide a baseline for comparisons**.
3. Assess the client's receptiveness to being examined to **help plan to reduce anxiety and improve compliance with the examination**.
4. Assess the client's understanding of the procedure to **help plan ways to reduce anxiety and improve compliance with the examination**.

> DIAGNOSIS

- 7.1.1 Body Image Disturbance—if abnormal physical findings.
- 7.1.2 Self-Esteem Disturbance—if abnormal physical findings.
- 8.1.1 Knowledge Deficit about normal and abnormal physical findings.

Through the accurate and efficient health assessment process normal, normal variant, and abnormal data are identified. The nurse can identify serious or life-threatening signs and critical assessment findings that require immediate attention. She can utilize the objective data obtained during the physical assessment process to contribute to problem-solving strategies that identify the client's current health status (acute, chronic, risk, and preventive). She can institute problem-solving strategies to place the client and the client's family or community in an optimal health status.

> PLANNING

Expected Outcomes:

1. Identify health parameters at multiple levels for total client management and to identify acute concerns and needs.
2. Identify serious, acute, or life-threatening abnormalities or critical assessment findings that require immediate attention.
3. Identify potential or chronic abnormalities that need planned intervention.
4. Monitor chronic stable problems to detect changes from baseline assessments.
5. Identify health risks, concerns, or needs. These include risks that are related to age, gender, environment, community, personal habits, or family history.
6. Respond to health maintenance needs. This includes monitoring the client's status and comparing findings with normal health parameters for age and gender. It also includes identifying normal variations of health that do not need intervention, providing routine or scheduled assessments, immunizations, preventive or palliative health care, and health education or anticipatory guidance.

Equipment Needed (see Figures 1-1-2A through 1-1-2H):

Equipment must be organized for easy accessibility. It is helpful to be able to reach each piece of equipment with one hand on the client. Short fingernails and warm hands are essential to performing a satisfactory physical examination.

- Pen
- Assessment forms or paper to record notations as well as document findings

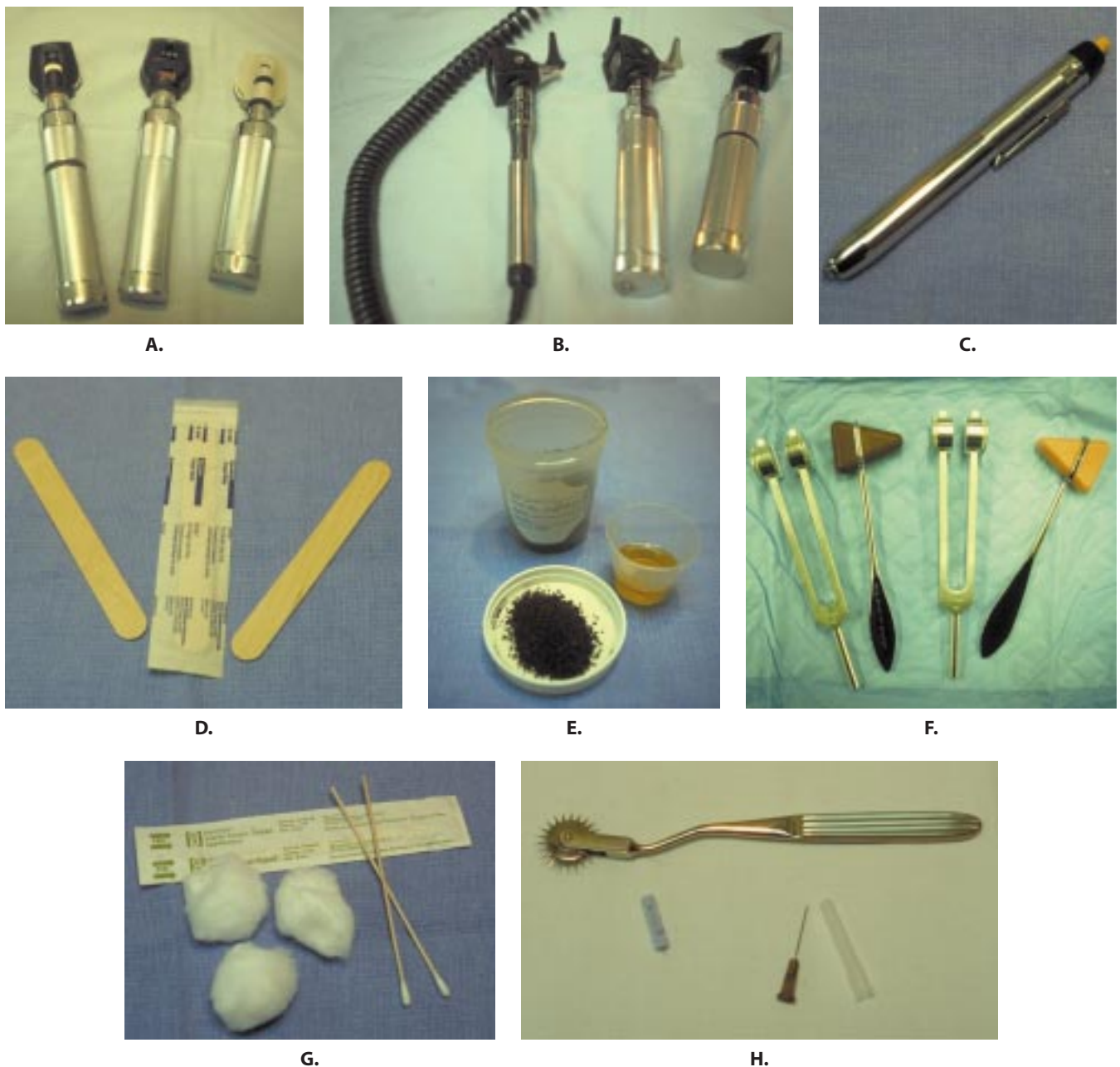


Figure 1-1-2 A. Ophthalmoscopes; B. Otoscopes; C. Penlight; D. Tongue depressors; E. Coffee grounds and orange extract; F. Tuning forks and reflex hammers; G. Cotton swabs and cotton balls; H. Sharp items used to assess sharp and dull sensations

- Growth charts for height and weight (and head circumference for infants): age, gender, culture, and sometimes medical condition
- Well-lit, warm, private room or space
- Gown for client privacy and comfort (swimsuits work well with children and adolescents)
- Drape sheet, or blanket for client privacy and comfort
- Thermometer: otic or oral/axillary digital preferred
- Stethoscope: acoustical with bell and diaphragm; ideal tubing less than 35 cm in length
- Watch with second hand
- Sphygmomanometer and blood pressure cuffs two-thirds the size of the client extremity
- Ophthalmoscope
- Vision charts: Illiterate (matching letters or objects), Snellen (far vision), Rosenbaum (near vision) pocket card, Ischara (color vision), or Titmus tester (includes all four), and pupil gauge (in mm)
- Otoscope with pneumatic tube
- Audio testing equipment: watch, tuning forks (minimum of one high pitched, 512 Hz, and one low

- pitched, 128 Hz), handheld audiometer, tympanometer, or full audiometry with soundproof room
- Nasal speculum with illumination. Optional headlamp with magnification
 - Penlight
 - Tongue depressors
 - Nonsterile gloves (possibly sterile gloves as well)
 - Glass of water
 - Marking pen
 - Measuring tape (with cm and inches), preferably cloth or plastic
 - Water-soluble lubricant
 - Guaiac card for occult blood
 - Specimen cup
 - Reflex hammer
 - Neurological “kit”: temperature (test tubes of hot and cold), touch (cotton ball, hair pin, paper clip, safety pin, key, marble, coin, low-pitched tuning fork), taste (sweet—sugar, honey; sour—lemon, lime, vinegar, bitter—alum, quinine; salty—salt, saline), smell (coffee, lemon, orange extract, flowers, perfume, mouthwash). If making your own kit, be sure to use identical appearing containers for each category and a cotton-tipped applicator or dropper for consistent application.
 - Other (these are helpful to have available although are not always used): slide, toothbrush (helpful to obtain skin scrapings), Wood’s lamp, magnifying glass, small test tube, flashlight and transilluminator, head lamp, gooseneck lamp, Doppler (for amplification of body sounds), goniometer, Denver Developmental Screening Kit contents, Mini-Mental status exam, fluid-resistant gowns, masks and eye covers.

> CLIENT EDUCATION NEEDED:

1. Introduce yourself by name and title. In some cases you may need to describe your role as well.



Estimated time to complete the skill:
Variable depending on the purpose and depth of the examination: average of 20–30 minutes.

2. Provide the client with an explanation of what is to follow (I will be checking everything from your head to your toes) and an approximate time frame for the exam. It helps to tell children how they will know when you are done (e.g., when I tell you to put your shoes back on).
3. Inform the client if you will be jotting down notations during the examination and how these will be used. This reassures confidentiality.
4. Before performing each step in the physical assessment process, inform the client of what to expect, where to expect it, and how you anticipate it will feel (I don’t think any of this will hurt but be sure to tell me if it does hurt).
5. Inform the client of what you are looking for and why as you perform your physical assessment. You can accomplish a great deal of education about the body, how it functions, and health prevention while performing your examination.
6. Teach skin self-examination as you evaluate the skin.
7. Teach breast self-examination as you examine breasts (male and female).
8. Teach testicular self-examination and self-checking for hernias during the genital exam.
9. Teach proper urinary hygiene and basics about sexually transmitted disease (STD) with the genital exam.
10. Reinforce good hygiene as you wash your hands and conduct the examination.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Organize equipment.
2. Review client history (see Figure 1-1-3).

RATIONALE

1. Promotes efficiency.
2. The first step of holistic assessment. Provides important clues to focus on or follow up during physical assessment.

continues

Figure 1-1-3 Review client history. Clients are often uncomfortable and anxious in the unfamiliar clinic setting. Establishing privacy and using words and body language to create a supportive environment help place the client at ease. Listen to the client's complaint, ask pertinent questions about symptoms and medical history, and write down key information.



3. Wash hands, preferably in front of client.

4. Explain plan and procedure.

5. Assist client to sitting position if possible.

6. Examine client.

7. Present findings if appropriate. Ask for additional information. Answer client's questions.

8. Schedule follow-up assessments, tests, or other appointments as needed.

9. Clean, replace, and discard equipment appropriately.

10. Wash hands.

3. Reduces transmission of microorganisms. Educates client.

4. Educates client. Reassures the client.

5. Provides best access to begin examination.

6. Collects information about health and disease.

7. Provides closure for the examination and communicates information.

8. Provides for follow-up care.

9. Promotes efficiency, organization, and reduces microorganisms.

10. Reduces the transmission of microorganisms.

Measurements and Overall Observations

11. Obtain baseline measurements and compare with normal data. Remember that normal values vary with age and normal temperatures do not rule out illness, especially with very young and elderly clients.

Check height, weight, head circumference (check normal values based on age percentiles for infants to 24 months), and temperature (palpate skin temperature during examination as well).

11. Provides measurable objective data about health state or baseline data.

12. Measure the heart rate, rhythm, and volume, the respiratory rate and rhythm, and the blood pressure bilaterally.
13. Check anthropometric measurements prn, body mass index (BMI), etc.
14. Assess the overall appearance of the client in a “once over” evaluation before you begin the detailed examination. Look for clues to poor health such as level of consciousness, personal hygiene, nutritional status, posture, gait, symmetry, appearance, and appropriateness of clothing. Listen to the quality and appropriateness of speech. Observe if the client makes eye contact and how comfortable the client is with interpersonal interaction.
 - Assess whether age is congruent with appearance. Observe body fat, stature, motor movements, and body and breath odors.
 - Assess dress, grooming, personal hygiene, mood, manner, speech, and facial expressions.
 - Finally, during your “once over,” look for signs of distress, as evidenced by breathing patterns, speech, facial expressions, perspiration, tension, guarding, bracing, and anxiety.
12. Provides cues for additional observations or actions required later in the examination.
13. Body mass and height-weight proportion can be better indicators of illness than simple height and weight measurements.
14. Provides objective cues about overall health state and cues to possible specific abnormalities to watch for later in the examination.

Skin, Hair, and Nails Examination

15. Take a moment to assess initially and continue assessment as you perform the remainder of the exam.
 - Inspect: color, vascularity, lesions, ulcers, scars, hair distribution, nail shape and configuration, nail bed angles. Measure, describe draw and/or stage abnormalities.
 - Palpate: moisture, temperature, texture, turgor, capillary refill (normal capillary refill is less than 3 seconds), edema.
15. Detects normal variation and abnormalities. Establishes a baseline for future comparisons. Skin abnormalities, including crepitus, nodules, mobility, and hydration will provide cues to illness, and are often indicators of systemic abnormalities.

Head, Face, and Lymphatics Examination

16. Inspect and palpate the head, face, and lymph nodes (see Figures 1-1-4 and 1-1-5). Proceed front to back.
17. Head: Examine scalp, hair, and cranium (frontal-parietal-temporal-occipital). Examine fontanelles and sutures in newborns to 24 months. Head should be normocephalic and symmetrical with no acromegaly, hydrocephalus, craniosynostosis,
16. Confirms health and identifies signs and symptoms of illness or disease, infections, old or new trauma, or other abnormalities.
17. Confirms health and identifies signs and symptoms of illness or disease, infections, old or new trauma, or other abnormalities.

Head, Face, and Lymphatics Examination *continued*

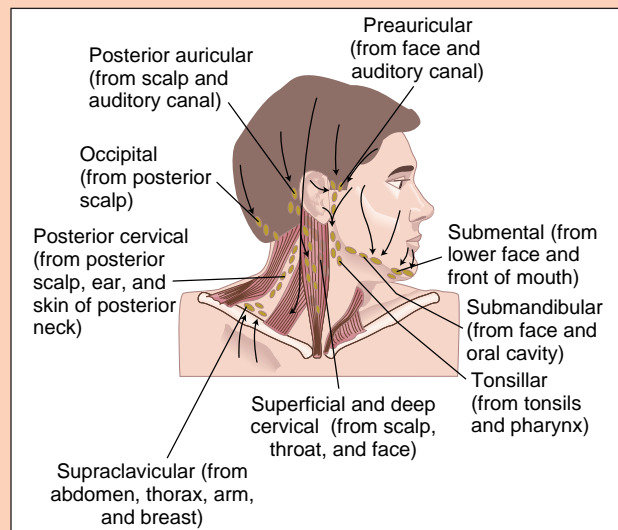


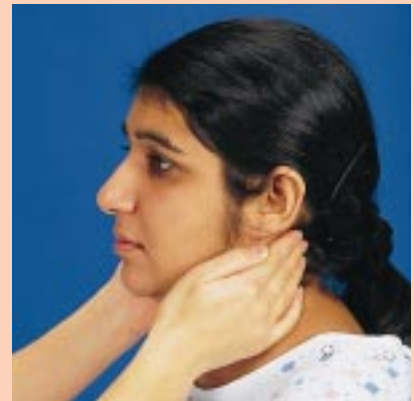
Figure 1-1-4 Lymph nodes of the head and neck. Arrows indicate drainage patterns.



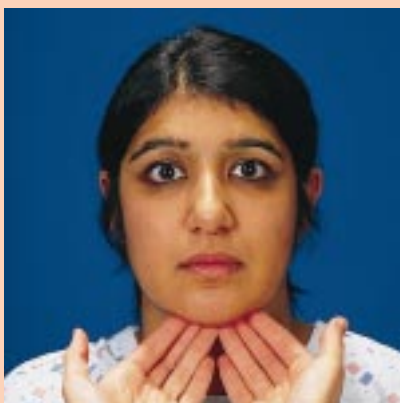
A. Preauricular



B. Postauricular



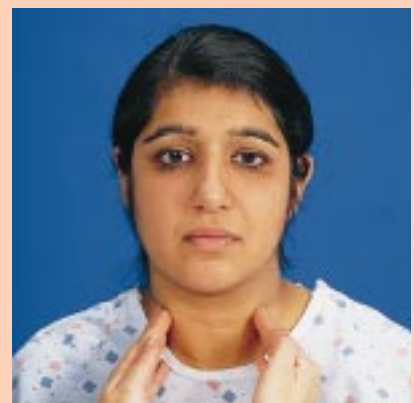
C. Occipital



D. Submental



E. Submandibular



F. Anterior cervical chain

Figure 1-1-5 Palpation of lymph nodes (*continues*)



G. Posterior cervical chain



H. Tonsillar



I. Supraclavicular

Figure 1-1-5 Palpation of lymph nodes

premature closure of sutures, masses, depressions, tenderness, or infestations.

- 18. Lymph nodes:** Examine preauricular, postauricular, occipital, submental, submandibular, anterior cervical chain, posterior cervical chain, tonsillar, supraclavicular, and parotid. Lymph nodes should be less than one centimeter in size and nontender. Note that children may have multiple nodes less than one centimeter, especially postauricular, but these will be small, nontender, and movable.
- 19. Temporomandibular joint:** Observe the motion of opening and closing the jaw. It should articulate smoothly without crepitus, clicking, or tenderness. There should be no sign of inflammation.
- 20. Face:** Observe for shape, symmetry, and expression. Have the client smile, frown, raise eyebrows, wrinkle forehead, show teeth, purse lips, puff cheeks, press tongue into cheek, “cluck” tongue and whistle. Inspect, percuss, and palpate frontal and maxillary sinuses. Use a wisp of cotton to assess tactile sensation over the trigeminal nerve sites and mandible bilaterally. Facial features should be symmetrical with a nasolabial fold present bilaterally. Clients of Asian descent may have slanted eyes with inner epicanthal folds. Normal sounds should be resonant. No pain should be present on percussion or palpation. Abnormal findings include edema, disproportionate structures, or involuntary movements.
- 18. Confirms health and identifies signs and symptoms of illness or disease, infections, old or new trauma, or other abnormalities.**
- 19. Confirms health and identifies signs and symptoms of illness or disease, infections, old or new trauma, or other abnormalities.**
- 20. Confirms health and identifies signs and symptoms of illness or disease, infections, old or new trauma, or other abnormalities.**

continues

Eye, Ear, Nose, Mouth, and Throat Examination

21. Examine the eyes. Inspect and palpate external structures, including brows, lids, lacrimal gland, and puncta. Inspect eye position and palpebral fissures. Examine bulbar and palpebral conjunctivae, sclera, cornea, and iris. Assess for a corneal touch reflex.
 22. Extraocular mobility: Check for Hirschberg's corneal light reflex using the cover-uncover test. Check the six cardinal fields of gaze. Examine pupils, including size, shape, response to light and accommodation, both direct and consensual. Examine the lens and retinal structures. First check for a red reflex with the ophthalmoscope set on "0." Move the diopter wheel to "+" to focus on anterior ocular structures and "-" to focus on posterior structures. Locate the retina, vessels, optic disk, and macula.
 23. Have the client identify an object, such as your finger, as it enters the visual fields from each of four directions. Normal movement is temporal 90 degrees, nasal 60 degrees, superior 50 degrees and inferior 70 degrees (see Figure 1-1-6).
21. Confirms health and identifies signs and symptoms of illness or disease.
 - Establishes the presence or absence of drooping, infection, or tumors. Confirms that the lid "meets" the iris, the lid margins are smooth, tears flow evenly instead of accumulating and "tearing up" the eye.
 - Establishes the presence or absence of inflammation of hair follicles, hemorrhages, discharge, discolorations, ectropion, swelling, edema, blepharitis, or dacryoadenitis.
 - Checks that the third cranial nerve (CN III) raises the lids symmetrically, and that the puncta are open and without inflammation.
 22. Checks that light reflects symmetrically from the center of corneas at 12–15 inches, and that the uncovered eye stays focused.
 - Checks the functions of CN III, IV, and VI.
 - Checks for the absence of tropia, phoria, or nystagmus.
 23. Checks the function of CN II.

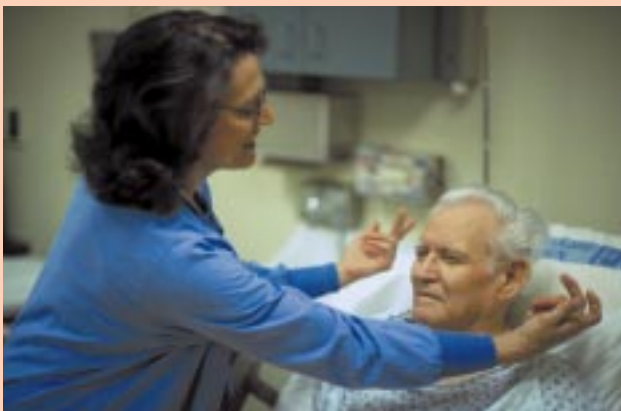


Figure 1-1-6 Have client identify the moment an object enters the visual field.



Figure 1-1-7 A Snellen chart is used to assess visual acuity.

- 24.** Check for visual acuity, including near and far sight, primary colors, and Ishihara plates (see Figure 1-1-7).
 - 25.** Examine the ears. Inspect and palpate the external ear, including alignment, pinna, tragus, lobule, and neck mastoid muscle. Observe the shape, color, and size of the ear.
 - 26.** Proceed with an otoscopic assessment, starting with the ear canal. Identify landmarks, the tympanic membrane, and observe tympanic membrane movement. Use tympanometry if needed to confirm visual findings.
 - 27.** Check the client's hearing acuity. Note responses to normal sounds. In an infant, observe for a startle reflex/bell response. In adults conduct a voice/whisper or watch-tick test at 1–2 feet. Conduct Weber and Rinne tests at 512 Hz.
 - 28.** Examine the nose. Inspect and palpate for nasal patency. Have the client inhale and exhale through each nostril. Observe the external surface, nasal mucosa, turbinates, and septum.
 - 29.** Have the client identify common odors.
 - 30.** Examine the mouth, including the teeth, tongue and throat (see Figure 1-1-8).
- 24.** Visual acuity tests are the last step in the eye examination so that physical abnormalities that might cause abnormal acuity will be detected first.
 - 25.** Confirms health and identifies signs and symptoms of illness or diseases of the ear. Checks for normal alignment, that the top of the ear crosses an imaginary line from eye to occiput. Checks for abnormal findings of tags, excess wax, drainage, deformities, nodules, inflammation, pain, and a tender or “boggy” mastoid. Establishes the quality of tympanic membrane (TM) movement, detects retractions, bulging, abnormal, or discolored middle ear fluid.
 - 26.** Confirms if there are signs of infection, impaction, or other abnormalities.
 - 27.** Hearing acuity tests are the last step in the ear examination so that physical abnormalities that might cause abnormal acuity will be detected first.
 - 28.** Confirms health and identifies signs and symptoms of illness or disease, including unusual or excessive discharge, damaged septum, polyps, tenderness, or nonclear drainage.
 - 29.** Tests CN I (the olfactory nerve).
 - 30.** Confirms health and identifies signs and symptoms of illness or disease.

Figure 1-1-8 The mouth examination includes the teeth, tongue, throat, oral mucosa, and salivary glands.



continues

Eye, Ear, Nose, Mouth, and Throat Examination *continued*

31. Inspect and count teeth.
32. Inspect and palpate lips and frenula, gums, buccal mucosa, tongue protrusion and frenulum, salivary glands, hard and soft palates, tonsils, uvula position and movement, and arches. Inspect the naso-oro-pharynx.
33. Conduct gag reflex response, and taste tests for sweet, sour, bitter, and salt.
34. Examine the neck. Inspect and palpate the trachea. Check that the trachea runs midline down the neck by examining the trachea at the suprasternal notch.
35. To examine the thyroid, observe the anterior neck slightly extended, then have the client flex the neck and swallow. Palpate the anterior neck, then palpate forward from the posterior. Identify tracheal rings, isthmus, thyroid cartilage, and gland lobes as the client is swallowing.
36. Palpate the temporal and carotid pulses. Assess the quality, character, rhythm, and strength of the pulse.
31. Confirms the number and condition of teeth for age.
32. Identifies lesions, color of membranes, abnormalities, cavities, odors, swelling, inflammation, swallowing difficulties, or hyperplasia.
33. Tests cranial nerve functions.
34. Confirms health and identifies signs and symptoms of illness or disease.
35. Checks for goiter, nodules, enlargement, or tenderness in the neck and thyroid.
36. Identifies signs and symptoms of cardiovascular illness or disease.

Upper Neuromuscular Examination

37. Inspect and palpate muscles, bones, and joints. In general, evaluate from the periphery to the center of the body.
Observe the configuration, symmetry, size, tone, and range of motion (ROM). Assess strength using resistive ROM.
38. Examine the cervical spine. Flex, extend, move lateral, and rotate the spine. Examine the spine for resistive strength by pushing your hand against the side of the client's face. Push left, right, back on the forehead, forward on the occiput, and down on the top of the head.
39. Examine shoulders. Flex, hyperextend, abduct, adduct, turn in internal and external rotation, shrug, and push/pull against the shoulders.
37. Confirms health and identifies signs and symptoms of illness or disease.
38. Checks the cervical spine, sternocleidomastoid, and trapezii baseline strength, integrity, and function.
39. Detects limitations of mobility, torticollis, pain, crepitus, nodules, lumps, or pulsations in the muscles, bones, and joints.

- | | |
|---|---|
| <p>40. Examine elbows. Flex, extend, rotate, push, and pull each elbow.</p> <p>41. Examine wrists. Flex, extend, and rotate each wrist.</p> <p>42. Examine hands by having the client grasp your hands with his.</p> <p>43. Examine fingers. Abduct, adduct the fingers. Perform finger thumb opposition with counting and position sense.</p> <p>44. Examine the epitrochlear lymph nodes, brachial and radial pulses, and bicep, tricep, and brachioradialis reflexes.</p> | <p>40. Checks for tenderness and mobility.</p> <p>41. Checks for tenderness and mobility. Detects the presence of carpal tunnel.</p> <p>42. Checks for tenderness and mobility.</p> <p>43. Checks for tenderness and mobility.</p> <p>44. Confirms that lymph nodes are nonpalpable and nontender, and that pulses are strong and regular. Checks neurological reflexes.</p> |
|---|---|

**Chest and Breast Examination
(See Skill 1-8, Breast Self-Examination.)**

- | | |
|---|---|
| <p>45. Inspect and palpate the breast, nipple, and areola. Palpate the axillary lymph nodes.</p> <p>46. Calculate the Tanner stage of sexual maturity if appropriate.</p> <p>47. Repeat breast and axillae examination while the client is in the supine position.</p> | <p>45. Confirms health and identifies signs and symptoms of illness or disease. Detects lumps, nodules, or discharge in tissue. Detects tenderness or lumps in axillary nodes, which drain the chest and breast.</p> <p>46. The Tanner stage assesses appropriate breast development progression and status for age and provides an opportunity for teaching.</p> <p>47. Repeating the examination while the client is supine increases likelihood of early identification of abnormalities.</p> |
|---|---|

Back and Posterior Lung Examination

- | | |
|---|---|
| <p>48. Inspect and palpate the skin.</p> <p>49. Recheck the thyroid from the posterior position.</p> <p>50. Examine the cervical and thoracic spine (see Figure 1-1-9), the scapulae, and the rib cage. Observe the posterior thoracic expansion. Estimate the anteroposterior-to-transverse chest ratio. A normal ratio is 1 : 2.</p> <p>51. Feel for the presence of fremitus posteriorly and laterally. Compare sides.</p> | <p>48. Confirms health and identifies signs and symptoms of illness or disease.</p> <p>49. Gland lobules are easier to palpate from back.</p> <p>50. Determines normal, normal variations, and abnormal findings in alignment, flexion, spinous processes, and paravertebral muscles. Checks that the scapulae are equal, and the rib cage is symmetrical.</p> <p>51. Checks for fremitus either increased with consolidation, or decreased with hyperinflation of the lungs. Bilateral comparison enables identification of differences.</p> |
|---|---|

Back and Posterior Lung Examination *continued*



Figure 1-1-9 Examine the cervical and thoracic spine for alignment, flexion, and symmetry with the rib cage and scapulae.



Figure 1-1-10 Auscultate the lungs, listening to inspiration and expiration at each site.

- 52.** Use indirect percussion at a minimum of four sites, preferably in regular intervals every 5 cm from top to bottom of lung fields. Move from superior to inferior and from lateral to spine.
- 53.** Auscultate the lungs (see Figure 1-1-10) using a side-to-side sequence and moving down 2–5 cm at a time. Listen to inspiration and expiration at each site. Listen for vocal fremitus while the client makes “99” and sustained “ee” sounds.
- 52.** Indirect percussion allows comparison of resonance bilaterally, and checks for tenderness over the lungs and kidneys. The organized sequence of side to side and superior to inferior increases the possibility of detecting abnormalities.
- 53.** Checks for bronchial noises over trachea, bronchovesicular sounds in the first and second intercostal spaces, and vesicular sounds over the peripheral chest. Detects abnormal sounds of rales, rhonchi, or wheezes.

Thorax, Lungs, and Respiratory Examination

- 54.** Stand in front of the client.
- 55.** Inspect and palpate the anterior chest. Observe position, chest movement, size, shape, and symmetry of the clavicles and ribs.
- 54.** Prepares to examine anterior lungs.
- 55.** Confirms health and identifies signs and symptoms of illness or disease. Checks for barrel chest, pectus excavatum, pectus carinatum, or tripod “splinting” positions. Splinting positions indicate the client is compensating for decreased oxygenation.
- 56.** Listen to the respiratory rate, including rhythm and depth of respirations. Compare rate with normal respiratory rates for the age of the client.
- 56.** Checks for 2:1 timing of the exhale/inhale breathing cycle. Detects shortness of breath (SOB), and abnormal respiration patterns, including Cheyne-Stokes, tachypnea, hyperpnea, and hypsypnea (see Figure 1-1-11).

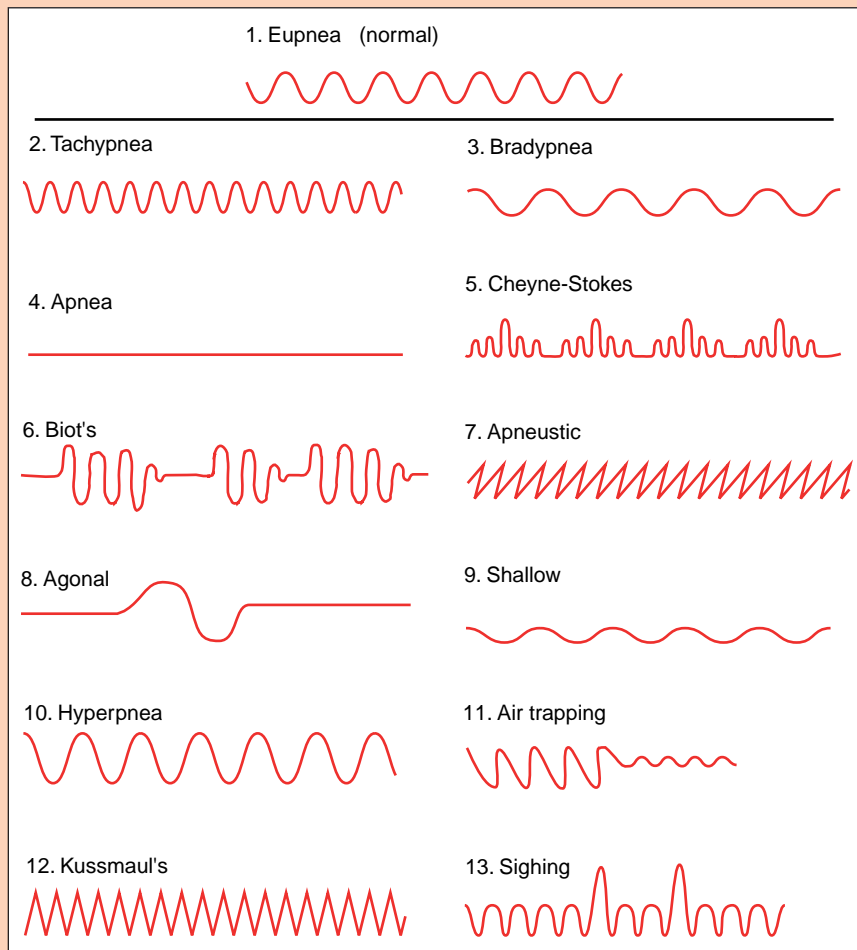


Figure 1-1-11 Normal and abnormal respiratory patterns

- 57.** Observe the diaphragmatic excursion, intercostal spaces (ICS), respiratory muscles, respiratory effort, and expansion. Watch for pursed lips, cyanosis, or a cough. Note that abdominal breathing is normal from birth to the second year of age.
- 58.** Feel for fremitus along the lung apices and bases.
- 59.** Use indirect percussion at intervals over intercostal spaces moving superior to inferior and collateral to spine. Percuss lung apices and bases, and the cardiac border if appropriate. Note percussion should be resonant over the lung, flat over bone, and dull over organs.
- 60.** Auscultate the anterior lung fields, using the same progression as the palpation procedure. Avoid listening over bone and breast tissue.
- 57.** Detects accessory muscle use or stridor.
- 58.** Detects fremitus, which is increased with consolidation, or decreased with hyperinflation.
- 59.** Side to side and superior to inferior organized approach increases the possibility of detecting abnormalities.
- 60.** Checks for bronchial noises over trachea, bronchovesicular sounds to the left and right of the sternum in the first and second intercostal

Thorax, Lungs, and Respiratory Examination *continued*

Observe intensity, pitch, ratio, quality (see Figure 1-1-12).

Listen for vocal fremitus during “99,” and sustained “ee” sounds.

space, and vesicular sounds over the peripheral chest. Detects abnormal sounds of rales, rhonchi, or wheezes.

Figure 1-1-12 Auscultate the anterior lung fields. Listen for abnormal sounds, including rales, rhonchi, or wheezes.

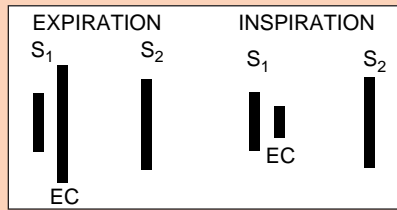


Heart and Cardiovascular System Examination

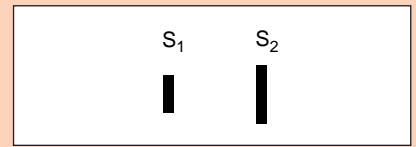
- 61.** Inspect and palpate the precordium. Identify the point of maximal intensity (PMI) at mitral area located at the left fifth intercostal space and confirm synchrony with the carotid pulse. PMI may not be palpable in large and muscular persons.
- 62.** Auscultate with the client sitting, then leaning forward. Listen with the diaphragm and then the bell.
- 63.** Examine all valvular landmarks at least twice. First locate and identify the S_1 , S_2 , S_3 , and S_4 heart sounds. Then listen for other sounds (murmurs, rubs, clicks, etc.). Auscultate in an orderly fashion from the apex to the base of the heart (or vice versa).
- 64.** In the mitral area identify that S_1 is louder than S_2 with the diaphragm of the stethoscope, because the left heart pressure is greater than the right, and the mitral valve closes slightly before the tricuspid valve. Use the bell to listen for a possible S_3 sound (see Figure 1-1-13).
- 65.** In the tricuspid area identify that S_1 is louder than S_2 with diaphragm, but that it is softer
- 61.** Confirms health and identifies signs and symptoms of illness or disease. Confirms the absence of cardiomegaly symptoms, visible thrills, heaves, and pulsations (except possibly 1–2 cm movements at mitral area during systole, especially in children and thin adults or the elderly).
- 62.** The bell detects lower pitched sounds than the diaphragm.
- 63.** Systematic progression of the examination minimizes omissions. Detects normal physiology, as the S_1 closure of mitral and tricuspid valves heralds the onset of systole. Detects any abnormal opening snap in early diastole, which could indicate mitral stenosis.
- 64.** Detects S_3 sounds, which are early diastolic filling sounds from the ventricles, and could indicate diastolic gallop.
- 65.** Detects the normal aortic valve closure occurring slightly before the pulmonic valve closure



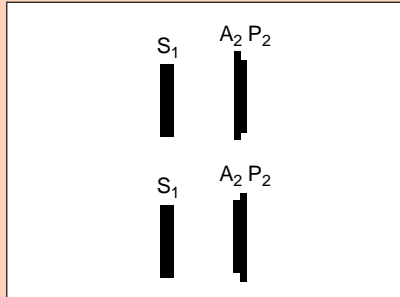
A. Normal S_2



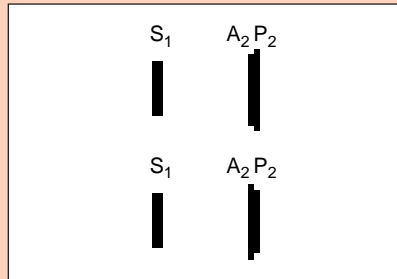
G. Paradoxical splitting of S_2



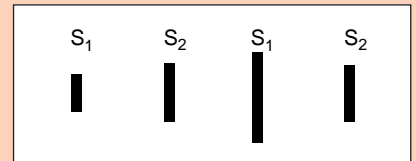
M. Loud S_1



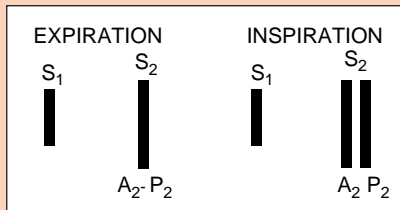
B. Intensified A_2 , diminished A_2



H. Pulmonic ejection click



N. Soft S_1



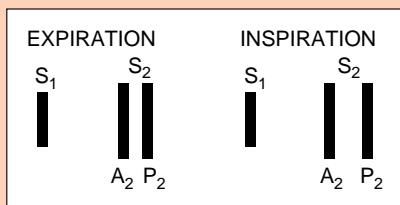
C. Aortic ejection click



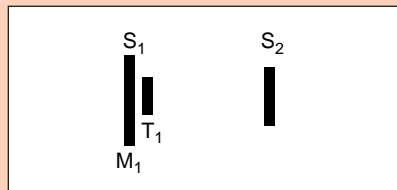
I. Intensified P_2 , diminished P_2



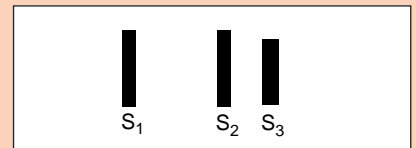
O. Variable S_1



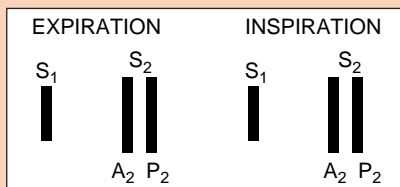
D. Normal physiological split of S_2



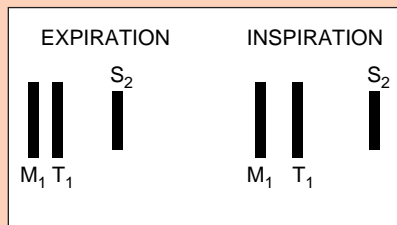
J. Normal S_1



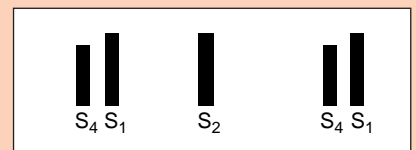
P. Opening snap



E. Wide splitting of S_2



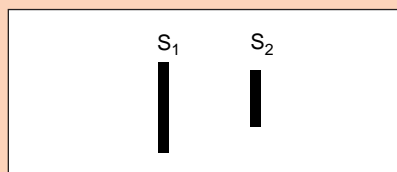
K. Normal physiological split of S_1



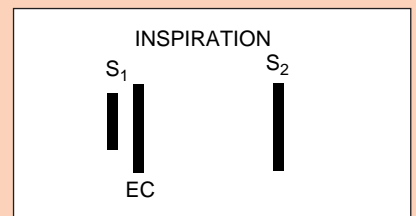
Q. S_3



F. Fixed splitting of S_2



L. Wide split of S_1



S. Summation gallop

Figure 1-13 Normal and abnormal heart sounds

Heart and Cardiovascular

System Examination *continued*

than at the mitral area. Listen for possible S_1 split that disappears when the client holds his breath. Listen for the S_3 sound with the bell.

- 66.** In the pulmonic area identify that S_2 is louder than S_1 , but softer than at aortic area. Note that physiologic splitting of S_2 , which indicates closure of the semilunar valves at this site is normal. In the aortic area identify that S_2 is louder than S_1 with diaphragm.
- 67.** Assess the epigastric, axillary, and Erb's point areas.
- 68.** Summarize the character of S_1 and S_2 sounds. Note the presence or absence of S_3 and S_4 (gallop), murmurs, rubs, clicks, or snaps.
- 69.** Assist client to left lateral position to continue the cardiac examination.
- 70.** Auscultate mitral and tricuspid sites with the bell.
- 71.** Assist client to return to supine position and continue cardiac examination.
- 72.** Inspect and palpate the precordium. Identify the PMI at the mitral area and confirm synchrony with carotid pulse. Assess apical, carotid, temporal, brachial, radial, femoral, popliteal, posterior tibial, and dorsalis pedis pulses (see Figure 1-1-14). Percuss the cardiac borders if needed. Auscultate the heart in supine position with bell, then with diaphragm. Check the mitral, tricuspid, pulmonic, aortic, and ectopic areas. Auscultate with bell for bruits at carotid and temporal pulse sites.
- 73.** Raise head to 30–45 degree angle and inspect the jugular vein distention (JVD).
- during inspiration as more negative intrathoracic pressure causes an increase in venous return to the right side of the heart.
- 66.** Finds symptoms of abnormal splits, which are wide, fixed, or paradoxical.
- 67.** Assesses for signs of mitral valve prolapse, which are best heard at the epigastric location. Assesses for abnormal murmurs radiating to the axilla. Checks Erb's point where both aortic and pulmonic murmurs may be heard.
- 68.** S_3 can be normal in children, third trimester, and adults younger than 30 years old. Other sounds need investigation.
- 69.** Positions the heart closer to the chest wall.
- 70.** Mitral and tricuspid abnormalities are heard best in the left lateral position.
- 71.** Facilitates next portion of cardiac examination.
- 72.** The PMI is best palpated in the supine position. Confirms the absence of visible thrills, heaves, and pulsations except possibly a small (1–2 cm) area at the mitral location during systole, especially in children and thin adults or the elderly. PMI may not be palpable in large and muscular persons. The client's position determines which sounds are heard best. It is easier to hear some murmurs with the patient in the supine position. The bell is best for detecting deeper sounds. Notes unusual symmetry, rate, rhythm, pulsations, volume, or thrills of pulses. Evaluates for cardiomegaly.
- 73.** Detects normal jugular vein distention, which is usually 1–2 cm above the sternal angle when the head is elevated 45 degrees and is



Figure 1-1-14 Assess for unusual symmetry, pulsations, volume, or thrills of pulses.



Figure 1-1-15 Percuss the abdomen to assess size and location of internal organs.

usually absent at 90 degrees and distended when flat. Jugular vein pressure (JVP) measurement plus 5 cm will give an estimate of the CVP (central venous pressure).

Abdominal Examination

- 74.** Inspect the size, contour, and symmetry of the abdomen. The normal abdomen is flat (except in young children), symmetrical, without scars, striae, masses, nodules, peristalsis (except in very thin individuals), or rectus ridge (except in young or thin individuals). Note pigmentation, scars, striae, masses, nodules, the condition of the umbilicus, and any respiratory or peristaltic movement. Check the rectus abdominus muscle by having the client raise his head.
- 75.** Auscultate with the diaphragm and then the bell. Listen for bowel sounds in each of the four quadrants. Right lower quadrant (RLQ), right upper quadrant (RUQ), left upper quadrant (LUQ), and left lower quadrant (LLQ).
- 76.** Percuss the RLQ, RUQ, gastric bubble, spleen, bladder, LLQ, LUQ, and liver span (see Figure 1-1-15).
Note the spleen, located between the sixth and tenth rib, may go undetected. The gastric air bubble (LUQ) is lower pitched than tympany of the intestine. The tympany changes to dull at lower edge of liver, and lung resonance changes to dull at upper edge of liver. You may try to percuss the kidney posteriorly while the client is sitting, if needed.
- 74.** Confirms health and identifies signs and symptoms of illness or disease.
Aortic pulsations may be seen in epigastric area in thin persons. Newborn to 2-year-olds breathe with their abdominal muscles, with no retractions of the intercostal muscles during inspiration, and a smooth rhythm. The umbilicus is normally depressed.
- 75.** Auscultate before palpating, as sounds will change in response to touch.
Detects a normal frequency of sounds of 5–30 sounds per minute, or abnormal bruits, hums, or rubs.
- 76.** Detects size and location of internal organs as tympany changes to dull over organs.

Abdominal Examination *continued*

77. Palpate all four quadrants superficially first then deep and rebound palpations to identify any discomfort, tenderness, or abnormalities. Check superficial abdominal reflexes in the LLQ, LUQ, spleen (use bimanual palpation), RLQ, RUQ, liver, aorta, kidney (use bimanual technique), and bladder (see Figure 1-1-15). Evaluate for guarding on expiration.

78. Check femoral pulses and superficial and deep inguinal nodes.

External Genitalia Examination

79. Assist client to modified or full lithotomy position.

80. Inspect and palpate deep inguinal nodes.

81. Observe pubic hair distribution, color, and texture. Check the femoral and inguinal areas for hernias.

82. Calculate the Tanner stage of sexual maturity if appropriate.

83. Check skin and look for abnormalities. In the female, examine the mons pubis, labia majora, labia minora, clitoris, urethral meatus, vaginal introitus, and perineum.

84. In the male, check the cremasteric reflex (in infant), urethral meatus, penis (glans, foreskin, shaft), scrotum (transilluminate if hydrocele suspected), scrotal rugae, testicles, epididymis, spermatic cord, and external inguinal ring.

77. Checks for normal umbilical deviation toward the direction of palpation stroke.

Determines normal abdomen, which is smooth and soft with no masses, bulges, swelling, organomegaly, bladder distention, fluid retention, or pain. Locates normal findings of palpated liver edge, aortic pulsations, and lower pole of kidney.

Normal voluntary muscle guarding ceases on expiration.

78. Determines normal pulses, which are symmetrical and even, with no bounding or thrills, and normal inguinal nodes, which are less than 1 cm in size, movable, and nontender.

79. Lithotomy position without stirrups is usually more comfortable for the client; however, both positions provide good visibility and access.

80. Deep nodes are more easily palpated in this position.

81. Confirms normal distribution of hair in an inverse triangle, and identifies abnormalities, including infestations, rashes, edema, condylomata, vesicles, varicose veins, discharge, odor, or bulges.

82. The Tanner stage assesses appropriate genital development progression and status for age and provides an opportunity for teaching.

83. Checks for abnormal color, lesions, pain, trauma, abnormal size, imperforate introitus, odor, or discharge.

84. Confirms normal appearance, where the urethral meatus is located centrally, with dorsal vein prominence, a small amount of smegma, and the left scrotal sac lower than the right. Detects a nonretractable foreskin in an uncircumcised child.

Checks for abnormal lesions, odor, swelling, inflammation, nodules, condyloma, vesicles, pustules, scaling, edema, phimosis, chordee

85. Examine the anus. You may need to return the client to the left lateral position to aide in visualization. Inspect and palpate the sacrococcygeal area and anal mucosa.

Lower Extremity and Musculoskeletal Examination

86. Assist client to supine position.

87. Inspect and palpate the skin. Look at the skin color, check that capillary refill is less than 3 seconds, observe hair distribution, veins, temperature, and texture of skin.

Observe the size, shape, isometric muscle contraction, tone, and strength (using resistive ROM) of muscles.

88. Inspect the joints. Palpate from periphery to center. Observe contour, periarticular tissue, neutral anatomic position, ROM (active and palpate passive), and strength (resistive motion). Also evaluate the hips. Have the client do a straight leg raise. Move the hips knee to chest, internal rotation, external rotation, abduction, and adduction. Listen carefully for a hip click in infants (Ortolani sign).

Assess the knees. Check the tibiofemoral joints by flexing the knee 90 degrees and with thumbs palpate tibial margins and collateral ligament. Check knee flexion, extension, and strength.

For the ankles and feet, palpate the Achilles tendon, at-rest, in dorsiflexion and plantar flexion, eversion and inversion. Check toe flexion, abduction, and adduction. Palpate metatarsophalangeal joints and interphalangeal joints.

Check popliteal, posterior tibial, and dorsalis pedis pulses.

Neurological Examination

89. Assist client to sitting position.

(curvature), hernia, hydrocele, spermatocele, or varicocele.

85. Confirms normal appearance of sacral dimpling, dark pink to brown color, puckered, and free of lesions, swelling, inflammation, tenderness, itching, fissures, rashes, masses, hemorrhoids, or skin tags.

86. Prepares for the next sequence in the examination.

87. Detects skin atrophy, breakdown, edema, ulcerations, or varicose veins.

Determines that muscle shape is symmetrical, with good tone. Detects atrophy, hypertrophy, flaccidity, spasticity, spasm, masses, or involuntary movements.

88. Confirms joints articulate in proper alignment and are free from swelling, nodules, pain, warmth, deformities, masses, crepitus, grating, or popping.

Evaluates for contractures, pain, or Homans' sign.

Evaluates for clonus, varus, valgus, planus, deviations, and inflammations.

89. Prepares for the remainder of the neurological examination.

Lower Extremity and Musculoskeletal Examination *continued*

- 90.** Check for deep tendon biceps, triceps, brachioradialis (if not done previously), patellar, and Achilles reflexes.

Check infantile reflexes, including rooting, suck, palmer grasp, tonic neck, stepping, plantar grasp, moro, Gallant and Landau.

Check the Babinski's reflex. A positive Babinski's reflex is normal until walking or 18 months of age.

- 91.** Examine the client's sensory abilities. Check for responses to skin sensations. Begin distally and move proximally. Touch fingers, hands, lower arms and toes, feet, legs, and abdomen as necessary. Be careful not to be "predictable." Alter the rate and rhythm of stimulation.

Compare right to left and proximal to distal sensations.

Check exteroceptive sensation, including light touch (use a cotton wisp), and sharp and dull (use a hair pin or paper clip). If the sharp/dull evaluation was abnormal, check temperature sensation as well.

Check the proprioceptive sensations of vibration, motion, and position.

Check the cortical sensations of stereognosis (coin, button, key, paperclip, etc.; different object in each hand), and graphesthesia. If needed, examine two-point discrimination and extinction. Normal distances vary with the body part tested. For example, fingers are approximately 5 mm, the hand or foot is 20 mm.

- 92.** Review and recheck the cranial nerves:

CN I: Olfactory

CN II: Optic

CN III: Oculomotor

CN IV: Trochlear

CN V: Trigeminal motor and sensory

- 90.** Measures the degree and speed of response, from 0 (absent) to 4+ (hyperactive), and the presence of clonus.

Observe fanning of toes with stroke of outer aspect of sole of foot from heel across ball.

- 91.** Confirms health and identifies signs and symptoms of illness or disease. Confirms normal sensory perceptions.

Proximal nerve transmission must be functional for distal sensations to be present.

Determines that client can feel stimuli, detect vibrations over bony prominences (this decreases after age 65), and identify changes in body position and motion. Clients should be able to identify objects with eyes closed.

- 92.** Identify normal versus abnormal functions:

CN I: To verify the client is able to distinguish and identify odors with each nostril.

CN II: To verify the client has normal visual acuity, visual fields, and a normal fundus or optic disk.

CN III: Checks for normal pupil reactions, cardinal fields of gaze, and eyelid elevation.

CN IV: Checks for normal extraocular movement.

CN V: Checks for strength and function of temporalis and masseter muscles, trigeminal nerve sensation, including light pain, light touch, temperature, and corneal reflex.

CN VI: Abducens

CN VII: Facial motor and sensory

CN VIII: Acoustic cochlear and vestibular

CN IX: Glossopharyngeal motor/sensory
CN X: Vagus motor and sensory

CN XI: Spinal accessory

CN XII: Hypoglossal

CN VI: Checks for normal extraocular movements, cardinal fields of gaze.

CN VII: Checks facial movements (frown, raise eyebrows) symmetrical (no palsy), and tearing.

CN VIII: Checks for normal hearing, Weber and Rinne tests. Checks vertigo, nystagmus, and good equilibrium.

CN IX and CN X: Checks for uvula rise midline, speech clear, swallow, taste in posterior third of tongue. Gag present.

CN XI: Checks for shoulders, trapezius, and sternocleidomastoid muscle movements.

CN XII: Checks for clarity of speech and tongue movements.

- 93.** Evaluate the client's mental status. Check level of consciousness, orientation to person, time, place, general appearance, behavior, affect, speech, content, memory, logic, and abstract reasoning (describe proverb), judgment, spatial perception (copy figures, identify familiar sounds, identify right versus left body parts). Mentally summarize the mental status from earlier observations during the examination.
- 94.** Examine cerebellar status: Conduct a finger-to-nose test (have the client use the index finger to touch your finger, held 18 inches away from the client, then have client touch his nose). Have client repeat this movement, gradually increasing the speed.
Observe for the client's ability to cross the midline. Look for tremor, overshoot, and undershoot. Repeat with the other hand.
Conduct a RAHM (rapid alternating hand movements) and note if the client exhibits smooth pronation-supination with increasingly rapid speed. Have the client touch fingers-to-thumb, and note if he can touch thumb to each of the fingers of the same hand in rapid succession from index to fifth finger and back. Note that ability depends on age.
Have the client touch heel-to-shin, foot tapping (RAFM), and foot "figure 8" movement tests. Determine whether the client can run heel down the shin of the opposite leg.
Look for smooth rapid ankle extensions and rotation.
- 95.** Assist client to standing position.
- 93.** Identifies normal versus abnormal functions. Checks that the client is awake, alert, and appropriate. Look for abnormal findings of drowsiness, lethargic, stuporous, comatose, or disoriented behaviors.
- 94.** Confirms health and identifies signs and symptoms of illness or disease. Confirms cerebellar status by evaluating coordination, balance, and checking for smooth and harmonious movement.
- 95.** Prepares client for remainder of examination.

Neurological Examination *continued*

- 96.** Inspect and/or palpate posture, weight-bearing and standing spine alignment, spinous processes, paravertebral muscles, and ROM (flexion, lateral bending, rotation, hyperextension). Do a Romberg test. Balance on the one foot for 10 seconds. Repeat heel-to-shin test, and have client hop on each foot and do shallow knee bends.
- 97.** Assess mobility by having the client perform a casual gait, toe and heel walk, tandem walk (forward and backward), step right, step left, walk briskly, and do jumping jacks (if client's condition permits).
- 98.** Recheck heart and respiratory sounds after exercising.
- 99.** Compare the client's status to age-appropriate standards for activities of daily living (ADLs), gross and fine motor function, speech and language, and personal-social interaction.
- 100.** Evaluate for psychiatric symptoms, including disturbed affect, aversive eye contact, symptoms of depression or anxiety, disrupted or confused thought processes, indications of delusional thoughts, and indications of suicidal thoughts.
- 96.** Determines that shoulders and hips are level, scapulae and iliac crests are symmetrical, toes and knees point forward, extremities are proportionate. Confirms that head spinous processes and gluteal cleft are in alignment. Checks for scoliosis, kyphosis, lordosis, or contractures.
- 97.** Assesses cerebellar and developmental status as well as musculoskeletal structure and function.
Checks that the posture and gait are erect, balanced, smooth, tandem for age with usually less than 1–2 inches between heel to toe steps. Estimates exercise tolerance for age and diagnosis.
- 98.** Checks for flow murmurs, cardiac rate, and recovery time. Compare to resting rates.
- 99.** Confirms health and identifies signs and symptoms of illness or disease.
- 100.** Checks that verbal and nonverbal behavior is consistent and congruent, that there is no evidence of delusions, hallucinations, or suicidal ideations.

**▼ REAL WORLD ANECDOTES**

A nurse was doing a routine physical assessment on a client with chronic pulmonary disease, listening to lung sounds. She heard a rapid, irregular heartbeat as well. She reported her findings to the nurse-practitioner, who ordered follow-up diagnostic tests. The client was later diagnosed with multifocal atrial tachycardia.

> EVALUATION

- Client relates history in logical, sequential manner. Questions are answered appropriately and without distraction. Client is able to easily and accurately recall history and facts.
- Explain findings to client within nurse's scope of practice and function.
- Formulate problem list reflecting findings.
- Generate intervention plan.

> DOCUMENTATION

Client's Chart

- All assessments and procedures must be completely documented according to institutional policy.
- Record under objective portion of assessment.
- Record in order of the category groupings used in the assessment.
- Record date and time of assessment.
- Identify information and historian.
- Indicate ability of client to assist with assessment.
- Record chief concern.
- List positive findings first followed by significant negative findings for each body system or body part examined.
- Record detailed description of assessment related to chief concern (need for visit).
- Record detailed description of abnormalities (positive findings).
- Record description of negative findings.

> CRITICAL THINKING SKILL

Introduction

The client knows his own body. Often the client is the expert consultant.

Possible Scenario

A nurse was doing a routine physical exam. While the nurse was concentrating on the priorities in the exam, the client mentioned that he could feel a lump in his hamstring. He wondered if he had injured it jogging. Because the nurse was examining the client's lungs, he listened to the client's complaint, made a noncommittal comment, and continued with his assessment. The client did not bring up his concerns again.

Possible Outcome

One month later, this client was diagnosed with a rhabdomyosarcoma, a highly malignant soft tissue cancer most often seen in children. He underwent surgery, chemotherapy, and radiation, and continues to be evaluated for recurrence every 3 months.

Prevention

This man's survival was directly related to the stage of the disease at diagnosis. This cancer is often found when the client or a parent mentions feeling a lump. The nurse missed the abnormal finding, because he did not follow up on the client's comment. The nurse should have followed up on the complaint by asking for more specifics and history, examining the area carefully, and reporting the findings.

▼ VARIATIONS



Geriatric Variations:

- *Vital signs and measurements must be age correlated to establish what "normal" is for an elderly client.*
- *Allow extra time for slower movement in an older client.*
- *An elderly client may need a warmer room to feel comfortable.*
- *You will find more "normal variations" in the geriatric population. This is especially true for skin conditions.*
- *Activities of daily living history need to be assessed in view of visual, auditory, musculoskeletal, and neurological findings.*
- *Any client with a change in neurologic function must be evaluated for dementia, depression, Alzheimer's disease, and Parkinson's disease.*
- *Make sure elderly clients can hear and understand what you want them to do when performing the neurological part of the examination.*



Pediatric Variations:

- *Keep parents within view of the child.*
- *Infants and young children may be more comfortable being examined in a parent's lap. Sit facing the parent with your knees touching theirs to make a "table."*
- *Examine ear, nose, and throat last because the child may react to the invasiveness of the procedures.*

continues

▼ VARIATIONS *continued*

- Allow the child some play time with your stethoscope or penlight. Clean these items before and after.
- Show the child the equipment before using it. Shine the otoscope light in the child's hand.
- Blow the air from the pneumatic tube. Sometimes demonstrating the procedure using a toy or doll helps make the child more comfortable.
- Give the child simple choices when possible. Do not bribe. Be honest.
- Allow children to cry or yell. Do not allow them to kick or bite.
- If there are two children to be examined, let them sit side by side and examine each body area on one and then on the other. You can enlist their cooperation by letting one child watch or help with the other child. Keep a careful recording of abnormal findings so you do not mix up who had what finding.
- Remember to thank the child for helping, cooperating, or just for coming in.
- Ask teens "private" questions by whispering or lowering your voice without drawing undue attention to the topic and without conveying the idea that certain topics should not be discussed with parents. You can act as a role model or help the child discuss "embarrassing" topics with the parents.
- Unclothe a child as you proceed with an examination rather than all at once. Shirts off, examine top half. Shirt on and pants off for bottom half. Leave underpants on, if possible.
- Examine the genitalia through a leg hole or by pulling the pant down halfway rather than taking pants all the way off. If you need to remove the underpants, let the child stand up on the table and hug a parent for balance while you examine them.
- Empower the child after the genital exam by asking the child to perform kicking motions of "exercise" while you check hips and knees. Sit them up as soon as possible. Sit down to check reflexes, so that you are physically lower than the child, if possible.



Home Care Variations:

- The examination can be done in bed, on a couch, or a kitchen table, or even on the floor. Ask the client for suggestions and decide the best location based on the age and flexibility of the client.
- Good lighting is more important than an optimum "table" or bed. Consider bringing extra lighting such as a gooseneck lamp.



Long-Term Care Variations:

- Examinations in the long-term setting are usually performed with the client in bed. Be sure of good lighting and take your own equipment, if needed.
- Auditory and visual privacy is usually more of a problem in this setting. Anticipate schedules and be sure the staff and roommates know how much private time you need.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Skipping seemingly insignificant areas and thereby missing significant information.

Ask Yourself:

How do I prevent this error?

Prevention:

Allow enough time for the examination. Ask the client to communicate concerns. Have a systematic progression that covers all areas.

Possible Error:

Failing to follow the sequencing of techniques or omitting one of the techniques such as inspection or palpation.

Ask Yourself:

How do I prevent this error?

Prevention:

Bring a checklist into the examination and follow it. Before moving on to the next part of the exam, review in your mind if you have covered all the techniques required to assess the current area.

> NURSING TIPS

- Vocalize “a” (like apple) versus “ah” (aw) to get higher uvula rise and better pharyngeal visualization.
- Measure chest circumference, divide by one-half, and subtract transverse diameter for anteroposterior (AP) measurement.
- If you detect rhonchi on auscultation, ask client to cough, then listen again. With infants and older children check lung sounds after performing the gag reflex portion of the pharyngeal exam.
- The heart exam can be a good opportunity to teach the client about the heart. Ask the client to tell you about the heart, where it is located, its size, and its shape. Answer questions about “what a heart attack is” and teach about heart-healthy diet and exercise.
- Follow a specific order when conducting the heart examination: mitral, tricuspid, pulmonic, aortic, ectopic (epigastric and axillary), or vice versa. Remember the order with the mnemonic phrase “Mom Tries Pasta Again Every Evening.” You may remember the four heart valves (in reverse order) using the phrase “A Poor Tired Monkey.”
- Exercise may make flow murmurs easier to hear.
- Percuss up to lower edge of liver and down to upper edge. Start palpation 2 cm below lower percussed margin and “rock” up and under the rib to look for the edge.

SKILL 1-2

Taking a Temperature

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Antipyretic
Axillary
Centigrade
Fahrenheit
Hypothermia

Oral
Pyrexia
Rectal
Thermometer
Tympanic



> OVERVIEW OF THE SKILL

Monitoring body temperature is a basic skill in nursing and medical decision making. When heat production exceeds heat loss, and body temperature rises above the normal range, pyrexia (fever) occurs. Pyrexia can accompany any inflammatory response or prolonged exposure to high temperatures. When the body is exposed to temperatures lower than normal for a prolonged length of time, hypothermia occurs. Hypothermia generally occurs in response to

prolonged exposure to cold weather or as a result of being immersed in cold water. Hospitalized clients are at particular risk for infection and accompanying fever. Clients are stressed by their presenting conditions and their bodies are further stressed by the hospital environment and are thus more susceptible to the infectious agents found there. Accurate monitoring and recording of a client's temperature is essential for diagnosis and treatment of the client.

> ASSESSMENT

1. Assess body temperature for changes when exposed to pyrogens (endogenous or exogenous substances that cause fever) or to extreme hot or cold external environments **because such environments may indicate the cause of an infection.**
2. Assess the client for the most appropriate site to check his temperature **in order to obtain an accurate reading.**
3. Confirm that the client has not consumed hot or cold food or beverage nor smoked for 15 to 30 minutes before the measurement **because these activities may alter the oral reading.**
4. Assess for mouth breathing and tachypnea **because both can cause an inaccurate oral reading.**

5. Assess for oral herpetic lesions **because herpes viruses are extremely contagious and require implementation of Standard Precautions of the Centers for Disease Control and Prevention. Clients with herpetic lesions should have their own glass thermometer to prevent transmission to others.**

> DIAGNOSIS

- 6.4.2 Altered Health Maintenance. The patient may have increased risk of exposure to pyrogens (surgery, medical procedure, injury, or illness).
- 1.2.1.1 Risk for Infection. The patient may have signs or symptoms of infection.

- 1.2.2.2 Hypothermia.
- 1.2.2.3 Hyperthermia.
- 1.2.2.4 Ineffective Thermal Regulation.
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit.

> PLANNING

Expected Outcomes:

1. An accurate temperature reading will be obtained.
2. The client will verbalize understanding of the reason for the procedure.

Equipment Needed (see Figure 1-2-2):

- Thermometer
 - Glass, oral, or rectal, at client's bedside
 - Electronic thermometer with disposable protective sheath
 - Tympanic membrane thermometer with probe cover
 - Disposable, single-use chemical strip thermometer
- Lubricant for rectal and glass thermometer
- Two pairs of nonsterile gloves
- Tissues



Figure 1-2-2 There are many types and brands of thermometers available to assess temperature.



Estimated time to complete the skill:

5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to client why an accurate body temperature is needed.
2. Describe the equipment to the client and explain what to expect during the procedure.
3. Answer any questions and/or fears the client may have regarding the procedure.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Review medical record for baseline data and factors that influence vital signs.
2. Explain to the client that vital signs will be assessed. Encourage client to remain still and refrain from drinking, eating, and smoking.
3. Assess client's toileting needs and proceed as appropriate.

RATIONALE

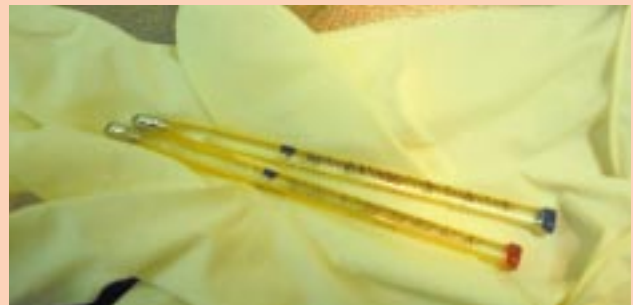
1. Establishes parameters for client's normal measurements, provides direction in device selection, and helps determine site to use for measurement. Vital signs are measured in the order of temperature, pulse, and respiration (TPR) and blood pressure (BP), usually without interruptions, so as to provide the nurse with an objective clinical database to direct decision making.
2. Encourages participation, allays anxiety, and ensures accurate measurements. Cold or hot liquids and smoking alter circulation and body temperature.
3. Prevents interruptions during measurements, communicates caring, and promotes client comfort.

4. Gather equipment.
5. Provide for privacy.
6. Wash hands and apply gloves.
7. Position the client in a sitting or lying position with the head of the bed elevated 45° to 60° for measurement of all vital signs except those designated otherwise.
8. Remove gloves and wash hands.
4. Facilitates organized assessment and measurement.
5. Decreases embarrassment.
6. Hands are washed before and after every contact with a client to reduce the transmission of microorganisms. Gloves are worn to avoid contact with bodily secretions and to reduce transmission of microorganisms.
7. Promotes comfort and improves site access for all measurements. Activity and movement can elevate heart and respiratory rates.
8. Reduces transmission of microorganisms.

Oral Temperature: Glass Thermometer

9. Select correct color tip of thermometer from client's bedside container (see Figure 1-2-3).
9. Identifies correct device; a blue tip usually denotes an oral thermometer.

Figure 1-2-3 Oral (blue tip) and rectal (red tip) glass thermometers



10. Remove thermometer from storage container and cleanse under cool water.
10. Cleansing removes disinfectant, which can irritate oral mucosa. Cool water prevents expansion of the mercury.
11. Use a tissue to dry thermometer from bulb's end toward fingertips.
11. Wipe from area of least contamination to most contaminated area.
12. Read thermometer by locating mercury level. It should read 35.5°C (96°F).
12. Thermometer must be below normal body temperature to ensure an accurate reading.
13. If thermometer is not below normal body temperature reading, grasp thermometer with thumb and forefinger and shake vigorously by snapping the wrist in a downward motion to move mercury to a level below normal.
13. Shaking briskly lowers level of mercury in column. Because glass thermometers break easily, make sure that nothing in the environment comes in contact with the thermometer when shaking it.

- 14.** Place thermometer in client's mouth under the tongue and along the gumline to the posterior sublingual pocket. Instruct client to hold lips closed (see Figure 1-2-4).



Figure 1-2-4 Place bulb of thermometer in the posterior sublingual pocket. Have client close mouth around thermometer.

- 14.** Ensures contact with large blood vessels under the tongue. Prevents environmental air from coming in contact with the bulb.



Figure 1-2-5 Wipe the thermometer with a tissue from the fingers toward the bulb.

- 15.** Leave in place as specified by agency policy, usually 3–5 minutes.

- 15.** Thermometer must stay in place long enough to ensure an accurate reading.

- 16.** Remove thermometer and wipe with a tissue away from fingers toward the bulb's end (see Figure 1-2-5).

- 16.** Mucus on thermometer may interfere with disinfectant solution's effectiveness. Wipe from area of least contamination to most contaminated area.

- 17.** Read at eye level and rotate slowly until mercury level is visualized.

- 17.** Ensures an accurate reading.

- 18.** Shake thermometer down, and cleanse glass thermometer with soapy water, rinse under cold water, and return to storage container.

- 18.** Mechanical cleansing removes secretions that promote growth of microorganisms. Hot water may cause coagulation of secretions and cause expansion of mercury in thermometer.

- 19.** Remove and dispose of gloves in receptacle. Wash hands.

- 19.** Reduces transmission of microorganisms.

- 20.** Record reading and indicate site as "OT."

- 20.** Accurate documentation by site allows for comparison of data.

- 21.** Wash hands.

- 21.** Reduces transmission of microorganisms.

Oral Temperature— Electronic Thermometer

- 22.** Repeat Actions 1–8.

- 22.** See Rationales 1–8.

- 23.** Place disposable protective sheath over probe (see Figure 1-2-6).

- 23.** Reduces transmission of microorganisms.

Oral Temperature: Glass Thermometer *continued*



Figure 1-2-6 Place disposable sheath over probe.



Figure 1-2-7 Place probe tip in the posterior sublingual pocket.

24. Grasp top of the probe's stem. Avoid placing pressure on the ejection button.
 25. Place tip of thermometer under the client's tongue and along the gumline to the posterior sublingual pocket lateral to center of lower jaw (see Figure 1-2-7).
 26. Instruct client to keep mouth closed around thermometer.
 27. Thermometer will signal (beep) when a constant temperature registers (see Figure 1-2-8).
24. Pressure on the ejection button releases the sheath from the probe.
 25. Sublingual pocket contains superficial blood vessels.
 26. Maintains thermometer in proper place and decreases amount of time required for an accurate reading.
 27. Signal indicates final temperature reading.



Figure 1-2-8 Listen for audible beep signal when temperature registers.



Figure 1-2-9 Preparation for the insertion of a rectal thermometer

- | | |
|--|--|
| <p>28. Read measurement on digital display of electronic thermometer. Push ejection button to discard disposable sheath into receptacle and return probe to storage well.</p> <p>29. Inform client of temperature reading.</p> <p>30. Remove gloves and wash hands.</p> <p>31. Record reading and indicate site "OT."</p> <p>32. Return electronic thermometer unit to charging base.</p> <p>33. Wash hands.</p> | <p>28. Reduces transmission of microorganisms. Ensures that the electronic system is ready for next use.</p> <p>29. Promotes client's participation in care.</p> <p>30. Reduces transmission of microorganisms.</p> <p>31. Accurate documentation by site allows for comparison of data.</p> <p>32. Ensures charging base is plugged into electrical outlet and ready for next use.</p> <p>33. Reduces transmission of microorganisms.</p> |
|--|--|

Rectal Temperature

- | | |
|---|--|
| <p>34. Repeat Actions 1–8.</p> <p>35. Place client in the Sims' position with upper knee flexed. Adjust sheet to expose only anal area.</p> <p>36. Place tissues in easy reach. Apply gloves.</p> <p>37. Prepare the thermometer.</p> <p>38. Lubricate tip of rectal thermometer or probe (a rectal thermometer usually has a red cap).</p> <p>39. With dominant hand, grasp thermometer. With other hand, separate buttocks to expose anus (see Figure 1-2-9).</p> <p>40. Instruct client to take a deep breath. Insert thermometer or probe gently into anus: infant, 1.2 cm (0.5 inches); adult, 3.5 cm (1.5 inches). If resistance is felt, do not force insertion.</p> <p>41. Hold in place for 2 minutes.</p> <p>42. Wipe secretions off glass thermometer with a tissue. Dispose of tissue in a receptacle.</p> | <p>34. See Rationales 1–8.</p> <p>35. Proper positioning ensures visualization of anus. Flexing knee relaxes muscles for ease of insertion.</p> <p>36. Tissue is needed to wipe anus after device is removed.</p> <p>37. Ensures a smooth procedure and an accurate reading.</p> <p>38. Promotes ease of insertion of thermometer or probe.</p> <p>39. Aids in visualization of anus.</p> <p>40. Relaxes anal sphincter. Gentle insertion decreases discomfort to client and prevents trauma to mucous membranes.</p> <p>41. Prevents trauma to mucosa and breakage of glass thermometer.</p> <p>42. Removes secretions and fecal material for visualization of mercury level. Prevents transmission of microorganisms.</p> |
|---|--|

Rectal Temperature *continued*

- | | |
|---|---|
| <p>43. Read measurement and inform client of temperature reading.</p> <p>44. While holding glass thermometer in one hand, use other hand to wipe anal area with tissue to remove lubricant or feces.
Dispose of soiled tissue. Cover client.</p> <p>45. Cleanse thermometer.</p> <p>46. Remove and dispose of gloves in receptacle. Wash hands.</p> <p>47. Record reading and indicate site as “RT.”</p> | <p>43. Promotes client’s participation in care.</p> <p>44. Prevents contamination of clean objects with soiled thermometer, decreases skin irritation, and promotes client comfort. Prevents embarrassment.</p> <p>45. Reduces transmission of microorganisms.</p> <p>46. Reduces transmission of microorganisms.</p> <p>47. Accurate documentation by site allows for comparison of data.</p> |
|---|---|

Axillary Temperature

- | | |
|--|--|
| <p>48. Repeat Actions 1–8.</p> <p>49. Remove client’s arm and shoulder from one sleeve of gown. Avoid exposing chest.</p> <p>50. Make sure axillary skin is dry; if necessary, pat dry.</p> <p>51. Prepare thermometer.</p> <p>52. Place thermometer or probe into center of axilla. Fold client’s upper arm straight down and place arm across client’s chest.</p> <p>53. Leave glass thermometer in place as specified by agency policy (usually 6–8 minutes). Leave an electronic thermometer in place until signal is heard.</p> <p>54. Remove and read thermometer.</p> <p>55. Inform client of temperature reading.</p> <p>56. Cleanse glass thermometer. Shake thermometer down, and cleanse glass thermometer with soapy water, rinse under cold water, and return to storage container.</p> <p>57. Assist client with replacing gown.</p> <p>58. Record reading and indicate site as “AT.”</p> | <p>48. See Rationales 1–8.</p> <p>49. Exposes axillary area.</p> <p>50. Removes moisture and prevents a false low reading.</p> <p>51. Ensures accurate use of thermometer.</p> <p>52. Puts device in contact with axillary blood supply. Maintains the device in proper position.</p> <p>53. Device must stay in place long enough to ensure an accurate reading. Signal indicates final temperature reading.</p> <p>54. Allows accurate reading of temperature.</p> <p>55. Promotes client’s participation in care.</p> <p>56. Prevents transmission of microorganisms and breakage of glass thermometer.</p> <p>57. Promotes comfort.</p> <p>58. Promotes accurate documentation for data comparison.</p> |
|--|--|

59. Wash hands.

Disposable (Chemical Strip) Thermometer

60. Repeat Actions 1–8.

61. Apply tape to appropriate skin area, usually forehead.

62. Observe tape for color changes.

63. Record reading and indicate method.

64. Wash hands.

Tympanic Temperature: Infrared Thermometer

65. Repeat Actions 1–8.

66. Position client in Sims' position.

67. Remove probe from container and attach probe cover to tympanic thermometer unit (see Figure 1-2-10).

68. Turn client's head to one side. For an adult, pull pinna upward and back; for a child, pull down and back. Gently insert probe with firm pressure into ear canal (see Figure 1-2-11).



Figure 1-2-10 Attach disposable probe cover to unit.

69. Remove probe after the reading is displayed on digital unit (usually 2 seconds).

70. Remove probe cover and replace in storage container.

59. Reduces transmission of microorganisms.

60. See Rationales 1–8.

61. Tape must be in direct contact with the client's skin.

62. Color indicates temperature reading (refer to the manufacturer's instructions).

63. Promotes accurate documentation for data comparison.

64. Reduces transmission of microorganisms.

65. See Rationales 1–8.

66. Promotes access to ear.

67. Prevents contamination.

68. Provides access to ear canal. Gentle insertion prevents trauma to external canal. Firm pressure is needed to ensure probe will record an accurate temperature.



Figure 1-2-11 Insert temperature probe into ear canal.

69. Reading is displayed within seconds.

70. Protects damage to the reusable probe.

Tympanic Temperature: Infrared Thermometer *continued*

- | | |
|--|--|
| <p>71. Return tympanic thermometer to storage unit.</p> <p>72. Record reading and indicate site as “ET.”</p> <p>73. Wash hands.</p> | <p>71. Recharges batteries of unit for future use.</p> <p>72. Promotes accurate documentation for data comparison.</p> <p>73. Reduces transmission of microorganisms.</p> |
|--|--|

Table 1-2-1 Advantages and Disadvantages of Four Routes for Body Temperature Measurement

ROUTE	NORMAL RANGE	ADVANTAGES	DISADVANTAGES
<p>ORAL</p> <p>Average 37.0°C or 98.6°F</p>	<p>36.0°–38.0°C 96.8°–100.4°F</p>	<p>Convenient; accessible</p>	<p>Safety: Glass thermometers with mercury can be bitten and broken, causing patient injury. Patients need to be alert and cooperative and cognitively capable of following instructions for safe use.</p> <p>Physical abilities: Patients need to be able to breathe through the nose, and be without oral pathology or recent oral surgery; route not applicable for comatose or confused patients.</p> <p>Accuracy: Oxygen therapy by mask, as well as ingestion of hot or cold drinks immediately before oral temperature measurement, affects accuracy of the reading.</p>
<p>RECTAL</p> <p>Average 0.7°C or 0.4°F higher than oral</p>	<p>36.7°–38.7°C 100.4°–100.8°F</p>	<p>Considered most accurate</p>	<p>Safety: Contraindicated following rectal surgery. Risk of rectal Valsalva’s perforation in children less than 2 years of age. Risk of stimulating Valsalva’s maneuver in cardiac patients.</p> <p>Physical aspects: Invasive and uncomfortable.</p>
<p>AXILLARY</p> <p>Average 0.6°C or 1°F lower than oral</p>	<p>35.4°–37.4°C 95.8°–99.4°F</p>	<p>Safe; noninvasive</p>	<p>Accuracy: Glass thermometer must be left in place for 5 minutes to obtain accurate measurement. Placement and position of thermometer tip affect reading.</p>
<p>TYMPANIC</p> <p>Calibrated to oral or rectal scales</p>	<p>See oral or rectal</p>	<p>Convenient; fast; safe; noninvasive. Does not require contact with any mucous membrane.</p>	<p>Accuracy: Research is inconclusive as to accuracy of readings and correlations with other body temperature measurements. Technique affects reading. Tympanic membrane is thought to reflect the core temperature.</p>

> EVALUATION

- Establish client's baseline temperature.
- Compare temperature with the client's baseline temperature.
- Evaluate the client's condition for trauma caused by the instrument.

> DOCUMENTATION

Vital Signs Flow Sheet

- Record the temperature measurement and site (OT, RT, ET, AT).

- Plot the temperature on a graph to identify patterns, or sudden elevations and drops (a condition known as spiking).

Medication Administration Record

- Record doses of antipyretic (fever-reducing) medications and temperature reading.

Nurses' Notes

- Record response to antipyretic medications.



▼ REAL WORLD ANECDOTES

The visiting nurse is making a routine visit to John, a diabetic patient. John is a morbidly obese patient with diabetic leg ulcers. The physician's orders are for routine wet to dry dressing changes and blood glucose monitoring. While changing the dressing, the nurse notes that John says he is cold, yet his skin feels warm and looks flushed. His blood glucose is 310 mg/dl. There are no routine vital signs ordered, but the nurse feels that John may be seriously ill. John is chilling, and his teeth are chattering.

A glass thermometer is available, but the nurse feels John won't be able to hold it in his mouth firmly enough to get an accurate reading. Because he is obese, a rectal temperature would be difficult and time consuming. The nurse chooses to take an axillary temperature. The reading is 104°F. The nurse notifies John's doctor and John is admitted to the hospital with sepsis. In this case, "routine vital signs" became a critical assessment tool.

> CRITICAL THINKING SKILL

Introduction

Use good judgment when choosing the site used to measure a temperature. An accurate reading requires use of all the assessment skills described.

Possible Scenario

You are assigned to work in the newborn nursery this evening. You are assessing a newborn. Using your nursing judgment you must determine the best method to evaluate the baby's internal temperature. Because you don't want to hurt the baby, you choose a glass thermometer and place it under the baby's arm.

Possible Outcome

Because this is the first temperature reading done on this client, it is an inaccurately low reading and fails to detect a problem. It also creates an incorrect baseline for future comparisons.

Prevention

You should realize that there are a number of factors that must enter into this decision. An oral temperature is contraindicated in newborns because they cannot follow instructions to keep their mouths closed and not bite the thermometer. An axillary temperature would be safe, but would yield the least accurate reading. A tympanic reading would be less invasive than the rectal temperature and more comfortable for the infant, but it is less accurate in infants. The rectal temperature is the preferred method for assessing newborn temperatures. Not only is it the most accurate method available to nurses but also it gives the nurse an opportunity to assess the structure and patency of the baby's anus, an important part of the newborn physical exam. So you should use the rectal thermometer to obtain an accurate reading.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients are more likely to be confused and unable to follow directions. It is especially important to be attentive and give clear, concise instructions when taking an oral temperature.
- Elderly clients may be more comfortable lying on their side with legs slightly flexed when taking a rectal temperature. Keep one hand on the thermometer and one hand on the client's hip so that you can detect if he starts to roll over. Place a pillow at the client's back for extra support if needed.
- Baseline temperatures of elderly clients may be below the normal range; therefore increases should be compared to baseline.



Pediatric Variations:

- Infants and children often are not able to understand the nurse's instructions.
- Infants and children are often fearful of medical personnel and of the possibility of painful procedures. This may lead them to refuse to cooperate or to be combative.
- Infants and children may lie supine with knees flexed toward the abdomen as the nurse inserts the thermometer (see Figure 1-2-12).
- It may be more accurate to measure the pulse and respirations before the temperature if the child becomes agitated during temperature taking.
- Glass thermometers are not the best choice for young children. Tympanic or chemical strip thermometers are much less invasive, and less anxiety producing.
- When using the chemical strip thermometer, allow the child to place the strip, and help you time the strip by holding your watch. Clean your watch before and after.



Figure 1-2-12 Taking a rectal temperature with infant in supine position



Home Care Variations:

- Working equipment may not be available in the home care setting. The nurse should come prepared with working equipment, including a thermometer appropriate to the client.
- The temperature and ventilation of the room may affect the client's temperature.
- Remember to bring the best type of thermometer for the client with you for your home health visit.



Long-Term Care Variations:

- Long-term care clients more often have physical limitations that must be considered when choosing the route to use in measuring the internal temperature. When considering route in a long-term care client, consider the possibility of a stoma where the rectum has been surgically closed or perhaps severe contractures that would make client positioning and cooperation difficult and painful.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

You are in a hurry and left the oral thermometer in the client's mouth for only 2 minutes.

Ask Yourself:

How do I prevent this error?

Prevention:

Use the equipment and its signals such as the beep of the electronic thermometer. Know the recommended length of time to leave a glass thermometer in place for an oral, axillary, and rectal temperature.

Ask Yourself:

How do I respond to this error?

Prevention:

Take the temperature again and observe the recommended time.

> NURSING TIPS

- An accurate method of comparing temperatures is to take them at the same time every day.
- A temperature reading should be repeated 30 minutes after an antipyretic medication is given and then every 2 to 4 hours.
- Oral and rectal temperature measurements are higher than axillary measurements because the measuring device is in contact with the mucous membrane.
- Rectal measurements are higher than oral measurements because of the seal created by the anal sphincter, which decreases contact with environmental influences.
- Remember not to rinse a glass thermometer in hot water. Hot water can cause the mercury to expand and break the thermometer.
- Do not allow the client to insert the rectal thermometer to avoid causing tissue trauma.
- Continuous monitoring can be done using a rectal probe.

SKILL 1-3

Taking a Pulse

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Apical pulse

Bradycardia

Pedal pulse

Popliteal pulse

Pulse deficit

Radial pulse

Tachycardia

Temporal pulse



> OVERVIEW OF THE SKILL

Pulse assessment is the measurement of a pressure pulsation created when the heart contracts and ejects blood into the aorta. Assessment of pulse characteris-

tics provides clinical data regarding the heart's pumping action and the adequacy of peripheral artery blood flow.

> ASSESSMENT

1. Assess client for need to monitor pulse because certain diseases or conditions, such as history of heart disease or cardiac dysrhythmias, chest pain, invasive cardiovascular diagnostic tests, infusion of large volume of IV fluids, or hemorrhage, can cause an increased risk for alterations in pulse.
2. Assess for signs and symptoms of cardiovascular alterations such as dyspnea, chest pain, orthopnea, syncope, palpitations, edema of extremities, cyanosis or fatigue because these signs may indicate a deficit in cardiac or vascular function.
3. Assess client for factors such as age, medications, exercise, change in position, or fever that may affect the character of the pulse. This enables the nurse to accurately assess for the significance of an alteration in pulse.
4. Assess for the appropriate site for measuring pulse so that the pulse will be accurate.

5. Assess the baseline heart rate and rhythm in the client's chart in order to compare it with the current measurement.

> DIAGNOSIS

- 1.4.2.1 Decreased Cardiac Output, due to alteration in the rate and rhythm of pulse.
- 1.4.1.1 Altered Cardiopulmonary Tissue Perfusion.

> PLANNING

Expected Outcomes:

1. Pulse rate, quality, rhythm, and volume will be within normal range for the client's age group.
2. The client will be comfortable with the procedure and demonstrate an understanding regarding its importance.

Equipment Needed (see Figure 1-3-2):

- Watch with a second hand
- Stethoscope
- Alcohol swab
- Gloves



Figure 1-3-2 A watch with a second hand is used to count pulse. Use a stethoscope to assess apical pulse. Gloves and alcohol swabs reduce the transmission of microorganisms.



Estimated time to complete the skill:

5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Ask the client to relax and sit or lie quietly while you take his pulse rate.
2. Explain the normal pulse range to the client when telling him what his pulse rate is. This eases the client's concerns regarding whether or not he is "normal."
3. If the client is taking any medications that affect pulse rate, this is a good time to review the name and purpose of this medication.
4. If taking a pulse at a site other than radial explain to the client the reason for using an alternate site.
5. Have the client breathe normally through the nose, especially if taking an apical pulse. Breathing through the nose decreases breath sounds, making the heart sounds easier to hear.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE****Taking a Radial (Wrist) Pulse**

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Inform client of the site(s) at which you will measure pulse. | <ol style="list-style-type: none"> 2. Encourages participation and allays anxiety. |
| <ol style="list-style-type: none"> 3. Flex client's elbow and place lower part of arm across chest. | <ol style="list-style-type: none"> 3. Maintains wrist in full extension and exposes artery for palpation. Placing client's hand over chest will facilitate later respiratory assessment without undue attention to your action. (It is difficult for any person to maintain a normal breathing pattern when someone is observing and measuring.) |
| <ol style="list-style-type: none"> 4. Support client's wrist by grasping outer aspect with thumb. | <ol style="list-style-type: none"> 4. Stabilizes wrist and allows for pressure to be exerted. |
| <ol style="list-style-type: none"> 5. Place your index and middle finger on inner aspect of client's wrist over the radial artery and apply light but firm pressure until pulse is palpated (see Figure 1-3-3). | <ol style="list-style-type: none"> 5. Fingertips are sensitive, facilitating palpation of pulsating pulse. The nurse may feel her own pulse if palpating with thumb. Applying light pressure prevents occlusion of blood flow and pulsation. |

continues

Taking a Radial (Wrist) Pulse *continued*



Figure 1-3-3 Place index and middle fingers over radial artery.



Figure 1-3-4 Count pulse rate for 30 seconds. Multiply by two.

6. Identify pulse rhythm.
7. Determine pulse volume.
8. Count pulse rate by using second hand on watch (see Figure 1-3-4).
For a regular rhythm, count number of beats for 30 seconds and multiply by 2.
For an irregular rhythm, count number of beats for a full minute, noting number of irregular beats.

Taking an Apical Pulse

9. Wash hands.
10. Raise client's gown to expose sternum and left side of chest.
11. Cleanse earpiece and diaphragm of stethoscope with an alcohol swab.
12. Put stethoscope around your neck.
13. Locate apex of heart:
 - With client lying on left side, locate suprasternal notch.
 - Palpate second intercostal space to left of sternum.
 - Place index finger in intercostal space, counting downward until fifth intercostal space is located.
9. Reduces transmission of microorganisms.
10. Allows access to client's chest for proper placement of stethoscope.
11. Decreases transmission of microorganisms from one practitioner to another (earpiece) and from one client to another (diaphragm).
12. Ensures stethoscope is nearby for frequent use.
13. Identification of landmarks facilitates correct placement of the stethoscope at the fifth intercostal space in order to hear point of maximal impulse.
 - Ensures correct placement of stethoscope.

- Move index finger along fourth intercostal space left of the sternal border and to the fifth intercostal space, left of the midclavicular line to palpate the point of maximal impulse (PMI) (see Figure 1-3-5).
- Keep index finger of nondominant hand on the PMI.



Figure 1-3-5 Palpating the apical pulse



Figure 1-3-6 Place diaphragm of stethoscope over the PMI to hear the heart rate.

14. Inform client that you are going to listen to his heart. Instruct client to remain silent.
15. With dominant hand, put earpiece of the stethoscope in your ears and grasp diaphragm of the stethoscope in palm of your hand for 5–10 seconds.
16. Place diaphragm of stethoscope over the PMI and auscultate for sounds S_1 and S_2 to hear lub-dub sound (see Figure 1-3-6).
17. Note regularity of rhythm.
18. Start to count while looking at second hand of watch. Count lub-dub sound as one beat:
 - For a regular rhythm, count rate for 30 seconds and multiply by 2.
 - For an irregular rhythm, count rate for a full minute, noting number of irregular beats.
19. Share your findings with client.
20. Record by site the rate, rhythm, and, if applicable, number of irregular beats.
21. Wash hands.
14. Elicits client support. Stethoscope amplifies noise.
15. Dominant hand facilitates psychomotor dexterity for placement of earpiece with one hand. Heat warms metal or plastic diaphragm and prevents startling client.
16. Movement of blood through the heart valves creates S_1 and S_2 sounds. Listen for a regular rhythm (heartbeats are evenly spaced) before counting.
17. Establishment of a rhythmic pattern determines length of time to count the heartbeats to ensure accurate measurement.
18. Ensures sufficient time to count irregular beats.
19. Promotes client participation in care.
20. Record rate and characteristics at bedside to ensure accurate documentation.
21. Reduces transmission of microorganisms.

Table 1-3-1 Pulse Point Assessment

PULSE POINT	ASSESSMENT CRITERIA
Temporal: over temporal bone, superior and lateral to eye	Accessible; used routinely for infants and when radial is inaccessible
Carotid: bilateral, under lower jaw in neck along medial edge of sternocleidomastoid muscle	Accessible; used routinely for infants and during shock or cardiac arrest when other peripheral pulses are too weak to palpate; also used to assess cranial circulation
Apical: left midclavicular line at fourth to fifth intercostal space	Used to auscultate heart sounds and assess apical-radial deficit
Brachial: inner aspect between groove of biceps and triceps muscles at antecubital fossa	Used in cardiac arrest for infants, to assess lower arm circulation, and to auscultate blood pressure
Radial: inner aspect of forearm on thumb side of wrist	Accessible; used routinely in adults to assess character of peripheral pulse
Ulnar: outer aspect of forearm on finger side of wrist	Used to assess circulation to ulnar side of hand and to perform the Allen test
Femoral: in groin, below inguinal ligament (midpoint between symphysis pubis and anterosuperior iliac spine)	Used to assess circulation to legs and during cardiac arrest
Popliteal: behind knee, at center in popliteal fossa	Used to assess circulation to legs and to auscultate leg blood pressure
Posterior tibial: inner aspect of ankle between Achilles tendon and tibia (below medial malleolus)	Used to assess circulation to feet
Dorsalis pedis: over instep, midpoint between extension tendons of great and second toe	Used to assess circulation to feet

From *Fundamentals of Nursing: Standards & Practice* by S.C. DeLaune and P.K. Ladner, 1998, Albany, NY: Delmar Publishers. Copyright 1998 by Delmar Publishers.

> EVALUATION

- Compare client's pulse with baseline rate and rhythm to detect any changes (see Table 1-3-2).
- If pulse is irregular or abnormal, ask another nurse to check the pulse and then report to physician or qualified practitioner.

> DOCUMENTATION

Nurses' Notes and/or Flow Sheet

- Pulse rate
- Observations regarding regularity, volume, or rate
- New irregularities in pulse reported to the patient's physician or qualified practitioner

Table 1-3-2 Scales for Measuring Pulse Volume

3-POINT SCALE		4-POINT SCALE	
SCALE	DESCRIPTION OF PULSE	SCALE	DESCRIPTION OF PULSE
0	Absent	0	Absent
1+	Thready/weak	1+	Thready/weak
2+	Normal	2+	Normal
3+	Bounding	3+	Increased
		4+	Bounding



▼ REAL WORLD ANECDOTES

A 74-year-old male presents to the emergency room complaining of pain in his chest. While taking routine vital signs, the nurse notes that both his apical and radial pulse are 44 beats per minute. The nurse considers the possibility that heart conductivity problems may be causing this low rate.

The client's EKG on the cardiac monitor appears normal. While taking a more complete history, the client states that he is a marathon runner and he takes his pulse rate himself daily as part of his training. The client notes that his pulse rate normally runs quite low. He also states that he just ate a large, spicy meal, an alternative explanation for his chest pain, which needs further assessment. The nurse makes a mental note not to jump to conclusions without a thorough history and physical.

> CRITICAL THINKING SKILL

Introduction

A pulse deficit exists when the heart is not ejecting enough blood volume to initiate a peripheral pulse wave. If untreated, this can lead to serious complications.

Possible Scenario

You are taking a radial pulse on a client who was admitted to the coronary care unit. The client's pulse volume is weak and thready. The radial pulse is slow and irregular. You are concerned and take an apical pulse as well. His apical pulse is faster than his radial pulse and

is regular. You check the nursing record, but see no mention of this finding.

Possible Outcome

You chart your findings and report them immediately to the client's physician. He confirms your finding of a pulse deficit and orders immediate intervention to increase this client's cardiac ejection volumes.

Prevention

Remember that the nature of the pulse volume, rate, and regularity is a valuable tool in assessing a client's overall health and in diagnosing disease states.

▼ VARIATIONS



Geriatric Variations:

- Tremors in geriatric clients can interfere with evaluating the radial pulse accurately.
- An apical or carotid pulse might be the better option in older clients.



Pediatric Variations:

- Radial pulses on infants are not reliable because of the small size of the client and the rapid heart rate normal in infants. A temporal or apical pulse is preferable.
- The PMI in an infant is usually located at the third to fourth intercostal space near the sternum.
- A child may be more comfortable sitting on his mother's lap while having his pulse assessed.
- A curious child may be more cooperative if he can listen to his own heart with a stethoscope.



Home Care Variations:

- The home care environment can be distracting for the nurse and the client. The television and loud music can make it difficult to hear an apical pulse and can artificially elevate the client's pulse rate.
- Be sure that the client is sitting or lying quietly before taking his pulse.
- Clients can be taught to assess their own pulse especially when taking cardiac medications.



Long-Term Care Variations:

- The relative immobility of most long-term care clients puts them at risk of decreased peripheral circulation. Pedal pulses are an important part of the nursing examination in long-term care clients.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You count the pulse of a client with a cardiac arrhythmia for 15 seconds and then multiply the rate by 4 to obtain a one-minute pulse rate.

Ask Yourself:

How do I prevent this error?

Prevention:

Count the heart rate for at least 30 seconds to increase the probability of noting irregularities. Some irregularities do not occur in less than 15-second intervals. Occasional premature beats or brief runs of supraventricular tachycardia can be missed.

Ask Yourself:

How do I respond to this error?

Prevention:

Count the pulse for a full minute noting the regularity or irregularity of the beats.

> NURSING TIPS

- Warm the bell of the stethoscope with your hands prior to placing it on the client's chest.
- Take a carotid pulse on only one side of the neck at a time in order to prevent cerebral blood flow impairment (see Figure 1-3-7).
- When taking pedal pulses, a firm touch is generally preferable to reduce any tickling sensations.
- A Doppler device may be necessary to detect a pulse on elderly or obese clients (see Figure 1-3-8).
- Do not palpate the radial pulse with your thumb because your own pulse may be felt.



Figure 1-3-7 Take a carotid pulse on only side of the neck at a time.



Figure 1-3-8 A vascular Doppler device is used to detect pulses in elderly or obese patients.

SKILL 1-4

Counting Respirations

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Apnea	Hyperpnea
Bradypnea	Hyperventilation
Cheyne-Stokes respirations	Hypoventilation
Cyanosis	Kussmaul's respirations
Diaphragm	Orthopnea
Dyspnea	Pleura
Eupnea	Tachypnea



> OVERVIEW OF THE SKILL

Respiratory assessment is the measurement of the breathing pattern. Assessment of respirations provides clinical data regarding the pH of arterial blood.

Normal breathing is slightly observable, effortless, quiet, automatic, and regular. It can be assessed by observing chest wall expansion and bilateral symmetrical movement of the thorax or by placing the back of the hand next to the client's nose and mouth to feel the expired air.

When assessing respiration ascertain the rate, depth, and rhythm of ventilatory movement. The nurse should assess the rate by counting the number of breaths taken per minute. Note the depth and rhythm of ventilatory movements by observing for the normal thoracic and abdominal movements and symmetry in chest wall movement. Normal respirations are characterized by a rate ranging from 12 to 20 breaths per minute.

One inspiration and expiration cycle is counted as one breath. The nurse can observe the rise and fall of the chest wall and count the rate by placing the hand lightly on the chest to feel it rise and fall. Count the number of respirations for a 30-second interval and multiply by 2 if respirations are regular and even. If the client is experiencing any respiratory difficulty, count the rate for a full minute.

When the chest wall moves, so do the lungs, because the lungs are attached to the inner wall of the thoracic cavity by the outer layer of the pleura (lining of the chest cavity). The movement of the chest wall should be even and regular, without noise and effort. On inspiration the chest changes shape and expands as the rib cage is raised and the diaphragm is lowered. Before inspiration, the pressure inside the chest cavity is negative (-4.5 to -9.0 mm Hg below atmospheric pressure). Air flows along the concentration gradient from a higher atmospheric pressure to the lower intrathoracic pressure.

The opposite action occurs with expiration. The muscles relax, causing the rib cage to lower, and the diaphragm to rise, compressing the chest. Intrathoracic pressure decreases to -3 to -6 mm Hg to allow the air to escape into the atmosphere.

Different respiratory wave patterns are characterized by their rate, rhythm, and depth. Eupnea refers to easy respirations with a normal rate of breaths per minute that are age specific. Bradypnea is a respiratory rate of 10 or fewer breaths per minute. Hypoventilation is characterized by shallow respirations. Tachypnea is a respiratory rate greater than 24 breaths per minute. Hyperventilation is characterized by deep, rapid respirations. Hyperpnea occurs with



Figure 1-4-2 Observe the movement of the chest wall and assess the quality and depth of respiration. Place your hand below the diaphragm to feel if the patient is using his diaphragm, instead of expanding his chest wall, to bring air into the lungs.

exercise when respirations are increased in depth and rate. Sighing is a protective physiologic mechanism for expanding small airways not used with normal breathing.

The nurse can also observe alterations in the movement of the chest wall: costal (thoracic) breathing occurs when the external intercostal muscles and the other accessory muscles are used to move the chest upward and outward; diaphragmatic (abdominal) breathing occurs when the diaphragm contracts and relaxes as observed by movement of the abdomen. Dyspnea refers to difficulty in breathing as observed by labored or forced respirations through the use of accessory muscles in the chest and neck to breathe. Dyspneic clients are acutely aware of their respirations and complain of shortness of breath (see Figure 1-4-2).

Respiratory alterations may cause changes in skin color as observed by a bluish appearance to the nailbeds, lips, and skin. The bluish color (cyanosis) results from reduced oxygen levels in the arterial blood. Changes in the level of consciousness (restlessness, anxiety, and dyspnea) may also occur with decreased oxygen levels. Clients with orthopnea may assume a forward-leaning position or may have to stand to increase the expansion capacity of the lungs.

Metabolic alterations such as diabetic ketoacidosis can cause Kussmaul's respirations, which are abnormally deep but regular.

Apnea is the cessation of breathing for several seconds. Persistent apnea is called respiratory arrest. Irregular rhythm with alternating periods of apnea and

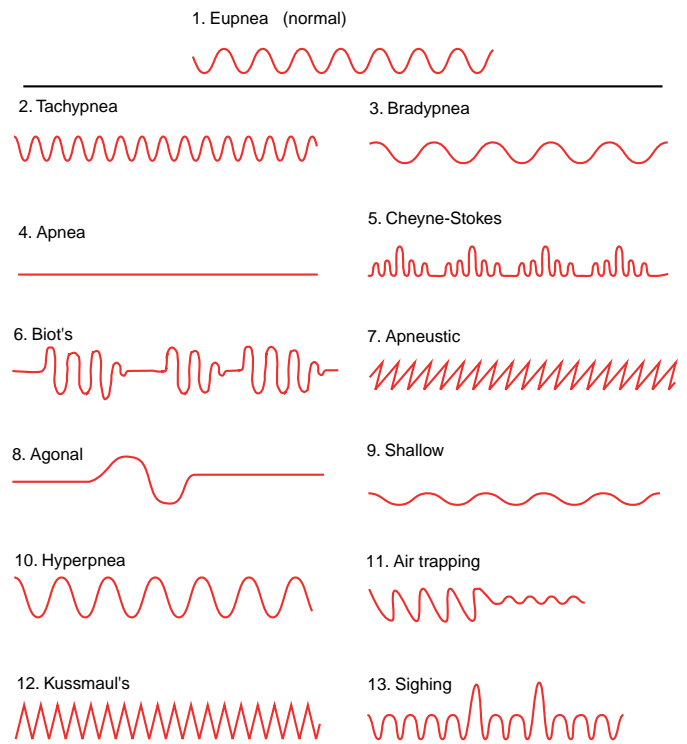


Figure 1-4-3 Normal and abnormal respiratory patterns

hyperventilation is called Cheyne-Stokes respirations (see Figure 1-4-3). The cycle begins with slow, shallow breaths that gradually increase to abnormally deep and rapid respirations, which then gradually slow and return to shallow breathing followed by apnea. This is common in dying patients (see Figure 1-4-4).



Figure 1-4-4 When assessing respirations, observe skin color and level of consciousness as well as respiratory rate and rhythm.

> ASSESSMENT

1. Assess the movement of client's chest wall to see if it is equal bilaterally, if the movement is labored, or if the client is using accessory muscles to breathe.
2. Assess the rate of respirations to identify slow, rapid, or irregular respirations or even periods of apnea.
3. Assess the depth of the client's breaths in order to monitor shallow, deep, or uneven respirations. Think if there is something influencing the client's respirations? Is he in pain, frightened, talking, smoking?
4. Assess for risk factors such as fever, pain, anxiety, diseases, or trauma to the chest wall that may alter the respirations because certain conditions may cause increased risk of alterations in respirations.
5. Assess for factors that normally influence respirations such as age, exercise, anxiety, pain, smoking, medications, or postural changes so that an accurate assessment can be made.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange.
- 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation.
- 1.5.1.2 Ineffective Airway Clearance.
- 1.5.1.3 Ineffective Breathing Pattern.

> PLANNING

Expected Outcomes:

1. An accurate evaluation of a client's respiratory rate and character will be obtained.
2. The respiratory rate and character will be normal.

Equipment Needed (see Figure 1-4-5):

- Watch with a second hand
- Stethoscope if needed



Figure 1-4-5 A watch with a second hand is used to assess respirations.



Estimated time to complete the skill:
3 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct the client about the reason for assessing respirations.
2. Teach the caregiver to count respirations while the client is not aware.
3. Instruct the caregiver to contact the nurse if there is an alteration in the client's respirations.
4. Clients should be taught to notify their caregiver or nurse when they feel a change in their respirations.
5. Clients who have decreased ventilation may benefit from being taught deep-breathing and coughing techniques.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Be sure chest movement is visible. Client may need to remove heavy clothing.
3. Observe one complete respiratory cycle. If it is easier, place the client's hand across his abdomen and your hand over the client's wrist.

RATIONALE

1. Reduces transmission of microorganisms.
2. Facilitates observation of chest wall and abdominal movements.
3. Helps determine what constitutes a breath. Helps to determine what to count. Hand rises and falls with inspiration and expiration.

continues

4. Start counting with first inspiration while looking at the second hand of a watch (see Figure 1-4-6).
 - Infants and children: count a full minute.
 - Adults: count for 30 seconds and multiply by 2. If an irregular rate or rhythm is present, count for one full minute.

Figure 1-4-6 Count inspirations for a full 30 seconds.



4. Respiratory rate is one complete cycle (inspiration and expiration).
 - Infants and children usually have an irregular rate.

5. Observe character of respirations:
 - Depth of respirations by degree of chest wall movement (shallow, normal, or deep)
 - Rhythm of cycle (regular or interrupted)
6. Replace client's gown if needed.
7. Record rate and character of respirations.
8. Wash hands.

5. Reveals volume of air movement into and out of the lungs.
6. Prevents embarrassment and chilling.
7. Record rate and characteristics at bedside to ensure accurate documentation.
8. Reduces transmission of microorganisms.

> DOCUMENTATION

Vital Signs Flow Sheet

- Respiratory rate

Nurses' Notes

- Record depth, rhythm, and character of respirations.
- Report a respiratory rate outside the normal age range, an irregular rhythm, inadequate depth, or any abnormal characteristics such as dyspnea.

> EVALUATION

- Evaluate client's respirations as a baseline value.
- Compare respirations with baseline to detect any alterations.



▼ REAL WORLD ANECDOTES

It is 6 AM and morning medication administration is well underway. The nurse caring for Carl enters the room to take his vital signs prior to giving him a dose of digoxin. Carl is still sleeping, and the nurse completes the pulse assessment without waking him. While attempting to count respirations she notes that Carl has stopped breathing. She feels for a pulse, which is still strong. After 45

▼ REAL WORLD ANECDOTES *continued*

seconds, Carl once again takes a breath. The nurse notes in Carl's chart that he appears to have sleep apnea. She leaves a note for Carl's physician regarding her observations and notes to herself the importance of counting respirations for at least 30 seconds.

> CRITICAL THINKING SKILL

Introduction

Assessing, but not correctly interpreting, abnormal respirations can lead to misdiagnosis or lack of treatment for a client.

Possible Scenario

While assessing clients at the beginning of the shift, the nursing student notes that Mr. Johnson, a diabetic, is lethargic. He responds to her greeting by asking where his baseball glove is. His respiration rate is 40 breaths per minute and his respirations are deep. His breath has a fruity odor. At the shift report, the nurse reported that he was alert and oriented with normal vital signs.

Possible Outcome

The student is glad that Mr. Johnson seems interested in his hobbies again, and seems to be so calm. She is reassured by his deep breathing, and is glad he was able to

drink some apple juice. She leaves the room. Thirty minutes later, the respiratory therapist comes in and notes that Mr. Johnson is having Kussmaul's respirations and notifies Mr. Johnson's nurse. She instructs the student nurse to check Mr. Johnson's blood glucose level while she urgently notifies his physician of the serious deterioration in his condition. Failure to catch this change in Mr. Johnson's condition could have led to his death.

Prevention

Any vital signs outside normal limits need assessment and interpretation. The rapid change in this client's condition should further alert the nurse to trouble. Any significant or rapid change in a client's condition should be noted and reported immediately to the client's physician. In this case, the client was exhibiting Kussmaul's respirations (a marked increase in rate and depth of respiration), which is associated with severe diabetic acidosis.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients may be confused, restless, or eager to talk so it may be difficult to get an opportunity to count quiet, at-rest respirations.
- Ask the client to sit quietly while you take his pulse or perhaps distract him with television or other activities.



Pediatric Variations:

- Counting respirations in small children should be done by observation.
- Give a small child a toy or something to distract him while you count his respirations.
- Infants or newborns at risk for respiratory arrest may need an apnea monitor at home.



Home Care Variations:

- Be sure the client is able to sit quietly while you take his vital signs to ensure an accurate reading.
- Assess the home for factors that may influence his breathing such as ventilation or gas fumes.



Long-Term Care Variations:

- Clients with long-term respiratory disease are often very aware of any changes to the air space around them. Do not stand in front of the client because it may cause him to feel as if you are cutting off his air supply, which could increase his respiratory rate and his anxiety.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

You take a resting respiration measurement of a client who is late for his appointment and who just walked up three flights of stairs instead of taking the elevator.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the client has at least 5–10 minutes to sit and rest to allow his vital signs to return to a resting state.

Ask Yourself:

How do I respond to this error?

Prevention:

I allow the client to rest for 10 minutes while I review his chart and then take the respiration measurement again.

> NURSING TIPS

- Try not to stand directly in front of the client while counting respirations. Some clients feel as though it is harder to breathe when someone stands directly in front of them.
- Fear, pain, and anger can easily raise the respiratory rate. If these emotions are present, consider assessing the rate again at a later time when the client appears calmed.
- If possible, the client should not be aware you are counting his respirations, because such awareness may alter the respiratory rate. Placing your hand on the clients wrist gives the appearance of taking a pulse, and turns the clients attention away from your respiratory assessment.

SKILL 1-5

Taking Blood Pressure

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Auscultation	Korotkoff's sounds
Auscultatory gap	Palpation
Diastolic	Sphygmomanometer
Hypertension	Stethoscope
Hypotension	Systolic



> OVERVIEW OF THE SKILL

Blood pressure measurement is performed during a physical examination, at initial assessment, and as part of routine vital signs assessment. Depending on the client's condition, the blood pressure is measured by either a direct or indirect technique.

The indirect method requires use of the sphygmomanometer and stethoscope for auscultation and palpation as needed. The most common site for indirect blood pressure measurement is the client's arm over the brachial artery. When the client's condition prevents auscultation of the brachial artery, the nurse should assess the blood pressure in the forearm or leg sites. When pressure measurements in the upper extremities are not accessible, the popliteal artery, located behind the knee, is the site of choice. The nurse can also assess blood pressure in other sites, such as the radial artery in the forearm and the posterior tibial or dorsalis pedis artery in the lower leg. Because it is difficult to auscultate sounds over the radial, tibial,

and dorsalis pedis arteries, these sites are usually palpated to obtain a systolic reading.

The direct method requires an invasive procedure in which an intravenous catheter with an electronic sensor is inserted into an artery and the artery-transmitted pressure on an electronic display unit is read.

Hypotension is defined as a systolic blood pressure less than 90 mm Hg or 20 to 30 mm Hg below the client's normal systolic pressure. Orthostatic hypotension or postural hypotension refers to a sudden drop of 25 mm Hg in systolic pressure and a drop of 10 mm Hg in diastolic pressure when the client moves from a lying to a sitting position or from a sitting to a standing position.

Hypertension refers to a persistent systolic pressure greater than 135 to 140 mm Hg and a diastolic pressure greater than 90 mm Hg. For a diagnosis of hypertension to be made, the client must have a sustained elevation in blood pressure over a period of time.

> ASSESSMENT

1. Assess the condition of the potential blood pressure (BP) site so that a site with an injury or surgery proximal to the site can be avoided.
2. Assess the artery for any compromise to it so that compressing the artery briefly will not cause decrease in circulation.

3. Assess the distal pulse to check if it is intact and palpable.
4. Assess the circumference of the extremity for the right size cuff to be used so an accurate reading can be obtained.
5. Assess for factors that affect blood pressure such as age, anxiety, fear, medications, smoking, eating or exercising within 30 minutes prior to BP assessment, and postural changes so that an accurate reading can be obtained.
6. Determine client's baseline blood pressure by reading the medical record so that a comparison can be made with each BP reading (see Figure 1-5-2).

> DIAGNOSIS

- 1.4.1.1 Altered Cardiopulmonary Tissue Perfusion.
- 1.4.2.1 Decreased Cardiac Output.
- 8.1.1 Knowledge Deficit of Blood Pressure Control.

> PLANNING

Expected Outcomes:

1. An accurate estimate of the arterial pressure at diastole and systole will be obtained.
2. BP is within normal range for the client.
3. Client will be able to understand why the BP is taken and what it means.



Figure 1-5-2 Be aware of blood pressure related factors, such as age, anxiety, and medications prior to taking a blood pressure reading.



Estimated time to complete the skill:

5 minutes

Equipment Needed (see Figure 1-5-3):

- Stethoscope
- Mercury sphygmomanometer with bladder and cuff
- Gloves if required
- Alcohol swabs

> CLIENT EDUCATION NEEDED:

1. Teach the client to refrain from eating, drinking, or smoking 30 minutes before the procedure.
2. Ask the client to sit or lie down in a warm, quiet room.
3. Ask the client to rest for 5 minutes before taking the measurement.
4. Calmly explain the procedure.
5. Advise the client regarding the correct size blood pressure cuff to use at home for his individual anatomy.
6. Advise the client to take his blood pressure at the same site using the same cuff for consistency.
7. Teach the client that the “top number” in a blood pressure reading is always higher than the “bottom number.”



Figure 1-5-3 Sphygmomanometer, stethoscope, and gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Auscultation Method Using Brachial Artery

1. Wash hands.
2. Determine which extremity is most appropriate for reading. Do not take a pressure reading on an injured or painful extremity or one in which an intravenous line is running.
3. Select a cuff size that completely encircles upper arm without overlapping (see Figure 1-5-4).



Figure 1-5-4 Select proper cuff size. An obese client may need a larger size cuff to obtain an accurate reading.

4. Move clothing away from upper aspect of arm.
5. Position arm at heart level, extend elbow with palm turned upward.
6. Make sure bladder cuff is fully deflated and pump valve moves freely.
7. Locate brachial artery in the antecubital space (see Figure 1-5-5).
8. Apply cuff snugly and smoothly over upper arm, 2.5 cm (1 inch) above antecubital space with center of cuff over brachial artery (see Figure 1-5-6).
9. Connect bladder tubing to manometer tubing. If using a portable mercury-filled manometer, position vertically at eye level.

1. Reduces transmission of microorganisms.
2. Cuff inflation can temporarily interrupt blood flow and compromise circulation in an extremity already impaired or a vein receiving intravenous fluids.
3. Provides equalization of pressure on the artery to ensure accurate measurement.



Figure 1-5-5 Palpate the brachial artery to determine placement of the stethoscope.

4. Ensures accurate measurement.
5. Blood pressure increases when arm is below level of heart and decreases when arm is above level of heart.
6. Equipment must function properly to obtain an accurate reading.
7. Designates placement of stethoscope.
8. Ensures even pressure distribution over brachial artery. Prevents tubing from being constricted and allows visualization of aneroid manometer dial.
9. Maintains closed system; supports accurate reading of mercury level in manometer.

continues

Auscultation Method Using Brachial Artery *continued*



Figure 1-5-6 Center the blood pressure cuff over the brachial artery.



Figure 1-5-7 The stethoscope chestpiece should not touch the blood pressure cuff.

10. Palpate brachial artery, turn valve clockwise to close and compress bulb to inflate cuff to 30 mm Hg above point where palpated pulse disappears, then slowly release valve (deflating cuff), noting reading when pulse is felt again.
11. Insert earpieces of stethoscope into ears with a forward tilt, ensuring diaphragm hangs freely.
12. Relocate brachial pulse with your nondominant hand and place bell or diaphragm chestpiece directly over pulse. Chestpiece should be in direct contact with skin and not touch cuff (see Figure 1-5-7).
13. With dominant hand, turn valve clockwise to close. Compress pump to inflate cuff until manometer registers 30 mm Hg above diminished pulse point identified in Action 9 (see Figure 1-5-8).
10. Inflates the cuff's bladder with pressure and temporarily impairs flow of blood through artery. Provides an estimate of maximum pressure required to measure systolic pressure.
11. Enhances sound transmission from chestpiece to ears.
12. Sound is heard best directly over artery; decreases muffled sounds that cause inaccurate reading. Bell chestpiece is more sensitive to low-frequency sound that occurs with pressure release.
13. Prevents air leak during inflation. Ensures the cuff is inflated to a pressure greater than the client's systolic pressure.



Figure 1-5-8 Compress the pump to inflate the blood pressure cuff.



Figure 1-5-9 Deflate the cuff completely and wait at least 2 minutes before taking a second reading.

14. Slowly turn valve counterclockwise so that mercury falls at a rate of 2–3 mm Hg per second. Listen for five phases of Korotkoff's sounds while noting manometer reading (for more information about Korotkoff's sounds, see Table 1-5-1)
 - I A faint, clear tapping sound appears and increases in intensity.
 - II Swishing sound.
 - III Intense sound.
 - IV Abrupt, distinctive muffled sounds.
 - V Sound disappears.
15. Deflate cuff rapidly and completely.
16. Remove cuff or wait 2 minutes before taking a second reading (see Figure 1-5-9).
17. Inform client of reading.
18. Record reading.
19. If appropriate, lower bed, raise side rails, place call light in easy reach.
20. Put all equipment in proper place.
21. Wash hands.
14. Maintains constant release of pressure to ensure hearing first systolic sound. Identify manometer readings for each of the five phases.
 - Identify two consecutive tapping sounds to confirm systolic reading.
 - Phase IV is regarded by the American Heart Association (AHA) as the best indicator of diastolic pressure in children (AHA, 1994).
 - Phase V is regarded by the AHA as the best index of diastolic blood pressure in clients over age 13 (AHA, 1994).
15. Prevents arterial occlusion and client discomfort of numbness or tingling.
16. Releases trapped blood in the vessels.
17. Promotes client's participation in care.
18. Ensures accuracy.
19. Promotes client safety.
20. Fosters maintenance of equipment.
21. Reduces transmission of microorganisms.

Palpation Method Using Brachial or Radial Artery

22. Palpate brachial or radial artery with fingertips of one hand (see Figure 1-5-10). Inflate cuff to 30 mm Hg above point at which pulse disappears.
22. Ensures accurate detection of true systolic pressure when cuff is deflated.

Figure 1-5-10 Palpate the brachial artery with index and middle fingers below the blood pressure cuff.



23. Deflate cuff slowly as you note on the manometer when the pulse is again palpable.
23. Ensures accurate reading.
24. Deflate cuff rapidly and completely.
24. Prevents arterial occlusion and client discomfort of numbness or tingling.

Palpation Method Using Brachial or Radial Artery *continued*

- | | |
|---|---|
| <p>25. Remove cuff or wait 2 minutes before taking a second reading.</p> <p>26. Inform client of reading.</p> <p>27. Record reading.</p> <p>28. Wash hands.</p> | <p>25. Releases trapped blood in the vessels.</p> <p>26. Promotes client's participation in care.</p> <p>27. Ensures accuracy.</p> <p>28. Reduces transmission of microorganisms.</p> |
|---|---|

Table 1-5-1 Korotkoff's Sounds Correlated to Pressure Dynamics

PHASE	PRESSURE DYNAMICS
I: Clear, soft tapping that increases to a thud or loud tap (systolic sound).	Ventilation—the inflow and outflow of air between the atmosphere and the lung alveoli.
II: Tapping changes to a soft, swishing sound.	Circulation—the quantity of blood flowing through the lungs equals that flowing through systemic circulation.
III: Clear tapping sound returns.	Diffusion—the exchange of oxygen and carbon dioxide between the alveoli and the blood.
IV: Muffled, blowing sound (diastolic sound in children or physically active adults).	Transport—the carrying of oxygen and carbon dioxide in the blood and body fluids to and from the cells.
V: Disappearance of muffled, blowing sound (second diastolic sound).	Regulation—the neurogenic system that adjusts the rate of alveolar ventilation to meet the demands of the body.

> EVALUATION

- Evaluate the blood pressure reading for accuracy by comparing with the medical record.
- Evaluate the client's blood pressure for being within the normal range.
- Identify variations in the client's blood pressure of more than 5 to 10 mm Hg from one arm to the other.
- Evaluate if the client's blood pressure changes significantly when he or she stands up.

- Report abnormal measurements to charge nurse, physician, or qualified practitioner.

> DOCUMENTATION

Vital Signs Flow Sheet

- Record the blood pressure measurement.
- Record the site where recording was done.
- Record the method of obtaining the pressure—auscultation or palpation.



▼ REAL WORLD ANECDOTES

Scenario 1

While Mrs. Price's blood pressure is being taken, she complains of pain in her arm. When Mrs. Price is questioned regarding the pain, she reports that about 5 years earlier she broke her shoulder and her arm has been sensitive ever since. When asked why she had not communicated this to the nurse prior to the blood pressure reading, Mrs. Price indicated that she assumed the nurse knew best. Be aware of individual client variations, especially when performing routine tasks.

▼ REAL WORLD ANECDOTES *continued*

Scenario 2

Mr. Johnson came to the occupational health nurse at his company to have his blood pressure checked as part of a company-wide campaign. His reading was very high. Upon further discussion, he told the nurse that he had just had a very frustrating argument over some purchase orders with a customer at lunch. He was stuck in traffic and had to run in from the parking lot to make this appointment. The nurse asked him to sit quietly for a few minutes, then took his blood pressure a second time. It was much lower, and within normal limits. Clients who have recently eaten, ambulated, or experienced an emotional upset will have a falsely high blood pressure reading.

> CRITICAL THINKING SKILL

Introduction

The routine of taking a blood pressure may become a mindless task. It is an important physical assessment tool.

Possible Scenario

Paul is a morbidly obese middle-aged client. He has a history of Type II diabetes and hypertension. He is being admitted to the hospital for observation of his blood sugar and blood pressure. You are performing his admission evaluation including vital signs. You use a blood pressure cuff that is in the room to take Paul's blood pressure, even though it barely covers his arm.

Possible Outcome

Your reading shows a drastically elevated blood pressure—the admitting orders call for transfer to in-

tensive care and Nipride therapy for a blood pressure this high. The client reports that when he took his pressure earlier in the day it was much lower. You ask another nurse to check Paul's blood pressure. He notes that the cuff you used is too small for Paul's arm and brings the correct size cuff from the nurses' station. This reading is much lower. Subsequent readings with the correct size cuff show no immediate intervention is necessary.

Prevention

A blood pressure reading must be accurate to be an effective diagnostic tool. Taking a blood pressure reading on obese patients with an average size adult cuff can give a falsely elevated reading. In addition, a blood pressure cuff that is too small for the client's arm will often come unfastened as it is inflated. Be sure to use the correct size cuff for the client.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have lost muscle mass and their upper arms may be quite thin. Be sure to adjust the cuff size to accommodate the client's arm.
- Many elderly clients have a history of hypertension and are taking antihypertensive medications.



Pediatric Variations:

- Small children may be uncooperative with the procedure and need the assistance of a parent to hold still.
- A cuff that fits adequately may not be available.
- It may be preferable to use the popliteal artery when taking a child's blood pressure.
- BP varies with size when a child reaches adolescence.
- Take BP first before other anxiety or pain-producing procedures.



Home Care Variations:

- Use the same blood pressure cuff the client normally uses for his home readings.
- Compare home readings to readings from a cuff you know is properly calibrated.
- Assess the client's financial ability to buy his own sphygmomanometer.
- Consider use of an electronic BP cuff if the client has a hearing deficit.

continues

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Be aware of any injuries, disease process, or appliances that may contraindicate a blood pressure reading at the chosen site.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

When taking a blood pressure reading the cuff is low enough on the arm that the stethoscope bell must be slid underneath the bottom edge of the cuff to be properly placed over the artery.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to use the correct size cuff and be sure to position it correctly on the client to prevent the stethoscope from contacting the cuff.

Ask Yourself:

How do I respond to this error?

Prevention:

Remove the cuff and reapply it, fitting it firmly on the upper arm so that the antecubital space is visible and repeat the blood pressure reading.

> NURSING TIPS

- Do not take an apical blood pressure on an arm with an AV shunt, IV, or if the client has a history of surgery or injury to the breast, axilla, or arm.
- The tubes extending from the blood pressure cuff bladder are not always centered on the bladder itself. It is not accurate to assume that the area between these tubes represents the center of the cuff bladder. Be sure to center the bladder by palpating the bladder itself.
- False high readings occur when the mercury column in the manometer is not positioned flat on a firm surface, when it is read above eye level, or when the extremity is below the heart's apex level.
- False low readings occur when the extremity is above the heart's apex level, when the cuff is too wide for the extremity, or when the mercury column in the manometer is read below eye level.
- If the nurse fails to recognize the auscultatory gap, the temporary disappearance of sounds at the end of Korotkoff's Phase I and beginning of Phase II, the systolic pressure is read at a false low.
- There are many different types and brands of BP measurement devices. Become familiar with the ones you will be working with.
- If an electronic blood pressure device is used, be sure to assess the accuracy of the machine. Use the same equipment when comparing a client's blood pressure.

SKILL 1-6

Weighing a Client, Mobile and Immobile

Bethany Campbell, RN, MN, OCN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Calibrate
Sling scale
Standing balance
scale

Standing electronic
scale
Weight



> OVERVIEW OF THE SKILL

A client's weight is an essential piece of data used in monitoring his response to a variety of therapies. Changes in a client's weight could necessitate an al-

teration in the assessment and intervention plans. An accurate weight is important, therefore, to ensure appropriate care.

> ASSESSMENT

1. Assess the client's ability to stand independently and safely on a scale. Consider factors requiring the use of a sling scale: the client is somnolent or comatose; paralyzed; too weak to stand; or unsteady when standing.
2. Determine if clothing is similar to that worn during previous weight measurement to help determine accuracy of the new weight.

> DIAGNOSIS

- 1.1.2.1 Altered Nutrition: More than Body Requirements.
- 1.1.2.2 Altered Nutrition: Less than Body Requirements.
- 1.4.1.2.1 Fluid Volume Excess.
- 1.4.1.2.2.1 Fluid Volume Deficit.

> PLANNING

Expected Outcomes:

1. Health care provider obtains accurate weight.
2. Client incurs no injuries.
3. Client maintains privacy.

Equipment Needed:

- Scale: standing electronic or balance scale (see Figure 1-6-2); or sling scale (see Figure 1-6-3)
- Recommended disinfectant
- 1–3 other staff members to assist when using sling scale
- Plastic cover for sling scale
- Gloves (when applicable)



Estimated time to complete the skill:
3 minutes when using standing scale
10 minutes when using sling scale



Figure 1-6-2 The standing balance scale is used to weigh ambulatory clients.

> CLIENT EDUCATION NEEDED:

1. When using the standing electronic scale, instruct the client not to step onto the scale until the digital display reads zero.



Figure 1-6-3 The sling scale is used to weigh clients in bed.

2. When using the sling scale, instruct the client when you would like him to turn, and inform him when you will be lifting him off the bed.
3. Instruct clients to track their weight at home and to weigh themselves without clothes, first thing in the morning after voiding.
4. Remind clients weighing themselves at home to use the scales on the same, even hard surface (kitchen or bathroom tile, hardwood floor).

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Standing Scale

1. Wash hands.
2. Introduce yourself to client and explain what you would like her to do.
3. Place scale near client.
4. Turn on scale and calibrate to zero.

1. Reduces transmission of microorganisms.
2. Builds rapport; involves client in her care.
3. Reduces risk of fall or injury.
4. Ensures accurate reading.

5. Ask client to step up on the scale and stand still (see Figure 1-6-4).

Electronic scale: Read weight after digital numbers have stopped fluctuating.

Balance scale: Slide the larger weight into the notch most closely approximating the client's weight. Slide the smaller weight to the notch such that the balance rests in the middle. Add the two numbers to read the client's weight.



Figure 1-6-4 Have client stand straight and still while on the standing scale so accurate measurements of weight and height can be obtained.

6. Ask client to step down and assist client back to the bed or chair, if necessary.
7. Wipe scale with appropriate disinfectant.
8. Wash hands.

Sling Scale

9. Wash hands and put on gloves.
10. Introduce yourself to client and explain what you would like him to do.
11. Place plastic covering on sling if available (can usually be ordered in bulk from the manufacturer).
12. Remove pillows. Turn client to one side and place half of sling on bed next to client with remaining half rolled up against client's back (see Figure 1-6-5).
13. Turn client to other side, and unroll rest of sling so it lays flat beneath client.

5. Obtains weight.

Reading is not accurate when the numbers are still fluctuating.

Weights on scale must be balanced to obtain accurate reading.



Figure 1-6-5 Turn client on one side and place sling on the bed.

6. Reduces risk of injury if client needs assistance.
7. Reduces risk of spread of infection.
8. Reduces transmission of microorganisms.
9. Reduces risk of nosocomial infection.
10. Builds rapport; involves client in his care.
11. Reduces risk of spreading infection between clients.
12. Most accurate weight will be obtained by leaving no other bedding between client and sling.
13. Turning in this manner maximizes client comfort.

Sling Scale *continued*

- 14.** Roll the scale over the bed such that the legs of the scale are underneath the bed (see Figure 1-6-6). Open and lock the legs of the scale.



Figure 1-6-6 After unrolling the rest of the sling under the client, move the scale into position over the bed.

- 15.** Turn on scale and calibrate to zero.
- 16.** Lower arms of the scale and slip hooks through holes in sling (see Figure 1-6-7).
- 17.** Pump scale until sling rests completely off the bed (see Figure 1-6-8).



Figure 1-6-8 Pump the scale until the sling lifts completely off the bed.

- 18.** Remind patient to remain still. Read weight after digital numbers have stopped fluctuating (see Figure 1-6-9).
- 19.** Lower client back to bed and remove arms of scale from sling (see Figure 1-6-10).

- 14.** Ensures equipment is being used safely to reduce risk of injury.



Figure 1-6-7 Attach the hooks through the holes in the sling.

- 15.** Ensures accurate reading.
- 16.** Attaches sling to scale to obtain weight.
- 17.** Ensures accurate weight.



Figure 1-6-9 Read the weight after the numbers have stopped fluctuating.

- 18.** Reading is not accurate when the numbers are still fluctuating.
- 19.** Prepare for removal of sling.



Figure 1-6-10 Lower the client back to the bed and remove the sling.

- | | |
|---|--|
| <p>20. Unlock legs, return to their original position, and remove scale from bed.</p> <p>21. Turn client from side to side to remove sling from underneath patient.</p> <p>22. Realign client with pillows and covers.</p> <p>23. Remove plastic covering from sling and discard per hospital policy.</p> <p>24. Remove gloves and wash hands.</p> <p>25. Wash hands.</p> | <p>20. Remove equipment to allow staff to remove sling from beneath client.</p> <p>21. Remove sling.</p> <p>22. Ensures comfort and privacy.</p> <p>23. Reduces risk of spread of infection.</p> <p>24. Reduces risk of nosocomial infection.</p> <p>25. Reduces transmission of microorganisms.</p> |
|---|--|

> EVALUATION

- Compare weight obtained to previously recorded weight. Repeat weight if large discrepancy noted.
- If large discrepancy still remains, notify appropriate health care team members.

> DOCUMENTATION

Vital Signs Flow Sheet

- Record the date and weight on area specific flow sheet.



▼ REAL WORLD ANECDOTES

A client was called back to the exam room area. The nurse wanted to check her weight on the standing scale in the hallway. The client was very upset that the nurse wanted to weigh her with her shoes on, which would add pounds to her weight. The nurse needed to hear that this individual was concerned and embarrassed about being overweight.

> CRITICAL THINKING SKILL

Introduction

Dramatic weight fluctuation may be explored by improper technique.

Possible Scenario

An immobile client has just been weighed using an over-the-bed scale. The nurse is alarmed that the client seems to have lost 20 pounds in 2 days. She records

her findings in the nurses' notes and alerts the nurse practitioner.

Possible Outcome

The nurse practitioner comes and repeats the weight. She finds the client has actually gained a pound. Upon reviewing her technique, the nurse realizes that she

probably did not lift the scale sling high enough to clear the bed, resulting in an inaccurate weight.

Prevention

Lift the sling high enough so that no part of the client touches the bed. Double-check any large change in weight with no apparent cause.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may need more assistance when moving to the scale. Consider using a sling scale if the client is too unsteady to stand independently.*



Pediatric Variations:

- *Pediatric scales are necessary to weigh infants. Follow the same steps as for a standing electronic scale, except place the infant on the scale after ensuring calibration, and elicit the caregiver's assistance in calming and distracting the child.*



Home Care Variations:

- *When using a client's own scale, assess its proper functioning, and use it in a consistent manner to ensure accuracy. For example, weigh the client using the scale on the same hard, even surface for each reading (e.g., bathroom or kitchen tile, hardwood floor).*
- *If you bring your own scale to a home visit, compare the two scales prior to recording weights from the different scales on the same flow sheet.*
- *Home scales may need to be adjusted so they read "0" when there is no weight on the scale.*



Long-Term Care Variations:

- *Establish an appropriate weigh schedule for the long-term client. It is easy to forget to weigh a client. Keeping an accurate weight will help monitor long-term gains or losses.*
- *Keeping a current weight will establish a baseline to compare with future changes.*

▼COMMON ERRORS—ASK YOURSELF**Possible Errors:**

Weight obtained differs greatly from previously recorded weight.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure scale is appropriately calibrated prior to use.

Ask Yourself:

How do I respond to this error?

Prevention:

Recalibrate the scale and repeat weight.

Possible Errors:

Sling scale begins to tip when client is lifted off the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to open the legs of the scale to broaden its support base.

Ask Yourself:

How do I respond to this error?

Prevention:

Lower the client, check legs, and open them if necessary.

> NURSING TIPS

- Weigh clients at the same time each day to enhance accuracy.
- Weigh clients in similar clothing each time to avoid unnecessary discrepancies.
- In an unfamiliar setting, check the bed. Some have a built-in scale.
- If a battery-operated electronic scale is used, plug it in between uses to keep the battery charged.

SKILL 1-7

Measuring Intake and Output

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Dehydration
Fluid balance
Fluid retention

Intake
Output



> OVERVIEW OF THE SKILL

One of the most basic methods of monitoring a client's health is measuring intake and output, commonly called "I and O." By monitoring the amount of fluids a client takes in and comparing this to the amount of fluid a client puts out, the health care team can gain valuable insights into the client's general health as well as monitor specific disease conditions.

To maintain good health, fluid intake should approximately equal fluid output. Intake that exceeds output can indicate medical conditions ranging from renal failure to congestive heart failure. Output that exceeds intake can be caused by things as serious as life-threatening diarrhea or as benign as diuretic medications. An accurate record of a client's fluid balance is an important nursing function.

Intake and output monitoring is often ordered by the physician or qualified practitioner but it can also be initiated by the nurse. Some institutions have policies regarding conditions that require intake and output monitoring as well. Generally clients who are receiving fluids through any route other than oral or who are losing fluids through any route other than voiding are placed on intake and output measurement. Clients with conditions that affect fluid balance, i.e., diabetes, renal failure, diuretic therapy, or anorexia also require intake and output monitoring.

Ideally intake and output should be monitored over several days to obtain an accurate record of the client's status. In critical situations, however, this may not be possible and the patient's intake and output may be monitored and reported on an hourly basis. A urine output of less than 30 cc per hour should be reported.

Daily weights are often done in conjunction with intake and output. Daily weights can indicate fluid retention or loss. One gallon of water weighs 8 pounds. An 8 pound weight gain over a 24–48 hour period could indicate a life-threatening condition for the client. A significant change in a client's weight or a significant difference in a client's total intake and output should be reported to the patient's physician or qualified practitioner.

Intake is considered to be any fluid consumed or infused. This includes water, juice, coffee, milk, ice cream, soup broth, and Jell-O®. Be sure to calculate the amount of water the client has consumed from the bedside water pitcher. Any fluids infused through IV lines, central lines, feeding tubes, or irrigant that is not returned is considered intake. Blood and blood products as well as the saline used to flush IV lines before and after the transfusion are also included in this count. IV piggybacks, fluids used to

measure cardiac output, central line flushes, and TKO (to keep often) fluids are also considered in the intake total.

Urine is the largest component of output fluid volume, but there are a number of other fluid loss avenues that must be considered. Diarrhea, diaphoresis, wound drainage, gastric or other fluids removed by suction, and bleeding are all fluid losses as well. These

losses should be measured or estimated and recorded in the total output.

If the client is able to understand and cooperate with the intake and output measurement, he should be encouraged to keep track of his fluid balance. Particularly in clients who are on a fluid restriction, client understanding and participation can greatly increase cooperation.

> ASSESSMENT

1. Assess the client's risk factors for fluid overload, such as congestive heart failure, renal failure, or ascites **because edema can result from excess volume in extracellular fluid spaces and transferring of fluid into tissues.**
2. Determine if the client is receiving fluids or medications that would predispose him to fluid overload such as large amounts of IV fluids or steroid therapy **because steroids cause sodium and water retention and excretion of potassium.**
3. Assess the client's risk factors for fluid loss such as diaphoresis, rapid respirations, diarrhea, gastric suction, blood loss, or wound drainage **because dehydration can result from reduction of fluid within the tissues and circulatory system.**
4. Determine if the client's urine output is in excess of his fluid intake **because the kidneys excrete excess fluid during periods of overhydration and conserve body water during periods of dehydration.**
5. Assess the client's ability to understand and cooperate with intake and output measurement **because cooperation in these measurements will help ensure accuracy.**

> DIAGNOSIS

- 1.4.1.2.1 Fluid Volume Excess.
- 1.4.1.2.2.1 Fluid Volume Deficit.
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit.

> PLANNING

Expected Outcomes:

1. The client's fluid intake and output will be accurately measured and recorded.
2. The client will participate in the recording of fluid intake and output to the best of his ability.

Equipment Needed (see Figure 1-7-2):

- I&O form at bedside
- I&O graphic record in chart
- Glass or cup
- Bedpan or urinal bedside commode
- Graduated container for output
- Nonsterile gloves
- Sign at bedside stating patient is on I&O



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct the client how to measure fluid intake using standardized volumes of glassware and dishes.
2. Teach the client which intake is considered to be fluid and which is not. Remind the client what is considered fluid intake, e.g., coffee, tea, and soda pop, as well as gelatin, ice cream, and Popsicles.
3. Teach the client to measure and record the amount of fluid his standard utensil hold and then to use those utensils exclusively.
4. Instruct client to void into a bedpan or urinal, not into a toilet.
5. Teach the client to dispose of toilet tissue in a plastic-lined container, not in the bedpan.



Figure 1-7-2 Intake and output forms

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Explain rules of I&O record. All fluids taken orally must be recorded on the client's intake and output form (sometimes called a fluid balance flow sheet).
 - Client must void into bedpan or urinal, not into toilet (see Figures 1-7-3 and 1-7-4).
 - Toilet tissue should be disposed of in plastic-lined container, not in bedpan.



Figure 1-7-3 Bedpan and urinal, protective pad, and graduated specimen container

3. Measure all oral fluids in accord with agency policy; e.g., cup = 150 ml, glass = 240 ml. Record all IV fluids as they are infused (see Figure 1-7-5).

Figure 1-7-5 All IV infused fluids must be measured.

4. Record time and amount of all fluid intake in the designated space on bedside form (oral, tube feedings, IV fluids).
5. Transfer 8-hour total fluid intake from bedside I&O record to graphic sheet or 24-hour I&O record on client's chart.
6. Record all forms of intake, except blood and blood products, in the appropriate column of the 24-hour record.

1. Reduces transmission of microorganisms.
2. Elicits patient support.
 - Fluid voided into the toilet cannot be measured.
 - Liquids absorbed into toilet tissue cannot be measured by volume.
3. Provides for consistency of measurement.



Figure 1-7-4 Graduated specimen container is used to measure urine, drainage, or other output.



4. Documents fluids.
5. Provides for data analysis of client's fluid status.
6. Documents intake by type and amount.

7. Complete 24-hour intake record by adding all 8-hour totals.

Output

8. Apply nonsterile gloves.

9. Empty urinal, bedpan, or Foley drainage bag (see Figure 1-7-6) into graduated container or commode “hat” (see Figure 1-7-7).



Figure 1-7-6 Urine in Foley drainage bag must be measured.

7. Provides consistent data for analysis of client’s fluid status over a 24-hour period.

8. Reduces potential for transmission of pathogens.

9. Provides accurate measurement of urine.



Figure 1-7-7 Empty urine into a graduated container to measure.

10. Remove gloves, and wash hands.

11. Record time and amount of output (urine, drainage from nasogastric tube, drainage tube) on bedside I&O record.

12. Transfer 8-hour output totals to graphic sheet or 24-hour I&O record on the client’s chart.

13. Complete 24-hour output record by totaling all 8-hour totals.

14. Wash hands.

10. Prevents cross-contamination.

11. Documents output.

12. Provides for data analysis of client’s fluid status.

13. Provides consistent data for analysis of client’s fluid status over a 24-hour period.

14. Reduces transmission of microorganisms.

> EVALUATION

- The client’s fluid intake and output was accurately measured and recorded.
- Note if the client was able to participate in the recording of fluid intake and output to the best of his ability.
- Note and report any abnormal findings to the client’s physician or qualified practitioner.

> DOCUMENTATION

Intake and Output Worksheet at Client’s Bedside

- Record all fluid intake and output.
- Add totals at the end of every shift.

Intake and Output Record in Client's Medical Record

- Add totals for 24 hours.

Nurses' Notes

- Any unusual findings, excessive intake, excessive output, or serious imbalance of intake and output should be documented and reported to the patient's physician or qualified practitioner.



▼ REAL WORLD ANECDOTES

Mr. Aguilar is a critically ill patient in the coronary care unit. During the night his nurse noted that his urinary output was 10 cc an hour for the past two hours. She called Mr. Aguilar's physician and received an order to give Mr. Aguilar an IV diuretic. While preparing to give Mr. Aguilar the diuretic, she took his vital signs and reassessed his condition. She noted that Mr. Aguilar's skin turgor was very poor and his skin was dry. He was complaining of thirst and his blood pressure was low. Mr. Aguilar's urine was dark and concentrated in appearance. The nurse called Mr. Aguilar's physician back with this information and voiced her concern that perhaps Mr. Aguilar's low urine output was due to dehydration rather than fluid retention. Mr. Aguilar's physician ordered a urine specific gravity test, which revealed that Mr. Aguilar was in fact dehydrated. An IV diuretic could have seriously harmed Mr. Aguilar in his dehydrated condition.

> CRITICAL THINKING SKILL

Introduction

Measuring and monitoring intake and output is critical to the care of a client, especially an infant.

Possible Scenario

An infant has been admitted to the pediatric unit. Her mother notes that she has been vomiting and having diarrhea. When asked, the mother was able to report how many times the baby had vomited and how many diaper changes she had performed, but she was unable to document how much fluid the baby had lost overall. The nurse admitting the baby was puzzled about how she was going to determine the baby's fluid balance baseline and how she was going to measure the baby's output. The nurse chose to use the infant's admission weight and hydration status as the baseline, ignoring the infant's current hydration status.

Possible Outcome

The infant's admission dehydration and electrolyte imbalance went untreated. The infant's status rapidly worsened, resulting in coma.

Prevention

Small children, and especially infants, are at increased risk of fluid imbalance problems. Infants have very small fluid reserves; a tablespoon of liquid is a much larger proportion of an infant's body weight than it is of an adult's. Uncontrolled diarrhea can kill infants in a matter of days. This baby girl is at risk and the nurse must be able to accurately assess the baby's fluid intake and output. The nurse can accurately assess incontinent fluid amounts by remembering how much water weighs. Weighing a diaper prior to placing it on the baby and then after it has been soiled can provide a good estimate of the amount of fluid the baby has lost. Likewise a pad placed to catch emesis, weighed before and after use, can provide an estimate of the amount of fluid the child has vomited. It is important to remember that small children cannot tolerate fluid and electrolyte loss as well as adults. Accurate measurement and keeping the physician informed of the results are essential when caring for children.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients are sometimes incontinent. Measuring output in an incontinent client can be difficult. Weighing the client's linen or incontinence pad prior to use and then weighing it again after it has been soiled can help the caregiver keep track of the amount of fluid output the client is generating.*

▼ VARIATIONS *continued*

- Elderly clients need a caregiver to monitor their fluid intake, especially when they are taking diuretics, supplemental potassium, and cardiac medication.
- Elderly clients are at risk for fluid and electrolyte imbalances from prolonged fever or gastroenteritis.



Pediatric Variations:

- The amount of fluid loss a child can tolerate is much smaller than that of an adult because of the proportionately smaller size of the child. Small amounts of fluid loss can be serious or fatal for small children.
- Infants and young children are at risk for fluid and electrolyte imbalances from prolonged fever or gastroenteritis.



Home Care Variations:

- The nurse should help the caregiver use standard cups and other utensils to measure intake and output.
- Assess the client's and caregiver's ability and compliance to record I&O.
- Provide appropriate charts and equipment, and teach how to record I&O.
- Ask the client and caregiver to perform a return demonstration for the procedure.



Long-Term Care Variations:

- Clients may suffer from a loss of appetite, including fluids.
- Clients may need assistance from a dietitian to prepare fluids that are appealing to them.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not counting the water the client drinks from the bedside pitcher.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the client is aware of the reasons for measuring his intake and output. Teach him how to keep track of it if he is able to understand. Be sure that any caregiver who is refilling water pitchers or providing juice understands the need to keep track of intake and how to do it. Teach the caregiver not to use the water in the pitcher to water flowers.

Ask Yourself:

How do I respond to this error?

Prevention:

Establish a system to mark each new pitcher of water the client receives. Measure the water left in the pitcher at the end of each shift. Ask the client to help you keep track of his intake.

> NURSING TIPS

- Pureed food is not considered to be fluid intake.
- Bottled nutrient tube feedings are liquid and must be considered in I&O.
- Record measurements immediately instead of waiting until the end of the shift.
- All postoperative clients are at risk for fluid loss through blood or plasma from their incision sites. Monitor the dressings.
- Remember that fluids taken to swallow pills must be recorded as intake (see Figure 1-7-8).
- Do not have visitors or family members empty bedpans, urinals, or catheter bags.



Figure 1-7-8 Even fluid used to swallow pills must be measured.

SKILL 1-8

Breast Self-Examination

Claretta Munger MSN, CPNP, ARNP,
and Carla A. Bouska Lee, PhD, ARNP C, FAAN

KEY TERMS

Assessment of
breasts
Breast development
Breast examination
Cancer prevention
Chest examination

Cyst
Fibrocystic disease
Mammogram
Physical assessment
of breasts
Tanner stage



> OVERVIEW OF THE SKILL

Physical assessment of the breast and axillae is part of periodic health maintenance examinations for both males and females of all ages. Breast cancer cannot be prevented, but early detection offers more treatment options, and a greater chance of cure. A breast examination performed by the nurse is accompanied by

breast examination education whenever possible. Teaching the client to perform monthly breast self-examinations, discussing risk factors, and prompting the client to seek recommended mammograms are essential for early diagnosis and treatment of breast cancer.

> ASSESSMENT

1. Assess client's musculoskeletal and range of motion ability to determine client's ability to participate and cooperate in examination.
2. Assess demonstrated health-seeking behaviors specific to obtaining breast examination as well as Pap and pelvic examinations to identify any education or health-seeking deficits.
3. Assess client's knowledge of breast self-examination and health maintenance recommendations for clinical examination to identify further education or health-seeking deficits.
4. Assess personal and family history relevant to cancers as well as breast and cervical abnormalities to assist in planning health management and screening schedules.
5. Assess if the client's health history reveals past or present use of hormonal medications, because a thorough follow-up may be necessary if any abnormalities are found since hormonal use is a known risk factor that may increase the risk for breast cancer.
6. Assess if the client's family history includes breast cancer in first-degree (mother or sister) or second-degree (aunt or grandmother) relatives, because a thorough follow-up may be necessary since this is a known risk factor.
7. Assess if the woman is postmenopausal because breasts in postmenopausal women may show normal atrophy of glandular tissue and increased striations.
8. Assess age for a male with enlarged breasts because breast enlargement in adolescent males is usually normal for puberty and is common when the boy is overweight.

> DIAGNOSIS

- 1.6.2.1.2.2 Potential for Impaired Tissue Integrity.
 5.4 Deficient Health-Seeking Behaviors.
 8.1.1 Knowledge Deficit.

> PLANNING

Expected Outcomes:

1. Normal breast examination. No dimpling, nodules, masses, inflammation, lesions, discharge, lymph node enlargement, or tenderness.
2. Client is able to demonstrate proper procedure for breast self-examination and offer a plan of when it will be performed monthly.
3. Client will identify when next screening should be performed.

Equipment Needed:

- Small pillow or towel
- Centimeter ruler
- Nonsterile gloves (sterile if open lesions or drainage)
- Drape/gown
- Teaching aid for breast self-examination



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct client not to use creams, lotions, or powders and not to shave underarms 48 hours before

the scheduled assessment as these things could alter the breast skin or cause folliculitis and lymph node enlargement.

2. Instruct client how to prepare for and what to expect from the procedure to decrease unnecessary anxiety and to maximize cooperation.
3. Remind client to inform you of any discomfort experienced during the procedure as it should not be uncomfortable.
4. Teach clients to initiate breast self-examinations during puberty when they start noticing breast growth before they start menstruating. They will remember better and are interested in their bodies at this stage.
5. Teach clients to examine on an easy to remember monthly date (1st day of the month, last day of the month, the 15th, or on the day of their birth, e.g., a client born April 26th would examine on the 26th of every month) rather than in relationship to the menstrual cycle. Menses are not always regular.
6. Women need a mammogram once between ages 35 and 40 and yearly after age 40. A family history of breast disease, previous abnormalities, and certain medical conditions require more frequent screening.
7. It is still necessary to perform monthly breast self-examinations and have yearly clinical examination even if receiving annual mammograms.
8. Persistent lumps should always be biopsied. Insist on a biopsy, if necessary.
9. Educate men to perform monthly breast self-examinations and obtain clinical examinations every 1–3 years as 1% of all breast cancer is found in men.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Review personal history, medications, allergies, and family health history.
2. Ask client to disrobe to the waist and to put on a gown with the opening in the front.
3. Wash hands. Apply gloves if required by institutional policy.

RATIONALE

1. Identifies risk factors and previous baseline (or lack of). Identifies allergies to latex.
2. Provides easy access while maintaining maximum privacy.
3. Prevents microorganism transfer and possible contact with discharge when palpating nipples.

continues

4. Assist client to sitting position facing you and expose chest and breasts (see Figure 1-8-2)

Figure 1-8-2 Assist client to sitting position facing the examiner.

4. Allows comparison of breasts bilaterally.



5. Inspect breasts, areola, and nipples:
 - With client's arms at sides
 - With client's arms raised (see Figure 1-8-3)
 - With client's hands pressed on hips (see Figure 1-8-4)
 - With client's arms extended straight ahead as client leans forward (may omit this position for male unless gynecomastia is present)



Figure 1-8-3 Inspect the breasts with the client's arms raised.

5. Observe for flesh color, slight inequities in size and symmetry, rounded shape, and smooth skin surface.

Redness, blue hue, retraction, dimpling, enlarged pores, edema, lumps, lesions, rashes, ulcers, and discharge are abnormal.

Supernumerary nipples along the milk line are a normal variant.



Figure 1-8-4 Inspect the breasts with the client's hands resting on hips.

6. Palpate adjacent lymph nodes: supraclavicular, infraclavicular, and subclavian (see Figures 1-8-5 and 1-8-6).



Figure 1-8-5 Palpate lymph nodes adjacent to breast tissue.

6. Nodes should be less than 1 cm in diameter and nontender.



Figure 1-8-6 Palpate infraclavicular lymph nodes.

7. Palpate breast: Using the palmar surfaces of the fingers, palpate the right breast by gently compressing the mammary tissues against the chest wall. Palpation may be performed from the periphery to the nipple, in either concentric circles or in wedge sections (see Figure 1-8-7).

Explain to client and teach breast self-examination as you examine.

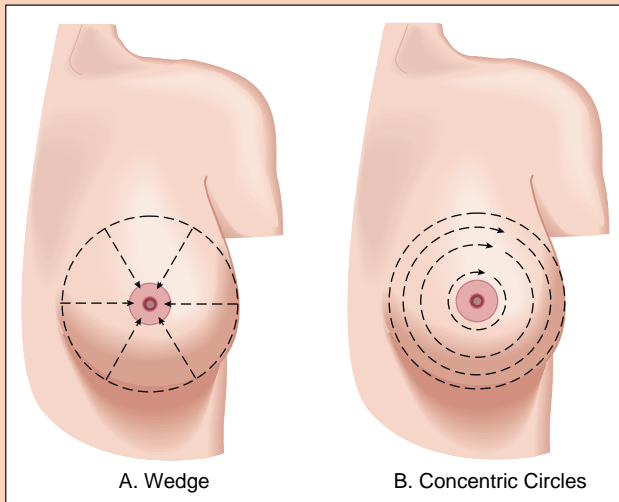


Figure 1-8-7 Palpation methods

- 8.** Palpate areola and nipple using similar circular technique as with breast. Pay special attention to subareolar area and gently press the nipple between your fingers.
- 9.** Palpate into axilla starting at anterior axillary line and continuing at an angle to the midaxillary line and up into the axilla (using same circular fingertip motion). Have client place arm at side and palpate deep into the axilla.
- 10.** Repeat Actions 7–9 on the left breast, areola, nipple, and axilla.
- 11.** Assist client to supine position. Place arm on examination side under head and place a small pillow under the same side scapula (see Figure 1-8-8).
- 12.** Palpate breast, areola, and nipple as in Actions 7–10 (see Figures 1-8-9 and 1-8-10).
- 13.** Assist client to sitting position. Review steps and ask client to return demonstrate breast self-examination.

7. Observe for warm temperature, elasticity, tenderness, pain, erythema, masses, or nodules, which are abnormal.



Figure 1-8-8 Place the client in a supine position.

- 8.** Observe abnormalities such as inflammation discharge, nodules, fissuring, or lesions.
- 9.** Identify posterior axillary, central axillary, anterior axillary, and lateral axillary node locations. Nodes should be less than 1 cm and non-tender.
- 10.** Identify normal versus abnormal as with right breast. Compare breasts bilaterally.
- 11.** Position spreads breast tissue over the chest wall, maximizing palpation accuracy.
- 12.** Reevaluate examination in second position.
- 13.** Provides more comfort for client. Evaluates success of your teaching.



Figure 1-8-9 Palpate the breast.



Figure 1-8-10 Palpate the areola and nipple.

14. Allow client to dress.

15. Remove gloves and wash hands.

16. Give client written materials to reinforce teaching. Instruct client when to schedule next clinical examination.

14. Provides for client's comfort.

15. Reduces transmission of microorganisms.

16. Reinforces teaching. Provides readily available form to client for reference when at home.

> EVALUATION

- Client is able to perform monthly breast self-examination.
- Client returns for clinical breast examination at prescribed time.
- Any abnormalities are identified early for referral evaluation and possible treatment.

> DOCUMENTATION

Nurses' Notes

- Record the date and time.
- Document findings of abnormalities and absence of abnormalities.
- Record the client's response to findings and teaching.
- Record a follow-up plan, if necessary.



▼ REAL WORLD ANECDOTES

Scenario 1

Three years ago a 52-year-old woman had a bilateral mastectomy due to cancer of the right breast. She chose the bilateral mastectomy due to increased risk of an aunt having the same kind of cancer in one breast and the trauma of having to return for a second surgery after a unilateral removal. She was relieved that she no longer needed to “worry” about cancer. She quit her monthly breast self-examinations thinking that she was no longer at risk. One day she noticed it hurt as she raised her left arm. An enlarged gland was causing the discomfort. She returned to her provider and had to undergo another surgery as well as follow-up treatment. It is possible that the course of treatment could have been shortened and the success rate increased had she continued her monthly breast self-examinations and her yearly clinical examinations. She is currently undergoing treatment.

Scenario 2

Mrs. Russell talks with a nurse practitioner about a soft, oblong lump she found in her left breast. She found the lump a week ago, but she did not think it was important because it was neither round like a pea nor firm. The nurse knows that masses may not be hard and may have irregular borders. She also knows that during a breast self-examination you should be sensitive to areas in the breast that “feel different” than the rest of the breast as opposed to looking for a clearly demarcated lump. The nurse orders additional assessment.

> CRITICAL THINKING SKILL

Introduction

Ms. Hernandez, who is 30 years old, asks whether she should worry about the lumps she frequently finds in her breasts. She has a history of polycystic disease.

Possible Scenario

She ignores the lumps, attributing them to polycystic disease.

Possible Outcome

One of the lumps is not just a cyst; it is malignant.

Prevention

Advise the client to never ignore lumps or diagnose them herself. She should continue monthly breast self-examinations and, at a minimum, have a yearly clinical exam. She should report any new or changed lumps to her primary provider and ask for an assessment no matter how many times the tests show a lump is benign.

▼ VARIATIONS



Geriatric Variations:

- Breasts are less firm, more pendulous, and often atrophied. The tissue is more coarse and more nodular.
- Be sure to lift pendulous breasts to inspect the skin under the breasts. This is a frequent site of yeast infection and needs immediate treatment. Do not use cornstarch to dry this area because cornstarch promotes yeast growth.
- Striae are normal with aging.



Pediatric Variations:

- At puberty when breast development starts, breasts are frequently asymmetrical.
- Overweight adolescents often falsely appear to have gynecomastia, especially during the prepubescent increase in adipose tissue.
- Inverted nipples are “normal” variants.
- Infants may have nipple discharge and up to 2 cm breast tissue from maternal estrogens.



Pregnancy Variations:

- Striae are common during pregnancy and sometimes after pregnancy if breasts remain large.
- Enlargement, tingling, tenderness, increased vascularity, increased alveoli, nodularity, darkening of the areolae, and erect and sensitive nipples are common during pregnancy.
- Lactation may occur prior to delivery. Colostrum may be secreted beginning in the second trimester (week 16).
- Note if nipples are inverted as this requires more teaching if breastfeeding is planned.



Home Care Variations:

- Teach a caregiver or family member the breast self-examination procedure if the client is unable to perform own examination.
- Omit certain positions, if necessary, for clients with medical conditions that limit movement or balance.
- If a client is rarely out of bed, teach the client or a caregiver to perform the breast self-examination when the client is both sitting up in a chair and lying in bed.



Long-Term Care Variations:

- Omit certain positions, if necessary, for clients with medical conditions that limit movement or balance.
- If a client is rarely out of bed, the nurse or caregiver can perform the breast self-examination when the client is sitting up in a chair or lying in bed.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Breast self-examination was stopped after no lumps were detected using the first two positions. An existing lump was not detected.

Ask Yourself:

How do I respond to this error?

Prevention:

Never assume that no detection of lumps in the first few positions means you will find nothing in the remaining positions. Do not rush the examination.

Ask Yourself:

How do I prevent this error?

Prevention:

Carefully explain each step and substep to the client. It is important for the client to understand the importance of every step so she can perform breast self-examinations and receive follow-up screening.

Possible Error:

Client does not understand how to correctly perform breast self-examination.

Ask Yourself:

Did I carefully explain each step and substep to the client?

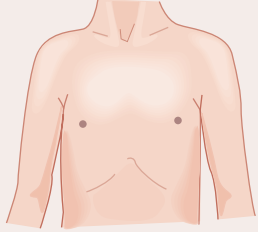

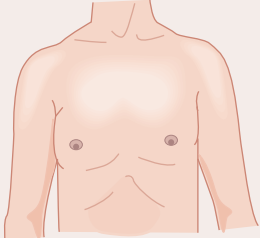
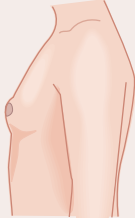
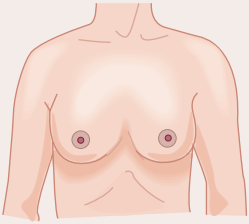
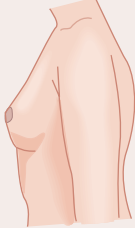
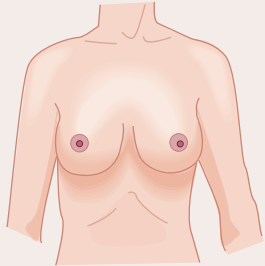

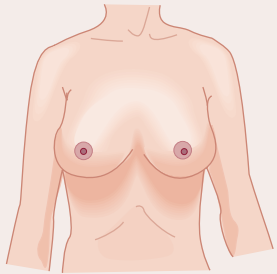

Prevention:

It is important for the client to understand the importance of every step so she can perform regular breast self-examinations and receive follow-up screening.

> NURSING TIPS

- Women who have had breast surgery still need clinical and monthly breast self-examinations to examine the chest area, incisional area, clavicular area, and axillae.
- Putting on gloves prior to palpation often makes the client more comfortable as it adds an element of depersonalization.
- To reinforce self-examination, use the same circular examination techniques recommended for breast self-examination, but a wedge or vertical pattern may be used as well. It is often helpful to use these alternate techniques to reexamine any abnormalities you find. It does not alarm the client as much.
- Use the flat pads of three fingers to palpate the breast tissue by compressing it gently against the breast wall.
- Use a bimanual palpation technique in large and/or pendulous breasts.
- Usually if you explain exactly what you are doing and what you are looking for as you examine there are no misunderstandings. If you are at all uncomfortable performing an examination, ask a “witness” to assist you to be sure that the client does not misinterpret your actions as inappropriate. With children, have the parent witness your examination.
- Expose only the area(s) being examined without undue exposure of other areas. For example, expose both breasts for inspection to compare bilaterally and then cover one breast while you palpate the other.
- Breasts are not always symmetric. Always review breast development in light of Tanner’s sexual maturity ratings (see Table 1-8-1). Correlate this with genital development whenever possible.
- Refer all abnormal or questionable findings. Describe nodules and masses as to number, shape, consistency, definition, mobility, tenderness, and skin retraction.

Table 1-8-1 Sexual Maturity Rating for Female Breast Development

		Developmental Stage
		1. Preadolescent stage (before age 10). Nipple is small, slightly raised.
		2. Breast bud stage (after age 10). Nipple and breast form a small mound. Areola enlarges. Height spurt begins.
		3. Adolescent stage (10–14 years). Nipple is flush with breast shape. Breast and areola enlarge. Menses begins. Height spurt peaks.
		4. Late adolescent stage (14–17 years). Nipple and areola form a secondary mound over the breast. Height spurt ends.
		5. Adult stage. Nipple protrudes; areola is flush with the breast shape.

Data from *Health Assessment & Physical Examination*, by M.E.Z. Estes, 1998, Albany, NY: Delmar Publishers. Copyright 1998 by Delmar Publishers.

SKILL 1-9

Collecting a Clean-Catch, Midstream Urine Specimen

Carla A. Bouska Lee, PhD, ARNP C, FAAN,
and Gaylene Bouska Altman, RN, PhD

KEY TERMS

Clean-catch specimen
Clean-voided specimen

Midstream specimen
Specimen
Urine specimen



> OVERVIEW OF THE SKILL

A clean urine specimen to be used for culture and sensitivity can be collected without using an invasive method such as catheterization. This procedure is referred to as a clean-voided, clean-catch, or midstream urine specimen in that it is not a sterile procedure such as catheterization, but rather a method of obtaining a clean specimen. This procedure is best accomplished with the client on the toilet because the use of a urinal or bedpan increases the risk of contamination. The client is asked to clean himself and ini-

tiate urination. After the client starts voiding, a sterile collection cup is placed under the stream of urine and a specimen collected, hence it is called midstream collection. The initial urine is not collected because this portion of the stream flushes the urethral opening and meatus of any bacteria. The end urine is not collected because as the urine stream slows, and increased dripping and contact with the meatus occurs, the chance of contamination increases. The clean-catch specimen is sent to a laboratory for analysis.

> ASSESSMENT

1. Evaluate the client's ability to obtain a clean-catch specimen to **determine if the client is able to clean himself appropriately and understands the need to obtain a midstream specimen.**
2. Assess the presence of signs and symptoms of urinary tract infections or other abnormalities **because burning or the inability to control urination may hamper the client's ability to obtain a clean specimen.**

> DIAGNOSIS

- 1.3.2 Altered Urinary Elimination.
- 9.1.1 Pain, related to potential urinary tract infection.
- 8.1.1 Knowledge Deficit, related to personal hygiene.
- 7.1.1 Body Image Disturbance.

> **PLANNING**

Expected Outcomes:

1. Client will be able to obtain a clean, midstream specimen.
2. Client will have absence of urinary abnormalities, such as burning, tingling, pain upon urination, or inability to control stream.
3. Client will understand procedure.

Equipment Needed (see Figure 1-9-2):

- Sterile collection container with lid and label
- Sterile midstream kit, antiseptic towelettes, or cotton balls with antiseptic solution
- Toilet paper
- Nonsterile gloves
- Sterile gauze (optional)

> **CLIENT EDUCATION NEEDED:**

1. Instruct client regarding need for clean, noncontaminated, specimen.
2. Instruct client how to collect specimen, open kit or towelettes, and use antiseptic solutions.
3. Instruct client regarding need for procedure.



Figure 1-9-2 Sterile specimen cup and gloves



Estimated time to complete the skill:
10–15 minutes

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Check orders and assess need for procedure. 2. Gather equipment. 3. Assess the client’s ability to complete the procedure, including understanding, mobility, and balance. 4. Assess the client for signs and symptoms of urinary abnormalities. 5. Check the client’s identification. 6. If client is to complete procedure in privacy, explain procedure, give equipment to client, and wait for specimen. If client has decreased personal hygiene, perform the procedure after bath or have client wash perineal area before procedure. | <ol style="list-style-type: none"> 1. Provides understanding of the purpose of procedure. 2. Provides for organization. 3. Improves compliance and likelihood of obtaining sterile specimen. 4. Improves compliance and provides baseline data. 5. Ensures accuracy. 6. Increases compliance. Protects client from embarrassment. |
|---|---|

continues

7. If nurse is to perform procedure: Wash hands and apply gloves. If client is to perform procedure instruct client to wash hands before and after the procedure. If the client is more comfortable, allow him to wear gloves.
8. Provide privacy.
9. Instruct the client. Female client: Sit with legs separated on the toilet. Male client: Sit down to help control splashing.
10. Using sterile procedure open kit or towelettes (see Figure 1-9-3). Open sterile container, placing the lid with sterile side up on firm surface (see Figure 1-9-4).
7. Decreases transmission of microorganisms.
8. Decreases embarrassment.
9. Increases compliance and understanding.
10. Prevents contamination of specimen.



Figure 1-9-3 Open specimen cup and kit or cleansing towel packages prior to beginning the procedure.



Figure 1-9-4 Place the lid on a firm surface, sterile side up. Do not touch the inside of the lid.

11. Use thumb and forefinger to separate labia, or have client separate labia with fingers (see Figure 1-9-5).
11. Provides access for cleaning labia.



Figure 1-9-5 Separate the labia with the fingers of the non-dominant hand.



Figure 1-9-6 Cleanse each side and down the middle using a single downward stroke for each towelette. Keep the labia separated.

- 12.** Female client: With the labia separated, use a downward stroke (from the top of the labia down toward the rectal area), and cleanse one side of the labia with the towelette (see Figure 1-9-6).

Discard the towelette and repeat the procedure on the other side with another towelette, keeping the labia separated at all times. With a third towelette, use a downward stroke from the top of the urethral opening to the bottom. Discard the towelette.

Male client: Pull back the foreskin (if present in uncircumcised male) and clean with a single stroke around meatus and glans. Use a circular motion starting with the head of the penis at the urethral opening, moving down the glans shaft. Discard the towelette and repeat the procedure with another towelette, keeping the foreskin retracted. Cleanse the head of the penis three times using a circular motion. Use a new towelette each time.

- 13.** Ask the client to begin to urinate into the toilet. After the stream starts with good flow, place the collection cup under the stream of urine. Avoid touching the skin with the container. Fill the container with 30–60 cc of urine and remove the container before urination ceases (see Figure 1-9-7). Wipe with toilet paper.

Figure 1-9-7 Place the specimen cup under the urine stream.

- 14.** Place the sterile lid back onto the container and close tightly (see Figure 1-9-8). Clean and dry the outside of the container with a towelette. Wash hands. Label and enclose in a plastic biohazard bag (see Figure 1-9-9), and follow facility policy for transporting specimen to the laboratory.

- 12.** Cleans area and prevents contamination of clean area. Prevents contamination by feces. Keeping labia separated avoids contamination and decreases microorganisms in specimen.

Prevents contamination of microorganisms from foreskin. Single strokes and moving away from opening prevents contamination of urethral opening.

- 13.** The specimen is collected midstream to avoid contamination of urine that touches the labia. The initial urine flushes bacteria from the orifice and the end urine may have contact with the meatus or labia, and hence be contaminated.



- 14.** Prevents contamination of sterile specimen, prevents spillage, and ensures accuracy.



Figure 1-9-8 Replace the lid and close tightly.



Figure 1-9-9 Label the container with the client, date, and time the specimen was collected.

15. Remove and dispose of gloves and wash hands.

15. Decreases transmission of microorganisms.

> EVALUATION

- Evaluate characteristics of urine.
- Evaluate client's compliance.
- Evaluate client's complaints associated with urination, such as burning, pain, or inability to initiate urination.

> DOCUMENTATION

Nurses' Notes

- Document procedure.
- Document characteristics of urine.
- Document client's signs and symptoms associated with urination.



▼ REAL WORLD ANECDOTES

Mr. Alvarez, 65 years old, is asked by a physician's assistant to provide a urine specimen. The nurse gives him a container and instructions on how to obtain a sterile clean-catch specimen. Mr. Alvarez is afraid he will not be able to produce enough urine if he waits for a midstream collection so he places the cup prior to beginning urination. When he returns the filled specimen cup, the nurse asks him if he followed her instructions. He admits that he did not get the sample midstream. The nurse explains the importance of following the procedure to obtain a sterile sample. Mr. Alvarez is asked to return after lunch.

> CRITICAL THINKING SKILL

Introduction

Helping a client overcome embarrassment can prevent an invasive procedure.

Possible Scenario

A client came into the emergency room at 2:30 AM with a fever of 102.3°F, complaining of bloody urine, dizziness, chills, and pelvic pain. The physician ordered a clean-catch urine specimen. The client was given a sterile specimen cup and ordered to go into the bathroom and return with the sample immediately, as the lab courier was waiting. At the front counter, with several staff and family members within earshot, the nurse gave the client instructions on how to clean herself and void.

Possible Outcome

Embarrassed by the request to void on demand, and the thought that several people knew she was in the bathroom voiding, the client was not able to void. The nurse was unable to collect a specimen. After several attempts, the physician ordered the client catheterized to obtain a sterile sample.

Prevention

Increase fluids. Provide both visual and auditory privacy for client education. Assess the client for signs of anxiety and embarrassment and plan the procedure to minimize embarrassment and provide support and education. If the client is having difficulty complying, obtain a specimen later, if possible. Plan ahead, if possible,

and encourage fluids before it is time for collection of specimen. Do not stand over the client, and do not stand immediately outside the door unless there is a risk of fainting or falling. If the client is embarrassed, leave the room after the explanation. Inform the client that you are leaving, and when you will return. Point out the

assistance call button prior to leaving. Instruct the client to call when the specimen is collected. Use techniques to encourage urination, such as running water, applying a moist compress over the abdomen or labia in women, pouring water over the labia, and placing hands under warm water.

▼ VARIATIONS



Geriatric Variations:

- *Elderly patients may have difficulty controlling stream.*
- *If arthritis is present, the client may have difficulty holding labia apart.*
- *Labia are enlarged with age and can be difficult to keep separated.*



Pediatric Variations:

- *Explain the procedure to a family member.*
- *In young children parents may prefer to obtain the specimen.*
- *Teenagers may be especially embarrassed by the request for a specimen, and need control and privacy over the procedure when possible.*



Home Care Variations:

- *Ensure that client understands the need for the sterile specimen.*
- *Specimens must be fresh and transported to the laboratory shortly after collection. Plan a specimen collection time, and a time when the specimen will be delivered to the laboratory.*
- *If specimens will be collected at home, ensure that the client has a sterile specimen cup and towelettes. Instruct clients to place container in a Ziploc® bag and refrigerate until it is delivered to a laboratory; prevents the growth of bacteria and promotes accuracy of results.*



Long-Term Care Variations:

- *Ensure that client understands the need for the sterile specimen.*
- *Specimens must be fresh and transported to the laboratory shortly after collection. Plan a specimen collection time, and a time when the specimen will be delivered to the laboratory.*
- *If specimens will be collected at home, ensure that the client has a sterile specimen cup and towelettes. Instruct clients to place container in a Ziploc® bag and refrigerate until it is delivered to a laboratory; prevents the growth of bacteria and promotes accuracy of results.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Specimen is contaminated because client does not understand cleaning procedure and need for specimen to be collected midstream.

Ask Yourself:

How do I respond to this error?

Prevention:

Explain to the client the importance of obtaining a clean specimen and the correct procedure. Ask the client to provide another sample.

▼ COMMON ERRORS—ASK YOURSELF *continued*

Possible Error:

Specimen contaminated by labia not held apart during voiding.

Ask Yourself:

How do I respond to this error?

Prevention:

Explain to the client the importance of obtaining a clean specimen and the correct procedure. Ask the client to provide another sample.

Possible Error:

The specimen container lid is placed upside down on a surface and contaminated.

Ask Yourself:

How do I respond to this error?

Prevention:

Do not use the contaminated lid. Obtain a new one instead.

Possible Error:

The specimen is not labeled.

Ask Yourself:

How do I respond to this error?

Prevention:

Always label the specimen immediately after it is obtained. There is no other way to identify the specimen.

> NURSING TIPS

- Labia may be slippery after cleansing; therefore, use sterile dry gauze to hold apart during urination.
- Clients often do not understand the need to remove specimen container before completing urination; therefore carefully explain the purpose for mid-stream collection.
- Place lid on firm surface within close reach.
- Send the specimen to the laboratory immediately. It must be fresh for accurate analysis.
- Label time of collection on specimen.
- If a container touches the client's skin and is contaminated, obtain a new specimen cup. If necessary, arrange to have the client return to obtain another specimen.

SKILL 1-10

Testing Urine for Specific Gravity, Ketones, Glucose, and Occult Blood

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Diastix
Dipstick
Glucose
Ketones
Occult blood

Specific gravity
Test tape
Urine refractometer
Urinometer



> OVERVIEW OF THE SKILL

Urine samples can be used to test specific gravity, ketones, glucose blood, pH, protein, nitrates, and bilirubin. Specific gravity is the concentration of dissolved substances in the urine as compared to water. The normal range of specific gravity is approximately between 1.010 and 1.025 g/mL. If urine is dilute and less concentrated, it will be closer to water with no substances, 1.000. Overhydration, or any disease that affects the ability of the body to concentrate substances in the urine, will cause a low specific gravity. Any condition that increases water reabsorption in the kidney will result in a high specific gravity.

Specific gravity testing takes only a few minutes. A rough screen can be done using a dipstick that measures specific gravity, such as a reagent strip. Reagent strips measure specific gravity through color changes, which are compared to a chart provided by the manufacturer. For greater precision, a urinometer or refractometer may be used. A urinometer measures specific gravity by displacement. Dissolved substances in the urine will push, or displace, the bulb upwards. A reading is taken at the meniscus. The measurement revealed urinometer is a comparison of where the bulb would be floating in pure water. Concentrated particles in the urine push the bulb higher and yield a higher reading. A refractometer measures specific gravity using the refraction of light as it

passes through a drop of urine on glass. A beam of light passing through the urine will bend and change direction. The amount of the bend, or refraction, is changed by the amount of dissolved substances in the urine. When frequent, exact measurements of specific gravity are required, refractometers are the best choice; however, refractometers are expensive compared to urinometers or dipsticks.

Test strips or dipsticks that are specific for ketones, glucose, blood, pH, proteins, nitrates, and bilirubin can be used to measure specific substances. These products use various names. Some examples and substances measured are ketostix (ketones), keto-diastix (glucose, ketones), clinistix and diastix (glucose), hemastix (blood), hemacombistix (pH, protein, glucose, blood), uristix (protein, glucose, nitrite, leukocytes), and labstix (pH, protein, glucose, ketone, blood). Many other examples are available. Other products can also be used to measure bilirubin, phenylketones, and leukocytes.

Multistix can be used to measure many possible substances (glucose, ketones, specific gravity, blood, pH, protein, nitrite, leukocytes, urobilinogen, and bilirubin). Sticks that measure multiple substances are generally more expensive. Tablets are available to measure glucose; however, these products are rarely used because dipsticks are readily available and easy

to use. Many different systemic changes can cause glucose, ketones, or blood in the urine. The presence of glucose usually indicates an elevated blood glucose (usually above 180 mg/dl); however, renal threshold can vary with each client. Most often blood glucose levels are used rather than urine glucose levels; however, this does require a venipuncture or finger prick. Ketones are present in the urine in starvation, dehy-

dration, and diabetic acidosis. The presence of ketones in the urine indicates that the body is burning fats for energy. Ketones alter the pH of urine to acidic. Blood in the urine indicates bleeding in the renal system or red blood cell breakdown elsewhere in the body, such as in trauma. Local bleeding, such as menstruation, surgery, or a recent delivery of a baby, may cause urine in the blood.

> ASSESSMENT

1. Assess the client's understanding of the urine test to be performed. **Determines what education should be provided.**
2. Assess the client's hydration, such as skin turgor, condition of the mucous membranes, fontanels (in infants), sunken eyes, intake, and output. **Provides information to help determine physical status in addition to urine tests.**
3. Assess the client's history for renal function (e.g., medical history and lab values, creatinine clearance). **Influences how the results of tests might be interpreted. Influences what tests might be performed.**
4. If measuring glucose, assess the client for signs and symptoms of increased glucose (polyuria, polydipsia, polyphagia, recent loss of weight, fatigue). **Provides information to help determine physical status in addition to urine tests.**
5. If the client is to perform long-term tests, assess the client's ability to perform the tests. **Determines what education should be provided.**

> DIAGNOSIS

- 1.4.1.2.1 Fluid Volume Excess.
- 1.4.1.2.2.1 Fluid Volume Deficit.
- 1.1.2.1 Altered Nutrition: More than Body Requirements.
- 1.1.2.2 Altered Nutrition: Less than Body Requirements.
- 8.1.1 Knowledge Deficit Regarding Urine Testing (e.g., client with elevated glucose).

> PLANNING

Expected Outcomes:

1. Normal specific gravity.
2. Absence of glucose and ketones in the urine.

3. The client understands the purpose of the test.
4. The client understands how to perform the test (if it is needed on a long-term basis).

Equipment Needed (see Figure 1-10-2):

- Urine specimen container
- Urinometer or refractometer for specific gravity
- Dipstick specific to product to measure
- Nonsterile gloves
- Watch or clock



Estimated time to complete the skill:

**5 minutes to collect urine;
5 minutes to perform test**

> CLIENT EDUCATION NEEDED:

1. Carefully explain the purpose of the test.
2. Instruct the client on the need for an uncontaminated specimen.
3. Instruct the client on the need for a second voided specimen for accuracy.
4. If the test is abnormal, explain what changes are necessary, e.g., increased glucose or dietary changes.



Figure 1-10-2 Reagent strips, pH papers, and urinometer are used to test urine for concentration, pH level, and specific substances, such as blood or ketones.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Overview—Measuring Specific Gravity

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. Apply nonsterile gloves. 2. Obtain urine from client either via clean catch (Chapter 1, Skill 1-9) or from catheter (Chapter 6, Skill 6-12). 3. Measure specific gravity using equipment available in your facility. 4. Discard urine according to standard precautions. 5. Remove gloves and wash hands. 6. Clean equipment with soap and water or according to manufacturer's instructions. 7. Record results and compare with previous recording. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Acquires a pure sample for testing. 3. Obtains a measurement using equipment available in your facility. 4. Reduces the transmission of microorganisms. 5. Reduces the transmission of microorganisms. 6. Reduces the transmission of microorganisms and prepares equipment for the next use. 7. Allow for accuracy and monitoring of client. |
|---|---|

Using a Digital Clinical Refractometer to Measure Specific Gravity

8. To use a digital refractometer (see Figure 1-10-3), become familiar with the manufacturer's instructions.

8. Ensures an accurate test.

Figure 1-10-3 Digital refractometer is to measure urine specific gravity.



- | | |
|--|---|
| <ol style="list-style-type: none"> 9. Use an eye dropper to drip urine onto the prism at the center of the stainless steel stage until the prism is covered. 10. Press the start/off button, or the button designated by the manufacturer, to activate the meter. The specific gravity reading is displayed. | <ol style="list-style-type: none"> 9. Following the manufacturer's instructions ensures an accurate reading. 10. Following the manufacturer's instructions ensures an accurate reading. |
|--|---|

continues

Using a Nondigital Refractometer to Measure Specific Gravity

11. For a urine refractometer: Collect a few drops of urine.
12. Place a drop of urine on the horizontal glass slide at the top of the scope.
13. Close the cover over the slide and turn on the light.
14. Look through the scope with one eye while keeping both eyes open.
15. Read the number at the line where the top black and lower white circle meet. Write down the number.
16. Clean the slide with a damp towel or gauze or according to manufacturer's recommendations.
11. Refractometers require only a drop or two of urine to measure specific gravity.
12. Following the manufacturer's instructions ensures an accurate reading.
13. Following the manufacturer's instructions ensures an accurate reading.
14. It is easier to visualize if both eyes are kept open.
15. Following the manufacturer's instructions ensures an accurate reading. Records an accurate reading since refractors are often kept in the utility room away from charting area.
16. Ensures equipment is ready for next use.

Using a Urinometer to Measure Specific Gravity

17. To measure specific gravity with a urinometer, at least 20 cc of urine are needed. Pour fresh urine specimen into glass cylinder to indicated line of urinometer, approximately 2/3 to 3/4 full (see Figure 1-10-4).
17. There must be enough time to make the bulb float, but it should not overfill the urinometer. The bulb should not touch the bottom of the urinometer. The meniscus of urine should be slightly below the top of the urinometer.



Figure 1-10-4 Fill the glass cylinder to the line with fresh urine.



Figure 1-10-5 Spin the glass stem in the urine.

18. Place urinometer on flat surface and gently spin the top of the glass stem (see Figure 1-10-5).
18. Necessary to obtain an accurate reading.
19. Wait until the stem stops moving up and down, then visualize the urinometer scale at eye level. Read at lowest point of meniscus where the urine level touches the calibrated scale (see Figure 1-10-6).
19. Necessary to obtain accurate results.



Figure 1-10-6 Read the calibrated scale when the stem stops spinning.



Figure 1-10-7 After dipping in fresh urine, wait the specified time interval before interpreting results.

Using a Dipstick to Test Urine for Glucose, Ketones, Occult Blood, or Specific Gravity

20. Collect a clean voided specimen.
 21. Obtain the correct product for testing. Check the expiration date.
 22. Review the instructions on the label. Visualize which color scale will be used.
 23. Follow the directions. The dipstick will usually be dipped into the container of urine and read at a specified time interval and according to a color scale on the bottle or tape holder as indicated by the manufacturer's instructions (see Figure 1-10-7).
 24. Record the results.
 25. Discard the urine and strip according to standard precautions.
 26. Remove gloves and wash hands.
20. Ensures accurate results.
 21. Products vary according to what is being measured. An expired product may produce an inaccurate reading.
 22. Accurate timing of reading is necessary for accurate results. Different manufacturers and different products require different procedures.
 23. Directions will vary according to different products; however, instruction, color scale, and time to visualize color changes will be included in instructions.
 24. Because the procedure is generally done in the utility room, results should be written down so accurate information will be transferred to the chart.
 25. Reduces the transmission of microorganisms.
 26. Reduces the transmission of microorganisms.

> EVALUATION

- Evaluate results of test and compare with previous results.
- Evaluate color of urine and any abnormal changes.

> DOCUMENTATION**Nurses' Notes**

- Document procedure and results.
- Document any visual changes noted in urine.

**▼ REAL WORLD ANECDOTES**

One nurse recalls her early nursing days and a particular learning curve. When she knew she needed to do a urine test using a dipstick, she would grab a strip from the bottle in the supply room and carry it down the hall to the client's room. She would then dip it in the sample in the client's bathroom and subsequently realize that she needed to compare it to the chart on the container that was sitting down the hall in the supply room.

> CRITICAL THINKING SKILL**Introduction**

Nurses should be able to evaluate visual changes in urine and the results of the test.

Possible Scenario

Your client comes in for a routine outpatient visit and physical exam. You need a urine sample, so you instruct the client on the procedure for obtaining a clean-catch urine specimen. She returns from the bathroom with the specimen, which looks dark. You perform the test for occult blood and it is positive.

Possible Outcome

You question the client further and discover that prior to voiding she removed her tampon so that the string would not dangle in the cup. You determine that the urine has been contaminated with blood from menstruation. You make arrangements to have the client return later in the afternoon to provide a second specimen.

Prevention

Since you cannot cover every possible contingency when providing instruction on how to collect a clean-catch urine sample, teach the client the importance of the goal to obtain uncontaminated urine for accurate testing.

▼ VARIATIONS**Geriatric Variations:**

- *Elderly clients may have a more difficult time collecting uncontaminated urine. Women especially may have difficulty because of labial changes that occur with age. They may need more careful assistance or instruction in collecting specimens.*
- *Elderly clients may have a difficult time reading the small print on the label or the color scale and may need assistance or a magnifying glass.*

**Pediatric Variations:**

- *A specific gravity can be obtained with a urine refractometer even with only a drop or two of urine from a wet diaper.*
- *Normal specific gravity values may vary slightly for children.*

**Home Care Variations:**

- *Contamination of the specimen may occur. Carefully instruct the client on the need for clean catch and second voided specimen.*

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *Instruct the client and caregiver on the need to use dipsticks or test tapes that are not past the expiration date. To save money, some clients may cut test tapes; doing so increases the risk for inaccurate readings.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Overfilling urinometer with urine.

Ask Yourself:

How do I prevent this error?

Prevention:

Avoid pouring from a large container with a large volume of urine. It is more difficult to control. Note carefully how much urine is needed to fill the urinometer to the correct amount.

Possible Error:

Urine contaminated with feces.

Ask Yourself:

How do I prevent this error?

Prevention:

Remind the client that the urine is being measured and tested when you place the bedpan, commode, or escort the client to the bathroom.

Possible Error:

Inaccurate timing with test strip if instructions not read ahead of time.

Ask Yourself:

How do I prevent this error?

Prevention:

Read the instructions before testing the urine.

> NURSING TIPS

- Visualize urine before tests to look for contamination.
- Read instructions before dipping stick or test tape in urine.
- Have at least 20 cc of urine for urinometer.
- Verify that urine specimen is second voided and explain need to client.

SKILL 1-11

Performing a Skin Puncture

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Capillary
Edematous
Lancet

Microhematocrit
Micropipette



> OVERVIEW OF THE SKILL

Skin punctures are performed when small quantities of capillary blood are needed for analysis or when the client has poor veins. Capillary puncture is also commonly performed for blood glucose analysis. The common sites for capillary punctures are the:

- Heel—most common site for neonates and infants
- Fingertip—the inner aspect of palmar fingertip used most commonly in children and adults
- Earlobe—used when the client is in shock or the extremities are edematous

> ASSESSMENT

1. Assess the condition of the client's skin at the potential puncture site to determine if it is intact, free of bruising, and can be used without causing undue trauma to the site.
2. Assess the circulation at the potential puncture site to determine if it is a good site to obtain a sample, and to determine if healing at the site might be compromised.
3. Assess the client's comfort level regarding the procedure to determine client education and support needed.
4. Assess the cleanliness of the client's skin to determine how much cleansing is needed prior to the skin puncture.

> DIAGNOSIS

1.6.2.1.2.2 Risk for Impaired Skin Integrity.

9.1.1 Pain.

9.3.1 Anxiety.

> PLANNING

Expected Outcomes:

1. An adequate blood specimen will be obtained.
2. The client will suffer minimal trauma during the specimen collection.
3. The specimen will be collected and stored in a manner compatible with the ordered tests.

Equipment Needed (see Figure 1-11-2):

- Antiseptic 70% isopropanol or povidone-iodine
- Microhematocrit tubes or micropipette (collection tubes)
- Sterile 2 × 2 gauze
- Sterile lancet
- Nonsterile gloves
- Hand towel or absorbent pad



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the reason that the lateral aspect of the finger is used to avoid the nerve endings at the tip of the finger.
2. Tell the client to hold pressure on the site for several minutes following the blood collection to prevent seepage of blood into the tissues.



Figure 1-11-2 Various lancet devices, povidone-iodine, gauze, and gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Check client's identification band if appropriate. 3. Explain procedure to client. 4. Prepare supplies: <ul style="list-style-type: none"> • Open sterile packages. • Label specimen collection tubes. • Place in easy reach. 5. Apply gloves. 6. Select site: Lateral aspect of the fingertips in adults/children. 7. Place the hand or heel in a dependent position; apply warm compresses if fingers or heel are cool to touch. 8. Place hand towel or absorbent pad under the extremity. 9. Cleanse puncture site with an antiseptic and allow to dry. Use 70% isopropanol if client is allergic to iodine (see Figure 1-11-3). | <ol style="list-style-type: none"> 1. Reduces transmission of microorganisms. 2. Ensures correct client. 3. Allays anxiety and encourages cooperation. 4. Ensures efficiency. 5. Decreases the health care provider's exposure to blood-borne organisms. 6. Avoids damage to nerve endings and calloused areas of the skin. 7. Increases the blood supply to the puncture site. 8. Prevents soiling the bed linen. 9. Reduces skin surface bacteria; povidone-iodine must dry to be effective. |
|---|---|

continues



Figure 1-11-3 Cleanse the puncture site and allow it to dry.

10. With nondominant hand, apply gentle milking pressure above or around the puncture site. Do not touch puncture site.
11. With the sterile lancet at a 90° angle to the skin, use a quick stab to puncture the skin (about 2 mm deep) (see Figure 1-11-4).
12. Wipe off the first drop of blood with sterile 2 × 2 gauze; allow the blood to flow freely (see Figure 1-11-5).



Figure 1-11-5 Allow the blood to flow from the puncture site to make sure an adequate amount of blood can be obtained.

13. Collect the blood into the tube(s). If a platelet count is to be collected, obtain this specimen first (see Figure 1-11-6).
14. Apply pressure to the puncture site with a sterile 2 × 2 gauze (see Figure 1-11-7).

Figure 1-11-7 Apply pressure to the puncture site to stop further bleeding.



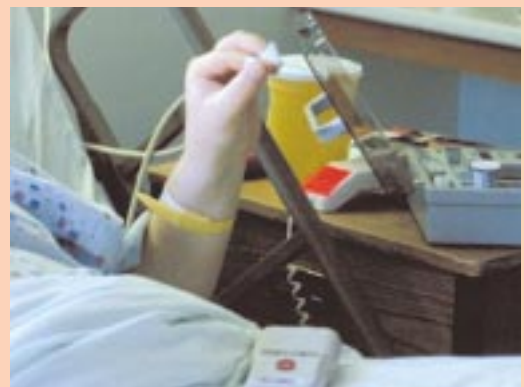
Figure 1-11-4 Use a quick stab to puncture the skin.

10. Increases blood to puncture site and maintains asepsis.
11. Provides a blood sample with minimal discomfort to the client.
12. First drop may contain a large amount of serous fluid, which could affect results. Pressure at the puncture site can cause hemolysis.



Figure 1-11-6 Collect a small sample of the blood.

13. Allows blood collection; avoids aggregation of platelets at the puncture site.
14. Controls bleeding.



- | | |
|---|--|
| <p>15. Place contaminated articles into a sharps container.</p> <p>16. Remove gloves; wash hands.</p> <p>17. Position client for comfort with call light in reach.</p> <p>18. Wash hands.</p> | <p>15. Reduces risk for needle stick.</p> <p>16. Reduces transmission of microorganisms.</p> <p>17. Provides for comfort and communication.</p> <p>18. Reduces transmission of microorganisms.</p> |
|---|--|

> EVALUATION

- Determine that specimen is adequate.
- Evaluate the client's condition for trauma.

> DOCUMENTATION

Nurses' Notes

- Document the puncture site and the reason for the puncture.
- Report test results if the testing is performed at the time of the puncture.



▼ REAL WORLD ANECDOTES

While performing capillary puncture for blood glucose monitoring, the nurse noted that despite what appeared to be an adequate puncture, the site was not bleeding. In an attempt to encourage a free flow of blood, the nurse gently squeezed the client's fingertip. Blood suddenly squirted from the puncture site, spraying the nurse's face. It is a good idea not to squeeze the area of a skin puncture but to let the blood flow freely.

> CRITICAL THINKING SKILL

Introduction

It is important to put the client at ease as much as possible.

Possible Scenario

A local company is offering free cholesterol tests. The sample is obtained using skin puncture and a capillary tube. Because of an unexpectedly large turnout at lunchtime, some clients have been waiting in line for an hour. A heavy-set male client sits down to have his cholesterol tested. He is pale and diaphoretic. He notes that he has always been frightened of any kind of needles and has fainted in the past. His stomach is growling.

Possible Outcome

The nurse feels pressure to work quickly because of the long line. She ignores the client's words and fails to note his physical symptoms. As she begins, the client com-

plains of "feeling queasy," then abruptly tumbles from the chair in a faint. Supplies and tubes tumble with him, and the chair is knocked over. The waiting line shortens considerably.

Prevention

Skin puncture is a frightening procedure to most people. Many people have unpleasant memories regarding this procedure. This client's apprehension regarding the procedure caused him to faint. Prior to venipuncture, the nurse should have allowed the client to sit a few minutes and talk about his concerns regarding the procedure. He needed to be reassured that skin puncture is done with a much smaller and sharper blade than in the past. If the client continued to seem pale and perhaps hypoglycemic, the nurse should have encouraged him to go eat lunch and come back a little later. Only perform the test if the client's condition seems stable. Be prepared if the client faints or vomits.

▼ VARIATIONS



Geriatric Variations:

- *The elderly often have very thin, fragile skin. When performing capillary puncture, be careful not to tear the skin.*



Pediatric Variations:

- *The heel is the most frequently used site for infants and neonates. Placing a warm pack on the infant's heel often increases the blood flow from the puncture site.*



Home Care Variations:

- *The home care client should be encouraged to rotate sites even if this is awkward at first.*
- *Teach the home care client to maintain sharp lancets for capillary puncture by frequently changing lancets rather than using the same one repeatedly.*



Long-Term Care Variations:

- *Clients who require frequent capillary puncture for blood level monitoring should be encouraged to rotate the sites used for puncture. Using both lateral aspects of all fingers can help prevent soreness and bruising at any one site.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The puncture is too shallow to obtain a sufficient specimen.

Ask Yourself:

How do I prevent this error?

Prevention:

This problem is usually resolved with practice. Think to yourself, why wasn't the puncture deep enough to obtain enough blood? Could this be the result of poor equipment or poor technique? Is the puncture blade sharp enough? Is it designed to enter skin to a measured depth and then retract? Did I use enough force to puncture the skin deeply enough? There are a number of devices on the market designed specifically for skin puncture. Try several types of devices until you find one you are comfortable using. Occasionally, the blade is not pressed tightly enough against the skin to obtain a deep, clean puncture. Be sure to use enough force to hold the puncture device tightly enough against the skin to obtain a deep, clean puncture.

> NURSING TIPS

- Have the client hold his hand in a dependent position while you are setting up the equipment to promote venous engorgement in the fingertips.
- Be sure the client's hands are warm.
- Use the client's nondominant hand, if possible.

SKILL 1-12

Measuring Blood Glucose Levels

Susan Weiss Behrend, RN, PhD, Catherine H. Kelley, RN, MSN, OCN, and Susan Randolph, RN, MSN, CS

KEY TERMS

Blood glucose meters	Capillary blood glucose
Blood glucose monitoring	Diabetes management
Blood glucose testing	Insulin management



> OVERVIEW OF THE SKILL

Advances in technology have enabled the nurse, client, and/or caregiver to perform some laboratory tests at the bedside or in the home setting. Blood glucose monitoring, using either reagent strips or glucose meters, combined with a skin puncture lancet, is an example of such technology. The convenience of this test has dramatically changed the ongoing management of many clients, particularly those with diabetes.

Testing of blood glucose can be done by obtaining a blood sample through venipuncture or by obtaining capillary blood with a skin puncture. In situations requiring frequent blood glucose monitoring, the preferred method of blood sampling is the skin puncture technique.

There are primarily two methods used to measure blood glucose. Both methods require a large drop of blood obtained through skin puncture with a sterile lancet. The first method requires that the drop of blood be applied to a special chemical reagent

strip. The participant visually compares the reagent strip to a color chart on the reagent container. Accuracy may be compromised if the result falls between two colors and the participant must estimate the blood glucose level. Examples of reagent strips include Chemstrip BG, Glucostix, and Trendstrips.

A second method of blood glucose monitoring replaces the visual comparison method with the use of a portable meter. Once the blood is placed on the reagent strip, the meter provides an accurate measurement of the blood glucose. There are a variety of meters available, including Glucometer II (Ames), Accucheck III (Boehringer, Mannheim), Glucoscan 3000 (Lifescan), and One Touch (Lifescan). Because models vary and technology continues to change, it is essential that the nurse or client using the device review the specific manufacturer's operating guidelines and be familiar with the equipment. Failure to do so could compromise the test results.

> ASSESSMENT

1. Review the physician's or qualified practitioner's order for glucose monitoring to determine if the order specifies the method (reagent strip versus meter).
2. Also identify which type of equipment is available at your facility. It is imperative to be knowledgeable of the type of method used and specific meter that is available for use. Accurate test results depend on proper use of all equipment involved.

3. Review the client's medical history for diabetes, any visual impairment, or anticoagulant therapy. A thorough knowledge of the client's medical history is important—even when the test performed is a relatively simple procedure. Visual impairment or other client disabilities can hinder self-care and may affect test results. Other factors, including anticoagulant therapy, may result in prolonged bleeding at the skin puncture site, which is problematic, unless the nurse, caregiver, or client applies proper pressure to the site.
4. Determine if the test requires special timing, e.g., before or after meals. Blood glucose levels are affected by diet and the test may be scheduled at very specific intervals. Therapy orders are based on the assumption that the test results are accurate.
5. Assess the client's or caregiver's ability to manage the equipment and perform the test accurately if the care will be provided at home. Proper client/caregiver education is essential; clients/caregivers should return demonstrate to the nurse their ability to carry out the test and clean the equipment before they assume such a responsibility.
6. Assess the client's understanding of the rationale for the test and the importance of accurate results. Determine the client's willingness to perform the test and identify if the client will incorporate the test schedule into his daily routine. Compliance to the expected schedule and procedure is more likely to occur when the client is knowledgeable of the rationale for the procedure. Some clients may have difficulty with some aspects of the procedure, such as the finger stick, and may be unwilling to participate in self-care.
7. Assess the client's sites for skin puncture. Sites should have good skin integrity in order to minimize risk of infection and promote healing.



Figure 1-12-2 Blood glucose meter. There are many types and brands of glucose meters available.

> DIAGNOSIS

- 9.3.1 Anxiety. The client may have anxiety or fear related to the procedure of skin puncture.
- 9.3.1 Anxiety. The client may have anxiety related to a diagnosis of diabetes.
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity. The client may have an alteration in skin integrity related to the diagnosis.
- 7.2 Sensory/Perceptual Alterations. The client may have an alteration in visual acuity or sensorium related to the disease process.

> PLANNING

Expected Outcomes:

1. Blood glucose level is maintained within a normal range.
2. Client/caregiver demonstrates accurate performance of the procedure.
3. Client verbalizes an understanding of the importance of the test and the need for accurate results.
4. Client verbalizes minimal anxiety associated with the procedure.
5. Skin puncture sites remain free of signs and symptoms of infection.

Equipment Needed (see Figures 1-12-2 and 1-12-3):

- Reagent strips
- Disposable gloves
- Lancet or automatic lancing device



Figure 1-12-3 Blood glucose meter, penlette, and test strips

- Paper towels
- Alcohol wipe
- 2 × 2 gauze
- Cotton ball
- Blood glucose meter



Estimated time to complete the skill:
10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the purpose and schedule for the test.
2. Provide information related to how the test results will affect the client's disease state management.
3. Discuss the time it will take for the client to master the skill.
4. When possible, include the caregiver in the teaching session to provide backup for the client in the home setting.
5. Provide information to clients regarding providers who can supply equipment needed for their diabetes care.
6. Require the learner to return demonstrate the procedure—including proper management of the equipment (cleaning, storage).
7. Help clients determine resources available if the meter malfunctions.
8. Help clients determine what their insurance plan covers related to nursing care, equipment, and medication needs.
9. Offer information on local and national organizations that provide information or support to clients with diabetes.
10. Review Standard Precautions with the client/caregiver.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Review orders, identify client, and review manufacturer's instructions for meter usage.
2. Wash hands.
3. Assemble the equipment at the bedside (see Figure 1-12-4).

Figure 1-12-4 Assemble blood glucose testing equipment next to the client.

4. Have client wash hands with soap and water and position client comfortably in a semi-Fowler's position or upright in a chair.

RATIONALE

1. Prevents performing an invasive procedure on the wrong client as well as promotes accuracy of results.
2. Reduces transmission of microorganisms.
3. Allows for a smooth procedure.



4. Reduces transmission of microorganisms and increases blood flow to the puncture site. Avoid having client stand during the procedure, as some individuals are prone to fainting.

continues

5. Remove a reagent strip from the container and reseal the container cap. Then, turn on meter.
6. Calibrate meter following manufacturer's instructions by inserting strip into meter.
7. Remove unused reagent strip from the meter and place it on a clean, dry surface (paper towel) with the test pad facing up.
8. Apply disposable gloves.
9. Select appropriate puncture site, and perform skin puncture (see Figure 1-12-5).



Figure 1-12-5 Perform the skin puncture.

10. Wipe away the first drop of blood from the site.
11. Gently squeeze the site to produce a large droplet of blood.
12. Transfer the drop of blood to the reagent strip by carefully moving the site over the strip. The droplet should transfer without smearing (see Figure 1-12-6). (Note: Some meters require that the blood droplet be applied to the strip that is already in the meter.)
13. Quickly press the timer on the meter and lay the strip next to the meter on a clean, dry surface.
14. Apply pressure to the puncture site (see Figure 1-12-7).

5. Tight closure of the container keeps strips from discoloring from environmental factors. Activates meter for test.
6. Some meters need to be calibrated; others require the timer to be adjusted; each meter has different requirements when setting it up for use.
7. Moisture may alter results of the test.
8. Protects from contamination by blood.
9. Collects blood necessary for test.



Figure 1-12-6 Transfer a drop of blood to the test strip.

10. This drop may impede accurate results because it may contain a large amount of serous fluid.
11. Do not contaminate site by touching it; the droplet of blood needs to be large enough to cover the test pad on the reagent strip.
12. The test pad must absorb the droplet of blood for accurate results. Smearing of the blood will alter results.
13. Timing is critical to produce accurate results. Always check manufacturer's instructions because meters vary in technique.
14. This will stop the bleeding at the site.



Figure 1-12-7 Apply pressure to the site.

- | | |
|--|--|
| <p>15. After 60 seconds, wipe the blood from the test pad with a cotton ball; place the strip into the meter. (Note: This step may vary with meter.) Allow the timer to continue.</p> <p>16. Read the meter for results found on the unit display.</p> <p>17. Turn meter off and dispose of test strip, cotton ball, and lancet properly.</p> <p>18. Remove disposable gloves and place them in appropriate receptacle.</p> <p>19. Wash hands.</p> <p>20. Review tests results with client.</p> <p>21. Notify physician or qualified practitioner of results.</p> <p>22. Wash hands.</p> | <p>15. This step is specific to certain meters (e.g., Accu-Check III) that require the strip to enter the meter dry.</p> <p>16. Each meter has a specified time for the reading to occur.</p> <p>17. Reduces contamination by blood to other individuals; sharps must always be handled properly to protect others from accidental injury.</p> <p>18. Reduces transmission of microorganisms.</p> <p>19. Reduces contamination of microorganisms.</p> <p>20. Promotes participation in health care.</p> <p>21. Results will be used to determine treatment plan for client.</p> <p>22. Reduces transmission of microorganisms.</p> |
|--|--|

> EVALUATION

- Reinspect the puncture site for bleeding or tissue injury.
- Compare glucose reading to client's previous glucose results.
- Compare client's results to normal blood glucose levels.
- Ask client to explain importance of the results.
- Ask client to return demonstrate procedure with next scheduled test.

> DOCUMENTATION

Flow Sheet

- Glucose test results
- Procedure and site used
- Appearance of puncture site
- Client's response to the procedure (feelings of lightheadedness, nausea, etc.)
- Abnormal results reported to physician or qualified practitioner
- Client's understanding of the procedure and ability to demonstrate the technique
- Medication Record
- Date and time insulin administered



▼ REAL WORLD ANECDOTES

Scenario 1

Ms. Smith is an elderly woman, newly diagnosed with type 1 diabetes. The new diagnosis was overwhelming to her. She is fearful that she cannot remember all of the material that she needs to learn in order to administer insulin and test her blood glucose level. The nurse in the clinic scheduled her teaching appointments and began the process of client education. In the clinic setting, Ms. Smith gradually felt more competent with the blood glucose monitoring technique. The next day at home she tried the technique she had been taught. Her blood glucose level was significantly lower than the results she had recorded when at the clinic. She called her clinic nurse, who in turn reported the low results to the physician, who decreased her next dose of insulin. Ms. Smith was later urgently admitted for symptoms of hyperglycemia. Apparently, when reviewing information with her nurse, Ms. Smith realized she had forgotten to wipe off the first drop of blood from her finger. She had used a blood sample that was diluted with serous fluid, making her blood glucose level abnormally low. In retrospect, it would have been more appropriate to have asked Ms. Smith to recheck her results at the clinic before changing her prescription, especially because the nurse was familiar with the client's usual blood glucose levels.

Scenario 2

Kelly is a 5-year-old, newly diagnosed with type 1 diabetes, whose parents are becoming quite efficient in the care of their daughter. The mother demonstrated the procedure for blood glucose monitoring and felt comfortable with the procedure. However, when it was time to test Kelly's blood glucose, Kelly refused to allow her mother to puncture her finger with the lancet. After much frustration, the nurse recommended that Kelly try the automated device. With her mother's help, Kelly and her favorite doll learned how to press the release button. Eventually, as Kelly became more comfortable with the "magic button," she allowed the device to be used for her blood glucose monitoring. It is important to incorporate play into the medical care of young children and to allow them to actively participate in the process.

> CRITICAL THINKING SKILL

Introduction

Accurate test results for blood glucose monitoring are critical because treatment decisions are based on those results. Documenting the results in a designated log/chart in the client's record is equally important.

Possible Scenario

Mr. Jones was admitted for symptoms of hyperglycemia associated with his long history of diabetes. His treatment plan included six-hour management of his blood glucose. The nurse was very busy and neglected to document the meter reading on the flow chart. The physician asked Mr. Jones if his test had been performed. He answered "yes" and stated what meter reading he had

seen on the display. The physician ordered a dose of insulin based on those results.

Possible Outcome

The obvious concern is that the meter reading was not properly documented and only anecdotal. There is considerable risk to the client if the insulin dosage is based on inaccurate blood glucose readings.

Prevention

Prompt documentation of all meter readings; notification of abnormal results to the physician or qualified practitioner; and informing the client of test results are actions that help prevent errors in this situation.

▼ VARIATIONS



Geriatric Variations:

- Warming fingertips will facilitate vasodilatation and collection of the blood droplet.
- Older clients are at risk for visual impairment; care should be taken to verify that the client is able to read the meter results accurately.
- Involve a caregiver in the teaching to provide backup for the elderly client, particularly in the home setting.



Pediatric Variations:

- Painful procedures such as a skin puncture for a blood sample should be performed in a procedure room rather than the client's hospital room.
- Have assistance from staff to restrain the child or infant during the skin puncture.
- Topical numbing creams applied to the site prior to the puncture may reduce the discomfort associated with the test.
- Allow the child to choose the puncture site, when possible.
- Allow the child and parent to demonstrate the procedure; incorporate play activity into the procedure as needed.
- When using the heel of an infant, warm the foot prior to the skin puncture.



Home Care Variations:

- Glucose monitoring meters are common devices used for home management of clients with diabetes. The nurse should note the manufacturer of the equipment and review proper maintenance of the device with the client. The nurse should also review proper disposal of equipment in the home environment.



Long-Term Care Variations:

- In long-term care facilities, employees performing blood glucose monitoring should be familiar with the device used for the client to ensure accurate results.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The manufacturer's requirements were not reviewed before testing, which resulted in an inaccurate result.

Ask Yourself:

How do I prevent this error?

Prevention:

Maintain information related to the meter in a place that is accessible to all nursing personnel. Review the specific technique required by the manufacturer.

Ask Yourself:

How do I respond to this error?

Prevention:

Repeat the test using the correct technique. Select a different puncture site on the client.

> NURSING TIPS

- Clients admitted to the hospital who have been performing blood glucose monitoring may choose to continue to perform the procedure themselves. The nurse has an opportunity to review information, assess accuracy of the client's techniques, and offer information on new equipment that may be available.
- Clients referred to home care may rent meters from those providers. It is important that the client teaching plan is consistent with the equipment delivered to the home.
- Understand the blood glucose level "norms" for an individual client. If the new level is significantly different, suspect an error in administration of the procedure and determine other factors that may impair accurate results.

SKILL 1-13

Collecting Nose, Throat, and Sputum Specimens

Kathy Lilleby, RN

KEY TERMS

Cultures
Nasal
Nasopharyngeal

Sputum
Swab
Throat



> OVERVIEW OF THE SKILL

A nose, throat, or sputum specimen is a simple diagnostic tool for clients with signs or symptoms of upper respiratory or sinus infections. Nose and throat specimens are collected from the client using a sterile swab. Sputum specimens are collected in a sterile cup. Spu-

tum specimens can also be obtained via a specimen trap connected to suction and then sent to the lab. The specimen is placed in a culture medium to allow pathogenic organisms to grow if they are present. A diagnosis can be determined based on this analysis.

> ASSESSMENT

1. Assess the client's understanding of the purpose of the procedure so he will be able to cooperate.
2. Assess the type of nasal or sinus drainage in order to determine what kind of collection equipment will be needed.
3. Review the physician's or qualified practitioner's orders for the cultures requested so repeat cultures are not done.
4. Assess the client for postnasal drip, sinus headache or tenderness, nasal congestion, or sore throat in order to know why the procedure is being done.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection.
- 9.3.1 Anxiety Regarding the Procedure.

- 1.6.1 Risk for Injury.
- 8.1.1 Knowledge Deficit Regarding the Procedure.

> PLANNING

Expected Outcomes:

1. An adequate specimen will be obtained.
2. The procedure will be performed with a minimum of trauma to the client.

Equipment Needed (see Figures 1-13-2, 1-13-3, and 1-13-4):

- Two sterile swabs in sterile culture tubes or a flexible wire sterile swab with cotton tip for nose or throat cultures (see Figure 1-13-3).
- Tongue blades
- Penlight



Figure 1-13-2 Penlight, tongue depressors, cotton swabs, culture medium, emesis basin, and gloves

- Facial tissues
- Clean, disposable gloves
- Nasal speculum (optional)
- Emesis basin or clean container
- Sterile specimen cup, or sputum specimen collector



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the procedure, that it is painless but may cause gagging.



Figure 1-13-3 Prepackaged sterile swab and culture medium containers



Figure 1-13-4 Sterile specimen cup and tube

2. Provide written or illustrated instructions on collecting cultures.
3. Discuss the rationale for obtaining the culture.
4. Discuss the time delay for the culture results.
5. Remind the client that the culture collection requires cooperation.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and put on clean gloves.
2. Ask client to sit erect in bed or on chair facing nurse.
3. Prepare sterile swab for use by loosening top from container (see Figure 1-13-5).

1. Reduces transmission of microorganisms.
2. Provides easy access to nose or throat.
3. Prevents contamination of swab.

continues



Figure 1-13-5 Loosen the swab top from container.



Figure 1-13-6 Depress the tongue with tongue blade.

Collecting Throat Culture

4. Ask client to tilt head backward, open mouth, and say "ah."
5. Depress anterior one third of tongue with tongue blade for better visualization (see Figure 1-13-6).
6. Insert swab without touching cheek, lips, teeth, or tongue.
7. Swab tonsillar area from side to side in a quick, gentle motion (see Figure 1-13-7).



Figure 1-13-7 Swab the sample area using a quick gentle motion.

8. Withdraw swab without touching adjacent structures and place swab in culture tube. Crush ampule at bottom of tube and push swab into liquid medium (see Figure 1-13-8).
9. Secure top to culture tube and label with client's name.
10. Discard tongue depressor, and remove gloves and discard. Wash hands.

4. Promotes visualization of pharynx, relaxes throat muscles, minimizes gag reflex.
5. Promotes visualization of pharynx, but may induce gag reflex.
6. Prevents contamination of the specimen with oral flora.
7. Ensures collection of microorganisms. Retains microorganisms in the culture tube and ensures the life of bacteria for testing.



Figure 1-13-8 Crush ampule to release the culture medium.

8. Prevents contamination from outside microorganisms and erroneous culture results.
9. Prevents identification mistakes.
10. Reduces transmission of microorganisms.

Collecting Nose Culture

11. Instruct client to blow nose and check nostrils for patency with penlight.
12. Ask client to occlude one nostril, then the other, and exhale.
13. Ask client to tilt head back.
14. Insert swab into nostril until it reaches the inflamed mucosa and rotate the swab.
15. Withdraw the swab without touching adjacent structures and place swab in culture tube. Crush ampule at bottom of tube and push swab into liquid medium.
16. Secure top to culture tube and label with client's name.
17. Remove gloves and discard. Wash hands.
11. Clears nasal passages of mucus containing resident bacteria.
12. Determines the optimal nasal passage from which to obtain the specimen.
13. Promotes visualization of the sinuses.
14. Ensures the swab will be covered with the appropriate exudate.
15. Prevents contamination from normal nasal flora and erroneous culture results.
16. Prevents identification mistakes.
17. Reduces transmission of microorganism.

Collecting of Nasopharyngeal Culture

18. Follow Actions 11–17 except use a swab on a flexible wire that can reach the nasopharynx via the nose.
18. Allows for access to the nasopharyngeal area.

Collecting a Sputum Culture

19. Explain to the client that the specimen must be sputum, coughed up from the back of his throat or lungs.
20. Have a sterile specimen cup ready for the sample and some tissue at hand.
21. Have the client take several deep breaths and then cough deeply (see Figure 1-13-9).
19. Promotes client cooperation.
20. The specimen must be collected in a sterile cup to prevent contamination.
21. This helps to loosen secretions so the client will be able to provide a specimen.



Figure 1-13-9 Have the client cough deeply.

Collecting a Sputum Culture *continued*

- 22. Have client expectorate the sputum into the sterile cup without touching the inside of the cup.
- 23. Place the lid on the specimen container without touching the inside of the lid or the container.
- 24. Provide the client with tissue and make him comfortable.
- 22. Prevents contamination of the specimen.
- 23. Prevents contamination of the specimen.
- 24. Promotes client comfort.

Alternative Sputum Collection Method

Generally used if the client is unable to expectorate an adequate sample

- 25. Obtain a sterile suction catheter and an inline sputum collection container.
- 26. Provide the client with warm humidified air for about 20 minutes if it is not contraindicated by his condition.
- 27. Hook the sputum collector up to suction tubing and a suction device (see Figure 1-13-10). Hook the suction catheter to the sputum collector.
- 25. Prevents contamination of the specimen.
- 26. Helps to loosen secretions in the lungs.
- 27. Prepare the equipment prior to having the client cough.



Figure 1-13-10 Sputum collector for use with suction

- 28. If the client is able to cooperate, have him take several deep breaths and cough.
- 29. As the client is coughing up sputum, carefully insert the catheter either orally or nasopharyngeally into the back of the throat and suction the sputum into the specimen container.
- 30. Safely dispose of the suction catheter.
- 31. Close the specimen container.
- 28. Loosens the secretions and brings them up to the back of the throat.
- 29. Obtains a sterile specimen that is not contaminated with saliva.
- 30. Prevents the spread of microorganisms.
- 31. Prevents contamination of the specimen.

- | | |
|--|---|
| <p>32. Provide tissue or other measures for patient comfort.</p> <p>33. Wash hands.</p> <p>34. Label each specimen with client's name.</p> <p>35. Send specimen to laboratory.</p> | <p>32. Promotes client comfort.</p> <p>33. Reduces transmission of microorganisms.</p> <p>34. Promotes correct diagnosis for client.</p> <p>35. Provides most accurate results.</p> |
|--|---|

> EVALUATION

- An adequate specimen was obtained.
- The procedure was performed with a minimum of trauma to the patient.

> DOCUMENTATION

Nurses' Notes

- Record the date, time, and site from which the specimen was obtained.
- Note any bleeding or obvious trauma as a result of the procedure.



▼ REAL WORLD ANECDOTES

When a respiratory syncytial virus (RSV) epidemic broke out in the city, school children were lined up to have throat cultures taken. Many of the children were frightened and their parents were impatient. Three nurses were taking the cultures and the child at the head of the line was supposed to go to the next available nurse. Danny was next in line and saw Nurse Prezbindowski. Danny was frightened and his mother was angry about the long wait. Danny was crying and his mother had to hold him and encourage him as the nurse took the throat culture. Danny's mother was obviously upset by the procedure and vented her frustrations to Nurse Prezbindowski. The culture was finally obtained and Danny and his mother quickly left the room. After they left, Nurse Prezbindowski discovered that Danny's mother hadn't fully completed the laboratory form. She did not put an address or a phone number on the form. Nurse Prezbindowski was not able to contact Danny's mother to obtain the information and without that information Danny's culture could not be processed by the lab. Danny's long wait and fearful cooperation was jeopardized by the missing information. Complete paperwork was required before the sample could be submitted to the lab. Before Danny and his mother left, the nurse should have reviewed the paperwork.

> CRITICAL THINKING SKILL

Introduction

An accurate specimen is necessary so that appropriate treatment can be initiated.

Possible Scenario

Mr. Habakangus was admitted to the hospital with suspected pneumonia. His doctor had ordered a sputum specimen in order to definitely diagnose pneumonia and determine what microorganism was causing the infection. You bring Mr. Habakangus a sterile specimen cup and explain the procedure to him. Mr. Habakangus speaks very little English, but he seems to understand what you are asking him to do. He takes several deep breaths, coughs, and spits into the cup. The specimen is

obviously saliva and you attempt to explain again that what is needed is sputum from his lungs. He tries to provide the needed specimen once more, but again he is able to provide only saliva.

Possible Outcome

You report to Mr. Habakangus' physician that you were unable to obtain a specimen. Without an accurate culture and sensitivity, his physician will have to prescribe a broad-spectrum antibiotic and hope it will work against the pneumonia. Mr. Habakangus may or may not get better quickly. His hospital stay and illness could be unnecessarily prolonged.

You reassure Mr. Habakangus and place a heated mist mask on him to help loosen the secretions. After

about 15 minutes, you return with a sterile suction catheter, suction tubing, and an inline specimen container. You explain to Mr. Habakangus that you will try to suction the sputum from the back of his throat. You assure him that the procedure is a little unpleasant but not painful. Once again you instruct him to take several deep breaths and cough, but you ask him to cough with his mouth open so you can insert the suction catheter. When you use the catheter to suction his airway, the specimen in the cup is green and thick and appears to be sputum. You dispose of

the catheter, cap the specimen cup, and comfort Mr. Habakangus. Because a sterile sputum specimen was obtained, the doctor will be able to pinpoint what organism is causing the pneumonia and how best to treat it.

Prevention

Educate the client regarding the importance of obtaining an actual sputum specimen and not saliva. Saliva has diagnostic value and sending an inadequate specimen only delays appropriate treatment for the client.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have difficulty tilting their head back due to osteoarthritis.



Pediatric Variations:

- Showing the tongue blade and penlight to a child before inserting it into the mouth may decrease anxiety.
- Ask the parent to help gently hold a child's head while obtaining a nose or throat culture.



Home Care Variations:

- When obtaining a specimen that will not be sent to the lab right away, be sure to store it in a cool place to prevent growth.



Long-Term Care Variations:

- When obtaining a specimen that will not be sent to the lab right away, be sure to store it in a cool place to prevent growth.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The agitated, confused client moves his head while a nasal culture is being obtained, contaminating the specimen and causing bleeding.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the client's ability to hold still during the procedure.

Ask Yourself:

How do I respond to this error?

Prevention:

Stop the bleeding by applying pressure to the bridge of the nose. Use a new culture swab and ask for assistance from a coworker to help stabilize the client's head while obtaining the culture.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The client gags on the tongue blade and contaminates the swab with his tongue.

Ask Yourself:

How do I prevent this error?

Prevention:

Instruct the client on how to obtain a throat culture.

Ask Yourself:

How do I respond to this error?

Prevention:

Remove the tongue blade and swab. Obtain a new culture swab. Ask the client to relax and take deep breaths. Depress the tongue blade on only the anterior half of the tongue. Swab the throat.

> NURSING TIPS

- Ask the parent or caregiver for assistance in obtaining the culture.
- Have the appropriate culture media available.
- Reassure the client of the short time of the procedure.
- Loosen the swab in the tube before having the client open his mouth for obtaining the throat culture.

SKILL 1-14

Testing for Occult Blood with a Hemoccult Slide

Kathy Lilleby, RN

KEY TERMS

Feces

Gastrointestinal

Guaiac

Intestinal

Occult blood

Stool



> OVERVIEW OF THE SKILL

The fecal occult blood test (FOBT), also known as the guaiac or guaiac-based test, detects microscopic amounts of blood in the stool. A color change is visualized by the use of hydrogen peroxidase on guaiac-impregnated paper. People can lose small amounts of blood as a result of minor abrasions of the nasopharyngeal or oral mucosa. In addition, hemorrhoids, rectal fissures, or rectal trauma can lead to blood in the stool. Blood can appear in the stool from cancers,

ulcers, or ulcerative colitis. The test is useful in diagnosing gastric or intestinal irritation, upper gastrointestinal ulcers, and colon cancer. When more than 50 ml of blood enters the feces from the upper gastrointestinal tract, the stool becomes darker and is called melena. This easy test requires only a small amount of stool and the client can be instructed how to collect the specimen for the test at home.

> ASSESSMENT

1. Assess the client's or family member's understanding of the need for this test **so the nurse can provide needed teaching.**
2. Assess the client's ability to cooperate with the procedure to collect the specimen **to maintain privacy while a sample is obtained.**
3. Assess the client's medical history for bleeding or gastrointestinal disorders. **The nurse can initiate screening tests.**
4. Assess any medications the client receives that can cause gastrointestinal bleeding, such as anticoagulants, steroids, or acetylsalicylic acid, **to help determine the need for the test, and/or the possible source of bleeding.**

> DIAGNOSIS

- 1.3.1.1 Constipation.
- 1.3.1.2 Diarrhea.
- 8.1.1 Knowledge Deficit, regarding the need and procedure of the test.

> PLANNING

Expected Outcomes:

1. The client will understand the purpose of the test.
2. The client will be able to collect the specimen, or allow the specimen to be collected.
3. The test for occult blood will be conducted properly and results will be recorded.

Equipment Needed (see Figure 1-14-2):

- Paper towel
- Disposable gloves
- Wooden applicator
- Occult blood test kit: Hemocult slide and Hemocult developing solution or Hematest tablets with guaiac-impregnated paper
- Sink with running water



Figure 1-14-2 Hemocult slide test kit to test for occult blood



Estimated time to complete the skill:

5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the stool test.
2. The client should be instructed to avoid red meat for 24 hours before the test due to the possibility of producing a false-positive result.
3. Reassure the client that a simple positive test does not confirm a diagnosis of rectal bleeding or colorectal cancer. Three tests need to be done as well as further testing such as a sigmoidoscopy.
4. Ask the client to list all medications he is taking in order to assess which ones he should not take before the Hemocult test.
5. If the client is collecting his own specimen, he should be instructed how to collect the test from two different areas of the stool specimen.
6. The client should be told to keep the specimen free of urine and tissue.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and apply clean gloves.
2. Obtain stool specimen from client, commode, specimen cup, or bedpan.
3. Obtain small portion of feces with wooden applicator.
4. Read and follow the manufacturer's instructions.

1. Reduces transmission of microorganisms from fecal specimen to nurse.
2. Uncontaminated specimen will be in a dry container without urine, water, or tissue.
3. Test can be performed on small specimen.
4. Ensures accurate results.

Perform Occult Blood Slide Test

5. Open flap of slide and smear thin sample of feces on paper in first box.
6. Apply feces from a different area of the specimen to the second box.

5. Guaiac-impregnated paper is sensitive to fecal blood.
6. Occult blood from upper GI tract is not always equally dispersed throughout stool.

continues

Perform Occult Blood Slide Test *continued*

7. Close slide cover and turn to reverse side.
Open flap and apply two drops of developing solution on each sample box and on each control box according to manufacturer's instructions (see Figure 1-14-3).

Figure 1-14-3 Apply the developing solution to slide.

7. Developing solution penetrates fecal specimen through the paper.



8. Note color change after 60 seconds or according to manufacturer's instructions.
9. Dispose of slide and applicator wrapped in paper towel in proper receptacle. Remove gloves and wash hands.

8. Bluish color indicates the presence of occult blood. Control box color can be used for comparison. No change in color is negative.
9. Reduces transfer of microorganisms.

Perform Hematest

10. Apply small amount of feces on guaiac-impregnated paper.
11. Place Hematest tablet on top of stool specimen.
12. Apply 2–3 drops of tap water on tablet.
13. Note color change after 2 minutes.
14. Dispose of tablet, paper, and applicator wrapped in paper towel in proper receptacle.
15. Remove gloves and wash hands.

10. Guaiac-impregnated paper is sensitive to fecal blood.
11. Tablet contains solid form of developing solution.
12. Tap water dissolves tablet, which releases solution over specimen and paper.
13. Bluish color indicates the presence of occult blood. Results after 2 minutes may be false.
14. Reduces transmission of microorganisms.
15. Reduces transmission of microorganisms.

> EVALUATION

- Note presence or absence of color change in the guaiac paper.
- Note color, character, and consistency of stool.
- Ask client to explain the rationale and procedure for the stool test.

> DOCUMENTATION**Nurses' Notes**

- Record the date and time the collection was obtained and the test performed.
- Record the results of the test.
- Record the color, character, and consistency of the stool.
- Record when the results of the test were reported to the physician or qualified practitioner.



▼ REAL WORLD ANECDOTES

Martha had a family history of colorectal cancer so her physician recommended yearly screening for occult blood test. The nurse taught her how to collect the specimen and how to apply a small sample of the stool onto the guaiac paper in the first box. Martha then showed the nurse how she would take a sample from another part of the stool and apply it to the second box. Satisfied with the return demonstration, the nurse gave Martha test kits for three days. She told her to bring the kits to the office when she had completed them. The nurse would develop the test and tell her the results.

> CRITICAL THINKING SKILL

Introduction

There are several causes for a false-positive occult blood test. One is eating red meat or citrus fruit and another is taking medications such as iron preparations, aspirin, anticoagulants, ascorbic acid, steroids, or indomethacin. Hemorrhoids can cause bleeding and may be misinterpreted as upper or lower gastrointestinal bleeding.

Possible Scenario

A client noticed small flecks of blood in his stool. He was instructed to collect a stool sample and apply it to

an occult blood kit. When the nurse developed it, the results were strongly positive.

Possible Outcome

The nurse reviewed the client's history and found that he had received treatment for hemorrhoids in the past. The client also admitted he had failed to stop taking his daily aspirin prescribed by his cardiologist.

Prevention

A careful health assessment would have revealed these two common reasons for blood in the stool—hemorrhoids and taking aspirin.

▼ VARIATIONS



Geriatric Variations:

- Some clients will need to bring the entire stool sample in a plastic specimen container if they are unable to use the occult blood test kit.



Pediatric Variations:

- Children may not be able to produce a specimen at a given time. Parents may need to assist them at home.
- Small children may be curious about what is done to the sample. They should be allowed to watch the test being done.



Home Care Variations:

- If the specimen is collected at home, the client should be instructed how to store it before it is brought to the laboratory.



Long-Term Care Variations:

- Review correct testing procedures with staff who may not be familiar with the test. If the test must be repeated periodically, encourage the client to be as independent as possible collecting the sample.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The stool becomes contaminated with urine.

Ask Yourself:

How do I prevent this error?

Prevention:

Use a plastic insert in the toilet to facilitate collection of the stool (see Figure 1-14-4).

Ask Yourself:

How do I respond to this error?

Prevention:

Discard the stool and wait for the next opportunity to collect a stool sample.

Possible Error:

The nurse opens the developing flap to apply the smear of stool.

Ask Yourself:

How do I prevent this error?

Prevention:

Read the directions on the flap to choose the correct side to apply the sample.

Ask Yourself:

How do I respond to this error?

Prevention:

Discard the Hemocult slide and use a new one to apply the stool to the correct side. Proceed with the development of the test.



Figure 1-14-4 Use a graduated specimen container to collect a stool sample

> NURSING TIPS

- Using a plastic insert in the toilet may facilitate obtaining a stool specimen.

Safety and Infection Control

- Skill 2-1** Handwashing
- Skill 2-2** Proper Body Mechanics and Safe Lifting
- Skill 2-3** Assisting with Ambulation and Safe Falling
- Skill 2-4** Donning and Removing Clean and Contaminated Gowns and Gloves
- Skill 2-5** Donning a Cap and Mask
- Skill 2-6** Removing Contaminated Items
- Skill 2-7** Applying Sterile Gloves via the Open Method
- Skill 2-8** Surgical Scrub
- Skill 2-9** Applying Sterile Gloves and Gown via the Closed Method
- Skill 2-10** Applying Restraints
- Skill 2-11** Emergency Airway Management
- Skill 2-12** Administering Cardiopulmonary Resuscitation (CPR)
- Skill 2-13** Performing the Heimlich Maneuver
- Skill 2-14** Responding to Accidental Poisoning
- Skill 2-15** Emergency Client Transport

SKILL 2-1

Handwashing

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

**Antimicrobial
Infectious
Friction**

**Microorganisms
Nosocomial
Transient flora**



> OVERVIEW OF THE SKILL

Handwashing is the rubbing together of all surfaces and crevices of the hands using a soap or chemical and water. Handwashing is a component of all types of isolation precautions and is the most basic and effective infection control measure that prevents and controls the transmission of infectious agents.

The three essential elements of handwashing are soap or chemical, water, and friction. Soaps that contain antimicrobial agents are frequently used in high-risk areas such as emergency departments and nurseries. Friction is the most important element of the trio because it physically removes soil and transient flora.

Handwashing should be performed after arriving at work, before leaving work, between client contacts, after removing gloves, when hands are visibly soiled, before eating, after excretion of body waste (urination and defecation), after contact with body fluids, before and after performing invasive procedures, and after handling contaminated equipment. The exact duration of time required for handwashing depends on the circumstances. A washing time of 10 to 15 seconds is recommended to remove transient flora from the hands. High-risk areas, such as nurseries, usually require about a 2-minute handwash. Soiled hands usually require more time (CDC, 1983; Department of Labor, 1991).

> ASSESSMENT

1. Assess the environment to establish if facilities are adequate for cleansing the hands. Is the water clean? Is soap available? Is there a clean towel to dry your hands?
2. Assess your hands to determine if they have open cuts, hangnails, broken skin, or heavily soiled areas.

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The caregiver's hands will be cleansed adequately to remove microorganisms, transient flora, and soiling from the skin.

Equipment Needed (see Figure 2-1-2):

- Soap
- Paper or cloth towels
- Sink
- Running water



Figure 2-1-2 Handwashing sink



Estimated time to complete the skill:

3 minutes

> CLIENT EDUCATION NEEDED:

1. Teach clients to wash their hands when they are visibly soiled, before eating, after excretion of body waste, and after contact with body fluids.
2. Teach clients to wash their hands from the least to the most contaminated areas.
3. Teach clients to turn off the water with a paper towel to prevent recontamination of their hands.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Remove jewelry. Wristwatch may be pushed up above the wrist (midforearm). Push sleeves of uniform or shirt up above the wrist at midforearm level. 2. Assess hands for hangnails, cuts or breaks in the skin, and areas that are heavily soiled. 3. Turn on the water. Adjust the flow and temperature. Temperature of the water should be warm. 4. Wet hands and lower forearms thoroughly by holding under running water. Keep hands and forearms in the down position with elbows straight. Avoid splashing water and touching the sides of the sink. 5. Apply about 5 ml (1 teaspoon) of liquid soap. Lather thoroughly. 6. Thoroughly rub hands together for about 10 to 15 seconds. Interlace fingers and thumbs and move back and forth to wash between digits. Rub palms and back of hands with circular motion (see Figure 2-1-3). Special attention | <ol style="list-style-type: none"> 1. Provides access to skin surfaces for cleaning. Facilitates cleaning of fingers, hands, and forearms. 2. Intact skin acts as a barrier to microorganisms. Breaks in skin integrity facilitate development of infection and should receive extra attention during cleaning. 3. Running water removes microorganisms. Warm water removes less of the natural skin oils. 4. Water should flow from the least contaminated to the most contaminated areas of the skin. Hands are considered more contaminated than arms. Splashing of water facilitates transfer of microorganisms. Touching of any surface during cleaning contaminates the skin. 5. Lather facilitates removal of microorganisms. Liquid soap harbors less bacteria than bar soap. 6. Friction mechanically removes microorganisms from the skin surface. Friction loosens dirt from soiled areas. |
|---|---|

continues

should be provided to areas such as the knuckles and fingernails, which are known to harbor organisms (see Figure 2-1-4).



Figure 2-1-3 Lather thoroughly and rub hands together.



Figure 2-1-4 Give special attention to fingernails and knuckles.

7. Rinse with hands in the down position, elbows straight. Rinse in the direction of forearm to wrist to fingers.
 8. Blot hands and forearms to dry thoroughly. Dry in the direction of fingers to wrist and forearms. Discard the paper towels in the proper receptacle.
 9. Turn off the water faucet with a clean, dry paper towel.
7. Flow of water rinses away dirt and microorganisms.
 8. Blotting reduces chapping of skin. Drying from cleanest (hand) to least clean area (forearms) prevents transfer of microorganisms to cleanest area.
 9. Prevents contamination of clean hands by a less clean faucet.

> EVALUATION

- The handwashing was adequate to control topical flora and infectious agents on the hands.
- The hands were not recontaminated during or shortly after the handwashing.

> DOCUMENTATION

No documentation is needed for routine handwashing by the nurse.

Nurses' Notes

- Document handwashing teaching provided to clients, visitors, or caregivers.



▼ REAL WORLD ANECDOTES

Nurse Wilkerson has been asked to assist with repositioning a client. She is very busy with her own assignments but agrees to help for a minute. The only gloves available in the room are a small size. While she is putting the gloves on, one tears. Nurse Wilkerson proceeds to assist with the client without changing gloves. The repositioning takes longer than expected and Nurse Wilkerson hurries out of the room without washing her hands. The next day Nurse Wilkerson discovers that the client she had helped to reposition was diagnosed with hepatitis. Through her carelessness Nurse Wilkerson has endangered herself, her coworkers, and her clients. She has violated the Nightingale Pledge, taken during graduation from nursing school, to “devote myself to the welfare of those committed to my care.” She has also placed herself in danger of litigation if any of her clients should contract the same strain of hepatitis.

> CRITICAL THINKING SKILL

Introduction

It is important that you are always aware of situations when handwashing is necessary.

Possible Scenario

While working as a visiting nurse, you are assigned to perform a dressing change on Mrs. Abercrombie's open leg ulcer. The ulcer is known to be contaminated with multiple antibiotic-resistant staph and you are careful to wear gloves while performing the procedure. As you are leaving, Mrs. Abercrombie takes your hands in hers and kisses them, thanking you for your help. You have just enough time to get to your next appointment. It is past lunch time and you are hungry, so you detour via

the fast food drive-through and eat while driving to see your next client.

Possible Outcome

Mrs. Abercrombie recontaminated your hands with highly resistant staph when she kissed them. You have touched the steering wheel of your car, handled money, and eaten lunch without washing your hands. You review the symptoms of a staph infection.

Prevention

Try to think ahead in situations where handwashing facilities may not be readily available. Be sure to keep antiseptic wipes or hand disinfectant close by if you are not sure you will be able to wash your hands when necessary.

▼ VARIATIONS



Geriatric Variations:

- *The geriatric home care client may not have the fine motor skills or grip strength to operate a faucet. They may avoid washing their hands for this reason. Make modifications as needed.*



Pediatric Variations:

- *Encourage parents to incorporate the handwashing routine into toilet training.*
- *Young children who are actively exploring their environment cannot tell the difference between “clean” and “dirty” things to explore with their hands and mouths. Infants, toddlers, and young children have runny noses and saliva and do not have bowel and bladder control over feces and urine. When working with young children, be sure to wash your hands frequently to reduce the transmission of microorganisms.*
- *Encourage parents to carry prepackaged wet-wipes or disinfectant to clean contact surfaces that might have been contaminated by unwashed hands.*



Home Care Variations:

- *You may need to carry hand disinfectant or bactericidal soap and clean towels with you.*
- *Assess the home for adequate handwashing facilities. Does the sink drain adequately? Can the faucet be operated without too much torque?*
- *The bathroom sink may not be the best place to wash hands when caring for the client. Be flexible in setting up a handwashing station that is easy and accessible.*



Long-Term Care Variations:

- *Encourage independence in handwashing. Modify the faucet or sink height or provide alternative handwashing facilities as needed.*
- *It is easy to remember to wash when working with visible dirt, bodily wastes, or contaminants. It is harder to remember to wash when the sources of infection cannot be seen. Reinforce the principles of asepsis and the transmission of microorganisms on a regular basis.*
- *Consider the sink area contaminated. Do not touch the sides of the sink or lean against the sink.*
- *Correct handwashing technique specifies that the hands always remain lower than the elbows. This is easy if the caregiver or client is an adult able to stand at the sink. For clients or caregivers in wheelchairs or children, modify the handwashing facilities where possible to allow proper technique.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

After washing her hands, the nurse picks up the IVAC thermometer she has been carrying from room to room while taking vital signs.

Ask Yourself:

Where has this thermometer been? What have I set it down on while going from room to room? How clean/contaminated is it?

Prevention:

Be aware of your environment. Be conscious of the differences between a clean and a dirty environment. Think about who or what has previously touched what you are touching.

> NURSING TIPS

- If in doubt, it is dirty.
- Wash hands before and after every client contact.
The most common cause of nosocomial infections is contaminated hands of health care providers.
- When you turn on the faucet of a sink you are unfamiliar with (especially in the home care setting), you might get wet! Be a little tentative the first time until you investigate the water pressure and the faucet.

SKILL 2-2

Proper Body Mechanics and Safe Lifting

Patricia Buchsel, RN, MSN

KEY TERMS

Ambulating a patient **Draw sheet**
Body mechanics **Safe lifting**
Center of gravity **Safety**
Chair **Stretcher**



> OVERVIEW OF THE SKILL

Client care skills often require that nurses have physical strength to provide individuals with the assistance required to remain mobile. Nurses may need to carry, pull, push, or lift clients and/or equipment to accomplish daily care. It is imperative that nurses know and use proper lifting techniques. Body me-

chanics is the term used when referring to lifting techniques. Correct body mechanics are essential and help to avoid work-related musculoskeletal injuries, diminish excessive strain and fatigue, and minimize the potential for client injury (see Figure 2-2-2).

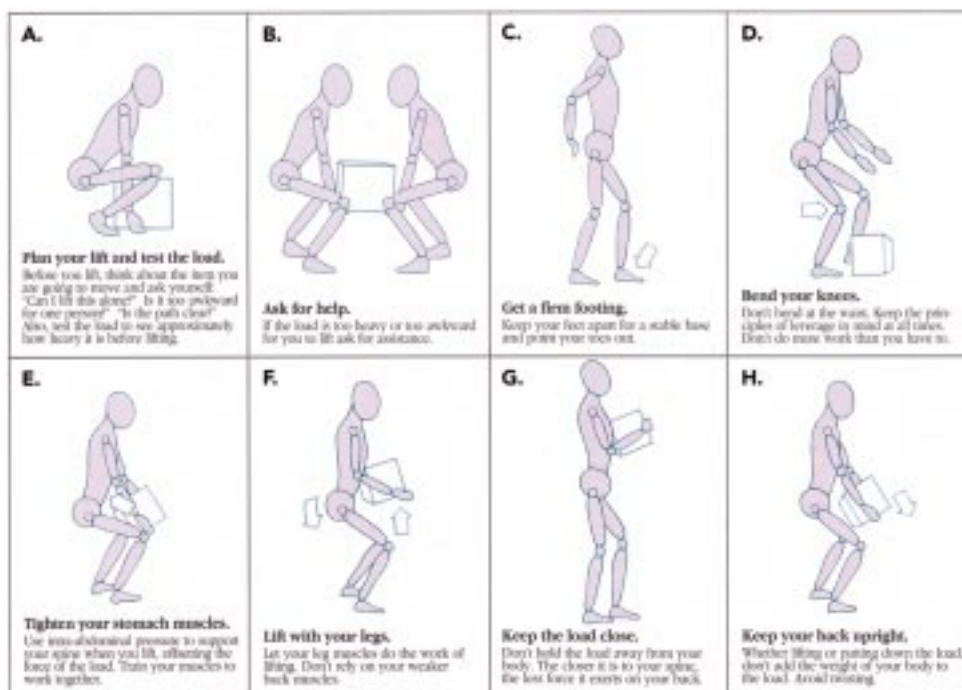


Figure 2-2-2 Always follow these eight rules for lifting. (Reprinted with permission from Ergodyne Corporation, St. Paul, MN.)

Body mechanics involve pushing, stooping, carrying, and lifting correctly. Included in this clinical skill is knowledge and the correct performance of various client transfer techniques using team approaches as well as diverse supportive equipment. This skill reviews the proper techniques of general body mechanics as well as some specialized lifting skills from bed to stretcher and from bed to chair

and wheelchair and the use of the bed transfer board and a hydraulic lift. Specific tips for client and staff safety will be highlighted, as well as the promotion of client independence and self-help behavior as an intervention to reduce the risk of client and nurse injury. There are also warm-up exercises that nurses can perform to help avoid injury (see Figure 2-2-3).

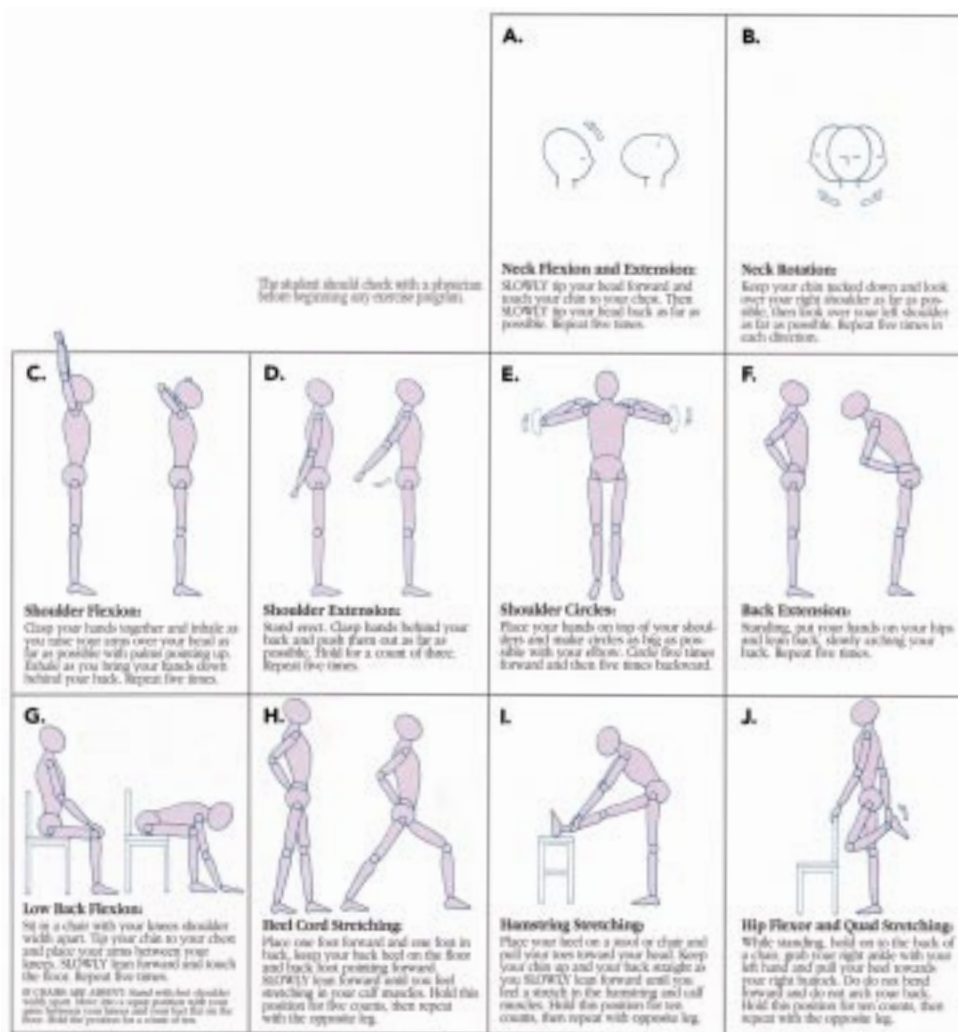


Figure 2-2-3 Follow these warm-up exercises to prepare for safe lifting. (Reprinted with permission from Ergodyne Corporation, St. Paul, MN.)

> ASSESSMENT

1. Assess the need and degree to which the client requires assistance to achieve physical movement. Identifies client's ability to attain maximum level of self-help before initiating intervention.
2. Identify the type of physical movement required to assure the use of proper body mechanics such as pushing, pulling, or lifting.
3. Identify the potential need for assistive equipment to accomplish the goal of safe lifting to minimize the risk of client/nurse injury.
4. Identify any unusual risks to safe lifting, such as an extra heavy client or a home care setting. Allows nurse to plan modifications to ensure good body mechanics and reduce the risk of injury.

5. Explain the steps required to achieve the goal of safe lifting with the client. **Clear, concise, verbal explanation** will secure the client's cooperation, diminish anxiety, and ease the physical requirements for both client and nurse.

> DIAGNOSIS

- 1.6.1 Risk for Injury
- 6.1.1.1 Impaired Physical Mobility

> PLANNING

Expected Outcomes:

1. Clients will be safely lifted by staff utilizing appropriate equipment and correct body mechanics.
2. Accidents during lifting of clients will be avoided by using proper body alignment and mechanics.
3. Heavy lifting will be facilitated by mechanical devices and a team effort.

4. Clients and families will be taught safe lifting techniques to facilitate this process in home and extended-care environments.
5. The nurse will practice safe lifting and proper body mechanics when performing nursing care that requires bending or lifting.

Equipment Needed (see Figures 2-2-4A, B, C, and D):

- Wheelchair equipped with working locks
- Transfer board
- Draw or lift sheet
- Nonslip shoes or slippers
- Safety or gait belt
- Stretcher equipped with working locks



Estimated time to complete the skill:
10–25 minutes for each variation of safe lifting



Figure 2-2-4A Wheelchair



Figure 2-2-4C Nonskid footwear



Figure 2-2-4B Transfer boards



Figure 2-2-4D Stretcher

> CLIENT EDUCATION NEEDED:

1. Advise clients of the plan to move them from one position to another.
2. Explain the procedure, provide a demonstration, and describe the individual client's specific participation requirements.
3. Explain that the ultimate goals of safe lifting and transfers are to encourage independence and to facilitate self-achievement.
4. If lifting requires the use of equipment, demonstrate the equipment before the application occurs.
5. Reassure client that every effort will be made to maintain individual privacy and dignity and that the body be covered throughout the move and upon completion.
6. Allay fear of falling, fear of isolation, and potential for the loss of well-being.
7. Encourage family member participation in order to facilitate safe lifting at sites external to the acute-care setting.
8. Advise client to inform the nurse immediately if he becomes dizzy or lightheaded. Do not wait and hope that it will go away.
9. Advise client to inform the nurse if more blankets are needed for warmth while being transported to other parts of the hospital.
10. Instruct client not to lean forward in the wheelchair because it may cause the wheelchair to tip.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Assess the situation for obstacles, heavy clients, poor handholds, or equipment or objects in the way. Reduce or remove safety hazards prior to lifting the client or object.
3. Assess the situation for slippery surfaces, including wet floors; slippery shoes on client, helper, or nurse; and towels, linen, or paper on the floor. Resolve the slippery surface prior to lifting the client or object.
4. Assess the situation for hidden risks, including client confusion, combativeness, orthostatic hypotension, drug effects, pain, or fear (see Figure 2-2-5).

1. Reduces the transmission of microorganisms.
2. Good planning helps prevent accidental injury.
3. Removes the cause of many falls and slips.
4. Allows the nurse to anticipate and plan for unexpected events.



Figure 2-2-5 Assess the client and the setting for safety risks before moving, lifting, or transferring the client.



Figure 2-2-6 Squat, rather than bend, to maintain good posture.

5. Maintain low center of gravity by bending at the hips and knees, not the waist. Squat down rather than bend over to lift and lower (see Figure 2-2-6).
6. Establish a wide support base with feet spread apart (see Figure 2-2-7).



Figure 2-2-7 Spread feet apart to establish a wide base of support.

7. Use feet to move, not a twisting or bending motion from the waist.
8. When pushing or pulling, stand near the object and stagger one foot partially ahead of the other.
9. When pushing a client or an object, lean into the client or object and apply continuous light pressure (see Figure 2-2-8). When pulling a client or an object, lean away and grasp with light pressure. Never jerk or twist your body to force a weight to move.
10. When stooping to move an object, maintain a wide base of support with feet, flex knees to lower, and maintain straight upper body.
11. When lifting or carrying an object, bend the knees in front of the object, take a firm hold, and assume a standing position by using the leg muscles and keeping the back straight.
12. When raising up from a squatting position, arch your back slightly. Keep the buttocks and abdomen tucked in and raise up with your head first.

5. Provides for the equal distribution of body weight and assists in maintaining safe balance.
6. Provides stability and lowers the center of gravity.



Figure 2-2-8 Lean into the client or object being pushed.

7. Assists in maintaining correct body alignment, which increases strength to lift, push, pull, and carry.
8. Provides a safety net for avoiding potential back injuries.
9. Firm pressure will provide continuous movement of the object and will avoid abrupt movements that require the expenditure of increased energy.
10. Provides the appropriate mechanics for the strength and endurance to achieve the task and to stand up straight upon completion.
11. This stance will avoid the use of the back, diminish the potential for spinal twisting, and provide the lifter with a firm center of gravity and strength to lift the required weight.
12. Keeps the back from bowing and increasing the strain on the back muscles.

- 13.** When lifting or carrying heavy objects, keep the weight as close to your center of gravity as possible (see Figure 2-2-9).



Figure 2-2-9 Hold weight close to your center of gravity.

- 13.** Reduces the strain on arm, leg, and back muscles.



Figure 2-2-10 Keep your back straight when reaching.

- 14.** When reaching for a client or an object, keep the back straight. If the client or object is heavy, do not try to lift the client or object without repositioning yourself closer to the weight. (See Figure 2-2-10.)

- 14.** Avoids straining the back and arm muscles.

- 15.** Use safety aids and equipment. Use gait belts (Figure 2-2-11), lifts (Figure 2-2-12), drawsheets, and other transfer assistance devices (Figure 2-2-13). Encourage clients to use handrails and grab bars (Figure 2-2-14). Wheelchair, cart, and stretcher wheels should be locked when they are not actually being moved.

- 15.** Reduces the strain on the nurse and improves the safety for the client.



Figure 2-2-11 Use gait belts for better grip and control.



Figure 2-2-12 Use lifts to carry the weight of the client. Monitor equipment, lines, tubes, and drains and adjust as needed to prevent them from being dislodged.



Figure 2-2-13 Use transfer boards to reduce shearing forces and to reduce the effort needed to slide the client.



Figure 2-2-14 Encourage the client to use handrails and grab bars to reduce the risk of slipping or falling.

> EVALUATION

- The client or object is lifted and/or moved without sustaining injury or damage.
- The nurse who is lifting and moving clients or objects is not injured.

> DOCUMENTATION

Nurses' Notes

- Document type of lift or move in the progress notes.
- Document client's tolerance of the lift or move in the progress notes.



▼ REAL WORLD ANECDOTES

Scenario 1

When Marsha moved from an inpatient hospital setting to a skilled nursing facility, she found the job required almost three times the amount of lifting and moving of clients. Her lower back began to ache by the end of her shift, and she was thinking of quitting. Her supervisor knew about lower back injuries. Together they worked out a schedule to spread her lifting chores out over the shift, to use hydraulic lifts with specific clients, and to get help for any client who could not assist by standing and supporting their own weight. An inservice where staff practiced lifting and moving techniques and exercising outside of work completed the intervention. Marsha stayed on the job with no further problems.

Scenario 2

A nurse was working in the home setting. Her elderly client was taking a tub bath, which he generally did every evening. This evening, the client felt dizzy after getting into the tub and started to get out unassisted. The nurse was in the bathroom. She saw her client stand up, sway, and start to lose his balance. She stepped forward, placed one foot into the bathwater, set her feet wide, bent her knees, and started to assist her client to sit on the edge of the tub safely. The bathtub had nonslip protection, but her other foot, on the wet bathroom floor, slid out from under her. They both fell into the tub. Fortunately, neither was seriously hurt.

Scenario 3

Annabell, a patient with breast cancer that has metastasized to her spine, is also hearing impaired. Although medicated with continuous opioids with a transdermal fentanyl patch, she has break-through pain. The health care team has planned to move her from her bed to undergo radiation palliation for her pain. The team decides to move Annabell from the bed to a stretcher using three assistants, one at the head of the bed, one at the side of the bed, and the third by the stretcher. Because Annabell is hearing impaired, her nurse writes the plan down for Annabell to read, thereby decreasing the client's anxiety and

continues

▼ REAL WORLD ANECDOTES *continued*

Scenario 3 *continued*

maximizing her ability to assist with the transfer. The nurse also plans to coordinate the transfer at a time when Annabell is pain free and can help herself move onto the stretcher. Summoning adequate assistance and enabling the client to assist and cooperate reduces the risk of back injury for the staff.

Scenario 4

Bobby is a hefty 16-year-old male who has sustained a crushing injury to his leg and foot from a lawn mower accident. He is taken to the hospital, the extremity is cleaned, hematomas are drained, lacerations are sutured, and the wounds dressed. His dressings require changing every 24 hours and he needs to be turned in bed to accomplish this task. The nurses caring for Bobby determine that their safety will require using two nurses and a draw sheet to turn and hold him. Bobby will be turned by both nurses. One nurse will hold and distract, and the other nurse will change the dressings. One nurse working alone would risk a twist or strain injury if she tried to hold, distract, restrain, and change a large dressing over a painful wound.

Scenario 5

A client is walking in the hall and becomes dizzy. She reaches out to grab onto the medication cart. The nurse had not locked the wheels of the cart. It rolls away, and the client falls to the floor.

> CRITICAL THINKING SKILL

Introduction

Plan ahead to avoid back strain.

Possible Scenario

Angela is 2 days status post a bilateral mastectomy and has been getting up to the bathroom alone for over 24 hours. During the night she puts on her call light to ask for assistance to the bathroom because she feels “groggy.” She weighs 250 pounds. The nurse is concerned that the client seems confused. She checks the medication chart and notes that Angela was given chloral hydrate, a sleeping pill, at 10 PM.

Possible Outcome

The nurse notes that chloral hydrate can often cause clients to hallucinate or become confused. In addition, the client is obese. The nurse asks another nurse to come in and assist. Angela stands up and lurches forward. She grabs the IV pole, thinking it is the bathroom door handle. Both nurses move into position to catch her before she falls, bracing their feet apart and bending at the knees. Injury to both nurses and the client is averted.

Prevention

In this case, the nurse realized there was an additional safety hazard and took the steps to prevent a fall and possible serious injury.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients often have reduced flexibility and muscle strength.*
- *While frail-looking elderly are assumed to have lower muscle strength, obesity may hide poor muscle tone as well.*
- *Elderly clients often live alone and are very independent. They know what their bodies can and cannot do. When assessing an elderly client, ask them their normal routine. Assist them, but follow their lead when possible to promote independence, control, and exercise.*

▼ VARIATIONS *continued*



Pediatric Variations:

- Younger children are often moved and carried by parents in the hospital setting. Make sure the parent is used to carrying the child and that the child has not grown too heavy for safe lifting and carrying by one adult.



Home Care Variations:

- The home care setting poses special challenges for safe lifting and moving. Often the nurse is the only person in the setting physically able to move and lift. Furniture, especially beds and chairs, may not be designed for client care.
- Know the policies and procedures for obtaining assistance and alternatives to lifting and moving heavy clients at home.
- Instruct home caregivers about the basics of good body mechanics. Practice and have the home caregiver demonstrate proper techniques.
- Many safety risks not considered in the hospital can be present in the home. Scatter rugs, slippery tile, older furniture in poor repair, narrow hallways, and confined spaces with reduced maneuverability must all be considered when planning to move or lift the client.



Long-Term Care Variations:

- Workers in long-term settings may have to do greater amounts of heavy lifting with less staffing, especially during night or evening shifts. Make sure lifting equipment is in good repair, gait belts are available, and personnel know how and when to use equipment safely.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client is moved but Foley catheters, pumps, drainage tubes, and IVs are not considered in the move and the client or nurse is injured by traumatic removal or falling equipment.

Ask Yourself:

How do I prevent this error?

Prevention:

Do a mental checklist of all tubes, drains, braces, and other devices. Mentally plan the move before you begin. Do not be in a hurry. If more than one nurse is involved in the move, do not assume that someone else has readied the tubes and equipment. Ensure that brakes are secured on wheelchairs, beds, stretchers, and reducing the client's risk for injury.

Possible Error:

Underestimating the strain or force required to assist a client.

Ask Yourself:

How do I prevent this error?

Prevention:

Often nurses focus on the task and time schedule and consider how difficult it would be to summon help versus performing the task. Instead, consider the weight, level of consciousness, and physical impairment of the client. A good rule of thumb is not to lift or move any client by yourself who cannot bear their own weight.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Slipping on spilled liquids on the floor.

Ask Yourself:

How do I prevent this error?

Prevention:

Make sure none of your nursing techniques, such as priming IV tubing, wringing out wet dressings or wet compresses, and giving bed baths systematically, allow water to spill. Clean up spills immediately, and warn others of the spill.

> NURSING TIPS

- Lock elevator doors before entering and exiting with clients in wheelchairs or stretchers. This will help you avoid twisting to reach for the door closing on a client. It will also keep the door from injuring the client.
- Use portable IV poles on stretchers and wheelchairs instead of independent IV poles. This will help you focus your attention on ambulating the client instead of the IV pole.
- All assistive devices used to facilitate safe lifting must receive periodic safety checks by the appropriate department assigned. It is imperative that staff oversee this effort and report equipment that may cause potential danger for clients and staff.
- Keep yourself strong and healthy. Nursing is a physical job. Nurses must have physical ability in order to avoid fatigue and injury associated with pushing, pulling, lifting, and carrying clients. Stay in shape and practice basic health habits. Poor eating habits, not enough sleep, stress, obesity, and inactivity all decrease strength, flexibility, and judgment, which increases the risk of injury.
- Be sure the bed is aligned to the same height as the stretcher.

SKILL 2-3

Assisting with Ambulation and Safe Falling

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Ambulation
Dangle
Gait

Gait belt
Orthostatic hypotension



> OVERVIEW OF THE SKILL

Client ambulation (assisted or unassisted walking) is encouraged soon after the onset of illness or surgery to prevent the complications of immobility. First, the nurse assesses the strength, endurance, and mobility of the client. The nurse assists with client ambulation, especially if equipment (IV infusions, urinary catheters, closed chest drainage systems, drainage tubes) is present. Finally, the nurse must evaluate client ambulation to plan the progression of activity.

Clients at high risk for falls include those with prolonged hospitalization, those taking sedatives or tranquilizers, confused clients, or those with a history of physical restraint use. A great majority of falls:

- Occur in the evening
- Occur in the client's room
- Involve wheelchairs
- Involve unattended clients
- Involve clients with poor footwear
- Occur with poor lighting
- Involve clients with poor vision
- Occur with clients experiencing neuromuscular impairment

Awareness of risk factors for falls allows the nurse to prevent many client injuries.

The nurse continually evaluates the client's strength and endurance during the entire ambulation process.

> ASSESSMENT

1. Determine the client's most recent activity level and tolerance to evaluate the client's current ambulatory ability.
2. Assess the client's current condition, including fatigue, pain, and medications for conditions that might adversely affect ambulation.
3. Check for handrails to help the client stand and to hold onto while walking. Check that the floor is level and clean and not slippery or wet. Make sure there is adequate lighting so the client can see where he is going. **Evaluates the client's environment for safety** (see Figure 2-3-2).



Figure 2-3-2 Prior to ambulating the client, check planned route for safety concerns. Check for good lighting, nonskid floors, accessible handrails, and possible barriers.



Figure 2-3-3 Gait belts

4. Assess the client's ambulation equipment, including the use of a walker, cane, or other assistive device to determine whether the equipment is in safe condition.
5. Check the client's clothing to determine that the client's shoes or slippers are safe to walk in and that he has adequate covering for warmth and privacy.
6. While the client is ambulating assess his gait and bearing. Determines how well he is tolerating the activity and allows detection of hypotension, diaphoresis, breathlessness, or weakness.
7. After ambulation, assess the client's ability to recover from the activity, including exhaustion, energy, and recovery times. Determine if modifications need to be made in the distance, type of assistance, or length of time the patient is ambulating.

> DIAGNOSIS

- 1.6.1 Risk for Injury
- 6.1.1.1 Impaired Physical Mobility
- 6.1.1.2 Activity Intolerance

> PLANNING

Expected Outcomes:

1. The client will be able to walk a predetermined distance, with assistance as needed, and return to the starting point.

2. While walking, the client will not suffer any injury.
3. The client will be able to increase the distance he can walk and/or will require less assistance to accomplish the distance on a regular basis.

Equipment Needed:

- Gait belt as needed (PRN) (see Figure 2-3-3)
- Assistive devices
- Shoes or nonslip footwear



Estimated time to complete the skill:
20–30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the importance of ambulation to recovery, including the role of early ambulation in increasing peristalsis and venous return from the lower legs.
2. Be sure the client understands the need to have assistance standing by the first few times ambulating.
3. Educate the client regarding the importance of proper gait and posture while ambulating.
4. Advise the client that even though ambulation may be uncomfortable or even painful, the activity will help the body produce endorphins and provide a natural form of pain relief.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Ambulation Safety

1. When assisting a client with an IV infusion, place the IV pole with wheels at the head of the bed before having the client dangle the legs, so there is room to swing the legs from the bed to the floor.
2. Transfer the IV infusion from the bed IV pole to the portable IV pole. The client or the nurse can guide the portable IV pole ahead during ambulation (see Figure 2-3-4).



Figure 2-3-4 Ambulating client with an IV

1. Prevents the client's legs from becoming tangled in the IV pole or tubing, causing a fall or causing the tubing to become dislodged.
2. Supports the IV while the client ambulates.



Figure 2-3-5 Ambulating client with a urinary drainage bag

3. When assisting the client with a urinary drainage bag, empty the drainage bag prior to ambulation. Have the client sit on the side of the bed with legs dangling. Remove the urinary drainage bag from the bed. The nurse or client can hold the urinary drainage bag during ambulation. Make sure the drainage bag remains below the level of the bladder (see Figure 2-3-5).
4. When the client has a drainage tube such as a T-tube, hemovac, or Jackson-Pratt drainage system, be sure to secure the drainage tube and bag prior to ambulation. Place a rubber band around the drainage tube near the drainage bag. Secure the drainage tube and bag with a safety pin through the rubber band. Allow slack. The safety pin can be secured to the client's gown or robe (see Figure 2-3-6).

3. Emptying the bag reduces the weight of the bag. An empty bag kept below the level of the bladder reduces the risk of urine flowing back into the bladder. Having the nurse hold the drainage bag allows the client to concentrate on safe ambulation.
4. Prevents the tubing from becoming dislodged or tangled in clothing or other tubes.

continues

Ambulation Safety *continued*

Figure 2-3-6 Secure tubes and drainage bags prior to ambulation, so they do not become dislodged.



Figure 2-3-7 Ambulating the client using a gait belt for better grip and control

5. Ambulating the patient with a closed chest tube drainage system often requires two nurses, one assisting the client and one nurse managing the closed chest tube drainage system. While the client is sitting on the edge of the bed with feet dangling, remove the hangers from the drainage system. Hold the closed chest tube drainage system upright at all times to maintain the water seal. Do not pull or tug on the chest tubes; they may not be sutured into place.
6. Use a transfer belt or gait belt when ambulating a client who is weak (see Figure 2-3-7).
7. If a client feels faint or dizzy during dangling, return the client to a supine position in bed and lower the head of the bed. Monitor the client's blood pressure and pulse.
8. If the client feels faint or dizzy during ambulation, allow the client to sit in a chair. Stay with the client for safety. Request another nurse to secure a wheelchair to return the client to bed.
9. If the client feels faint or dizzy during the ambulation and starts to fall, ease the client to the floor while supporting and protecting the client's head. Position yourself next to and slightly behind the ambulating client thus being able to step behind the client and safely ease the client to the floor. Ask other personnel to assist you in returning the client to bed. Assess orthostatic blood pressures.
5. Two nurses allows one to focus on the client's safety and ambulation while another focuses on maintaining the chest drainage system and keeping tubes from becoming dislodged.
6. The transfer belt is a 2-inch-wide webbed belt worn by the client for the purposes of stabilization during transfers and ambulation. It provides more support for the client by having the nurse hold the back of the belt.
7. Keeps the client from falling from the bed. Lowering the head of the bed will allow gravity to support blood flow to the brain in the hypotensive client.
8. May stop the client from progressing to a full faint.
9. Easing the client to the floor prevents injury to the client.

ACTION

RATIONALE

Safe Walking

1. Inform client of the purposes and distance of the walking exercise (see Figure 2-3-8).



Figure 2-3-8 Discuss the planned walking exercise with the client prior to ambulation.

2. Elevate the head of the bed and wait several minutes.
3. Lower the bed height.
4. With one arm on the client's back and one arm under the client's upper legs, move the client into the dangling position.
5. Encourage client to dangle at side of bed for several minutes.
6. Place gait belt around client's waist; secure the buckle in front.
7. Stand in front of client with your knees touching client's knees.
8. Place arms under client's axilla.
9. Assist client to a standing position, allowing client time to balance (see Figure 2-3-9).
10. Help the client ambulate the desired distance or distance of tolerance by placing your hand under the client's forearm and ambulating close to the client. Alternatively, place a gait belt around the client's waist and walk to the client's side and slightly behind with one hand grasping the belt at the center back.

1. Reduces client anxiety and increases cooperation.



Figure 2-3-9 Assist the client to stand.

2. Prevents orthostatic hypotension.
3. Reduces distance client has to step down, thus decreasing risk of injury.
4. Provides client support and reduces risk of fall.
5. Prevents orthostatic hypotension. Allows for assessing tolerance for the sitting position.
6. Provides handholds for the caregiver to support the client.
7. Prevents client from sliding forward if dizziness or faintness occurs.
8. Supports client's trunk.
9. Reduces risk of fall.
10. Provides assistance in achieving ambulatory goals.

Safe Walking *continued*

- | | |
|---|---|
| <p>11. Help the client back to the bed or chair. Make the client comfortable, and make sure all lines and tubes are secure.</p> <p>12. Document the activity.</p> <p>13. Wash hands.</p> | <p>11. Promotes safety and comfort.</p> <p>12. Provides a record to measure progress.</p> <p>13. Reduces the transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- The client was able to walk a predetermined distance, with assistance as needed, and return to the starting point.
- While walking, the client did not suffer any injury.
- The client was able to increase the distance walked and/or required less assistance to accomplish the distance on a regular basis.

> DOCUMENTATION**Nurses' Notes**

- Record the distance the client was able to ambulate and note how the client tolerated the ambulation.
- List any assistive devices the client required and any teaching done regarding using the device.
- Document any special concerns or unusual findings noted while ambulating the client.

**▼ REAL WORLD ANECDOTES****Scenario 1**

Nurse Reed was assisting Mr. Clark to walk to the bathroom. After they entered the bathroom, Mr. Clark complained of weakness and dizziness. Within a few seconds Mr. Clark fainted and fell, hitting his right arm on the toilet and landing with his body wedged against the closed bathroom door. Nurse Reed quickly turned the bathroom emergency light on. She made no attempt to move Mr. Clark but started to assess for any injuries. She noted that Mr. Clark was conscious and able to respond to questions. Mr. Clark complained of pain in his right arm and Nurse Reed noted that Mr. Clark's right arm was deformed and discolored. As she was talking to Mr. Clark, other staff members arrived to assist Nurse Reed and Mr. Clark. Nurse Reed had to move Mr. Clark in order to get the door open and she did this while making sure to maintain Mr. Clark's head and neck alignment and without further injuring Mr. Clark's arm. The other staff members were able to assist Nurse Reed and Mr. Clark. Mr. Clark's right arm was found to be broken at the point where it had impacted the toilet.

Scenario 2

Cindy was an adolescent client in an open psychiatric ward for evaluation of suicidal thoughts. She had been given an initial dose of Haldol 5 mg IM for agitation and was resting on the bed in her room. The nurse stood in the doorway and asked her to come down to the meeting room for an afternoon group session. Cindy made it as far as the hall when she fainted and hit her head on the edge of a chair. The nurse was not used to psychiatric clients experiencing mobility problems. He needed to remember that hypotension is one side effect of Haldol and be extra alert for the client's safety.

> CRITICAL THINKING SKILL**Introduction**

Be prepared to take rapid and decisive action to avoid injury to the client.

Possible Scenario

Mr. Hayes had abdominal surgery several days ago. You have been assigned his care, which includes ambulating him in the hallway. While walking with Mr. Hayes, you note that he has become pale and sweaty. His skin is clammy and he is complaining of dizziness and spots in

front of his eyes. There are no chairs nearby to sit Mr. Hayes down in and you are concerned that he is going to fall if you do not do something.

Possible Outcome

Without intervention Mr. Hayes will probably faint or simply fall due to hypotension. He could injure himself in the fall or possibly tear open his surgical site.

Prevention

The best thing to do the moment this happens is to gently lower Mr. Hayes to the floor before he falls. You

can then call for assistance to get Mr. Hayes into a wheelchair or onto a gurney and back to bed.

To prevent this from happening, be aware of good locations to sit a client prior to ambulation. Place a chair at a midway point if needed. Clients who are prone to dizziness can sometimes ambulate while using a wheelchair as a modified walker. The chair is available should the client become dizzy or need to rest. Also be sure to take into account that the distance walked from the bed is only half the distance the client will have to walk. If the client is to ambulate 10 feet it is 5 feet away from the bed and 5 feet back.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients are more likely to use ambulatory aids such as walkers or canes. Proper gait is even more important when using an assistive device.*



Pediatric Variations:

- *If ambulation is difficult or painful, children may give up and refuse to try. Offering a reward or treat for accomplishing the task may help motivate a child.*
- *Small children may not be as coordinated when walking and may require additional care and attention to safety.*



Home Care Variations:

- *Home care environments vary widely. Be sure the environment is safe for the client to ambulate in.*
- *Do not let barriers keep the client from moving about. Think of creative ways to overcome obstacles. Being able to go outdoors or to move to the living room from the bedroom can offer an uplifting change of scenery and improve feelings of independence.*



Long-Term Care Variations:

- *Clients with long-term ambulatory problems may become careless regarding their gait and their equipment. Be sure to check their equipment and reinforce proper gait.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Providing too much or too little support for the client during ambulation.

Ask Yourself:

How do I prevent this error?

Prevention:

When assisting with ambulation, place your hand under the client's forearm and ambulate close to the client. Another way to provide firm yet minimal support is with a gait belt around the client's waist.

> NURSING TIPS

- Be sure to take into account that the distance walked from the bed is only half the distance the client will have to walk. If the client is to ambulate 10 feet, it is 5 feet away from the bed and 5 feet back.
- Be aware of the surrounding environment. Think ahead regarding the client's activity tolerance and be aware of places the client might stop to sit or rest.
- Do not allow the client to place an arm around your shoulders for support. If the client falls, the weight of the client could cause twisting injuries to your back.
- Try to match your gait to the client's to provide a more even support.
- Remember to assess if the client can see and hear (i.e., glasses and hearing aids) prior to ambulation.

SKILL 2-4

Donning and Removing Clean and Contaminated Gowns and Gloves

Kathryn Lilleby, RN

KEY TERMS

Aseptic technique
Body substance
isolation
Clean technique
Gloves
Gown

Immunosuppressed
Infection
Isolation
Nosocomial infection
Standard
precautions



> OVERVIEW OF THE SKILL

Infection control is of paramount importance in a hospital setting in order to protect clients and health care workers from the spread of microorganisms. Clients can have low resistance to infectious organisms due to their underlying disease, increased exposure to other pathogens, and invasive procedures they may experience.

Infections acquired in a health care facility are called nosocomial infections. These infections are especially common in a hospital due to a large population of microorganisms that may be resistant to antibiotics. A pathogen can develop into an infection if the following criteria are met:

- A pathogen is present.
- A source for growth of the pathogen is present.
- A portal of exit from the source is present.
- A mode of transmission of the pathogen is present.
- A portal of entry to the host and a susceptible host are present.

Efforts to break this chain reaction at any point can prevent an infection from occurring. This is called aseptic technique. Asepsis is the absence of pathogens and is an effort to keep a client as free from contamination from microorganisms as possible. Medical asepsis, or clean technique, includes procedures to reduce the number of microorganisms and prevent their spread.

Thorough handwashing is the single most important technique for infection control. Other methods of infection control are special barrier precautions such as gowns and gloves. Gowns are required when caring for a client in strict isolation, during contact isolation, as enteric precaution, when caring for immunocompromised clients, or when infective material is likely to soil clothing (see Figure 2-4-2).

Sterile technique is practiced in the operating room or delivery room during a surgical procedure in order to reduce the risk of infection in the client. Gowns and gloves are generally worn to protect the client from infectious organisms.



Figure 2-4-2 Wearing gown, gloves, and mask reduces infection risks.

> ASSESSMENT

1. Assess the specific isolation precautions needed for the client's condition. The type of microorganism and mode of transmission determines the degree of precautions.
2. Assess the client's laboratory results in order to know which organism the client is infected with and client's immune responses.
3. Assess what nursing measures are required before entering the room in order to have all the necessary equipment.
4. Assess the client's knowledge for the need to wear a gown and gloves during care in order to direct client teaching.
5. Assess the type of procedure being done since not all sterile procedures require a gown to be worn.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
 3.1.2 Social Isolation
 7.1.2.2 Situational Low Self-Esteem

> PLANNING

Expected Outcomes:

1. The client will interact on a social level with the nurse, family members, and other visitors.
2. The client will remain free of nosocomial infections.
3. Staff and the rest of the client population will remain free of signs and symptoms of infection.



Figure 2-4-3 Clean gloves

Equipment Needed (see Figures 2-4-3 and 2-4-4):

- Gown, sterile or clean
- Gloves, sterile or clean



Estimated time to complete the skill:
5 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the need and reason for isolation.
2. The client should be assured that the use of a cap, mask, and gown will be discontinued when it is safe, although gloves will often be used for universal precautions.
3. The client and caregiver should be taught to report signs and symptoms of infection.
4. Provide written information on the rationale for barrier methods of isolation and have the client or caregiver give a return description regarding isolation and the reasons it is being implemented.
5. Ask the client or caregiver to assist the staff in maintaining the isolation standards by pointing out any breaks in technique that they notice.



Figure 2-4-4 Sterile gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Don gown before donning cap, mask, or gloves (see Figure 2-4-5):
 - a. Be sure gown covers all clothing.
 - b. Pull sleeves down to wrist.
 - c. Tie gown at neck and waist (see Figure 2-4-6).



Figure 2-4-5 Put on the gown before putting on gloves.

3. Put on clean gloves. If worn with gown, put on after gown and pull cuffs of glove over edge of gown sleeve.
4. Enter the client's room and explain the rationale for wearing a gown and gloves.
5. After performing necessary tasks, remove gown and gloves before leaving room:
 - a. Untie gown and remove from shoulders. Fold and roll gown down in front into a ball, so contaminated area is rolled into center of gown. Dispose in approved receptacle.
 - b. Grasp outside cuff of one glove and pull off, turning it inside out. Hold it with the remaining gloved hand (see Figure 2-4-7).
 - c. Pull the second glove off without touching the outside of the second glove. Turn the second glove inside out and over the first glove as it is removed (see Figure 2-4-8). Dispose into receptacle with the first glove (see Figure 2-4-9).

1. Reduces transmission of microorganisms.
2. Protective garments prevent the transmission of organisms from the nurse to the client or from the client to the nurse.

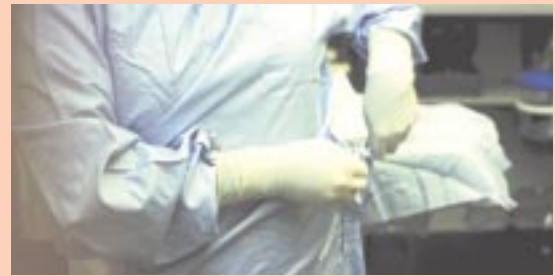


Figure 2-4-6 Tie the gown at the neck and waist.

3. Gloves prevent the transmission of organisms between nurse and client.
4. Minimizes anxiety and feelings of isolation.
5. Reduces transmission of organisms.



Figure 2-4-7 Grasp the outside cuff and turn the glove inside out.



Figure 2-4-8 Turn the second glove over the first glove.



Figure 2-4-9 Dispose of gloves into waste receptacle.

6. Wash hands.

6. Reduces transmission of organisms.

> EVALUATION

- The client interacts on a social level with the nurse, family members, and other visitors.
- The client is free of nosocomial infections.
- Staff and the rest of the client population have remained free of signs and symptoms of infection.

> DOCUMENTATION

- In the narrative notes document the types of protective barriers used while caring for the client. Be sure to note any breaks in isolation technique.
- Record the client's compliance with and adjustment to isolation as well as the reactions and compliance of the client's family.



▼ REAL WORLD ANECDOTES

Scenario 1

Jerry had a gangrenous buttock and back of upper thigh from an anaerobic infection. He had been taken to surgery for debridement and irrigation of the wounds. The surgeon had made 5- to 6-inch lateral cuts every 2 to 3 inches down his buttock and back of upper thigh in order to irrigate the wounds with an antiseptic solution and pack them with sterile gauze to promote drainage.

The wound care required two doctors and two nurses and a lot of pain medication and support for Jerry. All of the staff donned gown, gloves, cap, and mask due to the severity of the infection. Special precaution was taken not to infect the other surgical patients on the ward.

Scenario 2

A nurse-practitioner is in a client's room properly gowned and gloved and working with the client. Her pager goes off, and she quickly lifts the gown aside and silences it with her gloved hand. Her pager is now contaminated.

> CRITICAL THINKING SKILL

Introduction

Standard precautions are used when handling blood, body fluids containing blood, and tissues and fluids such as pericardial, peritoneal, amniotic, semen, synovial, vaginal, cerebrospinal, and pleural space.

Possible Scenario

You are assisting a physician performing a paracentesis on a 68-year-old female with a distended abdomen. The client has no signs of infection. You wash your hands on entering the room and support the client during the procedure. The physician hands you a syringe

containing a sample of the peritoneal fluid and asks you to send it to the laboratory for analysis.

Possible Outcome

You do not have gloves on but the patient does not have any obvious signs of infection and the doctor is impatient to get on with things. Without thinking, you take the sample, wipe off the fluid on the outside of the syringe, and carry it out to the nurses' station to call the laboratory. Later, you discover that the client has been diagnosed with an antibiotic-resistant infection, and you think about all the items you touched with your contaminated hands and the syringe—points of indirect contact to possibly spread the infection.

Or, if you had it to do over again:

Since you do not have gloves on when handed the sample, you ask the physician or qualified practitioner to hold it or put it on the tray with the sterile equipment until you can put gloves on. Then he or she can hand you the syringe and you can properly label it and put it in a plastic bag for transport to the laboratory.

Prevention

The well-prepared nurse will have two pairs of gloves available when assisting with a sterile procedure, a sterile pair to assist with the aseptic procedure and a non-sterile pair to handle any secretions that require standard precautions.

▼ VARIATIONS



Geriatric Variations:

- *The elderly client can feel depressed and shunted aside when in isolation. Provide the client with as much company and stimulation as possible.*
- *Reassure the client that the isolation is for a limited time only.*



Pediatric Variations:

- *Younger children may feel they are being punished for being sick. Be sure to regularly reinforce the real reason for isolation.*
- *Showing the gown and gloves to the child before putting them on will help the child understand why they are being used and will help the child recognize that there is a real person under the gown and gloves.*
- *Using a gown and gloves in play therapy will help the child work through feelings about the experience.*



Home Care Variations:

- *A safe receptacle for contaminated items needs to be identified and used properly. Review agency policy, and determine how this receptacle will be emptied and the items disposed of or cleaned.*
- *There are several possible drawbacks to the caregiver maintaining precautions at home, including the cost of supplies, the hassle, and the low perceived benefit. This is a situation where careful, supportive education of the caregiver and client is essential to help caregivers understand the need to consistently implement the procedures.*
- *Promote compliance by reducing the inconvenience with good assessment and planning.*



Long-Term Care Variations:

- *A safe receptacle for the contaminated items needs to be identified and used properly.*
- *In long-term care settings clients and caregivers can get careless regarding precautions. Be sure to reinforce the ongoing need for following strict guidelines regarding isolation and standard precautions.*
- *Make sure that workers not normally exposed to barrier methods in the facility understand the need for and procedures of the specific precautions for the client.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

A coworker enters an isolation room only to tell the nurse about a new admission when a client with a gastrointestinal bleed has a bloody projectile emesis and blood splatters the uniform of the nurse near the doorway.

Ask Yourself:

How do I prevent this error?

Prevention:

No one should enter the room of an isolation client without putting on the appropriate barrier garments.

Ask Yourself:

How do I respond to this error?

Response:

Immediately wash your hands and any other skin that was exposed to the contaminated material. After donning a clean gown over your contaminated uniform, leave the room and close the door. Report the incident to the charge nurse. If changing facilities are available, change into a scrub gown after carefully placing your uniform in a biohazard bag for cleaning. If there are no changing facilities available, continue to wear a clean isolation gown over your uniform. If your uniform is too soiled for the isolation gown to contain the infected material, some provision for changing your uniform will have to be made.

Possible Error:

A nurse observes a visitor go into an isolation room without putting on a gown and gloves.

Ask Yourself:

How do I prevent this error?

Prevention:

A sign at the door of the isolation room might include a caution to check with the nurse before entering the room or the patient in isolation might be near the nurses' station so visitors can be monitored.

Ask Yourself:

How do I respond to this error?

Response:

Ask the visitor to come out of the room and wash his hands. Then instruct the visitor how to put on a gown and gloves and the reason for doing so. If the visitor's clothing has contacted infectious material, provide a disposable gown to be worn home until the clothing can be laundered.

> NURSING TIPS

- Post signs with words and/or pictures on the doors of patients who require specific barrier methods.
- Review isolation procedures regularly.
- Provide a supply of the appropriate barrier at the doorway of the client's room.
- If you need equipment such as an item you are carrying in your pocket, you will not be able to reach your pocket after you don your gown. You will not be able to touch needed items if your gloves or gown are contaminated. Think ahead. Plan.
- Remember that anything you touch with contaminated gloves or gown will be contaminated.

SKILL 2-5

Donning a Cap and Mask

Kathryn Lilleby, RN

KEY TERMS

Asepsis

Cap

Contamination

Infection

Isolation

Mask

Nosocomial infection

Pathogen

Standard

precautions



> OVERVIEW OF THE SKILL

Infection control is of paramount importance in a hospital setting in order to protect clients and health care workers from the spread of microorganisms. Clients can have low resistance to infectious organisms due to their underlying disease, increased exposure to other pathogens, and invasive procedures they may experience.

Infections acquired in a health care facility are called nosocomial infections. These infections are especially common in a hospital due to a large population of microorganisms that may be resistant to antibiotics. A pathogen can develop into an infection if the following criteria are met:

- A pathogen is present.
- A source for growth of the pathogen is present.
- A portal of exit from the source is present.
- A mode of transmission of the pathogen is present.
- A portal of entry to the host and a susceptible host are present.

Efforts to break this chain reaction at any point can prevent an infection from occurring. This is

called aseptic technique. Asepsis is the absence of pathogens and is an effort to keep a client as free from contamination from microorganisms as possible. Medical asepsis, or clean technique, includes procedures to reduce the number of microorganisms and prevent their spread.

Thorough handwashing is the single most important technique for infection control. Another method of infection control is the use of special barrier precautions such as masks. Masks are required when caring for a client in strict isolation, contact isolation, or respiratory isolation. A mask should be worn when caring for an immunocompromised client or a client with hepatitis B or acquired immunodeficiency syndrome (AIDS). Eye goggles are often worn in addition to masks. Face shields also are used to protect the eyes, nose, and mouth from contamination.

Sterile technique is practiced in the operating room or delivery room during a surgical procedure in order to reduce the risk of infection in the client. Besides masks, caps covering the hair on the head are generally worn.

> ASSESSMENT

1. Assess the specific isolation precautions needed for the client's condition. The type of microorganism and mode of transmission determine the degree of precautions.
2. Assess the client's laboratory results in order to know which organism the client is infected with and the client's immune responses.
3. Assess what nursing measures are required before entering the room in order to have all the necessary equipment.
4. Assess the client's knowledge for the need to wear a cap and mask during care in order to direct client teaching.
5. Assess the type of surgical procedure being done since not all sterile procedures require a cap and mask.

> DIAGNOSIS

- 1.6.2 Altered Protection
 3.1.2 Social Isolation
 7.1.2.2 Situational Low Self-Esteem

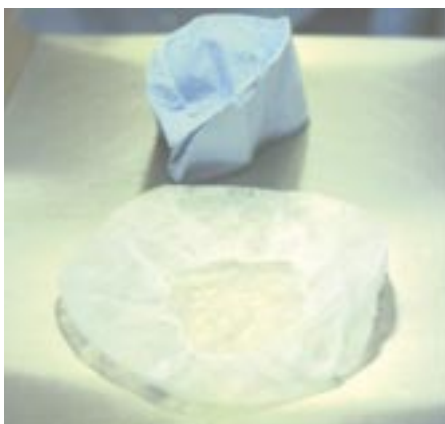


Figure 2-5-2 Caps

> PLANNING

Expected Outcomes:

1. The client will interact on a social level with the nurse, family members, and other visitors.
2. The client will remain free of a nosocomial infection.
3. The staff will be protected from infection when caring for the client.
4. The staff will avoid transmitting microorganisms to others.

Equipment Needed (see Figures 2-5-2 and 2-5-3):

- Cap
- Mask
- Mask with a face shield, if necessary



Estimated time to complete the skill:
2–3 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the need for isolation.
2. The client should be assured that the use of a cap and mask will be discontinued when it is safe.
3. The client and caregiver should be taught to report signs and symptoms of infection.



Figure 2-5-3 Masks

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Apply cap to head, being sure to tuck hair under cap. Males with facial hair should use a hood to cover all hair on head and face.

RATIONALE

1. Reduces transmission of microorganisms.
2. Protective garments prevent the transmission of organisms from the nurse to the client. The cap also protects the nurse from infectious pathogens.

continues

3. Secure mask around mouth and nose (see Figure 2-5-4). For masks with strings:
 - a. Hold mask by top and pinch metal strip over bridge of nose.
 - b. Pull two top strings over ears and tie at upper back of head.
 - c. Tie two lower ties around back of neck so that bottom of mask fits snugly under chin (see Figure 2-5-5).



Figure 2-5-4 Secure mask around mouth and nose.

3. Barrier garments prevent the transmission of organisms between nurse and patient. Mask will prevent organisms from entering or escaping around nose.



Figure 2-5-5 Bottom of the mask should fit snugly under chin.

4. Enter the client's room and explain the rationale for wearing a cap and mask.
5. After performing necessary tasks, remove cap and mask before leaving room.
 - a. Untie bottom strings of mask first, then top strings, and lift off of face. Hold mask by strings and discard.
 - b. Grasp top surface of cap and lift from head.
6. Wash hands after removing mask.

4. Minimizes anxiety and feelings of isolation.
5. Reduces transmission of organisms.
 - a. Prevents contaminated surface of mask from contacting uniform.
 - b. Minimizes contact of hands to hair.
6. Reduces transmission of microorganisms.

> EVALUATION

- The client interacts on a social level with the nurse, family members, and other visitors.
- The client remains free of any nosocomial infection.

> DOCUMENTATION

Nurses' Notes

- Document the type of protective barriers used and client understanding of the procedures.



▼ REAL WORLD ANECDOTES

Andrea was only 4 years old when she was admitted to the hospital with respiratory symptoms. After diagnostic tests, she was found to have pneumonia caused by an antibiotic-resistant organism. She was immediately placed in isolation.

Andrea cried when the nurse came in with gown, gloves, a mask covering her face, and a cap over her hair. She did not recognize her favorite nurse until she heard her say her name and laugh as she sat down beside Andrea. The nurse assured her that she would get better and then everyone who came into her room would not have to wear the masks, caps, and gloves anymore.

> CRITICAL THINKING SKILL

Introduction

Universal precautions are necessary when handling any body fluid containing blood. This includes wearing a mask and goggles, or a mask with face shield, when a blood splash is possible.

Possible Scenario

A nurse is caring for a client with a gastrointestinal bleed. The client has been vomiting bright red blood since he was admitted from the emergency room. The nurse steps out of the room to get some clean towels and medication and when she returns, the client has a bloody projectile emesis that splashes in her face as she approaches the client to help him.

Possible Outcome 1

The nurse, anxious to help the patient, uses one of the clean towels to wipe the emesis off her face. She pro-

ceeds to help the patient get cleaned up, medicated, and comfortable. Once she has seen to her client's comfort she proceeds to the sink by the door and washes her face with antiseptic soap. She later reports the incident to her supervisor.

Possible Outcome 2

The nurse observes that the client is not in any immediate danger so she washes her face with antiseptic soap at the sink by the door, puts on her mask with protective eyewear, and continues to care for the client. She later reports the incident to her supervisor.

Prevention

You need to have your mask on before approaching the client. Fresh supplies of masks and gowns should always be kept outside the closed door of an isolation room. Unless the patient is in grave danger, you must don the appropriate isolation apparel prior to entering the room.

▼ VARIATIONS



Geriatric Variations:

- Older clients who are confused may become more confused if they are unable to identify the person behind the mask.
- Older clients should be assured that they will not be left alone any longer than necessary.
- Elderly clients who lip read may have difficulty understanding a person wearing a mask. Make sure alternative communication devices are available, such as a pad and pencil or a computer. Make sure hearing aid is in place.



Pediatric Variations:

- A child may feel more confused and isolated if those caring for him are wearing a mask and cap. Allowing the child to play with a mask and cap will help the child become more comfortable with them.
- The nurse should show the child her face from the doorway before putting on the mask and cap.
- Younger children may feel they are being punished for being sick. Discuss the child's feelings at regular intervals to be sure the reason for the cap and mask is understood.
- Provide a cap and mask for the child's favorite stuffed toy to wear as well.



Home Care Variations:

- A safe receptacle for the contaminated items needs to be identified.



Long-Term Care Variations:

- A safe receptacle for the contaminated items needs to be identified.
- Long-term clients and staff should be cautioned not to become complacent regarding cap and mask precautions.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

You do not remove your mask when leaving one room and wear it into the next room.

Ask Yourself:

How do I prevent this error?

Prevention:

Always remove any contaminated items when leaving a room.

Ask Yourself:

How do I respond to this error?

Response:

Leave the room and return to the room where you wore the mask and cap. Remove them and leave them in the receptacle there. Wash your hands.

> NURSING TIPS

- Post signs on the doors of clients who require specific barrier methods.
- Review isolation procedures regularly with family and visitors.
- Provide a supply of the appropriate barrier at the doorway of the client's room.
- Long hair can be combed back and secured with a rubber band or pins in order to ensure that it will remain covered under the cap.
- Remember masks become less effective if worn too long, become wet, or are not changed between clients.

SKILL 2-6

Removing Contaminated Items

Catherine H. Kelley, RN, MSN, OCN,
and Susan Randolph, RN, MSN, CS

KEY TERMS

Aseptic technique
Contaminated
Cross-contamination
Infective materials

Isolation
Universal
precautions



> OVERVIEW OF THE SKILL

Infection control measures are used for all clients, regardless of the settings. Careful handling and removal of contaminated items from the client's environment are the responsibility of all personnel involved in the care of the client with an infection. Bagging these items properly prevents cross-contamination within the client's environment as well as accidental contamination of other individuals within the surrounding area. Items require bagging if they are contaminated with infective materials such as blood, pus, body fluids, feces, or respiratory secretions. This is especially important in any setting where medical personnel may be working with several clients throughout the day and risk spreading microorganisms from client to nurse, from nurse to nurse, or to other clients (see Figure 2-6-2).



Figure 2-6-2 Proper handling and disposal of client care items reduces the risk of contamination.

> ASSESSMENT

1. Assess the client's disease process and medical condition. Understanding the disease process and client's current status will help the nurse plan and organize care appropriately and institute appropriate infection control measures.
2. Assess the client's level of understanding regarding infection precautions. Determine if the client understands basic infection prevention measures. The patient may be confused or anxious if isolation measures are initiated.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 3.1.2 Social Isolation
- 7.1.2.2 Situational Low Self-Esteem

> PLANNING

Expected Outcomes:

1. Client will demonstrate an understanding regarding infection control procedures.

2. Client will demonstrate self-care measures related to infection prevention.
3. All contaminated items within the client's environment will be disposed of in an appropriate manner.
4. Personnel caring for the client will use appropriate infection prevention measures as determined by the client's condition.

Equipment Needed (see Figure 2-6-3):

- Disposable gloves.
- Self-supporting stand for the linen bag.
- Labeled bag for disposal of soiled linen. Bag should be hot water soluble; the bag may also be colored (red) for easy identification. (*Note:* Some agencies may require that linen be double bagged for removal.)
- Second linen bag if the double-bagging technique is used.



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. Educate client on the infection prevention measures that apply. An informed patient can monitor staff/visitor compliance to the procedures.
2. Explain to the client the rationale for the infection prevention measures.

3. Explain to the client the purpose of any related equipment, that is, specially designated linen or trash bags.
4. Demonstrate the technique of proper handwashing for visitors and client.
5. Ask clients to remind visitors to wash their hands when entering and leaving the room and to dispose of soiled client items appropriately. This is especially important if the visitor participates in the care of the client.
6. Encourage the client and caregiver to comply with universal precautions. This applies to the client cared for in the home as well as in the hospital setting.



Figure 2-6-3 Biohazard bags and gloves are used to handle and dispose of contaminated items.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Removal of Soiled Linen

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands when entering the client's room. | <ol style="list-style-type: none"> 1. Proper handwashing reduces transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Wear disposable gloves; wear other protective items (gowns, goggles) as determined by the situation and agency policies. | <ol style="list-style-type: none"> 2. Protects the nurse from contamination from blood and body fluids. |
| <ol style="list-style-type: none"> 3. Place labeled linen bag in stand. | <ol style="list-style-type: none"> 3. Proper labeling or identification of the linen bag ensures proper handling by other agency personnel. |
| <ol style="list-style-type: none"> 4. Gather linen and separate from disposable items. | <ol style="list-style-type: none"> 4. Prevents waste from being placed in linen bag. |

5. Do not allow any linen to touch the floor.
6. Place soiled linen in the linen bag; keep clean linen in a different area (see Figure 2-6-4).
5. The floor is always considered a contaminated area.
6. It is important to prevent cross-contamination to clean supplies and linen.



Figure 2-6-4 Place soiled linen in a bag.

7. Take care not to shake the linen when removing items from the bed or bathroom.
 8. Do not allow the soiled linen to contact your clothing. Carry linens with arms extended in front of you.
 9. Do not overfill the bag.
 10. Tie ends of the bag securely.
 11. Check for any punctures or tears in the bag.
 12. Double bag items if there is concern that the outside of the bag is contaminated or is torn.
 13. Wash hands.
 7. Minimizing movement through the air of the linens helps to reduce the risk of transmission of microorganisms.
 8. Prevents contamination of the nurse.
 9. Ensures proper closure of bag.
 10. Prevents linen from spilling out of the bag.
 11. The linen bag must be intact to prevent transmission of microorganisms.
 12. This is necessary to prevent cross-contamination and transmission of microorganisms to other personnel or other areas.
 13. Reduces transmission of microorganisms.
- Double-Bagging Technique**
14. With double bagging of linens, follow Actions 1–11. Then place the first bag into a second bag. Either a second nurse holds the second bag or it is in a stand immediately outside of the room.
 14. Some agencies require double bagging of linens as a measure to reduce the possibility of transmission of microorganisms. In most situations it is not necessary unless the single bag is not sturdy enough to hold the items or if the outside of the single bag has become contaminated.

Double-Bagging Technique *continued*

15. The second bag is properly labeled and secured.
16. The linens are then ready for the laundry.
17. Wash hands thoroughly upon leaving the room.
15. Proper labeling or identification of the linen bag ensures proper handling by other agency personnel.
16. Linens should be disposed of as soon as possible per agency policy.
17. Proper handwashing reduces transmission of microorganisms.

Removal of Other Contaminated Items

18. Removal and bagging of trash bag follow the same procedure as for linens (see Figure 2-6-5).
18. Check agency policy to determine if double bagging is required.



Figure 2-6-5 Bag all trash prior to removal.



Figure 2-6-6 Remove and replace full sharps containers to avoid needlestick injuries from pushing sharp items into a full container.

19. Sharps containers need to be removed when full or if the outside of the container becomes contaminated. Lock down the lid if available, and follow hospital policy for removal (see Figure 2-6-6).
19. Overfilling a sharps container can lead to injuries to staff members.
20. Always wash hands when entering or leaving the client's room (see Figure 2-6-7).
20. Proper handwashing reduces transmission of microorganisms.



Figure 2-6-7 Wash hands when entering or leaving the client's room.



Figure 2-6-8 Using disposable equipment reduces contamination risks.

21. Use disposable equipment when able (see Figure 2-6-8).
 22. Properly bag, label, and remove any nondisposable equipment that will require special cleaning (disinfection and sterilization).
 23. Disassemble special procedure trays into disposable and nondisposable parts. Send nondisposable items (after proper bagging) to central services for decontamination.
 24. Laboratory specimens should be placed in a leak-proof container and require no other precautions. Check to see that containers are not visibly contaminated on the outside (see Figure 2-6-9).
21. Reduces the possibility of transmission of microorganisms.
 22. Proper handling and labeling of the items ensures proper handling by other agency personnel.
 23. Some agencies require that items that can be sterilized by autoclave (glass, metal) be separated from rubber and plastic items.
 24. Personnel handling laboratory specimens utilize universal precautions.

Figure 2-6-9 Place specimens in leak-proof containers to avoid contamination.



25. Wash hands.
25. Reduces transmission of microorganisms.

> EVALUATION

- Client demonstrates an understanding regarding infection control procedures.
- Client demonstrates self-care measures related to infection prevention.
- All contaminated items within the client's environment were disposed of in an appropriate manner.
- Personnel caring for the client used appropriate infection prevention measures as determined by the client's condition.

> DOCUMENTATION

Nurses' Notes

- Note specific isolation precautions that were followed.
- Document any specific breaches of isolation noted.

Kardex

- Note any unusual isolation needs in the client Kardex.



▼ REAL WORLD ANECDOTES

Scenario 1

Mrs. Jones frequently participated in the care of her child. Her child was a frequent client at the medical center due to a diagnosis of cystic fibrosis and frequent bouts of pulmonary infections. Mrs. Jones was very aware of the importance of managing her child's secretions and was very upset when the nurse did not supply bags for disposal of trash (tissues) in the room. Mrs. Jones also noticed that the housekeeping personnel did not wear gloves when handling the trash. Her observations were reported to the nurse manager who instituted the appropriate infection prevention measures.

continues

▼ REAL WORLD ANECDOTES *continued*

Scenario 2

Mr. Smith was admitted to a medical surgical unit with a possible diagnosis of TB during a very busy evening shift. The admitting nurse failed to initiate orders for pulmonary infection precautions. The error was discovered in the morning report. Unfortunately, several nurses and other personnel had been exposed to Mr. Smith's secretions. The diagnosis of TB was confirmed and the exposed personnel were subsequently tested at expense to the agency, and disciplinary action was taken.

> CRITICAL THINKING SKILL

Introduction

The importance of properly bagging linens should not be minimized. Prevention of transmission of microorganisms is everyone's responsibility.

Possible Scenario

Mr. Kelley was transferred from a local nursing home with a wound infection. The microbiology results indicated the client had vancomycin-resistant enterococcus (VRE). The nurse was changing the bed of Mr. Kelley whose linens were contaminated with exudate from a recent dressing change. The nurse removed the linens from the bed and tucked them under her arm as she reached to pick up the call light that had fallen on the floor. She then placed the soiled linens in the proper bag in the room.

Possible Outcome 1

After changing Mr. Kelley's linens, the nurse answered a call light. The client who called wanted to be helped from the bed to the commode. During the transfer the

client grasped the nurse under the arms, placing her hand directly on the now contaminated area. This client was later found to have the same strain of VRE.

Possible Outcome 2

After changing Mr. Kelley's linens, the nurse started to answer a call light. While walking to the client's room, the nurse remembered that she had placed linen contaminated with an antibiotic-resistant bacteria against her uniform. She did not see any obvious contamination, but as a precaution she decided to wear an isolation gown over her uniform. There were no other cases of VRE in the facility.

Prevention

Microorganisms on the linens can be transmitted to the nurse's clothing with direct contact. This may cause possible risk of infection to other personnel and patients. Carry linens at arms length when removing them from the bed and placing them in the appropriate container.

▼ VARIATIONS



Geriatric Variations:

- Some older adults may lack the dexterity to assist in the bagging or labeling of soiled items and may need assistance from a health care worker.
- Some older clients with impairment of memory may have difficulty in understanding the importance of infection prevention measures or may be confused as to the purpose of such measures.



Pediatric Variations:

- Children's toys and books that are contaminated should be disinfected or destroyed.
- Teach the child and caregiver not to share toys with other children or siblings if the child has an illness that may be transmitted to others.
- It is also important to keep all bagging supplies (plastic bags) away from the reach of very young children since these items may pose a risk for suffocation.

▼ VARIATIONS *continued*



Home Care Variations:

- *In the home setting, the client and caregivers should be instructed to wash linens and clothing in a separate load of laundry if these items are considered contaminated. Laundry soap and a hot-water cycle should be used.*



Long-Term Care Variations:

- *Clients with impaired cognitive function will be unable to assist with bagging and removal of items in accordance with infection prevention measures.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Overfilled linen bag that cannot be secured properly.

Ask Yourself:

How do I prevent this error?

Prevention:

Use caution in handling soiled linens. Keep spare bagging supplies in a convenient location for use. Allow room at the top of each bag for proper closure.

Ask Yourself:

How do I respond to this error?

Response:

Put on gloves; set up an additional linen bag on stand; remove some of the linen from the first bag (take care not to contaminate the outside of the bag) until there is room for proper closure of the first bag. Place soiled linens in the second bag as appropriate.

Possible Error:

Placement of improper items in the bag.

Ask Yourself:

How do I prevent this error?

Prevention:

Separate disposable from nondisposable items when bagging for removal.

Ask Yourself:

How do I respond?

Response:

Put on gloves. Carefully sort the items and separately bag the nondisposable items for sterilization and chemical disinfection.

> NURSING TIPS

- Check supplies (bags, labels) before beginning bagging of items for removal.
- Always wash your hands before and after entering the room and bagging soiled items, even when wearing gloves.
- Use disposable equipment and supplies when possible.
- Do not take items such as your stethoscope into another client's room for use without proper cleaning when there is risk of transmission of infection.
- Review your agency's policies for specific guidelines. That is, some institutions may require double bagging for some items.
- Recheck labels and restock special bags as needed so that supplies are readily available for other caregivers and personnel.

SKILL 2-7

Applying Sterile Gloves via the Open Method

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Contamination
Open gloving
Spores

Sterile technique
Surgical asepsis



> OVERVIEW OF THE SKILL

Asepsis, or sterile technique, consists of those practices that eliminate all microorganisms and spores from an object or area. The use of sterile gloves is at the heart of aseptic technique. The ability to manipulate sterile items without contaminating them is critical to many diagnostic and therapeutic interventions. Common nursing procedures that require sterile technique are:

- All invasive procedures, either intentional perforation of the skin (injection, insertion of IV needles or catheters) or entry into a body orifice

(tracheobronchial suctioning, insertion of a urinary catheter)

- Nursing measures for clients with disruption of skin surfaces (changing a surgical wound or IV site dressing) or destruction of skin layers (trauma and burns)

There are two methods for applying sterile gloves: open and closed. The open method is used most frequently when performing procedures that require the sterile technique, such as dressing changes, but that do not require donning a sterile gown.

> ASSESSMENT

1. Assess the glove package. Is it intact? Is it wet or otherwise contaminated? Is it out of date? **Assesses the sterility of the glove.**
2. Assess the local environment. Is there an area suitable for opening the package and applying the gloves? Is it dry? Is it reasonably stable and horizontal? Are there obvious airborne contaminants? **A flat, clear workspace is necessary to successfully carry out the procedure.**

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. Sterility of the gloves will be maintained while they are being applied.
2. Sterility of the procedure will be maintained.

Equipment Needed (see Figure 2-7-2):

- Package of proper-sized sterile gloves



Estimated time to complete the skill:
5 minutes



Figure 2-7-2 Sterile gloves

> CLIENT EDUCATION NEEDED:

1. Inform the client that you are establishing a sterile field and request cooperation in not touching the sterile gloves or other sterile objects.

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Wash hands.
2. Read the manufacturer's instructions on the package of sterile gloves; proceed as directed in removing the outer wrapper from the package (see Figure 2-7-3), placing the inner wrapper onto a clean, dry surface (see Figure 2-7-4). Open inner wrapper to expose gloves (see Figure 2-7-5).



Figure 2-7-3 Remove the outer wrapper of the sterile glove package.



Figure 2-7-4 Place the gloves in the inner wrapper on clean, dry surface.



Figure 2-7-5 Open the inner wrapper to expose glove.

continues

3. Identify right and left hand; glove dominant hand first.
4. Grasp the 2-inch- (5-cm-) wide cuff with the thumb and first two fingers of the nondominant hand, touching only the inside of the cuff (see Figure 2-7-6).



Figure 2-7-6 Grasp first cuff with the nondominant hand.

5. Gently pull the glove over the dominant hand, making sure the thumb and fingers fit into the proper spaces of the glove (see Figure 2-7-7).
6. With the gloved dominant hand, slip your fingers under the cuff of the other glove, gloved thumb abducted, making sure it does not touch any part on your nondominant hand (see Figure 2-7-8).

Figure 2-7-8 Slip fingers under the cuff of the second glove.

7. Gently slip the glove onto your nondominant hand, making sure the fingers slip into the proper spaces (see Figures 2-7-9 and 2-7-10).



Figure 2-7-9 Pull on the second glove.

8. With gloved hands, interlock fingers to fit the gloves onto each finger.

3. Dominant hand should facilitate motor dexterity during gloving.
4. Maintains sterility of the outer surfaces of the sterile glove.



Figure 2-7-7 Pull the glove over the dominant hand.

5. Prevents tearing the glove material; guiding the fingers into proper places facilitates gloving.
6. Cuff protects gloved fingers, maintaining sterility.



7. Contact is made with two sterile gloves.



Figure 2-7-10 Make sure all fingers are in the proper spaces.

8. Promotes proper fit over the fingers.

If the gloves are soiled, remove by turning inside out as follows:

9. Slip gloved fingers of the dominant hand under the cuff of the opposite hand or grasp the outer part of the glove at the wrist if there is no cuff.
10. Pull the glove down to the fingers, exposing the thumb (see Figure 2-7-11).



Figure 2-7-11 Peel glove down to fingers, exposing one thumb.

11. Slip the uncovered thumb into the opposite glove at the wrist allowing only the glove-covered fingers of the hand to touch the soiled glove (see Figure 2-7-12).
12. Pull the glove down over the dominant hand almost to the fingertips and slip the glove on to the other hand (see Figure 2-7-13).



Figure 2-7-13 When soiled gloves are removed correctly, only the inside, clean surface of one glove is exposed.

13. With the dominant hand touching only the inside of the other glove, pull the glove over the dominant hand so that only the inside (clean surface) is exposed.
14. Dispose of soiled gloves according to institutional policy and wash hands (see Figure 2-7-14).

9. Contact is made with two sterile gloves.
10. Frees the thumb for the next step.



Figure 2-7-12 Slip uncovered thumb into the opposite glove.

11. Contact is made with two sterile gloves.
12. Removes glove without contact with soiled surfaces.



Figure 2-7-14 Dispose of gloves in appropriate receptacle.

13. Exposes only the clean surface of the gloves.
14. Prevents the transfer of microorganisms.

> EVALUATION

- Sterility of the gloves and sterile field was maintained without breaks.

> DOCUMENTATION

Nurses' Notes

- Document that the procedure was performed using sterile technique.



▼ REAL WORLD ANECDOTES

Scenario 1

A nurse is preparing a sterile field for a central-line insertion. She has the field established and puts on the sterile gloves. It is only after applying the sterile gloves that the nurse remembers that she has not opened the outer, contaminated wrapper on the prepackaged central-line kit. In order to add the central-line kit to the sterile field, the nurse must break the sterility of her gloves, open the outer, contaminated wrapper and then apply new, sterile gloves. The nurse is reminded to be sure she has everything in order and ready to use before applying her sterile gloves.

Scenario 2

While working in a teaching hospital, a nurse has the opportunity to assist a new intern in the insertion of a central line. The nurse has gathered the necessary equipment and established a sterile field. While applying the sterile gloves, the intern slides her bare, contaminated hand under the cuff of the glove to apply it to her dominant hand. The nurse, noting that the intern has contaminated the glove, hands her a fresh set of gloves. As the intern is about to contaminate a second set of gloves, the nurse gently points out the correct method of putting on sterile gloves.

> CRITICAL THINKING SKILL

Introduction

Environment is an important consideration in maintaining sterility.

Possible Scenario

You are getting ready to change a client's dressing. This is a sterile dressing change and you gather the equipment to establish a sterile field. The client's bedside table is the handiest place to set up the sterile field, and you clear the client's personal effects and water pitcher off the table. You lay out the supplies and start to establish a sterile field. As you are working, you do not notice

that the sterile gloves are lying in a pool of water that has collected under the client's bedside pitcher.

Possible Outcome

The package of sterile gloves has become contaminated by getting wet. You infect this client's wound with transient flora off the bedside table.

Prevention

When establishing sterility, you must be aware of the environment and possible means of compromising the sterile field and gloves. Especially in hospital settings, everything is dirty unless it has been specifically cleaned and maintained otherwise.

▼ VARIATIONS



Geriatric Variations:

- When gloving to care for a confused or restless client, make sure you open the gloves away from the client, so accidental contamination does not occur.
- Seek assistance restraining or holding a client in position prior to applying sterile gloves.

▼ VARIATIONS *continued*



Pediatric Variations:

- Create a play set of sterile gloves using clean gloves in a small size, cuffed, and wrapped in paper. Use play therapy to let a younger child go through the motions of gloving along with you. Teach the basics of clean versus dirty, and reinforce how handwashing is the first and last step to fight germs.
- Seek assistance restraining or holding a client in position prior to applying sterile gloves.



Home Care Variations:

- Caregivers may shy away from the cost of sterile gloves and be tempted to perform procedures at home with clean gloves or find other ways to “cut corners.” Be supportive as you listen to their concerns. Even with insurance, the costs associated with illness are often overwhelming to a caregiver on a limited budget. Make sure an adequate supply of gloves is available, and educate the caregiver on the need for proper technique to prevent infection.
- Uncluttered table-top space is often at a premium in the home care setting. If you need space to lay out supplies or open your glove package, bring along a TV tray or stand. You can quickly set it up and take it down in the patient care area.



Long-Term Care Variations:

- Make sure care providers not used to putting on sterile gloves have an opportunity to review the technique prior to caring for the client.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While putting on sterile gloves the nurse puts her fingers in the wrong fingerholes. In an attempt to straighten this out, the nurse reaches up with her ungloved hand to adjust the position of the glove's fingers.

Ask Yourself:

Has sterility been maintained?

Prevention:

Be careful to slide your hand into the sterile gloves in a way that the fingers will not become tangled and confused. If they do, do not try to adjust them. Put the second glove on touching only the sterile portion of the glove with the sterile portion of your gloved hand. Only after both hands have sterile gloves on can you adjust the fingers and the fit of the gloves. If you cannot adjust the fingers, get another pair of gloves and start over.

> NURSING TIPS

- Only touch dirty to dirty, clean to clean, and sterile to sterile.
- Be aware of the immediate environment when applying sterile gloves to avoid accidental contamination.
- Be sure to have everything you need ready before putting the sterile gloves on.

SKILL 2-8

Surgical Scrub

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Contamination
Friction
Scrub

Sterile
Surgical
handwashing



> OVERVIEW OF THE SKILL

Surgical handwashing or scrub is used to remove soil and microorganisms from the skin. Nurses working in the operating room perform surgical handwashing to decrease the client's risk for an infection should a sterile glove tear or break. The skin on the nurse's

hands and arms should be intact (free of lesions). Agency policy determines how to perform the scrub with regard to method and timing. This procedure describes the basic principles in performing surgical handwashing.

> ASSESSMENT

1. Assess the scrub environment for equipment and cleanliness to reduce the risk of infection.
2. Assess your preparedness. Are you prepared with the sterile towels and gown? Have you already changed into scrub clothes and applied shoe covers? Preparedness helps prevent infection by reducing the risk of recontamination following the surgical scrub.

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. Hands and forearms will be adequately cleansed for applying sterile gloves and gown.

Equipment Needed (see Figure 2-8-2):

- Surgical scrub items (antimicrobial soap, two brushes, and nail file)
- Surgical shoe covers (booties) and cap, face mask, sterile gown, and proper-size gloves
- Sterile towel



Figure 2-8-2 Surgical scrub items



Estimated time to complete the skill:
20 minutes

> CLIENT EDUCATION NEEDED:

Client education occurs during preoperative care.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Preparing for Surgical Handwashing

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Remove rings, chipped nail polish, watch, and earrings that do not fit under a surgical cap. 2. Use a deep sink with side or foot pedal to dispense antimicrobial soap and control water temperature and flow. 3. Have two surgical scrub brushes and nail file. 4. Apply surgical shoe covers and cap to cover hair and ears completely. 5. Apply mask (see Figure 2-8-3). | <ol style="list-style-type: none"> 1. Decreases resident and transient microorganisms. 2. Prevents hands and forearms from touching a soiled surface. 3. Enhances mechanical friction during the scrub. 4. Prevents introduction of contaminants into environment. 5. Provides a respiratory barrier. |
|--|--|



Figure 2-8-3 Apply cap and mask.

- | | |
|--|---|
| <ol style="list-style-type: none"> 6. Before beginning the surgical scrub: <ol style="list-style-type: none"> a. Open the sterile package containing the gown; using aseptic technique, make a sterile field with the inside of the gown's wrapper. b. Open the sterile towel and drop it onto the center of field. c. Open the outer wrapper from the sterile gloves and drop the inner package of gloves onto the sterile field beside the folded gown and towel. | <ol style="list-style-type: none"> 6. Preparing the sterile items prior to the scrub decreases the risk of contaminating scrubbed hands. |
|--|---|

continues

Surgical Handwashing *continued*

7. At a deep sink with foot or knee controls (see Figure 2-8-4), turn on warm water; under flowing water, wet forearms and hands (from elbows to fingertips), keeping arms and hands above elbow level during entire procedure (do not allow uniform to get wet).

Figure 2-8-4 Handwashing sink with knee controls

7. Water should flow from the least contaminated (forearms) to the most contaminated (hands).



8. Apply a liberal amount of soap onto hands and rub hands and arms to 2 inches above elbows (see Figures 2-8-5 and 2-8-6).



Figure 2-8-5 Apply a liberal amount of soap.

8. Reduces number of microorganisms on hands.



Figure 2-8-6 Scrub hands and arms.

9. Use nail file under running water, clean under each nail of both hands, and drop file into sink when finished (see Figure 2-8-7).



Figure 2-8-7 Use a nail file under running water to clean fingernails.

9. Removes dirt that harbors microorganisms.



Figure 2-8-8 Prepackaged scrub brush

10. Wet and apply soap to scrub brush, if needed. Open prepackaged scrub brush if available (see Figure 2-8-8). With brush in your dominant hand using a circular motion, scrub nails and all skin areas of nondominant hand and arm (10 strokes to each of the following areas):

10. Removes resident bacteria from the skin's surfaces; the circular motion mechanically removes microorganisms. Scrubbing the non-dominant hand first sets a routine you can remember if you should get interrupted during the scrub.

- a. Nails
- b. Palm of hand and anterior side of fingers

11. Rinse brush thoroughly, reapply soap.
12. Continue with scrub of nondominant arm with a circular motion for 10 strokes each to the lower, middle, and upper arm; drop brush into the sink.
13. Maintaining the hands and arms above elbow level, place the fingertips under running water and thoroughly rinse the fingers, hands, and arms (allow the water to run off your elbow into the sink); take care not to get your uniform wet (see Figure 2-8-9).



Figure 2-8-9 Thoroughly rinse fingers, hands, and arms.

14. Take the second scrub brush and repeat Actions 10–13 on your dominant hand and arm.
15. Keep arms flexed and proceed to area (operating or procedure room) with sterile items (see Figure 2-8-10).
16. Secure sterile towel by grasping it on one edge, opening the towel, full length, making sure it does not touch your uniform.
17. Dry each hand and arm separately; extend one side of the towel around fingers and hand and dry in a rotating motion up to the elbow (see Figure 2-8-11).

Figure 2-8-11 Dry arms up to the elbows.

11. Decreases transfer of microorganisms.
12. Decreases transfer of microorganisms from the arm; dropping the brush avoids contamination.
13. Allows flow of water to cleanse from the area of least contamination to the area of most contamination. Water conducts microorganisms, and keeping uniform dry aids in maintaining sterility of gown.



Figure 2-8-10 Keep arms flexed and proceed to area.

14. See Rationales 10–13.
15. Prevents water from flowing from least (elbows) to most (hands) clean area.
16. Maintains the sterility of the towel.
17. Prevents contamination by drying from cleanest to least clean area.



Surgical Handwashing *continued*

- | | |
|--|--|
| <p>18. Reverse the towel and repeat the same action on the other hand and arm, thoroughly drying the skin.</p> <p>19. Discard the towel into a linen hamper.</p> | <p>18. Prevents contamination of the gown.</p> <p>19. Keeps the environment clean.</p> |
|--|--|

> EVALUATION

- The nurse's hands and forearms were adequately prepared for closed gown and glove technique.
- The hands or forearms were not recontaminated following the scrub by touching contaminated surfaces.

> DOCUMENTATION

- No documentation of surgical scrub is required.

**▼ REAL WORLD ANECDOTES****Scenario 1**

The nurse was well into her surgical scrub when she realized she forgot to take off her rings. She stopped, removed and stored her rings, and started over. This nurse usually followed a mental checklist, but she had been distracted that day and had not followed her normal routine.

Scenario 2

Charles found that singing the lyrics to a popular song either out loud or in his head kept him from rushing his scrub session. Scrubbing to the beat of the music helped him stay focused on the repetitive task.

> CRITICAL THINKING SKILL**Introduction**

Least contaminated to most contaminated.

Possible Scenario

During a surgical scrub the nurse wets her hands and arms, allowing the water to flow from her elbows to her fingertips (from least contaminated to most contaminated). After scrubbing with soap, the nurse then rinses her hands and arms the same way, allowing the rinse water to flow from her elbows to her fingertips.

Possible Outcome

The nurse's hands, the portion of her body that most comes in contact with the client and the instruments, remain the most contaminated portion of her lower

arms. This could potentially compromise surgical sterility and the client's health.

Prevention

The nurse should understand the reasoning involved in the surgical scrub procedure. At the beginning of the scrub the nurse's hands are the most contaminated portion of her lower arms and the water is allowed to flow off the fingertips. During the scrub the nurse holds her arms flexed upward to allow contaminated water and soap to flow off her elbows, thus making her elbows the most contaminated portion of her lower arms. The rinse water is also allowed to flow from fingertips to elbows to maintain the hands as the least contaminated portion of the lower arm. It is preferable to keep the hands least contaminated since this is the portion of the body that most comes in contact with the client and the surgical implements.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Not scrubbing long enough

Ask Yourself:

Which element of handwashing is the most important?

Prevention:

Friction is the most important component of handwashing for the removal of soil and transient flora. Be sure to take the time to use plenty of friction and wash at least 10 strokes per area washed.

> NURSING TIPS

- Be sure to keep your hands and forearms above elbow level.
- Make sure you are not splashed by another person washing their hands.

SKILL 2-9

Applying Sterile Gloves and Gown via the Closed Method

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Cap
Closed glove
Gloves

Gown
Shoe covers
Sterile field



> OVERVIEW OF THE SKILL

Nurses in the operating room and special procedure areas such as cardiac catheter labs use the gown and closed gloved method to don these protective items. “Closed glove” refers to a technique where, after the surgical scrub, the gown is put on first; then the gloves are

put on by *grasping the gloves with the hands still in the sleeves of the gown*. The sterile gown and gloves serve as a barrier to decrease the risk of wound contamination. They also allow the nurse to move more freely in the environment with sterile drapes and objects.

> ASSESSMENT

1. Prior to applying gown and gloves, assess the surrounding environment. Where is the sterile field? Are the gown and gloves dry and intact? Maintains the sterility of the gown and gloves.
2. Assess the condition of your hands. Have they remained uncontaminated since you scrubbed? Prevents any breaks in sterile technique that could compromise the procedure.

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The caregiver will don a sterile gown and gloves without compromising their sterility.

Equipment Needed (see Figure 2-9-2):

- Sterile gown
- Sterile and proper-sized gloves



Figure 2-9-2 Sterile gloves



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

Client education occurs during preoperative care.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Gowning

1. The sterile gown is folded inside out.
2. Grasp the gown inside the neckline, step back, and allow the gown to open in front of you; keep the inside of the gown toward you; do not allow it to touch anything (see Figure 2-9-3).



Figure 2-9-3 Allow the gown to fall open.

3. With hands at shoulder level, slip both arms into the gown; keep your hands inside the sleeves of the gown (see Figure 2-9-4).
4. The circulating nurse will step up behind you and grasp the inside of the gown, bring it over your shoulders, and secure the ties at the neck and waist.

Closed Gloving

5. With hands still inside the gown sleeves, open the inner wrapper of the gloves on the sterile gown field (see Figure 2-9-5).
6. With your nondominant sleeved hand, grasp the cuff of the glove for the dominant hand and lay it on the extended dominant forearm

1. Allows ungloved hands to touch only the inside.
2. Keeps the outside of the gown sterile.



Figure 2-9-4 Slip both arms into the gown.

3. Prevents the gown from touching nonsterile objects; allows sterile items to come in contact only with other sterile items.
4. Prevents any part of the gown from touching a nonsterile object; provides complete coverage of undergarments.
5. Maintains sterility of the gloves.
6. Only sterile items come in contact with each other.

continues

Closed Gloving *continued*

Figure 2-9-5 Keep hands inside the gown sleeves when opening gloves. Handle the gloves through the fabric of the gown.



(see Figure 2-9-6); with palm up; place the palm of the glove against the sleeved palm, with fingers of the glove pointing toward elbow (see Figure 2-9-7).



Figure 2-9-6 Grasp the cuff of the glove.



Figure 2-9-7 Keep the fingers of the glove facing the elbow.

7. Manipulate the glove so that the sleeved thumb of your dominant hand is grasping the cuff; with your nondominant hand, turn the cuff over the end of dominant hand and gown's cuff.
8. With sleeved nondominant hand, grasp the cuff of the glove and the gown's sleeve of the dominant hand; slowly extend the fingers into the glove, making sure the cuff of the glove remains above the cuff of the gown's sleeve (see Figure 2-9-8).

7. Prevents the hands from contaminating the sterile glove.
8. Provides a closed sterile method for gloving; the glove cuff over the gown prevents contamination of the operative field with microorganisms.



Figure 2-9-8 Extend fingers into the glove.

9. With the gloved dominant hand, repeat Actions 7 and 8 (see Figures 2-9-9 and 2-9-10).



Figure 2-9-9 Place the second glove on the gown.

9. Only sterile items can touch each other.



Figure 2-9-10 Extend the fingers into the second glove.

10. Interlock gloved fingers; secure fit.

10. Promotes dexterity of gloved hands.

> EVALUATION

- Sterility of the gown and gloves was maintained while the caregiver applied them.
- Sterility of the environment was maintained while the caregiver applied the gown and gloves.

> DOCUMENTATION

- Document in nurses' notes or an incident report only if an incident occurred that could affect the care of the patient or increase the risk of transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

It is lunchtime for the operating room nurses. They carefully cover their scrub uniforms with gowns to prevent contaminating them and walk down to the cafeteria. They sit and eat lunch, in their gowns, surgical caps, and shoe covers, their masks dangling around their necks. After lunch they return to the changing area to go back to work. They remove the gowns, adjust their masks, and go to the scrub area to wash their hands. Nobody thinks to replace their now-contaminated shoe covers, masks, and caps before they scrub for the next surgical case.

Scenario 2

The nurse has finished her surgical scrub. She is about to don the gown when she realizes she left her watch on the counter. She picks it up with her fingernails and drops it in her pocket. She proceeds to gown and glove. Touching a contaminated object after scrubbing and prior to gloving allows microorganisms to contaminate her fingernails. The fingernail is a likely spot for a glove tear and could contaminate the surgical site.

> CRITICAL THINKING SKILL

Introduction

Neatness counts.

Possible Scenario

Nurse Adams reports for work in the operating room as usual. She changes out of her street clothes and into scrubs. She places protective covers on her shoes and dons a surgical mask and cap. She then proceeds to the scrub area and scrubs her hands and forearms using

liberal amounts of water. Happily talking with other workers in the scrub area, she does not notice water splashing onto the front of her scrubs. She continues to the operating theater to don a sterile gown and gloves. As she is putting on the sterile gloves, the water from her scrub uniform soaks through her sterile gown.

Possible Outcome

Water carries microorganisms from one site to another. Nurse Adams has broken sterile technique by

allowing her sterile gown to become contaminated with the water. This could compromise the sterility of the entire operation and present a danger to the client. She returns to the changing area, changes into a new scrub uniform, returns to the scrub area, and rescrubs her hands. She then returns to the operating

theater to regown and reglove. The surgery is delayed 15 minutes.

Prevention

Be aware of possible contaminants and avoid anything that might compromise sterile technique.

▼COMMON ERRORS—ASK YOURSELF

Possible Error:

Reaching behind yourself to adjust the sterile gown on your shoulders and free the ties.

Ask Yourself:

Does this increase the risk of contaminating the sterile gown? Am I dexterous enough to do this without contaminating the sterile gown?

Prevention:

Wait for the circulating nurse to adjust the gown and tie it. Do not be in a hurry to be too helpful.

> NURSING TIPS

- Only touch sterile to sterile.
- Be careful not to get your scrub uniform wet. This will contaminate the sterile gown.
- Do not lean against the scrub sink.

SKILL 2-10

Applying Restraints

Susan Weiss Behrend, RN, MSN

KEY TERMS

Belt restraint	Leather restraints
Chest restraints	Mitt restraint
Elbow restraint	Patient safety
Ethics of restraints	Posey restraint
Immobilization	Soft restraints



> OVERVIEW OF THE SKILL

Restraint devices exist in many forms and are used to limit movements that could be harmful to clients who are confused, agitated, or disoriented. A restraint is a physical or mechanical method of involuntarily restricting movement and physical activity so that the client is protected from causing harm to self and/or to others.

Restraints may be used to prevent movement during a procedure. When clients cannot support their posture or balance, a restraint may be used to provide the needed support or to prevent the client from falling. If a client is restless or confused, a restraint may be used to prevent the client from damaging therapeutic equipment.

The procedure to restrain a client is fairly simple. The emotional and ethical considerations that accompany this procedure are complex. Clients and caregivers often have strong opinions regarding the use of restraints. Many people see the use of restraints as demeaning and dehumanizing. Others feel that re-

straints are used to replace nursing contact in understaffed environments. Confused clients often feel that they are being imprisoned. While trying to balance these considerations, the nurse has a legal and ethical duty to keep her clients safe. The decision to restrain a client and how much to restrain the client is a delicate balancing act of nursing judgment.

There are a number of different types of restraints. They range from a simple armboard to prevent movement of a wrist or elbow to more complex locked restraints. The restraints most commonly used are soft restraints. They are made of mesh or soft canvas. They are designed to gently restrain the client without damaging the skin. Chest restraints, cloth wrist restraints, mitten restraints, and “posey” restraints fall into this category. Other types of restraints include locked web belt restraints, locked leather restraints, and full-body restraints. These are more often used in settings where clients are extremely agitated and belligerent.

> ASSESSMENT

1. Assess the client’s level of consciousness. This will help you determine the client’s ability to protect himself from potential harm.
2. Assess the client’s degree of orientation. A client who is confused regarding time, place, or person is more likely to be at risk of injuring himself. A client who is agitated or angry may be at risk of injuring others.
3. Assess the client’s physical condition. A client who has weakness, paralysis, or impaired balance or mobility is at increased risk of injury. Impaired

vision or hearing also increases the client's risk of injury.

4. Assess the client's history for falls, accidents, confusion, agitation, or self-inflicted injury. A client who has a history of this type is at increased risk for injury.
5. Assess the client's intent. A client who is verbalizing threats to harm self or others is at increased risk of injury.
6. Assess client and family knowledge regarding the use of and rationale for restraints or protective devices. The more the client and family understand regarding the reason for restraints, the more cooperative and understanding they will be.

> NURSING DIAGNOSIS

- 1.6.1 Risk for Injury
- 7.1.2 Self-Esteem Disturbance
- 7.3.2 Powerlessness
- 8.1.1 Knowledge Deficit Regarding the Need for Restraints
- 6.1.1.1 Impaired Physical Mobility



Figure 2-10-2 Locking belt restraint



Figure 2-10-3 Mitten restraints

> PLANNING

Expected Outcomes:

1. The client will remain uninjured.
2. The client will not suffer injury or impairment from the restraints.
3. The client's therapeutic equipment will remain intact and functional.
4. Others will not be harmed by the client.
5. The client will be restrained just enough to prevent injury.

Equipment Needed (see Figures 2-10-2, 2-10-3, and 2-10-4):

- Restraints appropriate to the client's condition and type of restraint required
- Cotton batting or foam padding



Estimated time to complete the skill: **10–20 minutes. The time may vary depending upon the type of restraint, the physical and emotional condition of the client, and staff availability.**

> CLIENT EDUCATION NEEDED:

1. Explain the reason for the need to use restraints/protective devices. Reassure the client and family that the restraint is not a punitive device but is intended to ensure the client's safety.
2. Show the client the equipment to be used and provide a simple explanation of how it is applied.
3. Reassure the client and family that the client will be monitored constantly and that assistance for personal care will be provided.



Figure 2-10-4 Jacket restraint

4. Allay fear of isolation and potential loss of well-being.
5. Teach the client how to communicate with the staff in order for needs to be identified and attended. Ensure that the client's call bell or the nurse's cellular telephone number is available.
6. Help clients develop an awareness regarding what is a comfortable application of the restraint and encourage them to report discomfort associated with the application.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Chest Restraint

1. Explain that the client will be wearing a jacket attached to the bed. Explain that this is for safety.
2. Place the restraint over the client's hospital gown or clothing.
3. Place the restraint on the client with the opening in the front (see Figure 2-10-5).



Figure 2-10-5 Place the jacket restraint on the client. Make sure the restraint is the proper size for the client and has been applied correctly.

4. Overlap the front pieces, threading the ties through the slot/loop on the front of the vest.
5. If the client is in bed, secure the ties to the movable part of the mattress frame with a half-knot (see Figure 2-10-6).
6. If the client is in a chair, cross the straps behind the seat of the chair and secure the straps to the chair's lower legs, out of the client's reach (see Figure 2-10-7). If it is a wheelchair, be sure the straps will not get caught up in the wheels.

1. Promotes client cooperation.
2. Provides for client privacy and prevents the restraint from rubbing the client's skin.
3. Allows movement but restricts freedom.



Figure 2-10-6 Secure ties to the movable part of the frame.

4. Secures the restraint.
5. Allows the restraint to move with the bed if the head of the bed is raised or lowered.
6. Provides support for the client to sit up while restricting freedom.

continues

Chest Restraint *continued*

Figure 2-10-7 Secure restraining straps out of the client's reach.



7. Step back and assess the client's overall safety. Be sure the restraint is loose enough not to be a hazard to the client but tight enough to restrict the client from getting up and harming herself.
8. Wash your hands.
7. Looking at the overall picture can allow you to see dangers you might have missed.
8. Prevents the spread of microorganisms.

ACTION**RATIONALE****Applying Wrist or Ankle Restraints**

1. Explain to the client that you will be placing a wrist or ankle band that will restrict movement.
2. Place padding around the client's wrist/ankle.
3. Wrap the restraint around the client's wrist/ankle, pulling the tie through the loop in the restraint and tie a square knot (see Figure 2-10-8).

Figure 2-10-8 Wrap restraint around the client's wrist.



4. Tie the restraint ties to the movable portion of the mattress frame.
5. Slip two fingers under the restraint to check for tightness. Be sure the restraint is tight enough that the client cannot slip it off but loose enough that the neurovascular status of the client's extremity is not impaired.
6. Step back and assess the client's overall safety. Be sure the restraint is loose enough not to be
1. Promotes client cooperation.
2. Prevents the restraint from chafing the skin.
3. Secures the restraint, and prevents the restraint from overtightening at the wrist.
4. When the head or foot of the client's bed is moved, the restraint will move with it.
5. If the restraint is too tight, the client's neurovascular status may be impaired, causing injury to the client.
6. Looking at the overall picture can allow you to see dangers you might have missed.

a hazard to the client but tight enough to restrict the client from getting up and harming himself (see Figure 2-10-9).

Figure 2-10-9 Restraints should not be too tight or loose. Check frequently.



7. Place the call light within the client's reach.

8. Check on the client every half hour while restrained. Assess the safety of the restraint placement and the client's neurovascular status.

9. Wash your hands.

7. Allows the client to contact the nurse to have any needs met. Provides the client with an increased sense of safety.

8. Assures that the client remains safe. Clients may try to escape from restraint and injure themselves in the attempt. States and institutions may have regulations outlining the frequency of patient checks if the client is in restraint. Be aware of any regulations that apply.

9. Prevents the spread of microorganisms.

> EVALUATION

- The client remains uninjured.
- The client has not suffered injury or impairment from the restraints.
- The client's therapeutic equipment has remained intact and functional.
- Others have not been harmed by the client.
- The client is restrained just enough to prevent injury.

> DOCUMENTATION

Nurses' Notes

- Document the use of restraints. Include the reason the client was restrained, the type of restraint placed, the time the restraints were placed, the condition of the client's skin at the site of restraint at

the time of placement, and any unusual findings at the time the client was restrained.

- Nurses' notes should be made at least every 2 hours even if a flow sheet is used.
- Nurses' notes should be made at least every 2 hours even if a flow sheet is used.
- Be sure to document the ongoing need for restraints.
- If the client's status changes, restraints may no longer be necessary.

Flow Sheet

- Some institutions have flow sheets that are used when a client is restrained. These flow sheets document the frequency of client checks, the client's condition, and how often the restraints are released.



▼ REAL WORLD ANECDOTES

Scenario 1

Bertha was an 80-year-old woman admitted to the oncology unit with a diagnosis of lung cancer metastatic to her brain. She was confused, agitated, and unable to safely transfer from her bed without assistance. The plan was for her to begin radiation treatments and IV decadron to diminish the side effects associated with the brain metastases. Bertha had a peripheral IV inserted in her left fore

continues

▼ REAL WORLD ANECDOTES *continued*

Scenario 1 *continued*

arm. The nursing plan was to restrain her at night for safety precautions using soft limb restraints. The morning of day two of the hospitalization, while on rounds, the nurse assessed that the IV bag still contained half of the solution and that the left arm at the site of the IV was infiltrated and the surrounding tissue was swollen. The nursing staff was reminded never to apply a limb restraint above an IV site due to the strong possibility of occluding the infusion or infiltrating the surrounding tissue. Additionally, the nursing team was told that half-hour checks are a requirement every shift, especially for elderly restrained patients.

Scenario 2

A busy medical-surgical floor of an urban hospital admitted a 20-year-old male to the unit from the emergency room at 4 AM. The client was admitted due to multiple injuries sustained in a car accident. His blood alcohol level was double the normal limit upon admission and head trauma was documented. The client was restrained with a vest in the emergency room because of combative behavior. When he was transferred from the stretcher to his bed, someone retied the vest restraints to the side rails of the bed. On early morning rounds the nurse lowered the side rail to administer care and the client's leg and arm were caught in between the side rail and he suffered a sprained wrist and ankle. The nursing staff was in-serviced on the seriousness of tying restraints to the side rails. All staff were told that they must never secure restraints to any movable bed part. In order to avoid injury, restraints must be secured to the bed frame only.

> CRITICAL THINKING SKILL

Introduction

Look at an example in which the clinical nurse specialist mobilizes the staff by using expert educational strategies and teaches the ethics of using restraints. This effort helps to avoid communication problems and conflict and ultimately ensures that safe and appropriate patient care is provided.

Possible Scenario

A 30-year-old female was admitted to the psychiatric unit of a large institution with a diagnosis of chemical dependency withdrawal. She was severely agitated, confused, and combative upon admission. A psychiatrist's order was written for four-point leather restraints. The use of this type of restraint is approved in this institution and sanctioned by state regulation. The medical order to four-point restrain this client created immediate staff dissension. Part of the staff felt that it was an extreme request and far too restrictive for the clinical management of this case. Several staff members felt that they could manage this client using soft restraints on a prn basis. They also felt that they would be able to maintain vigilant watch including half-hour checks for safety. A portion of the staff felt that if they chose not to restrain the client, it would help to establish a trusting relationship and hasten her recovery.

This client, while restrained, began to strongly resist the restraints. She began kicking, biting, and banging

her head in an attempt to resist the restraints. The staff remained divided about the need to restrain. The psychiatric clinical nurse specialist was consulted to meet with the professional nursing staff, the attending physician, and the client's family in an attempt to reach agreement concerning the use of restraints in this clinical situation. The clinical nurse specialist (CNS) arranged a meeting with the nursing staff, attending psychiatrist, client, and family (if possible). Through the use of expert facilitation and profound knowledge regarding the clinical use and ethical application of restraints, the CNS was able to educate the involved parties by providing information on the appropriate use of four-point restraints. A compromise among the parties was reached, and it was agreed that the restraints would be used during the acute phase of clinical management. A specific schedule would be prepared to allow the client time off of the restraints with staff providing one-to-one supervision during times when the restraints would be removed.

Possible Outcome

If the CNS had not intervened, staff dissension would have escalated and client care would have been compromised. Channels of communication would have been blocked, misinformation would have led to lack of evidence-based practice, and mistrust among colleagues could have resulted.

Prevention

The CNS prevented compromised care delivery and enhanced client comfort and safety while maintaining the individual's dignity along the continuum of care. Additionally, relationships between the client, the cli-

ent's family, the attending psychiatrist, and staff all solidified due to access to accurate knowledge and the opportunity for all parties to partake actively in the plan of care.

▼ VARIATIONS



Geriatric Variations:

- Older clients may require repetitive explanations about the rationale for using restraints.
- Older clients may have less body mass and require more protection of bony prominences.
- Older clients may have involuntary tremors and may require the assistance of more than one person to restrain them.
- Older clients may have compromised hearing and seeing and may require additional information about the type of restraint.
- Older clients may be more prone to aspiration and may require to be restrained on their sides.



Pediatric Variations:

- Children require simple, clear, and brief explanations to reassure them and minimize fear.
- Children need to be constantly monitored and intensely observed.
- It is vital that the child's family understands the need for the restraint.
- Reassurance to family members of the rationale for the restraint use and that it will not harm the child or be uncomfortable.
- Ties and safety pins, if used, must not be within the child's reach.
- Always align the infant/child's body properly when using restraints in order to avoid dislocation of body joints.
- Children and their families should be reassured that the restraint is not a punitive measure.



Home Care Variations:

- Family members and other caregivers must be taught the safe application of restraints.
- The home environment must be thoroughly assessed for safety and appropriate use of restraints.
- A visiting nurse must prepare a schedule for the home caregivers to follow regarding all aspects of care required for the client at home who requires restraints.



Long-Term Care Variations:

- Vigilant provision of the client's nutrition, elimination, and positioning must occur in long-term care settings.
- Prevention of pressure ulcers must occur by frequent repositioning, massaging, and protecting bony prominences with padding.
- Assess for pneumonia, urine retention, constipation, and sensory deprivation due to long-term restraint use.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Nurse waits for order from the physician to apply restraints during acute emergency.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Know hospital policy regarding application of emergency restraints without physician's or qualified practitioner's immediate order.

Ask Yourself:

How do I respond to this error?

Response:

Know your hospital policy in order to provide safe, effective, and prompt client care. In an emergency, apply restraints (know what constitutes an emergency situation), then seek medical order within reasonable time frame.

Possible Error:

Client at high risk for aspiration is restrained in supine position.

Ask Yourself:

How do I prevent this error?

Prevention:

Clients at high risk for aspiration must be restrained on their side.

Ask Yourself:

How do I respond to this error?

Response:

Assess client's condition: Know that status may change and warrant different clinical interventions.

Possible Error:

Client has had four-point restraints applied and secured to same side of the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess client; know that restraints secured to one side of the bed will place the client at a greater risk of falling.

Ask Yourself:

How do I respond to this error?

Response:

Careful, continuous assessment when using four-point restraints; always apply to all four sides of bed frame to minimize risk of injury due to falls.

Possible Error:

Restraint is applied above an IV site.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess restraint placement carefully, relative to IV sites; this will prevent infiltration.

Ask Yourself:

How do I respond to this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Response:**

Assess for IV sites, sites of shunts or implanted ports. Always place restraints strategically below these sites.

Possible Error:

Restraints are secured to side rail of the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

Always assess location of restraints and check for permanence of site.

Ask Yourself:

How do I respond to this error?

Response:

Always secure restraints to stationary part of the bed because caregivers may lower the rail not realizing that the restraints are attached. This can cause harm to the client.

Possible Error:

Restraining a client in the prone position.

Ask Yourself:

How do I prevent this error?

Prevention:

Never restrain someone in the prone position. This can cause limited vision and intensified sense of loss of control and may decrease respirations if the person has been sedated.

Ask Yourself:

How do I respond to this error?

Response:

Assess client; avoid restraining in this position.

Possible Error:

Restraints applied too tight.

Ask Yourself:

How do I prevent this error?

Prevention:

Cautiously apply restraints comfortably. Avoid tight and constrictive securing methods. Tight restraints can decrease peripheral circulation and impair respirations.

Ask Yourself:

How do I respond to this error?

Response:

Apply carefully; pad bony prominences; reposition and check patient frequently.

> NURSING TIPS

- Become familiar with restraint equipment: vest, limb, mitt, belt, body (posey), and leather restraints.
- Be safe and efficient when applying restraints. Always have organized and available assistance when placing restraints on a client. A team effort can provide simultaneous client teaching by one health care professional while another applies the restraint.
- Ensure that client comfort is not compromised. Provide frequent checks. Assess need for padding bony prominences to avoid pressure ulcers. Provide assistance with nutrition, elimination, repositioning, and general care.
- Always keep the client and family well informed regarding the rationale for restraints and the associated care required.
- Continuously assess client need for restraints. Allow changes in condition to dictate withdrawing or maintaining restraints.
- Restraints must be sized properly and according to the client's body build and weight. If restraints are loose, and smaller ones are unavailable, use gauze pads or soft towels to build them up and then tape securely.
- If leather restraints are used, have a key that fits the locks readily available.
- Pad bony prominence before applying protective device.
- Attach the device to the movable bed frame, not the side rails.
- Check client's respiratory status if a chest device is used.
- Check position of chest device so it is not constricting the client's neck.
- Restrain clients on their side if risk of aspiration is assessed.
- Do not secure four restraints to one side of the bed.
- When applying two-point restraints, restrain one arm and the opposite leg.
- Never apply restraint above an IV site.
- Do not restrain a client in the prone position.
- Provide frequent repositioning, massage, and surveillance of bony prominences.
- Be sure to place the client's call light within reach.

SKILL 2-11

Emergency Airway Management

Robi Thomas, MS, RN, AOCN

KEY TERMS

ABCs	Intubation
Airway obstruction	Oropharyngeal airway
Aspiration	Patient airway
Edema	
Endotracheal tube	



> OVERVIEW OF THE SKILL

An open airway is essential for oxygenation of the body. In an emergency situation, providing a patent airway is the top priority. If the client cannot get oxygen, the function of any other body system is superfluous. Maintaining an open airway for the client is a critical nursing function.

There are several causes of airway obstruction. The tongue may fall back into the pharyngeal cavity and obstruct the airway in an unconscious client. This is sometimes seen following grand mal seizures. Thickened secretions may obstruct or narrow the airway. This can be seen in clients with chronic obstructive pulmonary disease. Their ability to clear their airway is damaged and the secretions thicken and pool,

blocking airflow. Soft tissue edema may narrow or obstruct the airway. This is more often seen in children, whose airways are much smaller and more easily obstructed by a small amount of swelling. Aspiration of a foreign object can narrow or obstruct the airway. This is often caused by food or fluids entering the airway while eating.

When performing an initial assessment on a patient, use the acronym ABC. This stands for Airway, Breathing, Circulation. The first thing to assess is whether or not the client has a patent airway, with air being moved in and out of the lungs. If the airway is partially or fully obstructed, the client is at risk of injury or death.

> ASSESSMENT

1. Assess the client for any visible respirations to determine if the airway is open.
2. Assess for stridor, ability to speak or cough effectively, or clutching of the throat to determine if the client's respirations are partially obstructed.
3. Assess the client's mental status. Determine if the client can respond to verbal or tactile stimulus. This will help determine if the client is conscious and receiving adequate oxygen to the brain.

> DIAGNOSIS

- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
 - 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation
- 1.4.1.1 Altered Tissue Perfusion secondary to respiratory obstruction
- 1.6.1.4 Risk for Aspiration
 - 1.6.1.1 Risk for Suffocation

> **PLANNING**

Expected Outcomes:

1. The client will breathe effectively through an open airway.

Equipment Needed (see Figure 2-11-2):

No equipment is needed. The following are helpful if available:

- Supplemental oxygen
- Gloves
- Oropharyngeal airway
- Yankauer suction
- Pocket mask
- Ambu-bag and mask



Estimated time to complete the skill:
Time is of the essence, and thus the skill should be completed within minutes, depending upon the situation.

> **CLIENT EDUCATION NEEDED:**

1. Caregivers of clients at risk for airway obstruction should be instructed regarding the steps to take in case of obstruction. They should have the necessary equipment available and know how to use it.

2. Explain to the client what is happening and the steps you are taking to establish a patent airway.
3. Explain to the family what is happening. Update the explanations as the airway is reestablished and supportive measures are implemented. Often, in emergency situations, the family and client are never informed of exactly what occurred.



Figure 2-11-2 Equipment used to establish an emergency airway includes pocket masks, oropharyngeal airways, suction equipment and extra tubing, and oxygen delivery equipment.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands and apply gloves if available. 2. Assess airway. Call for assistance. 3. If the mouth is unopen, gently tilt the head backward. Place one hand on the forehead and two fingers of the other hand under the mandible, tilting the jaw forward and the forehead back (see Figure 2-11-3). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. If airway is not open, the client is at risk for injury or death. 3. If the tongue is blocking the airway, this action will reposition the tongue, allowing air to go to the lungs. |
|---|---|



Figure 2-11-3 Tilt the jaw forward and the forehead back.



Figure 2-11-4 Clear the mouth of obstructions.

4. Assess for spontaneous respirations.

5. Turn the client on the side and clear the mouth of secretions or obstructions using the fingersweep method or suction if available (see Figure 2-11-4).

6. Insert oropharyngeal airway if available (see Figure 2-11-5).

Figure 2-11-5 Oropharyngeal airways come in different sizes.



7. If spontaneous respirations occur, maintain head in proper position.

8. If respirations do not resume, initiate artificial respiration (see Figures 2-11-6 and 2-11-7).

9. Continue efforts until assistance arrives.

10. When client is stable or other assistance has arrived, remove gloves if you are wearing them and wash hands.

4. If spontaneous respirations are present, no other interventions may be required. If client is still not breathing, continue with interventions.

5. Clearing the airway may cause spontaneous respirations to resume.

6. Helps to keep the tongue from slipping into the pharyngeal area and blocking the airway.

7. Head must still be positioned correctly once respirations resume to maintain a patent airway.

8. Hypoxia is not conducive to life.

9. Assures that every effort has been made.

10. Reduces the risk of transferring microorganisms.

continues



Figure 2-11-6 Initiate artificial respiration.



Figure 2-11-7 To initiate artificial respiration, seal the client's mouth and nose before attempting to ventilate.

11. If in an institutional setting, document the incident on the appropriate forms. If the incident occurred in a noninstitutional setting, provide information to the aid personnel.

12. Wash hands.

11. Provides for continuity of care.

12. Reduces transmission of microorganisms.

> EVALUATION

- The client is breathing effectively through an open airway.

> DOCUMENTATION

Nurses' Notes/Code Record

- Note the time and condition in which the client was found.
- Record interventions that were implemented, including accurate times, results of the implementa-

tions, orders received from the physicians, vital signs of the client, timing of the incident, and status of the client afterward.

Medication Administration Record

- Record any medications the patient received, including time and route, during the procedure.
- If the incident occurs in a noninstitutional setting, the nurse should report her findings and interventions to aid personnel when they arrive.



▼ REAL WORLD ANECDOTES

*Susan was doing her initial rounds on her clients; upon entering John's room, she saw immediately that something was wrong. The 55-year-old man was lying in his bed, and his skin was a dusky color. He did not respond to Susan calling his name. Susan immediately called for assistance, at the same time assessing his airway. It appeared to be open, but there was no air movement. She performed the head tilt, chin lift on John and, again, assessed for breathing, but there was no air movement. Assessing for circulation, she saw that John had no pulse. A code was called. The code team was able to resuscitate John, and it was found that he had experienced a myocardial infarction. John's airway had not been blocked. However, assessing the patency of John's airway was the appropriate first step in assessing his condition. **Note:** In the immediacy of the moment, Susan did not follow correct cardiopulmonary resuscitation (CPR) protocol, which is to provide two rescue breaths prior to assessing for a pulse. Susan did, however, review and study the CPR skill so she would be better prepared for future episodes.*

> CRITICAL THINKING SKILL

Introduction

Keeping a client's airway patent may require problem solving by the nurse.

Possible Scenario

Mrs. Koski was intubated and being mechanically ventilated. You hear the ventilator alarms and check on her condition. The alarms indicate that there is increased airway pressure occurring. You note that Mrs. Koski is agitated and biting on the endotracheal tube. Her physician has indicated that he does not want to sedate Mrs. Koski so he can monitor her neurologic status.

Possible Outcome

You attempt to calm Mrs. Koski by talking to her soothingly and reassuring her that she is fine. You turn down the lights and reduce the extraneous stimulation. The high-pressure alarm continues to sound frequently and you return to the room often to assure Mrs. Koski that everything is fine. Toward the end of your shift the alarm sounds yet again. You return to Mrs. Koski's

room to find her extremely agitated. The ventilator tubing is on the floor and the upper half of the endotracheal tube is still attached to the tubing. You immediately determine that Mrs. Koski has bitten through her endotracheal tube and that the other half of the tube is probably still in her trachea, choking her. You call for emergency assistance and attempt to open Mrs. Koski's airway.

Prevention

You attempt to calm Mrs. Koski by talking to her soothingly and reassuring her that she is fine. You turn down the lights and reduce the extraneous stimulation. Despite these measures, Mrs. Koski continues to agitatedly bite the endotracheal tube. You obtain a bite block or oropharyngeal airway and tape it in place to protect the tube from the pressure of Mrs. Koski's teeth, being careful to secure it. If it is not properly secured, the bite block could slip into Mrs. Koski's throat, causing trauma and possible airway obstruction. You also notify Mrs. Koski's physician of her agitated state.

▼ VARIATIONS



Geriatric Variations:

- When assessing an elderly client's airway, bear in mind that the client may have dentures and a dental plate may be the source of airway obstruction.
- Care must also be taken with the elderly population as they have a high possibility of osteoporosis and spinal injuries. If clients are suspected of having neck injuries, the airway should be opened without tilting the head, but merely lifting the chin or thrusting the jaw.



Pediatric Variations:

- Respiratory arrest is a major cause of death in children; thus careful, continuous assessment of the pediatric client's respiratory status should be performed.
- The normal respiratory rate changes with age. Be aware of what is normal for the age client you are assessing. In newborns, the average rate is 40 breaths/min, in the 1-year-old child, it is 24 breaths/min; and in the 18-year-old it is 18 breaths/min.
- The child's upper airway is smaller and more flexible than an adult's and more easily blocked by overtilting the head. An infant's head should only be tilted slightly to open the airway.
- Noninvasive methods of opening the airway should be attempted prior to using invasive methods.
- If there is a large pediatric population to be served, be sure to have properly sized equipment. If you will be caring for infants and children, it is imperative to have oropharyngeal airways and endotracheal tubes of the proper size. Using adult-sized equipment on children can injure a child, potentially causing severe, permanent damage.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- *If a home care client is at risk for respiratory distress or failure at home, the client and his caregivers should be well educated on the risk factors for their particular situation and how to effectively deal with this potential problem.*
- *If the client will be traveling in a car, respiratory support equipment should be available in the car.*



Long-Term Care Variations:

- *All caregivers in long-term care facilities should know how to assess and respond to the ABCs.*
- *Emergency equipment should be available at long-term care facilities and within easy access to personnel.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Assessing circulation prior to assessing the client's airway. In the excitement of finding a client in respiratory distress or collapse, it is common for health care team members to check for a pulse prior to assessing the airway.

Ask Yourself:

What is the most important thing to establish first? If the client has a pulse but there is no oxygen to move, what will happen to the client?

Prevention:

Think of the ABCs—Airway, Breathing, Circulation.

Possible Error:

At a trauma scene, using the head-tilt method of opening the airway.

Ask Yourself:

If the client is a trauma victim, does he have a neck injury? How do you know? Will tilting the client's head cause more, possibly permanent damage?

Prevention:

The chin-lift is preferable to the head-tilt method. This is especially true when clients are suspected of having a neck injury. The chin-lift or jaw-thrust method should be attempted first and then, if needed, the head-tilt method should be attempted slowly and gently.

> NURSING TIPS

- Always know the location of airway equipment on your unit.
- Do not forget the ABCs—Airway, Breathing, and Circulation.
- Practice until you are comfortable with initiating oxygen at the bedside. The equipment can be awkward to manipulate.
- Have mock codes on your unit to practice what should happen if a nurse finds a client in respiratory and/or cardiac arrest.

SKILL 2-12

Administering Cardiopulmonary Resuscitation (CPR)

Susan Randolph, RN, MSN, CS,
and Catherine H. Kelley, RN, MSN, OCN

KEY TERMS

Artificial respiration	Emergency resuscitation
Cardiac arrest	Head tilt/chin lift
Cardiopulmonary resuscitation	Jaw lift
Chest compressions	Respiratory arrest
CPR	



> OVERVIEW OF THE SKILL

Cardiac or respiratory arrest can occur at any time to individuals of all ages. It is a crisis event that can be the result of an accident (e.g., foreign body aspiration, motor vehicle accident, drowning) or a disease process (e.g., cardiac arrhythmia, epiglottitis). Cardiopulmonary resuscitation (CPR) is the basic life-saving skill that is utilized in the event of cardiac, respiratory, or cardiopulmonary arrest to maintain tissue oxygenation by providing external cardiac compressions and/or artificial respiration.

This life-saving skill is initiated in the event that an individual is found with or develops the absence of a pulse or respiration or both. The basic goals of CPR, which are often referred to as the ABCs of emergency resuscitation, follow:

- A: Establish Airway
- B: Initiate Breathing
- C: Maintain Circulation

Cardiopulmonary resuscitation must be initiated immediately once it is determined that a cardiac or pulmonary arrest has occurred. Lack of oxygen to the tissues can result in permanent cardiac and brain damage within 4 to 6 minutes.

Cardiopulmonary resuscitation is a basic life-saving skill that nurses are expected to be able to perform not only in the hospital and other clinical settings but in the outside environments as well. It is expected that nurses maintain certification in the ad-

ministration of CPR to individuals of all ages and participate in annual review or recertification courses. In addition, this skill is frequently taught to the lay public and caregivers of medically fragile individuals.

Do Not Resuscitate Orders

Sudden death from a cardiac arrest requires the initiation of CPR by competent persons. In a health care facility, caregivers, often a nurse, perform CPR and other lifesaving measures in accord with agency policy unless the primary physician has written an order in the client's medical record; *do not resuscitate (DNR)*. The physician's DNR order provides an exception to the universal standing order to resuscitate.

Health care agencies are required to have policies in place that provide a mechanism for reaching a DNR decision as well as for resolving conflicts in decision making. The principles of informed consent must be respected by the physician who writes a DNR order. When the client is either comatose or near death, there should be knowledgeable concurrence by the physician and the client's family or guardian about the actions that should be implemented concerning prolonging the client's life. It is the responsibility of the nurse to know and follow the client's wishes relative to resuscitation and the application of life-support systems. This information should be documented in the client's medical record.

> ASSESSMENT

1. Assess responsiveness and level of consciousness by gently shaking or tapping the client while shouting, “Are you OK?” It is important to differentiate an unconscious individual from someone who is intoxicated, hypoglycemic, sleeping, or in shock. In addition, it is important to touch the clients in case they are hearing impaired.
2. Assess the amount and abilities of any available assistance. CPR cannot be performed indefinitely by a single individual. If in the hospital or a clinical setting, activate the appropriate “code” to signify there is an emergency situation. If outside of the hospital, call for help to activate emergency assistance (e.g., call 911 or the local emergency medical service).
3. Assess the client’s position. Proper positioning, in a supine position (flat) on a hard surface, is essential to assess respiratory and cardiac status and to adequately perform cardiopulmonary resuscitation. Care must be taken when positioning the client with a suspected neck injury.
4. Assess respiratory status by looking for chest rise and fall, listening for air exchange, and feeling for the presence of air movement. Presence of respirations contraindicates the initiation of artificial respiration. In addition, assessment of the respiratory status will uncover complicating factors, including foreign body obstruction and vomit or other excessive airway secretions. These complicating factors will need to be resolved in order to open the airway prior to the initiation of artificial respirations.
5. Assess circulatory status by using the carotid or brachial pulse points. Presence of pulse contraindicates the initiation of external chest compressions.

> DIAGNOSIS

- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
 - 1.5.1.1 Impaired Gas Exchange
 - 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation
- 1.4.2.1 Decreased Cardiac Output

> PLANNING

Expected Outcomes:

1. Client will experience improved clinical status, as evidenced by:
 - Patent airway with spontaneous respirations
 - Return of cardiac circulation
2. Client does not experience negative sequela related to hypoxic event.
3. Client does not have damage inflicted by incorrect positioning for CPR (e.g., paralysis from manipulation of neck injury, cracked ribs or sternum).
4. Cardiopulmonary resuscitation will only be terminated in the following situations:
 - Cardiopulmonary resuscitation was successful in reestablishing respirations and circulation.
 - The client is placed on advanced life support (e.g., intubated and transferred to the intensive care unit).
 - The rescuer is unassisted, fatigued, and unable to continue.
 - The physician or qualified practitioner pronounces the client dead and orders CPR to be discontinued.

Equipment Needed (see Figures 2-12-2, 2-12-3, and 2-12-4):

Hospital or Clinical Setting

- Hard, flat surface (e.g., chest compression board)
- Body substance isolation items
 - Gloves
 - Face shield
 - Mask/CPR oral barrier device
- Ambu bag



Figure 2-12-2 Ambu bag



Figure 2-12-3 Oropharyngeal airways

- Oral airway
- Emergency resuscitation cart
- Documentation forms

Outside: Public Environment

- Hard, flat surface (e.g., floor)
- Body substance isolation items, if available
 - Gloves
 - Face shield
 - Mask/CPR oral barrier device



Estimated time to complete the skill:

This skill must be initiated as soon as possible and continued indefinitely until one of the following occurs:

- 1. Cardiopulmonary resuscitation is successful and there is a return of spontaneous respirations and circulation.**
- 2. Advanced life support measures are implemented (in the hospital) or the client is transferred to a facility to provide advanced life support.**
- 3. A rescuer is alone and unable to continue CPR due to fatigue.**
- 4. A physician or qualified practitioner declares the client dead and discontinues CPR.**



Figure 2-12-4 Emergency resuscitation cart

> CLIENT EDUCATION NEEDED:

Frequently CPR is taught to caregivers and family members of clients at an increased risk for cardiopulmonary arrest (e.g., infant with a near sudden infant death experience). A certified instructor from either the hospital or ambulatory clinical setting, the American Red Cross, or the American Heart Association should provide this instruction.

- 1.** Family members or caregivers of individuals at risk for cardiopulmonary arrest should be taught CPR. The client and family should take a refresher course on an annual basis.
- 2.** The pediatric client usually experiences respiratory arrest more frequently than cardiopulmonary arrest.
- 3.** The client and family members should keep pertinent information such as current medications easily accessible at home and when traveling.
- 4.** Rescuers who perform CPR without body substance isolation are at an increased risk for contagious or communicable disease transmission. These risks must be evaluated against the risk of client death.
- 5.** Lay learners in the community are frequently taught one-person CPR due to the complexity of sequencing with two-rescuer CPR. Good Samaritan laws usually protect lay individuals who participate in emergency resuscitation from any lawsuits in the event that the client is injured during rescue efforts.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

CPR: One Rescuer—Adult, Adolescent

1. Assess responsiveness by tapping or gently shaking client while shouting, “Are you OK?” (See Figure 2-12-5.)

1. Prevents injury to a client who is not experiencing cardiac or respiratory arrest. Also assists in assessing level of consciousness and possible etiology of crisis.



Figure 2-12-5 Assess the client’s responsiveness.

2. Activate emergency medical system. In the hospital or clinical setting, follow institutional protocol. In the community or home environment, activate the local emergency response system (e.g., 911). The one exception to this sequence is if the rescuer is alone with no other bystanders; the rescuer should position the client and assess for respirations and a pulse. If absent, initiate CPR for one full minute and then activate emergency medical assistance.

2. Activates assistance from personnel trained in advanced life support. Also, one person cannot perform CPR indefinitely. If the rescuer is alone, providing 1 minute of CPR before activating the emergency response system helps reduce the risk of irreversible brain and tissue damage that can occur if a client is hypoxic for over 4 to 6 minutes.

3. Position client in a supine position on a hard, flat surface (e.g., floor or cardiac board). Use caution when positioning a client with a possible head or neck injury.

3. Proper positioning facilitates assessment of the cardiac and respiratory status and successful external cardiac massage. Care must be taken in positioning a client with a potential head or neck injury to prevent further damage.

4. Apply appropriate body substance isolation items (e.g., gloves, face shield) if available.

4. Prevents transmission of disease.

5. Position self. Face the client on your knees parallel to the client, next to the head, to begin to assess the airway and breathing status.

5. Proper positioning prevents rescuer fatigue and facilitates CPR by allowing the rescuer to move from chest compressions to artificial breathing with minimal movement.

6. Open airway. The most commonly used method is the head-tilt/chin-lift method. This is accomplished by placing one hand on the

6. A patent airway is essential for successful artificial respirations. The head tilt/chin lift assists in preventing the tongue from obstructing the

client's forehead and applying a steady backward pressure to tilt the head back while placing the fingers of the other hand below the jaw at the location of the chin and lifting the chin (see Figure 2-12-6). In the event of a suspected head or neck injury, this lift is modified and the jaw thrust is used. To perform the jaw thrust, place hands at the angles of the lower jaw and lift, displacing the mandible forward while tilting the head backward (see Figure 2-12-7). Additionally, if available, insert oral airway.



Figure 2-12-6 Use the head-tilt/chin-lift method to open airway.

airway. The jaw thrust is used when a head or neck injury is suspected because it prevents extension of the neck and decreases the potential of further injury.



Figure 2-12-7 The jaw thrust method is used to open the airway if a neck injury is suspected.

7. Assess for respirations. Look, listen, and feel for air movement.

8. If respirations are absent:

- Occlude nostrils with the thumb and index finger of the hand on the forehead that is tilting the head back (see Figure 2-12-8).
- Form a seal over the client's mouth using either your mouth or the appropriate respiratory assist device (e.g., Ambu bag and mask) and give 2 full breaths of ~0.5 to 2 seconds, allowing time for both inspiration and expiration (see Figure 2-12-9).



Figure 2-12-8 Occlude both nostrils with fingers.

7. Cardiopulmonary resuscitation should not be administered to a client with spontaneous respirations or pulse due to the potential risk of injury.

8. Occluding the nostrils and forming a seal over the client's mouth will prevent air leakage and provide full inflation of the lungs. Excessive air volume and rapid inspiratory flow rates can create pharyngeal pressures that are greater than esophageal opening pressures. This will allow air into the stomach, resulting in gastric distention and increased risk of vomiting.



Figure 2-12-9 Give 2 full breaths.

CPR: One Rescuer—Adult, Adolescent *continued*

- In the event of a serious mouth or jaw injury that prevents mouth-to-mouth ventilation, mouth-to-nose ventilation may be used by tilting the head as described earlier with one hand and using the other hand to lift the jaw and close the mouth.
9. Assess for the rise and fall of the chest:
 - If the chest rises and falls, continue to step 10.
 - If the chest does not move, assess for excessive oral secretions, vomit, airway obstruction, or improper positioning.
 10. Palpate the carotid pulse (5 to 10 seconds) (see Figure 2-12-10):
 - If present, continue rescue breathing, at the rate of 12 breaths/min.
 - If absent, begin external cardiac compressions.
 9. Visual assessment of chest movement helps confirm an open airway. A volume of 800–1200 ml is usually sufficient to make the chest rise in most adults.
 10. Performing chest compressions on an individual with a pulse could result in injury. Additionally, the carotid pulse may persist when peripheral pulses are no longer palpable. Hyperventilation assists in maintaining blood oxygen levels. Additionally, a pulse may be present for ~6 minutes after respirations have ceased.



Figure 2-12-10 Palpate for a carotid pulse.



Figure 2-12-11 Place the heel of one hand next to the index finger on the client's sternum.

11. Cardiac compressions are performed as follows:
 - Maintain a position on knees parallel to sternum.
 - Position the hands for compressions:
 - a. Using the hand nearest to the legs, use the index finger to locate the lower rib margin and quickly move the fingers up to the location where the ribs connect to the sternum.
 - b. Place the middle finger of this hand on the notch where the ribs meet the sternum and the index finger next to it.
 - c. Place the heel of the opposite hand next to the index finger on the sternum (see Figure 2-12-11).
11. Irreversible brain and tissue damage can occur if a client is hypoxic for over 4–6 minutes. Proper positioning is essential for the following reasons:
 - Allows for maximum compression of the heart between the sternum and vertebrae.
 - Compressions over the xiphoid process can lacerate the liver.
 - Keeping fingers off the chest during compressions reduces the risk of rib fracture.

- d. Remove the first hand from the notch and place it on top of the hand that is on the sternum so that they are on top of each other.
- e. Extend or interlace fingers and do not allow them to touch the chest (see Figure 2-12-12).
- f. Keep arms straight with shoulders directly over hands on sternum and lock elbows (see Figure 2-12-13).



Figure 2-12-12 Extend or interlace the fingers.



Figure 2-12-13 Keep arms straight and lock elbows.

- g. Compress the adult chest 3.8–5.0 cm (1½–2 inches) at the rate of 80–100 compressions per minute.
- h. The heel of the hand must completely release the pressure between compressions, but it should remain in constant contact with the client's skin.
 - i. Use the mnemonic “one and, two and, three and . . .” to keep rhythm and timing.
 - j. Ventilate client as described in Action 8.

12. Maintain the compression rate for 80–100 times/min, interjecting ventilation after every 15 compressions.

13. Reassess the client after four cycles.

CPR: Two Rescuers—Adult, Adolescent

- 14.** Follow the steps above with the following changes:
- One rescuer is positioned facing the client parallel to the head while the other rescuer is positioned on the opposite side facing the client parallel to the sternum next to the trunk (see Figure 2-12-14).
 - The rescuer positioned at the client's trunk is responsible for performing cardiac compressions and maintaining the verbal mnemonic count. This is rescuer 1.

12. Faster rate increases blood flow to key organ tissues.

13. Determines return of spontaneous pulse and respirations and need to continue CPR.

- 14.** Proper positioning allows one rescuer to perform artificial respirations while the other administers chest compressions without getting in each other's way. In addition, this facilitates ease in changing positions when one of the rescuers becomes fatigued. Palpating the carotid pulse with each chest compression during the first full minute assures that adequate stroke volume is being delivered with each compression.

CPR: Two Rescuers—Adult, Adolescent *continued*

- The rescuer positioned at the client's head is responsible for monitoring respirations, assessing the carotid pulse, establishing an open airway, and performing rescue breathing. This is rescuer 2.
- The compression-to-ventilation rate changes to 5:1, pausing 1–1½ seconds for ventilation.
- Rescuer 2 palpates the carotid pulse with each chest compression during the first full minute.
- Rescuer 2 is responsible for calling for a change when fatigued, following this protocol.
- Rescuer 1 calls for a change and completes the five chest compressions.
- Rescuer 2 administers 2 breaths and then moves to a position parallel to the client's sternum and assumes the proper hand position.
- Rescuer 1 moves to the rescue breathing position and checks the carotid pulse for 5 seconds. If cardiac arrest persists, rescuer 1 says, "continue CPR" and delivers one breath. Rescuer 2 resumes cardiac compressions immediately after the breath.

CPR: One Rescuer—Child (1–7 years)

15. Assess responsiveness, activate emergency medical system, position the child, apply appropriate body substance isolation, position self, open airway, and assess for respirations as described in Actions 1–7. Remember respiratory arrest is more common in the pediatric population.
 16. If respirations are absent, begin rescue breathing:
 - Give two slow breaths (1–1½ sec/ breath), pausing to take a breath in between.
 - Use only the amount of air needed to make the chest rise. When you see the chest rise and fall, you are using the right volume of air.
 17. Palpate the carotid pulse (5–10 seconds). If present, ventilate at a rate of once every 4 seconds or 15 times/min. If absent, begin cardiac compressions.
15. See Rationales 1–7.
 16. Hypoxia can cause irreversible brain and tissue damage after 4–6 minutes.
 - The volume of air in a small child's lungs is less than an adult's. Excessive air volume and rapid inspiratory rates can increase pharyngeal pressures that exceed esophageal opening pressures. This allows air to enter the stomach, causing gastric distention, increasing the risk of vomiting, and further compromising the client's respiratory status.
 17. Performing chest compressions on a child with a pulse could result in injury. Additionally, the carotid pulse may persist when peripheral pulses are no longer palpable. Hyperventilation assists in maintaining blood oxygen levels.



Figure 2-12-14 Two rescuer positioning. One person kneels on each side of the client.

Two rescuers are needed because one person cannot maintain CPR indefinitely. When a rescuer becomes fatigued, chest compressions can become ineffective, decreasing the volume of oxygenated blood circulated to key organs and tissue.

18. Cardiac compressions (child 1–7 years):

- Maintain a position on knees parallel to child's sternum.
- Place a small towel or other support under the child's shoulders.
- Position the hands for compressions:
 - a. Locate the lower margin of the rib cage using the hand closest to the feet and find the notch where the ribs and sternum meet.
 - b. Place the middle finger of this hand on the notch and then place the index finger next to the middle finger.
 - c. Place the heel of the other hand next to the index finger of the first hand on the sternum with the heel parallel to the sternum (1 cm above the xiphoid process).
 - d. Keeping the elbows locked and the shoulders over the child, compress the sternum 2.5–3.8 cm (1–1½ inches) at the rate of 80–100 times/min.
 - e. Keep the other hand on the child's forehead.
 - f. At the end of every fifth compression administer a ventilation (1–1½ seconds).
 - g. Reevaluate the child after 10 cycles.

CPR: One Rescuer—Infant (1–12 months)

19. Assess responsiveness, activate emergency medical system, position the child, apply appropriate body substance isolation, position self, open airway, and assess for respirations as described in Actions 1–7. Remember respiratory arrest is more common in the pediatric population.

20. If respirations are absent, begin rescue breathing:

- Avoid overextension of the infant's neck.
- Place a small towel or diaper under the infant's shoulders or use a hand to support the neck.
- Make a tight seal over both the infant's nose and mouth and gently administer artificial respirations.
- Give two slow breaths (1–1½ sec/breath), pausing to take a breath in between.
- Use only the amount of air needed to make the chest rise.

Additionally, a pulse may be present for ~6 minutes after respirations have ceased.

18. Irreversible brain and tissue damage can occur if a client is hypoxic for over 4–6 minutes. Proper positioning is essential for the following reasons:

- Allows for maximum compression of the heart between the sternum and vertebrae.
- The backward tilt of the head lifts the back of small children and a small towel or some other type of support is necessary for effective cardiac compressions.
- Compressions over the xiphoid process can lacerate the liver.
- Keeping fingers off the chest during compressions reduces the risk of rib fracture.
- Keeping one hand on the child's forehead helps maintain an open airway.

19. See Rationales 1–7.

20. Irreversible brain and tissue damage can occur if a client is hypoxic for over 4–6 minutes. Proper positioning is essential for the following reasons:

- It is believed that overextension of an infant's head can cause a closing or narrowing of the airway.
- Proper positioning with support allows maximum compression of the heart between the sternum and vertebrae.
- Making a complete seal over the infant's mouth and nose prevents air leakage.

CPR: One Rescuer—Infant (1–12 months) *continued*

- The volume of air in a small child's lungs is less than an adult's. Excessive air volume and rapid inspiratory rates can increase pharyngeal pressures that exceed esophageal opening pressures. This allows air to enter the stomach, causing gastric distention, increasing the risk of vomiting, and further compromising the client's respiratory status.
- 21.** Assess circulatory status using the brachial pulse:
- Locate the brachial pulse on the inside of the upper arm between the elbow and shoulder by placing your thumb on the outside of the arm and palpating the proximal side of the arm with the index finger and middle fingers.
 - If a pulse is palpated, continue rescue breathing 20 times/min or once every 3 seconds.
 - If a pulse is absent, begin cardiac compressions.
- 21.** The carotid pulse is often difficult to locate in the infant; therefore the brachial artery is the recommended site.
- 22.** Cardiac compressions (infant 1–12 months):
- Maintain a position parallel to the infant. Infants can easily be placed on a table or other hard surface.
 - Place a small towel or other support under the infant's shoulders/neck.
 - Position the hands for compressions:
 - a. Using the hand closest to the infant's feet, locate the intermammary line where it intersects the sternum.
 - b. Place the index finger 1 cm below this location on the sternum and place the middle finger next to the index finger.
 - c. Using these two fingers, compress in a downward motion 1.3–2.5 cm ($1/2$ –1 inch) at the rate of 100 times/min.
 - d. Keep the other hand on the infant's forehead.
 - e. At the end of every fifth compression, administer a ventilation (1– $1\frac{1}{2}$ seconds).
 - f. Reevaluate infant after 10 cycles.
- 22.** Irreversible brain and tissue damage can occur if a client is hypoxic for over 4–6 minutes. Proper positioning is essential for the following reasons:
- Allows for maximum compression of the heart between the sternum and vertebrae.
 - A small towel, diaper roll, or some other type of support is necessary for effective cardiac compressions.
 - Compressions over the xiphoid process can lacerate the liver.
 - Keeping other fingers and hands off the chest during compressions reduces risk of rib fracture.
 - Keeping one hand on the infant's forehead helps maintain an open airway.

CPR: Two Rescuers—Child (1–7 years) and Infant (1–12 months)

- 23.** Follow Action 14 for two-rescuer CPR for adults with the following changes:
- Utilize the child or infant procedure for chest compressions.
- 23.** Improper hand placement can cause internal organ damage or other medical complications in infants or children. Increased rate of ventilation allows for maximum oxygen delivery to

- Change the ratio of compressions to ventilation to 3:1 (three chest compressions to one ventilation).
- Deliver the ventilation on the upstroke of the third compression.

prevent tissue hypoxia. Delivering compressions during the upstroke phase allows for full lung expansion during inspiration.

CPR—Neonate or Premature Infant

- 24.** Follow the infant guidelines with the following changes for chest compressions:
- Encircle the chest with both hands.
 - Position thumbs over the midsternum.
 - Compress the midsternum with both thumbs.
 - Compress 1.3–1.8 cm ($1/2$ – $1/4$ inch) at a rate of 100–120 times/min.

- 24.** Improper hand placement can cause internal organ damage or other medical complications in infants or children

Table 2-12-1 provides a quick overview of the various cardiopulmonary standards.

CLIENT	HAND POSITION	CHEST COMPRESSION DEPTH (CM)	CHEST COMPRESSION DEPTH (INCHES)	CHEST COMPRESSION RATE (MIN ⁻¹)	CHEST COMPRESSION-TO-VENTILATION RATIO
Adult, adolescent, and larger child	Two hands on top of each other, heel on sternum, two finger widths above xiphoid	3.8–5.0	1½–2	80–100	15:2 (one rescuer), 5:1 (two rescuer)
Child (~1–7 years)	One hand, heel on sternum, two finger widths above xiphoid	2.5–3.8	1–1½	80–100	5:1 (one rescuer), 3:1 (two rescuer)
Infant (1–12 months)	Two fingers (index and middle) midsternum 1 cm below nipples	1.3–2.5	½–1	100	5:1 (one rescuer), 3:1 (two rescuer)
Neonate, premature infant	Encircle chest with hands, thumbs over midsternum	1.3–1.8	½–¾	100–120	5:1 (one rescuer), 3:1 (two rescuer)

> EVALUATION

- There should be a constant evaluation for the return of spontaneous pulse and respirations.
- Successful intervention with CPR is illustrated as follows:
 - The nurse maintains an open airway, as evidenced by the chest rise and fall.
 - The nurse is able to feel the resistance and compliance of the client’s lungs.

- The nurse feels and hears airway movement during expiration.
- The client’s color improves.
- The client has return of spontaneous pulse and respirations, as evidenced by a palpable carotid or brachial pulse and the presence of respiratory effort.
- Assist with transfer to hospital/advanced life support unit.

- If CPR was unsuccessful, assist in notifying next of kin and providing psychosocial support.

> DOCUMENTATION

Nurses' Notes/Code Record

- Note the time and condition in which the client was found.
- Record interventions that were implemented, including accurate times, results of the implementa-

tions, orders received from the physicians, vital signs of the client, timing of the incident, and status of the client afterward.

Medication Administration Record

- Record any medications the patient received, including time and route, during the procedure.
- If the incident occurs in a noninstitutional setting, the nurse should report her findings and interventions to aid personnel when they arrive.



▼ REAL WORLD ANECDOTES

Scenario 1

A child was found unconscious in a pool. One neighbor called 911 while another neighbor immediately yelled, "I know CPR," and positioned the child supine on the walkway. He assessed for respirations and found no air movement and opened the airway and began mouth-to-mouth resuscitation. After two breaths, he moved to the child's chest to begin cardiac compressions. Luckily, another neighbor asked if the child had a pulse and the rescuer remembered to check the carotid pulse, which was present. He then moved back into position to continue rescue breathing until the emergency medical team arrived. In this situation the child could have sustained injury from an unnecessary intervention (cardiac compressions). Both health care professionals and the lay public must remember to assess for both respiratory and circulatory status of a victim before beginning CPR.

Scenario 2

One trauma nurse mentally practiced CPR skills in a very effective way. Once or twice a month, she would set the alarm on her wrist watch to sound at some point in the day. When the alarm sounded, she would look at the first person she saw—the man in the cafeteria line or the driver in the car ahead, for example—and imagine the person collapsing in front of her. She would then mentally "go through the steps" of CPR, including who to call and how to position the patient in this setting. This exercise gave her "mental experience" and kept the CPR techniques fresh in her mind.

> CRITICAL THINKING SKILL

Introduction

Cardiopulmonary resuscitation is an emergency life support intervention that is used in both the clinical and outside community settings. For a nurse working in a hospital or other acute-care setting, it is not unusual to encounter an individual in respiratory or cardiac arrest. This is especially true in the emergency room or other high-acuity settings.

Possible Scenario

A client presented to the emergency room and had a rapid deterioration of clinical status leading to a car-

diopulmonary arrest. The first nurse on the scene immediately began resuscitative efforts without putting on the appropriate body substance isolation apparel.

Possible Outcome

This nurse could potentially develop a contagious disease, transmitted by improper utilization of body substance isolation garb during CPR.

Prevention

Body substance isolation should be practiced whenever possible during CPR, especially in a clinical setting where the equipment is readily available.

▼ VARIATIONS



Geriatric Variations:

- *It is important to remember that the older adult is at risk for rib or cartilage fractures, which may result from improper hand positioning.*
- *Age-related changes in the muscle skeletal system (e.g., osteoporosis) might limit positioning of the geriatric client.*
- *Many older adults may be wearing dentures, which should be removed during emergency resuscitation.*



Pediatric Variations:

- *Parents and caregivers should be taught the proper hand positions, ventilation-to-compression ratio, and breathing techniques for use in the pediatric population.*
- *It is important to reinforce that respiratory arrest is more common than a cardiopulmonary arrest in the pediatric population.*
- *Safety education with a focus on accident prevention should also be included in CPR instructional sessions. Refresher courses should be encouraged on an annual basis.*



Home Care Variations:

- *Caregivers and family members of clients requiring home care should be assessed for their educational level and ability to learn and retain the principles of CPR.*
- *It is important to have a working phone in the home and the client/family member/caregiver should know how to assess the emergency medical response system in their community.*
- *The home care nurse is ideally in a position to assess the home environment and the ability of the caregiver/family members to return demonstrate CPR skills. Referrals to the community resources may be useful (e.g., the American Red Cross, the American Heart Association, or the local hospital).*



Long-Term Care Variations:

- *In a long-term care facility it should be expected that all health care providers have certification in CPR.*
- *Special attention should be made for individuals wearing dentures, those at risk for choking (e.g., stroke victims), and clients with impaired cognitive function who may be at risk for falls or accidents.*
- *A complete evaluation should be made on all clients and care plans should include choking prevention measures as well as reinforcement of safety measures.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Incorrect hand placement during cardiac compressions.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to review on an annual basis at minimum the proper methods of administering chest compressions. In addition, always remember to think, “What do I have to do differently for a small child or infant?” Immediately correct anyone that you see performing chest compressions incorrectly. If you realize that your hand placement is wrong, take immediate action to correct placement and continue with the emergency resuscitation.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Incorrect placement of client for CPR

Ask Yourself:

How do I respond to this error?

Prevention:

Be sure to place anyone receiving CPR on a hard, firm surface. If a client is not placed on a hard, firm surface, the cardiac compressions will be ineffective and the rescuer will not be able to palpate a carotid pulse. Immediately move the client to a hard, firm surface.

> NURSING TIPS

- Maintain a current and valid CPR/emergency resuscitation certification.
- Differentiate between emergency resuscitations that occur in the hospital settings versus those occurring in the nonclinical environment.
- Understand the differences in lay public CPR teaching versus what is taught to health professionals.
- Maintain an ongoing assessment of the cardiac and respiratory status throughout emergency resuscitation efforts.
- Be aware of the emergency response systems available in each new environment.

SKILL 2-13

Performing the Heimlich Maneuver

Catherine H. Kelley, RN, MSN, OCN,
and Susan Randolph, RN, MSN, CS

KEY TERMS

Airway obstruction	Finger sweep
Cardiopulmonary resuscitation (CPR)	Heimlich maneuver
Chest thrust	Hypoxia
Choking	Rescue breathing/emergency resuscitation
Cyanosis	
Epiglottitis	



> OVERVIEW OF THE SKILL

Foreign body obstruction of the breathing passages has consistently ranked as one of the top ten causes of accidental deaths in the United States. Complete or partial airway obstruction by a foreign body can occur in numerous settings. In adults, large, poorly chewed pieces of food are most frequently the cause of airway obstruction, but in other situations an elevated blood alcohol level or dentures may be the culprit. Pediatric clients are at risk for choking, especially the infant and young child, and in this population food (e.g., grapes, hot dogs, raisins, and peanuts) as well as foreign bodies (e.g., coins, beads, marbles, thumbtacks, and paper clips) can cause airway ob-

struction. The Heimlich maneuver or subdiaphragmatic abdominal thrusts can assist a health care provider in successfully treating airway obstruction. It is important in the pediatric population to differentiate airway obstruction as a result of infection (e.g., epiglottitis) versus a foreign body aspiration.

Health professionals frequently teach the Heimlich maneuver to the general public since most food/foreign body obstructions occur outside of the hospital/clinic settings. It is important for the nurse to have a good comfort level with this skill as well as have the ability to disseminate this information in an easily understood manner to the public.

> ASSESSMENT

1. Assess air exchange. A foreign body obstruction can be complete or partial. Partial airway obstruction will have some air exchange. If the client can cough, this should be encouraged and the nurse should not interfere with the client's efforts. In the event of partial airway obstruction, the client will usually be able to cough but may wheeze between coughs. If the client has complete airway obstruction as indicated by a weak ineffective cough, high-pitched inspiratory noises (stridor), and signs of respiratory distress (cyanosis, loss of consciousness), intervention is necessary.
2. Establish airway obstruction. The universal sign of airway obstruction is clutching the neck with hands. In addition, the inability to talk or breathe as well as cyanosis and the progression to an unconscious state are indicative of airway obstruction. Determine the problem.

3. In the pediatric client differentiate between infection and airway obstruction. Fevers, gradually increasing respiratory distress, retractions, stridor, and drooling are all signs of infection. **In this situation it is important to maintain an upright position, keep the child as calm as possible, and seek immediate medical attention.** The Heimlich maneuver is not appropriate in these cases.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
- 1.6.1.1 Risk for Suffocation
- 1.6.1.4 Risk for Aspiration
- 9.3.2 Fear

> PLANNING

Expected Outcomes:

1. The client will demonstrate improved clinical status as evidenced by airway clearance or establishment of a patent airway.
2. The client will demonstrate improved gas exchange as evidenced by absence of signs and symptoms of partial or complete airway obstruction (e.g., cough, wheezing, stridor, loss of consciousness, cyanosis).
3. The client will experience minimal discomfort during the Heimlich maneuver or other method of airway clearance.
4. The client will not experience complications related to airway obstruction/hypoxia.

Equipment Needed:

- An individual with the training to perform this procedure



Estimated time to complete the skill:

1–4 minutes

> CLIENT EDUCATION NEEDED:

1. The prevention of food or foreign body obstruction is a key element of client teaching. Educate clients on the conditions under which airway obstruction occurs as well as prevention activities (e.g., childproofing a home).
Sample prevention activities include:
 - Food should be cut into small pieces and thoroughly chewed, and individuals wearing dentures should be particularly careful.
 - Avoid physical activity during the process of chewing and swallowing.
 - Avoid excess intake of alcohol, especially before and during meals.
 - Avoid laughing and talking with food in the mouth.
 - Gum and hard candy should not be in the mouth of anyone engaged in physical activity.
 - Restrict children from walking, running, or playing while they are eating.
2. The actual Heimlich maneuver or chest thrusts should not be practiced on human subjects due to the risk of internal organ damage. Proper positioning can be practiced without the actual thrusts. “Dummy” models are available in the adult, child, and infant sizes.
3. Provide an opportunity for the clients to practice the positions and actions to be utilized in the event of an actual choking.
4. Encourage ongoing parent/public education on the risks of accidental choking and methods of prevention or steps to follow if an obstruction should occur. In addition, teach the signs of airway distress and the need for immediate medical intervention.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Foreign Body Obstruction—All Clients

1. Assess airway for complete or partial blockage (see Figure 2-13-2).

1. If there is good air exchange and the client is able to forcefully cough, you should not intervene or interfere with the client’s attempts to expel the foreign body. Encourage attempts to cough and breathe, as attempts to cough will



Figure 2-13-2 Assess the client. Assess the airway for blockage.



Figure 2-13-3 Stand behind the client.

2. Activate emergency response assistance if respiratory distress or complete blockage, e.g., ask bystander to call 911.

Conscious Adult Client—Sitting or Standing (Heimlich Maneuver)

3. Stand behind the client (see Figure 2-13-3).
4. Wrap your arms around the client's waist (see Figure 2-13-4).



Figure 2-13-4 Wrap both arms around the client's waist.

5. Make a fist with one hand and grasp the fist with your other hand, placing the thumb side of the fist against the client's abdomen. The fist should be placed midline, below the xiphoid process and lower margins of the rib cage and above the navel (see Figure 2-13-5).

provide a more forceful effort. If complete airway obstruction is apparent, the Heimlich maneuver or alternative method of subdiaphragmatic thrust should be performed immediately.

2. Provides follow-up care by professionally trained personnel.
3. Proper positioning is necessary to provide an effective subdiaphragmatic thrust.
4. Proper positioning is necessary to provide an effective subdiaphragmatic thrust.



Figure 2-13-5 Make a fist. Place the fist below the xiphoid process, above the client's navel.

5. Correct hand placement is important to prevent internal organ damage.

Conscious Adult Client—Sitting or Standing (Heimlich Maneuver) *continued*

6. Perform a quick upward thrust into the client's abdomen, each thrust should be separate and distinct.
7. Repeat this process six to ten times until the client either expels the foreign body or loses consciousness.
6. This subdiaphragmatic thrust can produce an artificial cough by forcing air from the lungs.
7. Attempts to dislodge food or a foreign body to relieve airway obstruction should be continued as long as necessary due to the serious consequences of hypoxia.

Unconscious Adult Client or Adult Client Who Becomes Unconscious

8. Repeat Actions 1 and 2.
8. Determines the need for intervention and summons essential help.
9. Position the client supine; kneel astride the client's abdomen.
9. Proper positioning is necessary to provide an effective subdiaphragmatic thrust.
10. Place the heel of one hand midline, below the xiphoid process and lower margin of the rib cage and above the navel. Place the second hand directly on top of the first hand.
10. Proper positioning is necessary to provide an effective subdiaphragmatic thrust.
11. Perform a quick upward thrust into the diaphragm, repeating six to ten times.
11. A client who becomes unconscious may become more relaxed so that the previously unsuccessful Heimlich maneuver may be successful.
12. Perform a finger sweep:
 - a. Use one hand to grasp the lower jaw and tongue between your thumb and fingers and lift. This will open the mouth and pull the tongue away from the back of the throat.
 - b. Using the index finger of the other hand, insert the finger into the client's mouth next to the cheek and using a hooking motion dislodge any foreign body. Caution must be used to prevent pushing the foreign body farther down into the airway (see Figure 2-13-6).
12. Should only be used on the unconscious client, who will not fight the action.
 - a. Draw the tongue away from any foreign body lodged in the back of the throat.

Figure 2-13-6 Use a sweeping, hooking motion to dislodge and remove obstruction.



13. Open the client's airway and attempt ventilation.
13. The brain can suffer irreversible damage if it is without oxygen for over 4–6 minutes.

14. Continue sequence of Heimlich maneuver, finger sweep, and rescue breathing as long as necessary.

14. Life-saving efforts must continue until they are successful; or until the rescuer becomes exhausted and cannot go on.

Chest thrusts should only be used for the very obese client or a woman in the late stages of pregnancy.

Conscious Adult Sitting or Standing—Chest Thrusts

15. Repeat Actions 1 and 2.

15. Determines the need for intervention and summons essential help.

16. Stand behind the client and encircle the chest with arms under the axilla.

16. Proper hand placement should avoid the xiphoid process and rib cage margins to minimize internal organ damage.

17. Make a fist and place the thumb side of the fist on the middle of the client's sternum and grasp the fist with the second hand.

17. Proper hand placement should avoid the xiphoid process and rib cage margins to minimize internal organ damage.

18. Perform backward thrusts until the client either becomes unconscious or the foreign body is expelled.

18. Thrusts may not be effective on the first tries. Keep trying.

Chest thrusts should be used only for the very obese or a woman in the late stages of pregnancy.

Unconscious Adult—Chest Thrusts

19. Repeat Actions 1 and 2.

19. Determines the need for intervention and summons essential help.

20. Place client in the supine position and kneel at the client's side.

20. Places the client and the rescuer in the most effective position to apply interventions.

21. Place the heel of one hand on the lower half of the sternum—same position as with external cardiac compressions.

21. This is the most effective position for thrust.

22. Perform each thrust in a slow, separate, and distinct manner.

22. Each thrust should be delivered with intention of relieving the airway obstruction.

23. Follow Actions 9–12 for the adult Heimlich maneuver, unconscious client.

23. Performs the life-saving procedure.

Airway Obstruction—Infants and Small Children

24. Differentiate between infection and airway obstruction.'

24. Infectious complications that lead to airway obstruction require immediate medical attention, establishment of a patent airway (intubation or emergency tracheotomy) and

Airway Obstruction—Infants and Small Children *continued*

treatment of the underlying infection. Food/foreign body airway obstruction also needs immediate attention, however airway management differs between each scenario.

Infant Airway Obstruction

- | | |
|--|--|
| <p>25. Straddle infant over forearm in the prone position with the head lower than the trunk. Support the infant's head positioning a hand around the jaws and chest.</p> <p>26. Deliver four back blows between the infant's shoulder blades.</p> <p>27. Keeping the infant's head down, place the free hand on the infant's back and turn the infant over supporting the back of the child with your hand and thigh.</p> <p>28. With your free hand, deliver four thrusts in the same manner as infant external cardiac compressions.</p> <p>29. Assess for a foreign body in the mouth of an unconscious infant and utilize the finger sweep only if a foreign body is visualized.</p> <p>30. Open airway and assess for respiration. If respirations are absent, attempt rescue breathing. Assess for the rise and fall of the chest; if not seen, reposition infant and attempt rescue breathing again.</p> <p>31. Repeat the entire sequence again: four back blows, four chest thrusts, assessment for foreign body in oral cavity, and rescue breathing as long as necessary.</p> | <p>25. Proper positioning is essential for success of the maneuver and prevention of other organ damage.</p> <p>26. Technique for dislodging the obstruction.</p> <p>27. Safely rotates the infant's position to continue life-saving procedures.</p> <p>28. Technique for dislodging the obstruction.</p> <p>29. A blind finger sweep is avoided in infants and children since a foreign object can be pushed back further into the airway, increasing obstruction.</p> <p>30. Many times some air can get around the foreign body causing the airway obstruction. This allows for some oxygenation of the client. Without oxygen, irreversible brain damage can occur within 4–6 minutes.</p> <p>31. Life-saving efforts must continue until they are successful or until the rescuer becomes exhausted and cannot go on.</p> |
|--|--|

Small Child—Airway Obstruction (Conscious, Standing or Sitting)

- | | |
|--|--|
| <p>32. Assess air exchange and encourage coughing and breathing. Provide reassurance to the child that you are there to help.</p> | <p>32. Inability to breathe is a distressing event for anyone, especially a small child who may not fully understand the circumstance. Reassurance is important to gain the child's trust and cooperation with the maneuvers necessary to help him, especially if the child is conscious.</p> |
|--|--|

33. Ask the child if he is choking. If the response is affirmative, follow the steps outlined below. In addition, if the child has poor air exchange (and infection has been ruled out), initiate the following steps:

- a. Stand behind the child with your arms wrapped around his waist and administer six to ten subdiaphragmatic abdominal thrusts.
- b. Continue until foreign object is expelled or the child becomes unconscious.

Small Child—Airway Obstruction (Conscious or Unconscious, Lying)

34. Position the child supine and kneel at the child's feet and gently deliver six to ten subdiaphragmatic abdominal thrusts. The subdiaphragmatic thrusts are delivered in the same manner as for an adult but more gently.

35. Open airway by lifting the lower jaw and tongue forward. Perform a finger sweep only if a foreign body is visualized.

36. If breathing is absent, begin rescue breathing. If the chest does not rise, reposition the child and attempt rescue breathing again.

37. Repeat this sequence as long as necessary.

38. Wash hands.

33. Many small children are capable of responding to simple questions such as "Are you choking?"

- a. Proper positioning is essential for success of the maneuver and prevention of other organ damage.
- b. Life-saving efforts must continue until they are successful or until the rescuer becomes exhausted and cannot go on.

34. This is the recommended position for small children; the astride position may be used for larger children. Proper positioning is essential for success of the maneuver and prevention of other organ damage.

35. Opens the airway and allows visualization of the oral cavity. A blind finger sweep can cause increased obstruction by pushing a foreign object further back into the airway.

36. Many times some air can get around the foreign body causing the airway obstruction. This allows for some oxygenation of the client. Without oxygen, irreversible brain damage can occur within 4–6 minutes.

37. Life-saving efforts must continue until they are successful or until the rescuer becomes exhausted and cannot go on.

38. Reduces transmission of microorganisms.

> EVALUATION

- The client demonstrates improved clinical status as evidenced by airway clearance or establishment of a patent airway.
- The client demonstrates improved gas exchange as evidenced by absence of signs and symptoms of partial or complete airway obstruction (e.g., cough, wheezing, stridor, loss of consciousness, cyanosis).

- The client experienced minimal discomfort during the Heimlich maneuver or other method of airway clearance.
- The client did not experience complications related to airway obstruction/hypoxia.

> DOCUMENTATION

- If the airway obstruction occurs in the health care setting, document the following in the narrative

notes and in the emergency procedure notes if needed:

- Time and date of onset of symptoms
 - Presentation including onset and type of symptoms
 - Type (complete or partial) and cause of obstruction, if known
 - Interventions utilized to alleviate obstruction
 - Results of interventions
 - Other emergency support needed (e.g., emergency tracheotomy)
- If the airway obstruction occurs in an alternate setting (e.g., restaurant, home), provide the following information to the responding health care providers for documentation:
 - Presentation including onset and type of symptoms
 - Type (complete or partial) and cause of obstruction, if known
 - Interventions utilized to alleviate obstruction
 - Length of time with airway obstruction
 - Results of interventions



▼ REAL WORLD ANECDOTES

Scenario 1

An infant was brought into the emergency room in respiratory distress, with audible stridor and visible drooling. Before the parents could report that the child had a fever and had been sick, a new emergency room nurse turned the child over and began the procedure for removal of a foreign body obstruction. The infant's respiratory distress worsened immediately. Other emergency room personnel intervened, and it became immediately apparent that the child had an infection with epiglottitis and required an emergency tracheotomy. Failure to quickly differentiate the cause of respiratory distress in an infant or child can result in incorrect interventions and exacerbation of symptoms.

Scenario 2

A very obese gentleman was eating dinner in a restaurant. He stopped talking and grabbed his neck, and his tablemates began to yell for help. Someone began to deliver hard slaps to his back while another person attempted the Heimlich maneuver while the client sat in his chair. The client soon became unconscious before a nurse in the restaurant came over and yelled for someone to activate the local emergency response system and performed chest thrusts, dislodging a piece of meat. She then used a finger sweep to remove the meat and began rescue breathing. Luckily, the gentleman regained consciousness and had no adverse sequela from the event. This illustrates the need for health care professionals to be leaders in providing both emergency support to individuals with airway obstruction and education of the general public on the appropriate interventions to utilize in the event of an airway obstruction. In this case chest thrusts were the appropriate intervention.

> CRITICAL THINKING SKILL

Introduction

The Heimlich maneuver and alternative methods to relieve airway obstruction are basic nursing skills. The choking on food or a foreign body resulting in the lack of oxygen is a significant and life-threatening event that requires emergency management.

Possible Scenario

A woman begins choking on some food in a restaurant. She is alone, panics, grabs her throat, and runs toward the restroom.

Possible Outcome

Failure to follow this individual into the restroom could result in her death. The universal sign of choking is

hands clutching the throat. This individual is alone with no tablemates to assist her. Anyone with the knowledge of the Heimlich maneuver, especially health care professionals and restaurant employees, should follow her into the bathroom to provide interventions if needed. This is not a time to be embarrassed about entering a women's restroom if you are a male or entering a men's restroom if you are a female.

Prevention

The best prevention is nursing education to the general public about the dangers of accidental choking, emergency interventions, and the need to chew food thoroughly and eat slowly. In addition, restaurant workers are key individuals to target with this health education.

▼ VARIATIONS



Geriatric Variations:

- *The older adult is at risk for rib or cartilage fractures, which may result from forceful thrusts or improper hand positioning.*
- *Age-related changes in the muscle skeletal system (e.g., osteoporosis) might limit positioning of the geriatric client.*
- *Many older adults may be at risk of choking due to dentures, and appropriate education should take place when such devices are fitted on an individual and reinforced by all other health care professionals working with the client.*



Pediatric Variations:

- *All individuals in health care and day care settings should be educated in the hand placement and methods to remove food or foreign bodies from a child with an airway obstruction and in how they differ from treating an adult.*
- *In addition, how to access emergency medical assistance as well as prevention should be a key educational piece for all new parents and any facility that has infants and young children under its care.*
- *Infants and toddlers should not be given foods that they can choke on, especially children who do not have the ability to properly chew yet. These foods include peanuts, round hard candies, and cut-up hot dogs.*



Home Care Variations:

- *Both the caregivers and the clients requiring home care should be assessed for their educational level on interventions to take if someone is choking.*
- *Identify a working phone in the home; the client/caregiver should know how to access the emergency medical assistance available in their area.*
- *Referrals to community resources may be necessary (e.g., classes held at the local American Red Cross or the local hospital).*
- *Clients in the home care setting may have impaired swallowing abilities and are at higher risk of choking. They and their caregivers should be made aware of the proper feeding techniques to decrease the possibility of choking on food.*



Long-Term Care Variations:

- *In a long-term care facility, all employees should be educated in emergency resuscitation measures.*
- *Special attention should be made for individuals wearing dentures and those at higher risk for choking, for example, stroke victims.*
- *Foods may have to be pureed and liquids may need to be thickened.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not assessing for full-versus-partial airway obstruction.

Ask Yourself:

How do I prevent this error?

Prevention:

Make airway assessment and questions to the client (e.g., “Are you choking?”) the first priority when a suspected airway obstruction occurs.

Ask Yourself:

How do I respond to this error?

Response:

If clients are able to cough forcefully and breathe, assist them in relaxation and coach them to cough. Reassure clients that you will not leave them. If there is total airway obstruction, follow the appropriate protocol outlined earlier.

Possible Error:

Not employing correct technique for obstructed airway on an obese individual or a woman in the advanced stages of pregnancy.

Ask Yourself:

How do I prevent this error?

Prevention:

Evaluate the situation and employ chest thrusts for obese individuals or women in the advanced stages of pregnancy. Maintain regular recertification for cardiopulmonary resuscitation, which includes a review of managing airway obstruction.

Ask Yourself:

How do I respond to this error?

Response:

Reposition arms and hands and employ chest thrusts versus the Heimlich maneuver.

> NURSING TIPS

- Maintain a current and valid cardiopulmonary resuscitation/emergency resuscitation certification.
- Differentiate between emergency resuscitations that occur in the hospital settings versus those occurring in the nonclinical environment.
- Approach clients with confidence and reassure clients that you will remain with them throughout the procedure.
- Maintain an ongoing assessment of the respiratory status as well as the need to progress to full cardiopulmonary resuscitation.
- Be aware of the emergency response systems in each new environment.

SKILL 2-14

Responding to Accidental Poisoning

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Activated charcoal
Chemicals
Ipecac syrup
Medications

Poison Control
Center
Poisoning



> OVERVIEW OF THE SKILL

Accidental poisonings result from the ingestion of cleaning products, household chemicals, and medications. Often, these items are stored in cupboards that are easily accessible to young children. Prevention is the best way to reduce the two million accidental poisonings that occur each year. However, if an acciden-

tal poisoning does occur, it is critical to act quickly and calmly to prevent or slow damaging effects. Poisoning may cause many physical reactions, including sleepiness, pneumonia, organ damage, and death. A quick response is your best chance to reduce the harmful effects of an accidental poisoning.

> ASSESSMENT

Preventing an Accidental Poisoning

1. Assess the environment to establish ways to keep all medications out of reach: use child-resistant caps and label medicine and household chemicals with poison symbols or Mr. Yuk stickers. These precautions help decrease the likelihood of an accidental poisoning.
2. Assess if client is able to read medicine labels accurately. Inability to read medicine labels can lead to overdose of medication and accidental poisoning.

Responding to an Accidental Poisoning

1. Assess for signs of poisoning, such as congestion, crankiness, drowsiness, abdominal pain, nausea, and vomiting. These symptoms may indicate poisoning as well as the severity of the situation.

2. Assess what, when, and how much of the harmful substance was taken. This information is important to identify actions to be taken.

> DIAGNOSIS

1.6.1.2 Risk for Poisoning

> PLANNING

Expected Outcomes:

1. Accidental poisoning will be prevented.
2. If accidental poisoning occurs, the client will experience a minimum of trauma.

Equipment Needed:

- Phone number for Poison Control Center
- Ipecac syrup or activated charcoal



Estimated time to complete the skill:
Not applicable.

> CLIENT EDUCATION NEEDED:

1. Explain intervention before initiated. For example, ipecac syrup induces vomiting by irritating the stomach lining and triggers a vomiting response. Activated charcoal absorbs poisons from the stomach and intestines until the poisons can be excreted during a bowel movement.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

When a Potential Poisoning Victim Is Discovered

1. Be familiar with the emergency procedures at your facility (see Figure 2-14-2).

1. Allows a quick and accurate response when the need arises.

Figure 2-14-2 Know emergency procedures for accidental poisoning.



2. Call for help. Assess the client. If the client does not have a pulse and/or is not breathing, call 911 for assistance with life-saving measures. Intervene to clear airway, reestablish breathing, and restore circulation as required.
3. If the client is conscious and breathing, call 911 or poison control for assistance with the poisoning.
4. Determine what substance was ingested and how much was ingested. Keep the container if it is available.
5. If you are talking to poison control, have them determine what treatment is appropriate.

2. Institute cardiopulmonary resuscitation (CPR) and life-saving measures immediately. First aid is only a stopgap measure until professional help is available.
3. First aid is only a stopgap measure until professional help is available.
4. Helps determine the course of treatment.
5. Difficult poisons have different treatments. Do not induce vomiting unless it has been speci-

- | | |
|---|--|
| <p>6. If appropriate, give syrup of ipecac or activated charcoal.</p> <p>7. Follow the instructions of the emergency providers. Instructions may range from a 911 urgent call to the site, transport to the emergency room, taking the victim to a physician, or simple observation.</p> <p>8. Wash hands.</p> | <p>cally authorized. Inducing vomiting when a caustic substance has been ingested can do more harm than good.</p> <p>6. Ipecac will induce vomiting. Activated charcoal will bind with the poison so it can be excreted in the stool.</p> <p>7. Even if the victim seems to have recovered, a physician or nurse practitioner should examine the victim for damage or residual effects.</p> <p>8. Reduces transmission of microorganisms.</p> |
|---|--|

Steps to prevent poisoning are presented in Table 2-14-1.

Table 2-14-1 Steps To Prevent Poisoning

SAFETY WITH DOSAGES

- Do not take or give medicines meant for someone else.
- Take or give medicines according to clear directions from health care professionals. Request these directions in writing. This prevents ingestion of medication at incorrect dosage.
- Do not take or give medicines unless the container labels can be read accurately to prevent ingestion of wrong medication or incorrect dosage.

SAFETY WITH LABELS

- Keep medicine labels attached to medicine containers for quick reference in case of accidental ingestion.
- Do not keep medicines beyond the time of directed use or beyond a year if there are no expiration dates.
- Label medicine and household chemical containers with poison symbols to alert that the substance is dangerous. Do not store household chemicals in soda bottles or cans.
- Flush old medicines down the toilet; then rinse containers, wrap securely, and put in tamper-proof trash cans.

SAFETY WITH CHILDREN

- Refer to medicines by their proper names in front of children to alert children that medicine is not candy.
- Do not take medicines in front of a child. This may prevent accidental ingestion, especially when the child is imitating adult activity, behavior, and expressions.
- Store medicines out of a child's reach, in a cabinet with a safety lock to prevent accidental ingestion by a child.
- Use child-resistant caps and keep in the locked position if children are in the home or visit occasionally. This may prevent accidental ingestion by a child.
- Post the number for the Poison Control Center near the telephone to assure the number is available in an emergency.

> EVALUATION

- Accidental poisoning is prevented.
- If accidental poisoning occurred, the victim experienced a minimum of trauma.

> DOCUMENTATION

Nurses' Notes

- Document time and date of accidental poisoning incident.
- Document client's condition on arrival.
- Indicate the harmful substance and how much may have been ingested.

- Document circumstances of the accidental poisoning.
- Record the names of people with the client or those who accompanied the client.
- Document interventions used and the client's response.

Accident Report (if incident occurred within an institution)

- Follow the institution's guidelines for accident reports.
- Document all of the items noted in the Nurses' Notes, as required.



▼ REAL WORLD ANECDOTES

Jane was sent home with a prescription for dexamethasone and was instructed to take 2 mg b.i.d. When she got home, she forgot the dose she was to take and called her doctor's office to clarify. By this time, the office was closed. Jane thought the nurse had said to take 2 pills b.i.d. instead of 2 mg b.i.d., and she took two pills twice a day for three days. By the third day, she was having difficulty sleeping at night and was drowsy all day. She went back to see her doctor and the overdose was discovered. The nurse was reminded to always give the client written instructions in addition to verbal instructions regarding new medications.

> CRITICAL THINKING SKILL

Introduction

When a potentially poisonous substance is ingested, action must be taken quickly. If poisoning is suspected, do not wait to see what effect the substance may have; obtain help from emergency services (911) or the Poison Control Center.

Possible Scenario

Jimmy is a 3-year-old boy who was at his grandmother's house when he was found sitting on the floor playing with pills from a container.

Possible Outcome 1

Jimmy's grandmother scolded him for getting into her things and checked the bottle. Upon discovering that he was holding a bottle of her pain pills, she checked to see how many were left. There did not seem to be any missing. Jimmy's grandmother remembered that these pain pills had not been very strong and she decided to watch Jimmy for any symptoms. Shortly afterward, the phone rang. As his grandmother talked on the phone, Jimmy fell asleep on the carpet. When his grandmother hung up, she found Jimmy lying on the carpet breathing stertorously. She quickly scooped him up, ran to the car,

and rushed him to the hospital. As a result of Jimmy's grandmother's delay in getting him to the hospital, he was found to have suffered hypoxic brain damage.

Possible Outcome 2

Jimmy's grandmother checked the bottle of pain medication. Although she did not notice any missing, she suspected that Jimmy might have ingested some of the pills. She immediately called 911 for assistance. The emergency service team induced vomiting using ipecac syrup. Jimmy vomited immediately and was admitted to the hospital to be observed overnight.

Prevention

All medications, cleaners, and any other potentially poisonous substances must be kept out of reach, especially when young children are present. Clients should be cautioned when given potentially poisonous medications. Children are curious and inventive. They will explore everything and everywhere and can get into things adults cannot imagine. Advise clients, when childproofing a house, to get down on the floor at a child's eye level and look around. Have them ask themselves what a child would find interesting from the lower angle. If it is something dangerous, put it away.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have difficulty hearing instructions or reading medication bottles.*
- *Elderly clients may be forgetful regarding when they actually took their last dose of medication. Be sure to establish a dosing system that will help prevent an accidental overdose.*
- *Elderly clients may have grandchildren or neighbor children in their homes. Many elderly clients choose to remove medications from childproof bottles, especially if children are rarely in the home. Caution them to secure medications when children are present.*



Pediatric Variations:

- *Children can mistake medication for candy and chemicals for soda or juice.*
- *When giving potentially poisonous medications to clients, always stress the possible dangers. Have them use poison stickers or Mr. Yuk stickers to emphasize things that should not be touched. Then put those things well out of the child's reach.*



Home Care Variations:

- *Chemicals and other potentially poisonous materials are often present in the home. In suspected poisonings, do not assume the poison came from the medicine cabinet or the kitchen. Consider other sources, including the garage, shed, workshop, and basement.*
- *In a home with young children, common potential poisons may be placed safely out of reach. When leaving medications at the home, be sure to follow the same safety procedures for these potential poisons.*



Long-Term Care Variations:

- *Safety precautions can become lax in the long-term setting. For example, pouring a cleaning solution in a drinking cup and then leaving it at the bedside can increase the risk of accidental poisoning.*
- *Clients may be confused and have less supervision than in other settings.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Client misunderstands instructions regarding medication ingestion.

Ask Yourself:

How do I prevent this error?

Prevention:

Provide both verbal and written instructions to the client.

Ask Yourself:

How do I respond to this error?

Response:

Ask the client to repeat the correct name, dosage, and frequency of the medication.

> NURSING TIPS

- Have poison prevention pamphlets and stickers with the phone number of the local poison control center available for clients.
- Remind clients to keep medication and chemicals in a safe location, especially if they have young children.
- Review dosage schedules with elderly clients, especially if the schedule has changed recently.

SKILL 2-15

Emergency Client Transport

Valerie Coxon, RN, PhD

KEY TERMS

Carry
Danger
Disaster
Drag
Evacuate

Evacuation
Fire
Fireman's carry
Rescuer
Transport



> OVERVIEW OF THE SKILL

A disaster is an emergency incident with destructive potential. Some examples of a disaster are a fire, a bombing, a tornado, an earthquake, a storm, or a chemical spill. In the event of a disaster, your quick action in safely evacuating clients may save their lives. Quickly and safely moving a client in an emergency situation is an essential nursing skill.

Planning ahead, or disaster preparedness, is the first step in safely moving a client. Assess the situation as much as possible before a disaster occurs. Read the emergency or disaster manual (see Figure 2-15-2). Think about potential obstacles, such as stairs to navigate, equipment to move, and the physical conditions of your clients. Know the location and availability of portable equipment, the location and condition of emergency supplies, and how much help will probably be available in the immediate area.

During the disaster it is critical to communicate clearly to send and receive important information. It is important to know and use the emergency evacuation plan for the disaster you encounter. Use the safest means of transport available, if the clients must be moved. After you have moved everyone to a safe place, reassess the situation. Make sure all clients were moved, and that all clients and staff are accounted for.

After the clients have been evacuated, their needs may still be critical. Check the clients' conditions and determine what additional equipment or supplies are

needed immediately, such as portable oxygen, a crash cart, IV poles, or Ambu bags.

Check if any clients, rescuers, or other staff members have sustained additional injury from the move or the disaster. Determine if the client, other staff members, or you yourself need any decontamination or have suffered inhalation exposure. Check for the onset of shock.

From the beginning to the end, safety is the number one concern. Good body mechanics can help you



Figure 2-15-2 Read the disaster manual to know the procedures that may be required in an emergency.

avoid injury and fatigue, as well as reduce the risk of injuring a client.

Types of emergency transportation include ambulation, ambulation with assistance, wheelchairs, stretchers, the bed, and one or more people carrying or dragging the client. Using a manual carry may cause injury, or increase the severity of an existing condition or injury. It can be exhausting to the rescuer, however, it

may be the only option to save a life. If a manual carry is necessary, use two rescuers whenever possible. This will reduce the fatigue and risk of injury to the rescuers, and is less traumatic to the client.

Select the best mode of manual carry. For example, the fireman's carry is one of the easiest ways for one person to carry a client. A support carry can be used when the client can use only one leg, or can walk weakly.

> ASSESSMENT

1. Determine the nature of the disaster, and where the danger is located. **Helps determine the extent and urgency of the evacuation.**
2. Determine who is in charge of the evacuation, both overall, and in your part of the facility. **Defines who to locate to obtain orders and report information.**
3. Determine obstacles to the evacuation, including stairs, structural damage, darkness, or smoke. **Helps to determine the type of evacuation used.**
4. Determine your current client's medical needs, activity level, and tolerance. **Helps determine which clients are evacuated using which method.**
5. Review what equipment and supplies will be needed immediately to ensure client stability and safety. **Helps determine which equipment is gathered along with the evacuation, or obtained from other sources immediately.**

> DIAGNOSIS

- 1.6.1 Risk for Injury
- 6.1.1 Impaired Physical Mobility
- 9.3.2 Fear
- 8.1.1 Knowledge Deficit

> PLANNING

Expected Outcomes:

1. Client will be evacuated to a safe environment without injury to the client or the staff member.
2. Client will have essential medical support restored after the evacuation.

Equipment Needed (see Figure 2-15-3):

- Flashlight, if needed
- Equipment required for evacuation choice may include:
- Stretcher
 - Wheelchair
 - Walker

- Mattress
- Sheets

Support equipment needed to maintain client:

- Portable oxygen
- Clamps
- Occlusive dressing
- Bandages
- Sterile syringes
- Portable suction



Estimated time to complete the skill:
30 seconds to 6 minutes per client

> CLIENT EDUCATION NEEDED:

1. Calmly explain to the client the emergent situation, including the type of disaster, and the need to evacuate.
2. Explain to the client the method that will be used to transport him to safety.
3. Give the client specific instructions on how to assist you, if the client is able.
4. Give visitors or family specific instructions on how to assist you.
5. Reassure the client that his medical needs will continue to be met in the safe area.



Figure 2-15-3 Walker

IMPLEMENTATION—ACTION/RATIONALE

ACTION

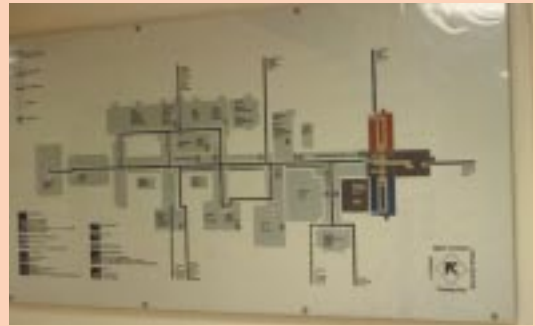
RATIONALE

- | | |
|--|---|
| <p>1. Remain calm; do not panic.</p> | <p>1. Enables you to receive and process information about the disaster and the evacuation. Enables you to think and plan more clearly; helps your clients to remain calm.</p> |
| <p>2. Assess the source of the danger.</p> | <p>2. Helps you plan the evacuation route.</p> |
| <p>3. Assess for the increasing risk of danger from secondary source (fire after an earthquake, for example).</p> | <p>3. Helps you assess the total risk for the client. Helps anticipate unexpected emergency situations.</p> |
| <p>4. Determine the immediate risk to yourself, and your ability to handle the situation. Intervene to reduce the risk to your safety, and to get help, if needed.</p> | <p>4. Reduces the risk of the rescuer becoming an additional victim.</p> |
| <p>5. Check the condition of the clients and staff who may have been injured. Assess airway, breathing, and circulation.</p> | <p>5. Allows emergency life-saving responses.</p> |
| <p>6. Determine who is in charge of the evacuation, as per the emergency manual. Locate that person. Listen to and follow his or her instructions.</p> | <p>6. Ensures an orderly and safe evacuation.</p> |
| <p>7. Determine a safe location where clients will be transported.</p> | <p>7. Allows you to evacuate in the proper direction.</p> |
| <p>8. Determine who needs to be transported. Clients in the most physical danger from the disaster need to be transported first.</p> <p style="margin-left: 20px;">If the physical danger is the same for all, and your rescuing resources are limited, evacuate those who can be quickly moved first, then those trapped under debris or those who require moderate time to move.</p> <p style="margin-left: 20px;">Finally, move those trapped behind walls, those who need to be extricated, or those who require intensive time and assistance.</p> | <p>8. Allows you to prioritize the evacuation.</p> |
| <p>9. Determine what mode of transport will be used.</p> | <p>9. Allows you to plan the evacuation, and assemble the equipment.</p> |
| <p>10. Inform the client what is happening, and how he will be transported.</p> | <p>10. Elicits client cooperation and provides information.</p> |
| <p>11. Gather equipment and personnel.</p> | <p>11. Allows for a smooth procedure.</p> |

12. Make sure the escape route is clear, and you or the assistant knows where to go (see Figure 2-15-4).

Figure 2-15-4 It is important to have a clear understanding of possible escape routes.

12. Decreases the risk of leading a client into greater danger.



13. Make sure you have a light source if you will be passing through areas that are dark.

13. Decreases the risk of falls or injury from unknown hazards while transporting the client.

14. Transport the client as predetermined.

14. Allows the client to be moved to a safe location.

15. Recheck the client after evacuation, and provide immediate intervention to treat injuries, shock, or immediate medical needs.

15. Continues to provide client care.

16. If the evacuation location is outdoors, protect the client from the elements.

16. Protects the client from the additional trauma of cold, heat, rain, or other weather.

17. Continue to monitor the situation. If you need to return to the disaster site to evacuate additional clients, assign someone to remain with the present client.

17. Ensures that the client will not be alone. Allows you to return to where you are needed most.

18. Continue with the disaster protocol as outlined in the facility's disaster manual.

18. Ensures smooth and efficient disaster response.

Emergency Transfer from Bed to Wheelchair, Walker, or Ambulation for Evacuation

19. Put the head of the bed up.

19. Prepares the patient to sit.

20. Pull covers down past the feet.

20. Allows you to check for tubes or drains. Prevents the feet from getting tangled in the bedding.

21. Put slippers or shoes on feet if readily available, and if time permits.

21. Provides traction and warmth.

22. Put on robe, coat, or blanket if client will be going outside, or if heat or electricity has been cut off.

22. Provides warmth and protection.

23. Disconnect IV pumps, suction, oxygen, or other devices from the wall. Reconnect to portable devices if available, and if time permits.

23. Prevents trauma to the body. Continues essential therapy.

Emergency Transfer from Bed to Wheelchair, Walker, or Ambulation for Evacuation *continued*

- | | |
|--|---|
| <p>24. Assist the client to stand and help with wheelchair or walker, if needed.</p> <p>25. Walk with the client to the safe location, or assign an assistant to walk with the client.</p> | <p>24. Prepares the client to move safely.</p> <p>25. Allows the client to be moved to a safe location.</p> |
|--|---|

Emergency One-Person and Two-Person Evacuations

- | | |
|--|--|
| <p>26. <i>Support-walk with the client.</i> Use this technique if the client is conscious, can walk, walk with difficulty, or hop on one foot. Use only if the client has no suspected neck injuries.</p> <p>27. <i>One person.</i> Assist the client to a standing position. Firmly grasp the client's wrist and wrap the client's arm around the back of your neck. Place your arm around the client's waist, and walk with the client, supporting and stabilizing him.</p> <p>28. <i>Two people.</i> Each person firmly grasps one of the client's wrists and wraps the client's arm around the back of the rescuer's neck. Each person places an arm around the client's waist, and together the rescuers walk the client, supporting and stabilizing him.</p> <p>29. <i>Piggyback carry (one person).</i> Use this technique if the client is conscious and has no suspected neck or arm injuries.</p> <ul style="list-style-type: none"> • Have the client stand or sit, or lift him to a standing position. Turn your back to him. Bend your knees and have the client place his hands on your shoulders. Lift the client, shifting the weight of the client onto your back, and grab his legs behind the knees with your hands or forearms. Instruct the client to "hang on" with his arms and hands. Make sure the client does not position his hands or arms to block your vision or hearing or to choke you. <p>30. <i>Cradle/arms carry (one person).</i> Have the client stand, or lift him to a standing position. Place one arm under the client's knees and the other arm around the client's back and lift, taking the weight with your knees.</p> | <p>26. Allows evacuation with minimal fatigue to the rescuer.</p> <p>27. Safe evacuation technique.</p> <p>28. Safe evacuation technique.</p> <p>29. Safe evacuation technique.</p> <p>30. Safe evacuation technique.</p> |
|--|--|

31. Drag (one or two people). Place the client on his or her back, and kneel at his head. Slide your hands under the client's shoulders and grasp the rib cage under the armpits. Rise and drag the client backwards. Support the client's head on one or both forearms.

- *Using clothing as a handhold.* A variation of this technique is to grasp the clothing on each side of the client, under the armpits, and drag.
- *Using a blanket or mattress.* Another variation is to quickly place a blanket or mattress under the client and use this to support the client as you drag him or her to safety (see Figure 2-15-5).



Figure 2-15-5 Use a blanket to drag the nonambulatory client to safety.

- *Using this technique on stairs.* With the client in a semi-sitting position, rise and drag backwards. Then back down, or climb up the steps. Support the client's head and body. Let the hips and legs slide and drop from step to step.

32. Chair drag (one or two people). Place the client in a chair (secure hands across chest, if necessary). Secure the person in the chair if the client is confused or unconscious. Drag the chair and the client to safety.

33. Fireman's carry (one person). Hoist, lift, or have the client stand facing you. Grab the client's wrist furthest from you with your hand (see Figure 2-15-6). Squat/lean and grab the client's thigh closest to your body (see Figure 2-15-7). Hoist the weight of the client over your shoulder closest to the client, and lift with your legs (see Figure 2-15-8). Balance the weight of the client (see Figure 2-15-9), keeping a firm grip on the client's wrist and thigh (see Figure 2-15-10). You may briefly let go of the client's wrist, if necessary, to open doors or grab railings.

31. Safe evacuation technique.

- Safe evacuation technique.
- Safe evacuation technique.



Figure 2-15-6 Grab the client's wrist furthest from you with your hand.

- Safe evacuation technique.

32. Safe evacuation technique.

33. Safe evacuation technique.

Emergency One-Person and Two-Person Evacuations *continued*



Figure 2-15-7 Grab the client's thigh closest to your body.



Figure 2-15-8 Hoist the client's weight over your shoulder, lift the client, and rise up to a walking position using your legs to avoid back strain.



Figure 2-15-9 Balance the weight of the client prior to walking.



Figure 2-15-10 Keep a firm grip on the client's wrist and thigh.

34. *Two-person packsaddle carry (two people).* Each rescuer grasps his own wrist and the other bearer's wrist, forming a seat. Bend your knees and lower the seat. Have the client sit, and wrap each of his arms around a rescuer for support. Rescuers must communicate clearly with each other when starting, stopping, turning, and changing direction.

35. *Cradle carry (two people).* Lay client on his back and have one rescuer kneel on each side. Each rescuer slides one arm under the client's thighs and the other under the client's back. Each rescuer grasps the other's wrists. On a signal, they rise together, using their legs to lift the client.

34. Safe evacuation technique.

35. Safe evacuation technique.

> EVALUATION

- After the immediate danger has passed, evaluate critical elements of the rescue or evacuation, including communication, safety of the rescuers, safety of the client, and the types of evacuation chosen, and care or follow-up at the safe site.
- Assess the condition of the client immediately after the evacuation. Check tubing, lines, and monitors. Assess anxiety or panic generated during the disaster or evacuation. Provide reassurance and information. If you must leave, enlist someone to remain with the client. Do not leave the client alone, if possible.
- Assess the client for injuries sustained during the evacuation. Check the ABCs (airway, breathing, and

circulation). Check vital signs and level of consciousness. Check for bleeding.

> DOCUMENTATION

Nurses' Notes

- Document date and time the disaster occurred.
- Document time of the evacuation.
- Document method used to evacuate the client.
- Document how the client tolerated the evacuation.
- Document postevacuation vital signs.
- Document injuries sustained during the disaster or evacuation.
- Document visitors or family present during or after the disaster and evacuation.



▼ REAL WORLD ANECDOTES

Maria has always considered disaster drills an interesting, if far-fetched diversion from the normal workday. Her feelings changed in one quick moment. It was evening, and she was on her way home from work. Waiting at an intersection, she was startled to see two cars collide in a rainy, dark intersection. One car immediately caught fire. Then, she watched a motorcycle rider, unable to stop in time, lose control and slide under the burning cars. There was hardly time to think, and little time to react, as Maria ran to the rider, and pulled him from under the car. Using a modified drag carry, she supported the rider's helmeted head and cervical spine between her forearms, grabbed his motorcycle jacket, and pulled him away from the fire.

> CRITICAL THINKING SKILL

Introduction

In real life, that client who goes down may need to come back up.

Possible Scenario

A large electrical fire has started somewhere in your outpatient clinic. You are with a client in a treatment room on the third floor when you hear the fire alarm go off. You step out into the hall, and immediately see smoke, three feet deep, acrid, thick, and choking, pouring through the vents, rolling along the ceiling tiles, and swirling around the lights. You hear someone down the hall yelling, "It's on the fourth floor! Get out now!" Your client is in a long-leg cast and crutches. You assist her over to the nearest stairwell, push open the door, check that the stairwell is free of smoke, and tell her to go down quickly. You remain in the clinic, looking for other clients, following the facility's disaster drill protocol.

Possible Outcome

Your client works her way down the stairs. At the first floor, she opens the fire door right into the heart of the

fire. A wall of heat and smoke rushes into the stairwell, sucking away the oxygen. Your client turns to make her way back up the stairs, but her heavy cast and crutches slow her down. She gasps for air, breathing in the thick, caustic smoke. Her life is saved by another coworker, who also mistakenly came down the same stairs. He grabs her in a support-walk carry, and quickly helps her back up the stairs to another evacuation route. She is hospitalized for smoke inhalation and shock.

Prevention

In your panic, you misunderstood a critical piece of information. The person yelling down the hall actually said, "It's on the *first* floor! Get out now!" While you were not hysterical, you did panic. You should have taken a little more time to assess the information, and determine the source of the danger. You needed to assess what evacuation routes were available, then try to determine the source of the fire prior to selecting a route. You should have considered the limited mobility of the client. There were many able-bodied people evacuating at the same time. You should have enlisted one of them to accompany the client if you could not go with her yourself.

▼ VARIATIONS



Geriatric Variations:

- Older clients may be mobile, but may not have the strength or stamina to climb or descend stairs, or walk fast.
- Older clients may have respiratory deficits that make breathing more difficult with panic or exertion.
- Older clients may have hearing or vision difficulties that make it more difficult to navigate in a disaster situation, or to hear critical instructions.



Pediatric Variations:

- Children should always be accompanied by a parent or rescuer, even if they are physically able to evacuate themselves.
- If possible, quickly grab a favorite stuffed animal for the child to hold during and after the evacuation.
- If the parent is not with the child at the time of the disaster, keep watch for the parent arriving at the evacuation location. Make it as easy for the parent to locate the child as possible.
- Make sure someone remains with the child in the evacuation location.



Home Care Variations:

- Take a moment during the home health visit to mentally locate emergency stairwells and evacuation routes in case of a fire, earthquake, or explosion.
- Take a moment to check smoke alarms in the home, and know where the fire extinguishers are. Keep a fire extinguisher in your car.
- You may need to improvise a stretcher in the home setting. Enlist neighbors and home caregivers to help evacuate the client.
- Remember that in the home setting you are more or less on your own to follow an evacuation plan. If the setting is in a high-rise, for example, you may need to carry the client a long distance, or down narrow stairs. Keep the principles of safe evacuation in mind, and do not be afraid to recruit help from bystanders.
- When possible, grab essential supplies as you evacuate. Equipment or materials will not likely be available nearby in the community setting. If it is a large disaster, help may be delayed.



Long-Term Care Variations:

- Study evacuation procedures in the facility, and participate in disaster drills when available.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client was not disconnected from all tubes, monitors, or intravenous equipment prior to moving.

Ask Yourself:

How do I prevent this error?

Prevention:

Mentally review the condition of each client to recall what tubes or equipment are currently in use. Perform a head to toe check for tubes and lines. In an emergency or urgent situation, don't be afraid to move the bed

▼COMMON ERRORS—ASK YOURSELF *continued*

linen away from the body to check for equipment. Be especially careful if the client is unfamiliar to you, or if you are assisting in the evacuation of another floor or area of the facility. If the error occurred, apply pressure to bleeding sites. Clamp tubing. Clamp chest tubes or apply occlusive dressings if needed. Cover sterile sites or tubes with sterile dressings. Take disconnected equipment and new sterile supplies with you to reconnect the client after the evacuation.

> NURSING TIPS

- Learn the disaster plan for each facility where you work. Read the manual on your break periodically to refresh your memory.
- Use blankets, sheets, or even privacy curtains to place under the client. Roll up the sides of the material to the client and use as a stretcher or drag the client along on the material.
- Never use the elevator to evacuate clients in an emergency, unless the fire or rescue team in charge of the evacuation gives the “OK” and supervises the elevator use.
- Remove contaminated clothing that may have metal or glass fragments, spilled medications, or liquids that could potentially cause injury to a caregiver or the client.
- Doors, short ladders, and backboards can all be used to improvise stretchers. Keep an eye out for suitable materials.
- Make sure any improvised stretcher will clear passageways and doorways.
- When evacuating any client with a chest tube, remember to toss clamps and occlusive dressings in your pocket for emergency use. Monitor the client for respiratory distress frequently as you evacuate, especially if the environment is chaotic and noisy. There is increased risk that the chest tube might become dislodged, and that you will not hear clients in distress in the confusion.
- Support and immobilize the neck whenever possible prior to evacuation, especially if there is the possibility the client has been injured in the disaster. Use tape, sandbags, pillows, towels, full IV bags, or whatever is available.

Patient Care and Comfort

- Skill 3-1** The Effective Communication Process
- Skill 3-2** Guided Imagery
- Skill 3-3** Progressive Muscle Relaxation
- Skill 3-4** Therapeutic Massage
- Skill 3-5** Applying Moist Heat
- Skill 3-6** Warm Soaks and Sitz Baths
- Skill 3-7** Applying Dry Heat
- Skill 3-8** Using a Thermal Blanket and an Infant Radiant Heat Warmer
- Skill 3-9** Applying Cold Treatment
- Skill 3-10** Assisting with a Transcutaneous Electrical Nerve Stimulation (TENS) Unit

SKILL 3-1

The Effective Communication Process

Valerie Coxon, RN, PhD

KEY TERMS

Active listening
Feedback
Interaction
Interpersonal
Medium

Message
Nonverbal
Receiver
Sender
Verbal



> OVERVIEW OF THE SKILL

Communication is a foundation of nursing care. Effective nursing requires clear communication with the client, the family, and other members of the health care team. Communication is a basic ingredient of the nursing process. Assessing, mediating, problem solving, teaching, planning, implementing care, receiving feedback, and many other nursing tasks require clear communication.

The essential components of communication include the sender, the receiver, the message, the message channel, and the feedback to the message (see Figure 3-1-2). The sender is the individual who generates and communicates the message. The sender senses a need to communicate—to express a feeling, to relate to another, to seek to understand, or to request information from another person. The message is generated mentally, then encoded into a form that can be communicated. Eye movements, gestures, words, sounds, facial expressions, and body postures are all forms of communication.

The receiver is the person who receives and interprets the message. The message is heard, seen, or felt, then mentally interpreted, or decoded, as the individual decides what is being communicated. How messages are received and interpreted depends on many factors, including the receiver's vision, hearing, level

of anxiety, mood, beliefs, values, expectations, and previous experiences.

The message is defined as the package of information being transferred from the sender to the receiver via one or more communication channels. Although messages are often thought of as written or spoken words, a message can be verbal, nonverbal, written, drawn, or sculpted. Verbal messages can be words, language, sounds, songs, or noises. Nonverbal messages include hand and body gestures, facial expressions, and postures. Written and artistic messages include the written word, drawings, photos, and models.

Most messages are packets of information communicated via multiple channels. A verbal message, for example, is a selection of spoken words of certain loudness, pitch, and rate, communicated via the auditory

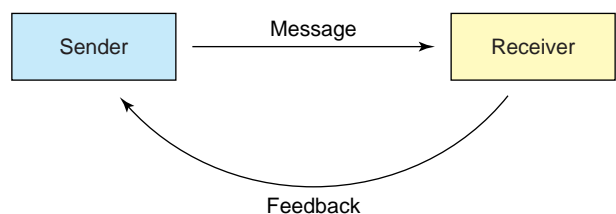


Figure 3-1-2 The nurse and client each act as sender and receiver, communicating messages and feedback.

channel, accompanied by facial expressions, posture, and gestures, communicated via the visual channel.

There are two basic goals of therapeutic communication: 1) to formulate and send clear messages and 2) to be able to receive, interpret, clarify, and respond to the messages sent by the client and other members of the health care team. Two key elements of this process are active listening and communication barriers.

Active listening is the dynamic process individuals engage in when they desire to receive accurate messages. It consists of hearing and interpreting words; watching for and interpreting gestures and postures; and identifying and surfacing feelings, undercurrents, or themes in a communication sequence.

The goal of active listening is to accurately hear the complete message being sent.

Barriers to communication block or distort communication. Some examples include gender and sociocultural differences, language differences, pain, and cognitive or sensory deficits. More subtle barriers include differences in knowledge, daydreaming, environmental noise, privacy, fatigue, fear, or the use of jargon. Individuals can introduce barriers to communication as they communicate. Blaming or belittling, pressuring, being defensive, using clichés, changing the topic to a more comfortable one, or using “yes or no” questions are all examples of communication blocks.

> ASSESSMENT

1. Assess the client’s ability to send clear messages. Check for physical barriers such as mental confusion, sedation, or the restricted ability to speak or gesture. Check for emotional or social barriers such as the fear of communicating certain messages, doubts about the appropriateness of when and how to communicate with health care members, or embarrassment over the content of the message. **Determines how to intervene to remove barriers to communication.**
2. Check the ability to receive messages. Look for hearing or vision difficulties. Check for confusion, anxiety, dizziness, or sedation. Check for emotions that may block or skew incoming messages, such as anger, frustration, depression, or doubt. **Determines how to intervene to remove barriers to communication.**
3. Assess for the amount of information that may effectively be delivered or received and processed in a time block. Sedation, pain, anxiety, and distractions all reduce the amount of information the client can process at one time. Difficult concepts or complicated or detailed information must be delivered at a rate and clarity level that the client can absorb. The nurse must be able to focus on the communication process without distraction. Competing demands may necessitate moving the communication to a different time. **Allows the nurse to select the most appropriate time and amount of information to send and receive.**
4. Check for impediments to communication in the surrounding environment. Ambient noise, bright or dim lighting, the presence of strangers or family members, the lack of privacy, task-oriented

“busy” staff, and isolation precautions such as masks and goggles can all impede effective communication. **Allows interventions and modifications to the environment to reduce barriers to communication.**

5. Assess your own ability to receive and send messages. Check for internal biases or beliefs about clients that may cause you to skew or distort your interpretation of the messages they are sending. Check for your openness to receive messages, including your focus on other tasks, priorities, comfort level with the subject matter, and ability to understand the words and gestures of the client. **Determines how to interpret or seek additional communication.**

> DIAGNOSIS

- 2.1.1.1 Impaired Verbal Communication
- 7.3.2 Powerlessness
- 9.3.1 Anxiety
- 8.1.1 Knowledge Deficit
- 8.2.2 Confusion
- 8.3 Altered Thought Processes

> PLANNING

Expected Outcomes:

1. The client’s environment will be as free from barriers to communication as is possible given the client’s physical condition and immediate environment.
2. The nurse will communicate internally generated messages successfully as evidenced by feedback

that confirms the intended message was received by the client or health care team member.

3. The client or health care team member will communicate internally generated messages successfully as evidenced by feedback that confirms the intended message was received by the nurse.

Equipment Needed:

- Quiet, private area free of distractions or interruptions
- Aids to communication as necessary, including glasses, hearing aids, pencil and paper, computer, sign board, or interpreters
- Comfortable chair or bed for the client and chair for the nurse that places her at eye level with the client



Estimated time to complete the skill:
1–60 minutes, depending on the nature and content of the communication

> CLIENT EDUCATION NEEDED:

1. Explain the need to communicate and the nature of the messages to the client such as assessment, counseling, teaching, delivering or receiving information, or planning.
2. Arrive at mutually agreed upon goals for the communication session: understanding the nature and level of client distress, understanding teaching needs, understanding postoperative exercises, open-ended discussion about client frustrations, and so on.
3. Assure the clients that they are in control of the situation and that they may stop or modify the communication session at any time.
4. Inform the client of the need to provide feedback for messages sent by the nurse. Discuss the nature of feedback, and inform the client how you will signal the need for feedback from the client.
5. Remind clients that even though it is often easier to let a family member communicate for them, it is OK to speak up directly.
6. Teach clients that it is normal to forget information about their care and condition in the stressful hospital setting. Let them know it is OK to ask questions.
7. Remind clients that there are no “dumb” questions.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Arrange for an uninterrupted time block.
3. Prepare to be an effective communicator:
 - Decide what information you wish to communicate or solicit.
 - Determine the appropriate difficulty level for your language and how much information you should attempt to communicate at any one time.
 - Decide how long the session will be and at what pace to provide messages.
 - Review the tenants of active listening.
 - Do a quick internal check for beliefs or prejudices that might affect the ability to communicate.
4. Assess the environment for barriers to communication. Adjust the environment to facilitate

1. Reduces the transmission of microorganisms.
2. Interruptions disrupt the process.
3. Facilitates successful communication.
4. Facilitates the transmission of messages.

the communication process. Close doors for privacy and move sources of noise away (see Figure 3-1-3) or turn them off if possible. Provide glasses or hearing aids, turn off TV, remove visual distractions, and so on. Adjust lighting so the client can see you (see Figure 3-1-4), and do not stand with your back to a sunlit window or a bright light (see Figure 3-1-5).



Figure 3-1-3 Noisy equipment or environments can interfere with verbal communication.

5. Assess the client for barriers to communication, and intervene where possible. Intervene for pain (see Figure 3-1-6), nausea, anxiety, or chills. If appropriate, select a time when the client is feeling alert, awake, and ready and willing to communicate.



Figure 3-1-6 Pain or anxiety can distract the client from sending and receiving clear messages.

6. Sit in a comfortable chair, or squat close to the client (see Figure 3-1-7). You should be at eye level to allow you to make eye contact, to hear and be heard, and to use touch if appropriate



Figure 3-1-4 Poor lighting can interfere with nonverbal communication.



Figure 3-1-5 Standing in front of a bright window or light can prevent the client from seeing your face or gestures.

5. Establishes the best available environment for the type of communication desired.



Figure 3-1-7 Squat or sit close to the client to facilitate seeing and hearing messages.

6. Increases client comfort.

(see Figure 3-1-8). Make sure the client is warm and comfortable.

Figure 3-1-8 Position yourself at eye level so both individuals can hear, read lips, and observe facial expressions.



7. Provide similar seating to an interpreter or other person participating in the communication.
 8. Introduce yourself, and state the purpose of your communication.
 9. Using the purpose of the communication as a guide, draw the client into the communication session with you. Use techniques that allow the client to set the pace, encourage spontaneity, focus on the client, and encourage the expression of feelings.
 10. At regular intervals during the communication session, request feedback from the client to assess if your communication is being received as you intended it.
 11. At regular intervals during the session, provide feedback to the client that states what you are hearing the client communicate, both verbally and nonverbally. Request clarification when needed.
 12. Monitor yourself and your client for nonverbal messages (see Figures 3-1-9 and 3-1-10).
 13. Assess for signs of boredom, distraction, confusion, or emotional responses. Ask for feedback and clarification. Adjust your communication or terminate the session, if needed.
 14. If the communication session is interrupted, terminate the session if the interruption is a higher priority, or at the client's request. Identify a time and place to resume.
7. Allows messages to be clearly transmitted.
 8. Reduces confusion.
 9. Initiates the process of communication.
 10. Gathering feedback enables the nurse to modify the communication and detect barriers.
 11. Providing feedback helps clients assess if they are communicating the message intended. Providing feedback allows the nurse to communicate active listening. The focus of the feedback helps the nurse direct the conversation toward areas not completely understood or communicated.
 12. Allows further clarification of the messages being communicated. Allows detection of thoughts or emotions that you or the client may be reluctant to verbalize.
 13. Allows early detection of barriers that might reduce the quality of or end the communication.
 14. Reduces confusion and establishes the importance of the communication.



Figure 3-1-9 Crossed arms can communicate a defensive nonverbal message.



Figure 3-1-10 A hand covering your mouth can interfere with verbal communication.

15. When the information has been communicated by the client, nurse, or family and adequate feedback has been obtained on both sides, terminate the communication session.
 - Review information if appropriate.
 - Schedule follow-up communication if appropriate.
 - Confirm follow-up actions or third-party communications as planned. If information to be passed along is confidential, verify the client's consent.

15. Provides closure to the communication session.

> EVALUATION

- If the communication was about a client concern, have the client evaluate, on a 1–10 rating scale how well the client feels the message was heard and how satisfied the client is with the response.
- Review the discussion. Determine what worked well and whether any distractions were evident. Identify the emotions that arose during the session, and describe any nonverbal gestures that were noted.

- Evaluate the outcome of the communication. Determine whether behaviors or nonverbal communications have changed and whether learning has occurred.

> DOCUMENTATION

Progress Notes

- Document the type of communication such as client education, support, planning.
- Document the subject matter, the feedback, and the outcomes, if any.
- Note any barriers to communication such as pain, anxiety, or hearing or visual impairments.



▼ REAL WORLD ANECDOTES

David was a newly hired night-shift nurse who abused drugs. Bad days consisted of wild mood swings punctuated by angry outbursts and long silent stares. Other nurses on the lightly staffed unit were afraid of David and concerned about the care he was providing. One nurse who had worked with David in another facility went to the supervisor with her concerns. The supervisor did not keep the information confidential, and the nurse was so harassed by David for “squealing” on him that she requested a transfer.

continues

▼ REAL WORLD ANECDOTES *continued*

Things came to a head one night when David restrained an alert and conscious elderly client who was on the unit for telemetry. David would not let him up and he became more and more agitated. Another nurse intervened. The client called family members who reported the incident to the hospital administrator. David was fired on the spot, and the nurses were reprimanded for not reporting the situation.

Communication about this potentially dangerous situation was suppressed by a barrier of fear. The nurses feared that the supervisor would “tattle,” yet “do nothing,” and they feared reprisals from David. The nurses needed to communicate with each other to define the problem, identify the barriers, and plan a solution. In this case, putting their concerns in writing and going to the supervisor as a group may have been effective ways to overcome these potentially disastrous communication barriers.

> CRITICAL THINKING SKILL

Introduction

Nonverbal communication can be ambiguous. Clarify with verbal communication when possible.

Possible Scenario

Joy is on your unit recovering from a hysterectomy. She is not on patient-controlled analgesia (PCA) and has requested pain medication. You enter her room about 10 minutes after her request, and she is resting in bed with her eyes closed.

Possible Outcome

Assuming that she has fallen asleep, you pause in the doorway. After a few seconds, you conclude that she is not in pain and leave the room. A half-hour later, she calls

again. When you arrive and ask how her nap was, she bursts into tears. “I can’t sleep! I hurt so much and you forgot to bring me a pain shot! I keep trying to doze off to escape the pain, but it is no use! Where have you been?”

Prevention

The nurse needed to assess this client for pain. This requires sending and receiving clear messages, both verbal and nonverbal. The nonverbal messages of closing the eyes and holding still were misread by the nurse as indicating that the client was asleep and that she no longer desired medication for the pain. The nurse needed to assess the nonverbal messages while standing at the bedside, then send a quiet verbal message, along with nonverbal touch, announcing her presence and confirming the request for pain medication.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients are much more likely to have hearing and visual difficulties that make communication more difficult. Be sure to assess the cognitive and sensory abilities.
- Geriatric clients may not be as familiar with the “jargon” used by younger generations. This could lead to confusing messages.
- Geriatric clients with sensory deficits may have more stress and anxiety due to the difficulty of maintaining good communication and feedback about unfamiliar procedures and environments.
- If elderly clients are hard-of-hearing, remember to stand in front of them at eye level so they can see your lips. Keep your hands away from your mouth. Speak slowly and distinctly. Do not shout.



Pediatric Variations:

- Match the difficulty of the words you choose with the age of the child.
- Remember that younger children will more likely take what you say literally.
- Ask the parent to tell you special words or phrases that have meaning for the child.

▼ VARIATIONS *continued*

- *The parent can often help interpret complex nonverbal behaviors that indicate the child is afraid, tired, or in pain.*
- *Assessing the needs of the preverbal, nonverbal, or sensory-impaired child can be a challenge. Don't assume needs are not present just because they are not communicated verbally.*



Home Care Variations:

- *Remember that as a caregiver, you are a guest in the client's home. The client may need some time to evaluate you and establish trust prior to communicating important messages. Facilitate this by using nonjudgmental, open, and friendly words or gestures. Keep communication short and friendly, and select nonthreatening topics while trust is being established.*
- *Communications and education in the stressful hospital environment are often poorly received. A posthospitalization home visit is a good time to review and clarify education and information received in the hospital.*



Long-Term Care Variations:

- *Smaller staffing in long-term facilities may limit the communication a staff member can engage in with a client. Staff members need to take every opportunity to communicate while other tasks are being performed such as eating or bathing.*
- *Staff members in task-oriented positions may find it difficult to practice active listening, especially with clients who have physical or mental communication restrictions. Setting aside time for one-on-one communication is important nursing care.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Reassuring the client before completely listening to the concern.

Ask Yourself:

How do I prevent this error?

Prevention:

Recognize your desire to make the client feel better. Recognize that the real concerns may not come up in the first few sentences. Use open-ended questions to gently explore the concern.

Possible Error:

Avoiding an uncomfortable message: "Nurse, I think I am dying."

Ask Yourself:

How do I prevent this error?

Prevention:

Learn to recognize how you react internally to a threatening or uncomfortable message. Learn to recognize ways you avoid dealing with uncomfortable messages. Set a priority on communication over tasks, especially when you detect that the message is important.

Respond by stopping your task and expressing your desire to hear more. Communicate quietly and gently to the client the message you heard, and ask for feedback and confirmation. Ask open-ended questions, and ask if the client wishes to discuss the message further. If necessary, schedule a time to return to the client later. Do not forget.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The client cannot hear your words.

Ask Yourself:

How do I prevent this error?

Prevention:

Position yourself close to the client. Speak clearly but do not yell. Speak into the client's ear if helpful. Make sure your voice does not lower in volume at the end of a sentence.

> NURSING TIPS

- As a rule of thumb, when soliciting information, ask two to three open-ended questions for every statement you make.
- As a rule of thumb, when providing education, try to ask one open-ended question for every three points you make.
- At a sunny bedside, stand away from the window so the light shines on your face and not behind your back. This will reduce the glare and make it easier for the client to see you.
- When practicing active listening, restate what you have heard in your own words. Rather than saying, "I hear you," say, "This is what I am hearing . . . is this correct?"
- Understand that angry messages often hide fear and vulnerability. Find and respond to the underlying messages as well as the communicated one.
- Communication is a complex subject. To truly learn therapeutic communication, seek out additional learning resources. Practice your skills in a variety of settings, then apply what you have learned to your nursing care.
- Drawing pictures as you speak, or having the client draw or point to pictures to illustrate concepts, helps minimize daydreaming and provides another avenue of communication.
- Remember that a client can speak the same language but be from a different culture or country. Words may have different meanings.

SKILL 3-2

Guided Imagery

Tom Ewing, RN, BSN

KEY TERMS

**Cognitive
Empowerment
Guided imagery
Imagination
Mental imagery**

**Psychosis
Psychosocial
intervention
Relaxation
Visualization**



> OVERVIEW OF THE SKILL

Guided imagery or visualization is a technique that uses an individual's imagination to elicit positive images to reduce stress or promote healing. Imagery has been used effectively in a wide variety of situations: symptom management of cancer and chemotherapy, chronic pain management and stress reduction, substance abuse counseling, sleep disorders, allergies and asthma, labor and delivery, headaches, migraines, hypertension, and a myriad of other conditions.

There are many types of visualization techniques. Clients will sometimes listen to a prerecorded audiotape guiding them through the imagery process. Common to all techniques is a positive mental image that encompasses all the senses in a very comfortable atmosphere free of interruption (see Figure 3-2-2). With practice, nurses can guide clients through this

process using a variety of scripts that elicit positive images from the client. There are several resources available offering scripts and tapes for using imagery.



Figure 3-2-2 Help the client visualize a calming place or scene.

> ASSESSMENT

The procedure should first be explained to the client, then assess the client for the following:

1. Assess the client's mental status to determine if the client has signs of active psychosis or has a tenuous hold on reality. Such clients should not take part in guided imagery.
2. Assess the client's sensory or cognitive deficits to establish if any hearing, vision, or neurological deficits will influence the procedure.
3. Discuss the procedure with the client to determine willingness to participate in the imagery exercise. The intervention will be more beneficial with a willing client.

- 4. Have clients describe their current problem; identify key words in their description such as “sharp, stabbing pain,” “throbbing headache,” “agitated and jumpy.” Identifying key descriptors both before and after the session will help to determine whether there has been improvement in the client’s condition.
- 5. Identify your own feelings regarding imagery’s effectiveness. Confidence in imagery as an intervention will increase the effectiveness of the session.

- 3. Increased coping methods
- 4. Increased sense of self-control

Equipment Needed:

- Quiet, comfortable environment free of distractions
- Music or other material for client’s comfort
- Prerecorded script if not providing your own
- Blankets, pillows, and a comfortable bed or recliner

> **DIAGNOSIS**

- 9.1.1 Pain
 - 9.1.1.1 Chronic Pain, related to (client’s problem), evidenced by client’s statement of pain and grimacing, guarding
- 9.3.1 Anxiety (mild, acute, panic), related to (client’s problem), evidenced by client’s statement of anxiety, increased heart rate and blood pressure
- 6.2.1 Sleep Pattern Disturbance, related to client’s anxiety, evidenced by client’s reduced ability to get to sleep and stay asleep

> **PLANNING**

Expected Outcomes:

- 1. Reduced pain
- 2. Reduced anxiety



Estimated time to complete the skill:
10–20 minutes

> **CLIENT EDUCATION NEEDED:**

- 1. Explain the procedure and potential benefits to the client.
- 2. Arrive at a mutually agreed upon goal and positive expectation for the session: reduced anxiety, pain, and so on.
- 3. Assure clients that they are in control of the situation and may stop at any time if they wish.
- 4. Let the client know that it is not uncommon for pent-up emotions to surface. Unexplained feelings of sadness, anger, or joy are common.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Wash hands 2. Explain the procedure to the client. 3. Select a comfortable environment that will be free of distraction for approximately 20 minutes. 4. Ensure that the client is in a comfortable position and turn on either the relaxing background music or prerecorded audiotape (see Figure 3-2-3). | <ul style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. The client must have an understanding of the procedure to gain the most benefit. 3. The client must be comfortable and the session uninterrupted for maximum effectiveness. 4. This maximizes the client’s comfort. |
|--|--|

Figure 3-2-3 Place the client in a comfortable position prior to beginning the session.



5. If you are using your own script, begin the session with a few relaxing breaths, then proceed to guide the client to a pleasing, restful place. Use pauses in your script for maximum effectiveness.

Example:

“Relax with each breath.”

“Let your imagination take you to a place where you are comfortable and safe.”

Help guide clients to their special place. It may be a mountain meadow, a spot in the forest, a garden, the beach, or a special room.

“This is your safe and special place. Any time that you’re stressed, you can go to this place.”

There are many options from here, depending on what the client has selected as the special place.

“Imagine yourself walking along your mountain path. Listen to the sounds of your feet on the path ... smell the air ... the trees ... the flowers ... feel the cool breeze.”

“You are nearing a spot next to a creek ... listen to the water splash off the rocks.”

“Sit down next to the creek and relax.”

“Dip your feet into the cool water ... feel the shiver up your spine ... the refreshing coolness on your feet.”

“Relax next to the creek ... you’re cooled from your dip ... lie down and listen to the birds ... the creek.”

“Feel the warmth of the sun coming through the trees. See the white clouds against the blue sky.”

“You don’t have to go anywhere, just relax by the creek for awhile.”

Trust your intuition and watch for signs of relaxation, tension, and emotion. Watch for changes in body language, facial expressions, and signs of sadness such as tears.

5. A relaxing breath is an inhalation followed by a slow exhalation with a conscious relaxation of the whole body with each breath.

Briefly discuss the client’s special place so that you can help to guide the client and tailor the imagery to the special place.

Pause between statements to help clients concentrate on their visions.

You can vary your script as needed for the situation. Feel free to ask the client about his feelings about the experience and whether the imagery is effective for him.

Bring as many of the senses as possible into the image.

Allows the client to relax.

6. Slowly bring the client back to the present. Have him begin moving his hands, arms, and feet while taking some deep breaths. Assure him that he is safe and can go to his special place whenever needed.

6. Brings the client back to reality in a calm manner and reenergizes him.

> EVALUATION

- Have clients reevaluate their stressors while identifying key words and phrases, noting changes in descriptors from pre-session.
- Allow time for discussion of the experience. Determine what worked well. Identify physical or emotional sensations that arose during the session.
- Arrange for a follow-up session with clients if they desire.

> DOCUMENTATION

Progress Report

- Document the session according to institutional policy.

- Include date, time, and length of the session.
- Identify the client's specific complaint and key descriptors from both before and after the session.
- Note any emotional or physiological changes that the client experiences, especially statements of satisfaction with the experience.

Example:

Guided imagery session performed with client. Client states that he has had increased anxiety and problems sleeping related to his diagnosis. Reports that he has felt agitated and anxious at night and feels like his skin is crawling. Reports imagery session as enjoyable. Will try to use the technique on his own tonight at bedtime. Follow up with client in the morning to assess effectiveness of self-guided imagery.



▼ REAL WORLD ANECDOTES

Mrs. Fung was going through her second round of chemotherapy. She had suffered from extreme mucositis during her first chemotherapy round and expected the same during her second course. She was approached about trying some guided imagery this time and was open to the suggestion. The imagery technique was introduced early in her regimen before the chemotherapy's effects. Her image included imagining that the skin in her mouth was growing together, closing the sores with the aid of small helping hands reaching toward one another. She also worked with imagining the pain of her mouth sores as a lightbulb that she could control using a dimmer switch. Mrs. Fung still needed a PCA with morphine to help control her pain but required less morphine and felt more in control of her situation than during her first course of chemotherapy.

> CRITICAL THINKING SKILL

Introduction

Guided imagery can be used in many situations. Imagery can be used to promote healing, increase self-control, and decrease recovery time.

Possible Scenario

A client has been admitted to the oncology floor for an autologous stem cell transplant. There will be a prolonged period of neutropenia while she is waiting for engraftment. The client is taught guided imagery early in her regimen. Her image is one of the "baby" stem cells being infused into her empty marrow, growing and

rapidly dividing, filling up her marrow. As they are growing they are getting more and more defensive, protecting her from invaders. As her neutrophil counts increase, she imagines them as large troops of soldiers protecting her.

Possible Outcome

The client will still be covered with prophylactic antibiotics during her regimen and time of neutropenia. The imagery will give her a sense of self-control during a period of otherwise helplessness and vulnerability to infection.

Prevention

Anxiety and the fear of infection are substantial factors during the period of neutropenia following stem cell or bone marrow transplant. By giving people a sense of self-control, this anxiety can be reduced, decreasing the

amount of anti-anxiety medications normally required. This can increase client activity and ambulation, decreasing problems such as respiratory compromise and venostasis, which are caused by inactivity, and also decreasing recovery time.

▼ VARIATIONS



Geriatric Variations:

- Often senior adults will enjoy remembering back to times of their youth. This can be a time of recollection for them.
- Be sure to assess for cognitive and sensory deficits. The session may need to be altered to accommodate them.
- Stay alert for signs of sleeping or loss of interest.



Pediatric Variations:

- Children have very active imaginations and are adept at guided imagery.
- Children may be more comfortable with a parent or guardian with them.
- If appropriate, teach a parent or guardian how to guide the child through the process.
- Encourage children to use their safe spot on their own during times of stress.
- Watch for signs of distraction—children have shorter attention spans.



Home Care Variations:

- Make sure the area is free of distraction. You may want to take the phone off the hook.
- Train caregivers or loved ones how to use or assist with imagery techniques, if appropriate.
- Encourage clients to try the technique on their own.



Long-Term Care Variations:

- Arrange for a quiet area free of distraction.
- Be sure to assess cognitive and sensory abilities, you may need to speak louder or keep sessions shorter.
- Sessions may be performed with small groups on a regular basis to increase socialization and discussion.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Client did not relax or enjoy the session because the setting and scenario were not conducive to relaxation and imagery.

Ask Yourself:

How do I prevent this error?

Prevention:

You must prepare for each session. Some ways to prepare include:

- If you are not using a prerecorded tape, practice your script's general flow.
- Do not read your script. Let the script flow naturally, following your intuition.

continues

▼COMMON ERRORS—ASK YOURSELF *continued*

- Use pauses in your script for maximum effectiveness.
- Do not talk too much; let the imagination work.
- Encourage the client to suggest effective imagery. The image of an ocean beach may be empty and relaxing for one client but crowded with people and energizing for another.
- Choose a quiet time of the day and eliminate distractions as much as possible. A knock on the door can abruptly terminate the most focused imagery session.

> NURSING TIPS

- Introduce guided imagery as early as possible in the client's regimen. Research shows that the earlier it is introduced the more effective it is.
- Know your own feelings toward imagery. You must believe in its effectiveness to maximize its benefits.
- This is the client's experience; you are only the guide. Do not be disappointed if the client does not report a positive experience. It is not a sign of failure on your part. Explore other relaxation options with the client.
- Do not prejudge whether a client will be receptive to guided imagery. Offer it to anyone who may benefit from its results.
- Some clients twitch and fidget and send nonverbal cues of throat clearing and hand motions. They cannot seem to relax and concentrate. Allow this to happen, especially at the start of the session. If it continues and you feel the client is not able to follow the process, gently inquire. Stop if necessary and talk with the client about possible solutions.
- Make sure your nonverbal communication is not stressful. If you are feeling rushed or uncomfortable, your respiratory rate might be elevated, your muscles might be tense, and you may fidget and be a distraction to the client. Make it a habit to quiet and calm yourself before interacting with the client. One way to do this is to imagine that your tension is like a tightly wound spring. Take a deep breath and "unhook" each end of the spring, and allow 10 seconds of visualization as you "watch" it unwind into a flat line. Take another deep breath. Relax your shoulders. Continue to breathe slowly and deeply, and stay relaxed as you approach the client.

SKILL 3-3

Progressive Muscle Relaxation

Tom Ewing, RN, BSN

KEY TERMS

Compliance

Progressive muscle relaxation

Psychosocial interventions

Relaxation

Relaxation breath

Stress management

Tensing-relaxation



> OVERVIEW OF THE SKILL

Developed by Dr. Edmund Jacobsen in 1927, progressive relaxation is based on the theory that muscle tension is the body's response to anxiety-provoking thoughts, while deep muscle relaxation decreases physiological tension and blocks anxiety. Clients tightly tense, then completely relax muscle groups in a systematic manner. Progressive relaxation can reduce pulse and respiratory rates and has provided positive results for those with muscle spasms, lower-back pain, migraines, hypertension, irritable bowel, and mild phobias. It has also been used as an adjunct to traditional therapies for chemotherapy-induced nausea and vomiting. Progressive muscle relaxation is a procedure that is easily learned, easy to teach, and can be beneficial in a wide variety of situations.

Each muscle group is tightly tensed for 5 to 7 seconds, then relaxed for 20 to 30 seconds. Respirations

can be coordinated with these actions, inhaling while tensing, then slowly exhaling while relaxing the muscle group. The major muscle groups are covered: face, neck, and shoulders; hands, forearms, and biceps; chest, abdomen, and lower back; buttocks, thighs, calves, and feet.

When clients enter a state of deep relaxation, they may experience a release of blocked emotional issues both at a conscious and unconscious level. It is not unusual for a client to experience unexplained sadness or tears or for unexplained physiological changes to take place, e.g., rapid breathing, change in heart rate, etc. Many clients report a feeling of release with these experiences, often invoking thoughts of long-buried emotional experiences. Other common sensations are feelings of floating, drifting, or moving, and a feeling that limbs and joints are disconnected from the body.

> ASSESSMENT

1. Check the client's mental status. Clients with active psychosis or those with a tenuous hold on reality are contraindicated for this procedure.
2. Check for any sensory deficits. Hearing, vision, or other neurological deficits affect how you administer the procedure.
3. Determine that the client is willing to participate in the relaxation exercise. The procedure is more beneficial with a willing client.
4. Check the nature of the medical or emotional problem. Areas that are injured should not be actively tensed. Knowing the problem will help assess the intervention's effectiveness.

5. Have the client quantify the problem, such as using a 1 to 10 pain scale. **Quantifying results provides more validity to the intervention.**

> DIAGNOSIS

- 1.8. Energy Field Disturbance
- 9.1.1 Pain
- 9.3.1 Anxiety

> PLANNING

Expected Outcomes:

1. Reduced client anxiety
2. Reduced pain
3. Reduced nausea
4. Reduced insomnia
5. Increased sense of self-control

Equipment Needed:

- Quiet environment, without distraction or interruptions
- Music or ambient noise recordings
- Blankets
- Pillows
- Recliner (See Figure 3-3-2.)
- Bed



Figure 3-3-2 Recliner



Estimated time to complete the skill:
15–30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain procedure and the potential benefits to the client.
2. Arrive at mutually agreed upon goals for the session: reduced tension, decreased pain, anxiety, etc.
3. Practice relaxed breathing and its timing with alternating tensing and relaxation.
4. Assure the client that he is in control of the situation and that he may stop the procedure at any time.
5. Encourage the client to listen to his own body, and not to tense or overtighten an injured or sore muscle.
6. Let the client know that it is normal to get distracted, but with practice he will be able to stay better focused.
7. Assure the client that feelings of floating, warmth, spinning, or heaviness are all natural experiences of relaxation. If these sensations become uncomfortable, the client can open his eyes to reorient himself.
8. Let the client know that he should do his session 1 hour before or 2 hours after meals. Relaxation with a full stomach can lead to sleep.
9. Make sure that the client knows that you are only a guide. Any benefits received from the session are the result of his own efforts.
10. Make sure that the client knows that he can perform the procedure any time he wishes on his own, and that it is beneficial for a variety of problems.
11. Help the client to distinguish between a tense and a relaxed muscle state. Encourage him to assess the degree of tension at regular intervals during the day, and to relax his muscles in between sessions.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Arrange for an uninterrupted 15–30 minute time block. | 2. Interruptions disrupt the process. |
| 3. Lower lighting level and turn on music to desirable level. | 3. Heightens relaxation. |

4. Seat client in comfortable recliner, or in bed if necessary, using pillows to prop up arms at the sides (see Figure 3-3-3). Make sure that client is warm.



Figure 3-3-3 Use pillows to prop up the client's arms for comfort prior to beginning the session.

4. Increases client comfort.



Figure 3-3-4 Have the client take 3–6 slow, deep breaths.

5. Have client take 3–6 breaths, relaxing deeply with each breath (see Figure 3-3-4).
6. As you instruct the client, keep your voice calm and smooth. Gently correct positioning and tensing if needed, but then move smoothly on to the next segment (see Figure 3-3-5).

5. Allows client to center thoughts.

6. Allows the client to focus on the content of your voice and not be distracted.



Figure 3-3-5 Keep your voice calm and smooth when guiding the client through progressive relaxation stages.



Figure 3-3-6 Tense each hand by making a fist.

7. Begin the tensing-relaxation process in the following order, coordinating inhalation, and slow exhalation with relaxation:
- Face, jaw, mouth (squint eyes and grimace)
 - Neck (pull chin to neck)
 - Right hand (make a fist) and then relax (see Figures 3-3-6 and 3-3-7)
 - Right arm (bend elbow in tightly and then relax)
 - Left hand (make a fist and then relax)
 - Left arm (bend elbow in tightly then relax)
 - Back, shoulders, chest (shrug shoulder up tightly then relax them)

7. Coordinating the breathing increases relaxation.



Figure 3-3-7 Relax hand completely.



Figure 3-3-8 Tense and relax one leg at a time.

- Abdomen (pull abdomen in strongly then relax)
- Right upper leg (push upper leg down strongly then relax leg (see Figure 3-3-8))
- Right lower leg (point toes toward body then relax leg)
- Left upper leg (push upper leg down strongly then relax leg)
- Left lower leg (point toes toward body)

8. Have client finish with 3–6 additional relaxation breaths (see Figure 3-3-9).



Figure 3-3-9 Finish the session with 3–6 deep relaxation breaths.

9. Have client slowly move feet, hands, arms, legs, reopen eyes, and reorient himself (see Figure 3-3-10).

8. Provides a sense of closure to the procedure.



Figure 3-3-10 Allow the client time to open his eyes and reorient to the surrounding environment.

9. Slowly reenergizes the client.

> EVALUATION

- Have the client reevaluate, on a 1 to 20 scale, the problem.
- Allow time for discussion of the experience. What worked well? Were there distractions? What physical and emotional sensations arose during the session?
- Arrange for follow-up sessions with the client.
- Evaluate the client's readiness to pursue the intervention on his own.

> DOCUMENTATION

Progress Report

- Record intervention and outcomes.
- Record the specific complaint, pain, etc., with a quantitative rating, both before and after the intervention.
- Note emotional or physiological changes that the client experiences, such as reduced pain, anxiety, especially statements of satisfaction with the experience.



▼ REAL WORLD ANECDOTES

When working with Mrs. Smith, a high-dose chemotherapy client with breast cancer, she reported a very uncomfortable sadness during the first two sessions of progressive muscle relaxation. She stated that the sessions were improving her nausea, but she couldn't shake the uneasy feelings she was experiencing. After the third session she mentioned that she was experiencing flashbacks to her adolescence in the early 1970s, when her aunt died of breast cancer, and the circumstances surrounding that experience. The nurse discussed the differences between the treatments her aunt received back in the 1970s and what she was receiving, and also what a better prognosis she had because her cancer was caught much earlier than her aunt's cancer. Mrs. Smith reported that the following session was much nicer, much more relaxing. She was able to continue the relaxation sessions on her own after a few more sessions.

> CRITICAL THINKING SKILL

Introduction

In this situation a nurse introduces progressive muscle relaxation to a client who has been experiencing anticipatory nausea and vomiting before her daily chemotherapy sessions.

Possible Scenario

Mrs. Jones has been receiving daily doses of oral busulfan in preparation for peripheral stem cell transplantation. She has had a problem with gagging and retching before she begins taking the large capsules. She does not like the “loopy” feeling that she gets from Aptiva, and none of the antiemetics she has been taking have been helping. The nurse suggests that she might want to try some progressive muscle relaxation before taking her medication. Mrs. Jones is a little hesitant, but willing to try anything at this point.

Possible Outcome

Mrs. Jones' nurse contacts the psychosocial nurse practitioner who arranges a session in the hour before the medication is due. With Mrs. Jones' permission, the nurse practitioner explains the treatment, lowers the lights, turns off the ringer on the phone, and turns off her pager. She plays some low-key music on a portable CD player

she has brought. She helps Mrs. Jones lower the head of the bed and get comfortable with pillows under her arms and her head. She places a “Do Not Disturb” sign on the door. After 20 minutes of progressive relaxation, Mrs. Jones is relaxed and drowsy. She is breathing slowly, deeply, and evenly while lying quietly with her eyes closed. The nurse comes in and quietly administers the busulfan. Mrs. Jones has no difficulty swallowing the capsules and returns to her restful state almost immediately.

Prevention

Without control of her nausea, Mrs. Jones may vomit her medication, leading to inaccurate dosing. Anticipation of each treatment can cause significant nausea. Without some measure of control, Mrs. Jones' nausea could decrease her compliance with the regimen, lead to nutritional deficits, and potential electrolyte imbalances. Introducing progressive muscle relaxation early in Mrs. Jones' treatment gives her a sense of self-control. It also gives her an alternative to the sedative qualities of many of the antiemetics such as Ativan or Compazine. By avoiding the use of anti-anxiety medications, the client was able to stay more alert and oriented during her treatments. She felt more active and ambulatory. Her increased activity helped her to avoid respiratory and circulatory stasis.

▼ VARIATIONS



Geriatric Variations:

- If the client has problems with chronic joint pain or arthritis, passive muscle relaxation may be substituted for the active tension-relaxing of progressive muscle relaxation. The procedure is done in the same order as progressive muscle relaxation. The client brings his awareness to the muscle group of focus and, using a deep relaxing breath, relaxes the muscle group a little more with each exhalation.

continues

▼ VARIATIONS *continued*

- *Be sure to assess the client's cognitive and sensory abilities. You may need to speak louder, or make the session a little shorter.*



Pediatric Variations:

- *Children generally enjoy the experience.*
- *Be certain that they feel comfortable and safe.*
- *If appropriate, include the parents in the session and teach them how to guide the child through the procedure.*



Home Care Variations:

- *Make sure there will be no distractions. The client may want to take the phone off the hook, and put a note on the door requesting quiet.*
- *Encourage any caregivers in the home to take part in the session so they can help guide the clients with future sessions.*



Long-Term Care Variations:

- *Arrange for a quiet area without interruptions.*
- *The sessions can be performed with small groups of 2 to 4 people encouraging socialization and discussion.*
- *Be sure to assess cognitive and sensory abilities. You may need to speak louder, or keep sessions shorter.*
- *Revamp the progressive relaxation session to accommodate any physical disabilities.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Having the session interrupted by a pager beeping or the telephone ringing.

Ask Yourself:

How do I prevent this error?

Response:

Set your pager to vibrate prior to the session. Turn your pager off, if that is an option. Turn off the phone.

Possible Error:

The client cannot hear the instructions.

Ask Yourself:

How do I prevent this error?

Response:

Position yourself close to the client. Make sure your voice does not lower in volume as you become more relaxed!

> NURSING TIPS

- Introduce progressive muscle relaxation as early as possible when you anticipate that a client's treatment has the potential for pain, anxiety, nausea, etc.
- Do not prejudge whether a client will be receptive to treatments. Offer it to anyone who may benefit from treatments.
- This is the client's experience; you are only the guide. Do not be disappointed if the client does not enjoy or get any benefit from the session.
- Use a variety of expressions to describe the relaxation of the muscles: melting away, letting go, loosen and soften, drift away, smooth out, etc.
- Practice the procedure yourself; not only does it help you memorize the steps, but in the stressful job of nursing you can also benefit.
- Documenting progressive relaxation can be very subjective. An example of good documentation follows: Progressive muscle relaxation session performed. Client rated lower-back pain as 6 out of 10 before session and 4 out of 10 postsession. Client states that he was distracted by call lights going off in the hall, and his mind wandered to thoughts other than the task at hand. Client reports some unexplained feelings of sadness during the session. Client states he would like to try another session, and feels that he will be able to continue the practice on his own.
- Be prepared for the session. If you do not have the order of progression memorized prepare a "cheat-sheet."
- Do not talk too much!
- Ask simple yes or no questions when checking for the correct music volume, comfort level, etc.

SKILL 3-4

Therapeutic Massage

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Effleurage
Friction
Petrissage

Tapotement
Vibration



> OVERVIEW OF THE SKILL

Therapeutic massage is the application of pressure and motion by the hands with the intent of improving the recipient's well-being. It involves kneading, rubbing, and using friction. Massage therapy is now recognized as a highly beneficial modality and is prescribed by a number of physicians and qualified practitioners. Back rubs traditionally have been administered by nurses to provide comfort to hospitalized clients. Today, they are considered standard practice.

Massage techniques can be used with all age groups and are especially beneficial to those who are immobilized. A back rub or massage can promote relaxation; increase circulation of the blood and lymph nodes; and provide relief from musculoskeletal stiffness, pain, and spasms (see Table 3-4-1). As reported by Ferrell, Troy, and Glick (1993), massage significantly reduced the anxiety, heart rate, blood pressure, and perception of pain in hospitalized cancer clients.

> ASSESSMENT

1. Assess the client's current emotional and physical condition to determine if the client is anxious, tense, or in pain. **Determines what benefits the client would receive from therapeutic massage.**
2. Review the client's current diagnosis. **Determines precautions to use, particularly for clients with heart disease, diabetes, hypertension, or kidney disease. Massage should never be attempted in areas of circulatory abnormalities such as aneurysm, varicose veins, necrosis, phlebitis, or thrombus or in areas of soft tissue injury, open wounds, inflammation, joint or bone injury, der-**

matitis, recent surgery, or sciatica. Increased circulation and physical pressure could be harmful in these conditions.

3. Assess the client's current physical surroundings. **Determines the best way to provide the client with privacy and a restful environment.**

> DIAGNOSIS

- 9.3.1 Anxiety
- 1.4.1.1 Altered Tissue Perfusion
- 8.1.1 Knowledge Deficit, related to the procedure

Table 3-4-1 Massage Techniques

EFFLEURAGE:	<ul style="list-style-type: none"> • Gliding and long rhythmic strokes are used. • The whole hand is used. • Firm, even-pressured strokes are directed toward the heart to assist blood return. • Lighter pressure is used when moving away from the heart.
PETRISSAGE:	<ul style="list-style-type: none"> • Pressing, squeezing, kneading, and rolling movements by both hands (use entire hand) are used. • Deep circulation is enhanced. • C-shaped motions stimulate the muscle body. • Promotes muscle relaxation.
FRICITION:	<ul style="list-style-type: none"> • Focused, deep, circular motions are used. • Thumb pads, heel of hand, or fingertips are used. • Penetrates deeper muscle layers. • Done after effleurage and petrissage.
TAPOTEMENT:	<ul style="list-style-type: none"> • Brisk, vigorous, rhythmic, percussive movements are used. • Hands alternately tap, cup, slap, and pummel muscles. • Palms, fingertips, and knuckles are used. • Invigorates and stimulates tired muscles.
VIBRATION:	<ul style="list-style-type: none"> • Very fine, rapid, shaking movements are administered by the entire hand. • Stimulates or relaxes muscles.

> PLANNING

Expected Outcomes:

1. Client's relaxation will be increased, and muscle stiffness, pain, and spasms will be decreased.
2. Circulation to the massaged area will be increased.

Equipment Needed (see Figure 3-4-2):

- Flat sheet
- 1 or 2 pillows
- Lotion or oil
- Bath blanket or light coverlet
- Towel
- Tape or CD player



Estimated time to complete the skill:
15–25 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client how you will perform the procedure to ensure that the client is comfortable

and to reduce stress over the unknown of the procedure.

2. Explain what kind of oil or lotion you will be using so the client can approve its use and to check for allergies.
3. Educate the client on ways to prolong the effects of the procedure.
4. Encourage the client to relax and enjoy the procedure and to advise of any part that is uncomfortable.



Figure 3-4-2 Lotion or oil is used to reduce friction. Towels and light blankets are used to keep the client warm and comfortable.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Set room temperature at approximately 75°F. Provide low or indirect lighting, privacy, and background music.
2. Prepare the massage table or hospital bed by placing a clean sheet on the surface. Adjust the surface height.
3. Remove your rings and watches. Wash hands.
4. Explain the procedure to the client.
5. Help the client assume either a prone, supine, or sitting position, depending on client's condition (see Figure 3-4-3).



Figure 3-4-3 Position the client sitting or prone. Assess for comfort prior to beginning the procedure.

6. Loosen or remove clothing from the client's back and arms. Drape the client with a sheet to cover areas not being treated directly.
7. Squeeze a small amount of lotion or oil into the palm of the hand to warm before applying to the client.
8. Begin with light to medium effleurage at lower back and continue upward following muscle groups, being careful to avoid the spine and spinal processes. Move hands up toward the base of the neck and continue outward over the trapezius muscles with circular motions,

RATIONALE

1. Maintains client's body heat, protects privacy, and promotes relaxation.
2. Both the massage table and hospital bed can be adjusted so that the height of the work surface can be raised or lowered as necessary.
3. Avoids scratching the client and reduces the transmission of microorganisms.
4. Prepares the client for the treatment.
5. Appropriate position enables the nurse to apply the necessary amount of pressure to the back without causing discomfort to the client.



Figure 3-4-4 Massage gently but firmly, keeping your hands in contact with the client's skin.

6. Exposes parts of the back on which the massage will be performed. Draping untreated parts of the back helps keep the client warm.
7. Cold lotion or oil can cause discomfort to the client.
8. Prevents damage to internal structures, stimulates circulation, and promotes relaxation.

over and around shoulders and upper arms, and return with lighter downward strokes laterally over the latissimus dorsi to the upper gluteals. Use slow, rhythmic movements, keeping in contact with the skin at all times. Check pressure. Continue the effleurage for approximately 3 minutes (see Figure 3-4-4).

9. Continue treatment, if appropriate, with gentle petrissage (see explanation in text; also see Figure 3-4-5) to major muscle groups in the back, shoulders, and upper arms (see Figure 3-4-6).



Figure 3-4-5 Petrissage involves pressing, squeezing, kneading, and rolling hand movements.

10. Use friction on particular muscle groups where tension is being held.
11. Use tapotement to stimulate any muscle groups that may be fatigued (see Figure 3-4-7).



Figure 3-4-7 Use hands to tap, cup, slap, and pummel muscles to stimulate fatigued muscle groups.

12. Finish treatment with effleurage (see Figure 3-4-8).
13. Wipe any excess lotion or oil from skin with a towel, or use a small amount of warm soap and water to clean the client's skin, taking care to dry it completely.

9. Enhances circulation, stimulates muscles, and promotes relaxation.



Figure 3-4-6 As the massage continues, move outward from the neck to the upper back and shoulders.

10. Penetrates deeper muscle layers, thus promoting further relaxation.
11. Invigorates and stimulates tired muscles.



Figure 3-4-8 Finish the massage with effleurage—long, gliding, rhythmic strokes.

12. Assists with relaxation and provides a sense of completion.
13. Promotes and maintains skin integrity.

14. Assist client into a comfortable position for a period of rest or sleep.

15. Document treatment, client's response, and skin assessment data.

16. Wash hands.

14. Allows client to fully experience the therapeutic benefit of massage.

15. Communicates pertinent data to other members of treatment team; promotes continuity of care.

16. Reduces the transmission of microorganisms.

> EVALUATION

- Determine the client's subjective response to the massage.
- Ask the client if he is more comfortable and relaxed.

> DOCUMENTATION

Nurses' Notes and Client Care Checklist

- Record the date and time.
- Document the client's response to the treatment.



▼ REAL WORLD ANECDOTES

Mrs. Nguyen, a 94-year-old patient, is admitted to the hospital with two broken ankles. She is on bed rest preoperatively. Her nurse, Tom, is aware that therapeutic massage would benefit Mrs. Nguyen since her mobility level is decreased. He explains the procedure and the potential benefits to Mrs. Nguyen, who adamantly refuses therapeutic massage. Tom is sensitive to the possibility that Mrs. Nguyen is concerned about the gender difference and offers to have a female nurse perform the massage. Mrs. Nguyen happily accepts the offer. This nurse was sensitive to differences in cultural and social perceptions.

> CRITICAL THINKING SKILL

Introduction

Massage is not always appropriate.

Possible Scenario

Carl is a client recovering from abdominal surgery yesterday. He asks you to massage his left calf. He is complaining of pain and cramping in the area. When you uncover his left leg, you note that his left calf is slightly reddened and is painful when you apply pressure to the area.

Possible Outcome

You do not massage this client. You remember that massage should never be attempted in areas of circulatory

abnormalities. Areas with open wounds, redness or inflammation, necrosis, or obviously impaired circulation should not be massaged. You contact Carl's physician and report the signs and symptoms of a blood clot in Carl's leg.

Prevention

Therapeutic massage is a valuable tool to help clients relax and feel more comfortable, especially if their mobility is impaired. As in any modality, however, it is not universally appropriate. Clients who have recently had surgery are at risk of thrombus (clot) formation. The left leg is frequently the site of the clot. Massage to this site could cause the clot to break free from the vessel wall. The clot could then lodge in the lungs (pulmonary embolism), causing potentially fatal complications.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients are more likely to be confused and may misinterpret the intent of the therapeutic massage. They may become combative or react in other inappropriate ways.
- Geriatric clients are more likely to be immobilized. Therapeutic massage is especially beneficial for these clients.

▼ VARIATIONS *continued*

- *Massage over bony prominences in an elderly person with thin skin may increase the potential of developing a pressure sore. Massage the skin around these areas.*



Pediatric Variations:

- *Pediatric clients are often fearful of strange situations and strange people. Therapeutic massage is contraindicated in these clients.*
- *Pediatric clients who have been neglected or abused may respond negatively to therapeutic massage.*



Home Care Variations:

- *The home care setting is often more relaxing for the client and can increase the effectiveness of therapeutic massage. Provide for privacy.*



Long-Term Care Variations:

- *Clients in long-term care are sometimes in the position of receiving decreased contact and human touch. Therapeutic massage is one method of increasing the clients' level of awareness and involvement in the world around them.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client requests a back rub because his back itches from lying in bed. When he rolls over so the nurse can rub his back, the nurse notes a large raised red rash on the client's back.

Ask Yourself:

How do I respond to this error?

Prevention:

Before beginning the massage, ask the client about the history of this rash. Check to see if any medications have changed. Ask the client if he has other symptoms that might indicate an allergic reaction to medications, the sheets, or the lotion used for back rubs. Do not perform the back rub. Check with the client and in his chart regarding a history of rash and/or allergies. If this is a new symptom, notify the client's physician. Document the client's symptoms and any other findings.

> NURSING TIPS

- Be sure the client is comfortable with the procedure. Cultural and personal beliefs regarding touch must be respected.
- To warm the lotion prior to use, place the lotion bottle in a pan of warm water while preparing the table and the client.
- Use this opportunity to assess the client's skin integrity and condition.

SKILL 3-5

Applying Moist Heat

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Heat application
Hot soaks

Moist heat
application
Warm compresses



> OVERVIEW OF THE SKILL

Heat application is used to promote vasodilatation, increase capillary permeability, decrease blood viscosity, increase tissue metabolism, and reduce muscle tension. Moist heat can be in the form of im-

mersion of a body part in a warmed solution or water. It can also be accomplished by wrapping body parts in dressings that are saturated with warmed solution.

> ASSESSMENT

1. Assess the area to receive heat treatment for circulation. Heat increases circulation; adequate vasculature must be present to be effective.
2. Assess the skin sensation and integrity around the area to be treated. Heat treatment cannot be used over areas of blisters, burns, or redness indicative of burning.
3. Assess for open wounds that may be affected by the treatment. Moist heat provides an ideal climate for the growth of microorganisms. Moist heat should be applied to open wounds only with orders from a physician or qualified practitioner.

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion
- 9.1.1 Pain
- 1.6.2.1.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. If heat treatment is being used to decrease muscle tension or alleviate pain, then the client will experience a decrease in pain and tension.
2. If heat treatment is being used to increase circulation, then circulation will improve as demonstrated by color or assessment for blanching.
3. If heat treatment is being used to decrease edema, then the client will experience a decrease in swelling in the area being treated.

Equipment Needed (see Figure 3-5-2):

- Aqua heat pad
- Commercial heat pack
- Solution for heat treatment
- 4 × 4 Gauze and waterproof pads
- Examination gloves
- Sterile glove if open wounds
- Towel



Estimated time to complete the skill:

Depends on condition and use. Usually heat is applied for 20–30 minutes, but the nurse may not need to be in attendance the entire time.

> CLIENT EDUCATION NEEDED:

1. Teach client that overuse of heat can cause tissue damage and burn the skin.
2. Applying heat longer than the prescribed time can cause reflex vascular constriction.
3. Moist heat can cause damage faster than dry heat.
4. Do not use moist heat over scarred or exposed tissue unless treatment is specifically for those areas.
5. If electric heating systems are used, avoid high settings. Teach the caregiver to watch so that the



Figure 3-5-2 Aquathermia pad

client at home doesn't fall asleep with the unit in place. Warn the client to stay awake when a heating unit is in place.

6. Teach the client not to use the wrong heat source—placing lower legs on a space heater for warmth, for example.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Assess the client's skin for areas of redness, breakdown, or scar tissue. If open wounds are involved, carefully assess the open wounds.
2. Determine the client's condition, medical diagnosis, and any history of diabetes mellitus or impairments in sensation.
3. Check the physician's order and the reason for the warm compress. The reason for the compress should be explained to the client.
4. Wash hands.

RATIONALE

1. Provides baseline information for comparison assessments. Because scar tissue may be heat sensitive or insensitive, this area should be avoided, if possible, when the compress is applied. Any open wounds should be avoided unless the treatment is specific for these areas, such as body immersion for debridement.
2. Sensation is often impaired in peripheral vascular disease, diabetes and especially in peripheral neuropathy. People with impairments in sensation may not be able to identify when the compresses are too hot. The risk of burns is greater with moist heat than with dry heat. The client's history and medical diagnosis may alert you to other problems.
3. A physician's order is required.
4. Reduces the transmission of microorganisms.

continues

5. Warm the container of sterile saline or tap water by placing it in a bath basin filled with hot tap water. Sterile saline should be warmed to 105°–113°F. If you are using a commercial compress, follow the manufacturer's directions for heating the compress.
6. Place a waterproof pad under the body area that needs the warm compress (see Figure 3-5-3).



Figure 3-5-3 Use a waterproof pad to protect the client's bed and clothing.

7. A thin layer of petroleum jelly may be placed on the client's skin in the area to be treated. Do not put petroleum jelly on an open wound or use with oxygen therapy.
8. Pour the sterile saline into the sterile basin. Soak an appropriate-size piece of gauze or a towel, wring out the excess saline, and place it on the affected area (see Figure 3-5-4). Wear gloves if there is any drainage of the client's body fluids. Wear sterile gloves if there is an open wound.
9. Wrap the area with a waterproof pad or apply a disposable heat or aquathermia pad (see Figure 3-5-5).

Figure 3-5-5 Wrap the hot, moist towel with a waterproof pad and secure.

10. Check the client's skin periodically for signs of heat intolerance. Tell the client to report any signs of discomfort immediately.

5. Sterile saline is used to prevent any contamination of the wound. A temperature above 113°F will cause further injury.
6. Protects the client's bed and clothing.



Figure 3-5-4 Place the moist towel on the area being treated.

7. Helps protect the client's skin.
8. A sterile basin is used to prevent further contamination. Excess saline may increase the chance of burns.
9. Maintains or holds in the heat.



10. Signs of intolerance may include redness or further swelling.

11. If it is tolerated, leave the compress in place for approximately 30 minutes and then remove it.
12. Dry the affected area with sterile towels if there is an open wound and with clean towels if there is no open wound.
13. Properly dispose of all single-use equipment according to hospital protocol.
14. Clean the bath basin and thermometer. Return the sterile basin to the appropriate place for resterilization.
15. Remove gloves if they were worn and wash your hands.
16. Reassess the condition of the client's skin.
17. Record the procedure. Note the condition of the client's skin and the length of the application. Report any abnormal findings to the physician.
11. Application of moist heat for a longer period of time may damage the client's skin and may predispose the client to edema formation from circulatory congestion.
12. The client may feel chilled when the warm compress is removed. Dry the area completely to prevent chilling.
13. The basins and thermometer can be used again. Proper disposal of all other equipment reduces the transmission of microorganisms.
14. Reduces the transmission of microorganisms and gets the equipment ready for use again.
15. Reduces the transmission of microorganisms.
16. The condition of the client's skin and any signs of heat sensitivity should be assessed and documented.
17. Communicates the findings to the other members of the health care team and contributes to the legal record by documenting the care given to the client.

> EVALUATION

- Evaluate post-treatment for decreased swelling, decreased edema, decreased muscle tension, and improved circulation depending on the purpose of the treatment.
- Evaluate skin post-treatment for any heat damage such as excess redness, swelling, or blistering.

> DOCUMENTATION

Nurses' Notes

- Document the treatment and the results of treatment.
- Document the condition of the skin.
- Document the purpose and type of moist heat application.
- Record the results of the treatment and the client's tolerance.
- Document client teaching.



▼ REAL WORLD ANECDOTES

The IV in Mr. Kowalski's right forearm had infiltrated and the area was swollen and painful. Chen, the nurse on duty, offered to put warm, moist heat on the area to help reduce the swelling and ease the pain. Chen first tried running a washcloth under hot tap water, but she was unable to get the tap water hot enough for her satisfaction. In an attempt to get the wet cloth hot enough, Chen wrapped it in a waterproof pad and placed it in the microwave oven for one minute. When she opened the waterproof pad, the washcloth was hot and steamy. Carrying the cloth in the waterproof pad, she returned to Mr. Kowalski's room and placed the pad-covered cloth on Mr. Kowalski's right forearm. He initially complained that it was a little warm, but he soon adjusted to the temperature.

continues

▼ REAL WORLD ANECDOTES *continued*

By the time Chen left the room, Mr. Kowalski was resting comfortably with the hot pack on his arm. After about half an hour, Chen returned to check on Mr. Kowalski and remove the hot pack. As she removed the wet cloth, she noticed that Mr. Kowalski's arm was quite red and inflamed. To Chen's dismay, Mr. Kowalski sustained first degree burns on his right forearm that required extra treatment and increased his suffering.

> CRITICAL THINKING SKILL

Introduction

Remind outpatient or home care clients to monitor water temperature carefully.

Possible Scenario

A diabetic client being seen in the diabetic clinic reports that he soaks his feet in hot water to decrease swelling. The nurse notes this in her record. She also notes that this client has peripheral vascular disease and peripheral neuropathy.

Possible Outcome

The nurse does not connect the two related pieces of information. She recalls it as she is performing a

dressings change on this client, who could not sense the temperature of the water on his feet and suffered second-degree burns when his water heater malfunctioned.

Prevention

Burns can occur readily in clients with poor circulation and are extremely difficult to heal. The client isn't able to gauge the water temperature and should, therefore either use the back of his hand or have someone else check the water temperature. If a household thermometer is available, have the client check the temperature with the thermometer. Make sure the client is not visually impaired and can read the thermometer correctly.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients have thin skin and decreased sensation and can be burned easily.
- Teach elderly clients not to use the “high” setting on their heating pad. Use a more moderate setting, even if it takes a little longer to achieve the desired warmth.



Pediatric Variations:

- Children have increased sensitivity to heat.
- Age-appropriate activities can be provided to distract and entertain the child during the treatment.
- Go over types of feedback children will give to tell you how comfortable they are with the heat treatment. “Cold, warm, hot, red hot” or “green, yellow, red” are ways to receive feedback from children.



Home Care Variations:

- If pain continues and no relief is achieved from home heat treatment, further assessment of the cause of the pain should be performed. Make sure the client knows who to contact.
- Make sure cords and electrical outlets are in good condition when assessing home heat therapies that use electric heating pads or other electric heat sources.
- Microwavable forms of heat are commonly available for home use. Make sure the client does not overheat items in the microwave. Liquid packets can explode and cause burns.



Long-Term Care Variations:

Reusable sources of heat will wear out when used periodically over time. Check and replace as needed.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Redness, irritation, or burns occur.

Ask Yourself:

How do I prevent this error?

Prevention:

Use protective cloth or padding between heat source and client. Do not leave heat on too long.

Possible Error:

Client assessment, history, and education regarding home heat treatments are not done.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember to ask clients during assessment what heat treatments they are using at home. Ask how frequently they use heat, how they determine what temperature to make the treatment, and what effects they notice from the treatments.

> NURSING TIPS

- Do not use heat treatment more than 20–30 minutes.
- If a large area of the body is exposed to heat treatment, the client's systemic temperature may be affected. Dizziness or hypotension may occur from vasodilatation.
- Assess client's fluid status if large parts of the body are immersed in heat, and take vital signs before and after treatment.

SKILL 3-6

Warm Soaks and Sitz Baths

Pam Talley, MN, CNS

KEY TERMS

Episiotomy care
Nonpharmacological pain relief
Perineal care

Sitz bath
Vasoconstriction
Vasodilation
Wound healing



> OVERVIEW OF THE SKILL

The application of warm soaks encourages increased circulation and helps distribute the body's healing elements to a specific area. In addition to encouraging

healing, warm soaks also provide nonpharmacological pain relief and help to localize infection. Sitz baths are a method used to apply warm soaks to the perineum.

> ASSESSMENT

1. Assess the client for conditions such as circulatory problems, decreased sensation, age, or diagnosis that may require alteration to the treatment plan.
2. Assess the ability of the client to participate in treatment. For example, ascertain whether a client will be able to maintain a position for 15–20 minutes to determine whether any alterations to the procedure are necessary.
3. Assess the area of injury for drainage, edema, or redness. The injured area should not have increasing edema at the time of heat application. Determines the appropriateness of the procedure.
4. Assess the availability of appropriate equipment and clean hot water to determine whether changes to the procedure will be necessary.
5. Warm soaks are used frequently in many people's homes. Assess each client's experience of using warm soaks before teaching to determine the type and amount of client teaching needed.

> DIAGNOSIS

- 9.1.1 Pain Edema and/or Muscle Spasm
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Client will experience decrease in pain.
2. Affected area will heal.

Equipment Needed:

Sitz Bath: Portable

- Portable sitz bath (see Figure 3-6-2)
- Towels
- Peri-care equipment

> CLIENT EDUCATION NEEDED:

1. Do not begin using warm soaks until the initial injury phase is over, usually the first 12–24 hours



Estimated time to complete the skill:

30 minutes

This does not include time for assisting with perineal care.

following the injury. Some injuries may require up to 72 hours to stabilize. Warm soaks will add to post-trauma swelling in the first hours after injury, which could lead to more damage.

2. If there is no thermometer to measure the water temperature, water should be as warm as can be comfortably tolerated. Also, the client may become used to the temperature quickly, creating the feeling that the soak is not hot enough. Warn the client that this does not signal the need to increase the temperature.
3. Soak about 15–20 minutes (or as directed by health care provider). After this much time, the vessels may “rebound” and constrict, creating a situation opposite of the desired effect.
4. Following the soak, elevate the affected area.
5. A sitz bath can be a time for a new mother to have a few minutes to herself. Ensure that the baby is cared for by others during this time. Encourage the mother to rest either flat or with hips elevated for 15–20 minutes (or longer if possible) after a sitz bath. This will help prevent



Figure 3-6-2 Portable sitz bath

unnecessary swelling or pressure. Sitz baths may be taken two to four times per day. Also, women should be encouraged to use a peri-bottle with warm or cool water to cleanse the perineal area after each void or defecation for the first week after childbirth.

6. If the client is to perform warm soaks at home, encourage the client or the client’s caregiver to participate in setting up and carrying out the procedure as they are able.
7. Encourage clients to plan how this procedure will be carried out in their home.
8. Warm soaks are used frequently in many people’s homes. Assess each client’s experience of using warm soaks before teaching.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands and assemble equipment.
2. Run tap water to preferred temperature (between 100°F and 110°F). Have client test the temperature on the dorsal surface of the wrist.
3. For toilet insert model, raise the seat of the toilet. Set the basin on the rim of the toilet bowl. Fill water bag and prime tubing. Close the clamp.
Hang the water bag above the toilet. Thread the tubing through the front of the basin. Secure the tubing in the notch in the bottom of the basin.

RATIONALE

1. Reduces the transmission of microorganisms and organizes time.
2. Prevents burn injury.
3. Basin will rest on the bowl.
Water bag will create a gentle swirling of water. The higher the bag, the more forceful the flow and the faster the water will run out.

continues

4. For stand-alone model, fill basin with water (see Figure 3-6-3).

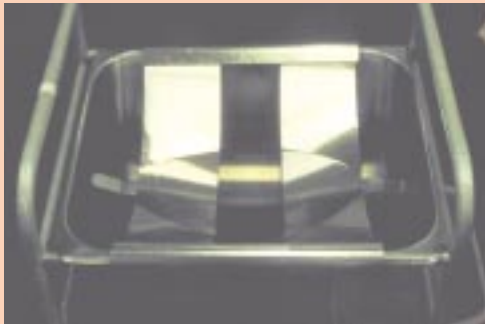


Figure 3-6-3 Fill the sitz bath basin with warm water.

5. Pad the seat with a towel (see Figure 3-6-4).
6. Always use universal precautions when assisting with perineal care treatments.
Have client remove and dispose of peri-pad using universal precautions.
7. Ensure that the floor is dry. Assist client to the bathroom if necessary.
8. Have client sit in the basin (see Figure 3-6-5). For toilet insert model, demonstrate how to unclamp the tubing to start the water flow.



Figure 3-6-5 Have the client sit in the basin.

9. Cover the client's lap for warmth and modesty (see Figure 3-6-6).
10. Ensure that the client can reach the call button. Instruct the client to call before standing up.
11. After 20 minutes (or sooner if client is finished), help the client dry the area by gently patting with clean towels.

4. Allows client to sit in the water.



Figure 3-6-4 Pad the seat of the sitz bath with a towel for comfort.

5. Provides client comfort.
6. Prevents infection.
7. Prevents injury from falling.
8. Water flow is soothing and helps cleanse the area.



Figure 3-6-6 Cover the client's lap with a towel or blanket for warmth and modesty.

9. Provides client comfort and privacy.
10. Water may splash over the floor, creating a slipping hazard.
11. Warm soaks should last no longer than 20 minutes to prevent rebound vasoconstriction.

12. Assist client to bed. Encourage client to lie flat or elevate hips for 20 minutes.
13. For toilet insert model, empty remaining water into toilet. Rinse basin and bag and allow to air dry. Then clean according to institutional policy. For stand-alone model, empty water from drain tap into basin (see Figure 3-6-7). Clean according to institutional policy.

12. Prevents congestion and decreases swelling.
13. Prepares equipment for the next use.



Figure 3-6-7 Open the drainage tap to allow waste water to empty into a basin for disposal.

> EVALUATION

1. Client experienced decrease in pain.
2. Affected area is healing as indicated by improved appearance of the injured area.
3. Client does not report a negative reaction to the procedure.

> DOCUMENTATION

Follow the guidelines for documentation in your institution.

Nurses' Notes

- Record the date and time of each warm soak.
- Document any variation from expected, individual needs and preferences.
- Document improvement or decline in the client's condition.



▼ REAL WORLD ANECDOTES

Patty had her first baby 24 hours ago and had an episiotomy. She had been taking codeine pills for perineal pain but complained that she did not like the way they made her feel. Her nurse suggested that she try a sitz bath to see if she could reduce the amount of codeine she needed to relieve her pain. After using the sitz bath, Patty was able to reduce her use of codeine.

> CRITICAL THINKING SKILL

Introduction

Client teaching is an important part of the treatment.

Possible Scenario

Mr. Simpson presented to his nurse practitioner with a boil on his right buttock. The nurse practitioner lanced the boil. She prescribed twice daily sitz baths for Mr. Simpson to keep the area clean and to help the healing process.

Possible Outcome

Mr. Simpson did not know what a sitz bath was and was too embarrassed to ask the nurse practitioner. As a result, he did not treat the area and the boil recurred, requiring more treatment and more discomfort for Mr. Simpson. The second time she lanced the boil, the nurse practitioner asked Mr. Simpson about his at-home care of the site. Once she realized that Mr. Simpson did not understand her previous instructions, she carefully explained how to set up and use a sitz bath.

Prevention

Do not assume the client is familiar with the process of a sitz bath. Because this treatment is generally used to treat the perineal area, clients may be embarrassed to ask questions regarding the procedure. The nurse may

be embarrassed regarding this procedure as well, skimping on the instructions and relaying her discomfort to the client. Assess the client's level of comfort with the procedure and determine whether the client understands how to perform a sitz bath.

▼ VARIATIONS



Geriatric Variations:

- *As skin ages it becomes more vulnerable to heat and maceration. If sitz baths are to be administered, consider decreasing the length of the procedure and be cautious about the temperature of the soak.*



Pediatric Variations:

- *Not all children will be able to cooperate with the length of time needed for a sitz bath.*
- *Children are susceptible to burns from water that is too hot. It is imperative to warn parents that a child's skin is much more sensitive to heat and burns than an adult's.*



Home Care Variations:

- *Do not assume that all homes have adequate water and heat. If your client will be performing sitz baths at home, these must be evaluated.*



Long-Term Care Variations:

- *Need for a sitz bath must be reevaluated periodically.*
- *Check progress of healing on a regular basis.*

▼ COMMON ERRORS—ASK YOURSELF

Common Error:

The nurse fills the sitz bath with water that is too hot.

Ask Yourself:

How do I prevent this error?

Prevention:

Use a bath thermometer or test the water temperature with your forearm. It is better to have the water temperature a little too cool than too warm.

> NURSING TIPS

- Ensure that your client is comfortable and able to cooperate with the treatment.
- If it is appropriate to leave your clients during treatment, check on them periodically and ensure they have the call bell in reach.
- If a portable sitz bath is not available, disinfect the tub and wrap a towel in a horseshoe shape. The cli-

ent sits on the round side of the horseshoe-shaped towel with the knees bent to keep the perineum off the tub floor. Do not use inflatable donuts for the sitz bath because these may prevent the warm water from giving the most benefit and cause undue pressure on the perineal area, preventing increased circulation. Fill the tub to about the top of the hip. This allows a regional vasodilation instead of a generalized increase in blood flow.

- A sitz bath can be a time for a new mother to have a few minutes to herself. Ensure that the baby is cared for by others during this time.
- Encourage the mother to rest either flat or with hips elevated for 15 to 20 minutes (or longer if possible) after a sitz bath. This will help prevent unnecessary swelling or pressure.
- Sitz baths may be taken two to four times per day.
- If the client is to perform warm soaks at home, encourage the client or the client's caregiver to participate in setting up and carrying out the procedure.
- Encourage clients to plan how this procedure will be carried out in their home.

SKILL 3-7

Applying Dry Heat

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Aqua pads

Aquathermia pads

Dry heat

Gel packs

Heating pads

Hot water bottles

or bags

K-pads



> OVERVIEW OF THE SKILL

Dry heat can be used to enhance circulation, promote healing, reduce swelling and inflammation, reduce pain, reduce muscle spasms, and increase systemic temperature. Different types of equipment are used to apply dry heat to body surfaces, specific areas, and the entire body. These can be divided into the following categories:

1. *Body surfaces.* Equipment used to apply heat to any body surface includes disposable instant hot packs, gel-filled hot packs, aquathermia pads, electric heating pads, and hot water bags or bottles. Aquathermia pads are water-flow rubber heating pads with tubing and a reservoir control unit, sometimes called aqua pads, k-pads, t-pump, or hydrocalculator. Hot water bags or bottles should be used only

by clients at home because bags and bottles cannot be cleaned properly to meet universal standards.

2. *Specific areas.* Equipment used to apply heat to specific areas includes heat lamps or infrared lamps (generally for the abdomen, perineum, or the chest), heat cradles (generally for the lower extremities), and diathermy (generally for deep heat treatment, which utilizes electrical energy that is changed to heat).
3. *Entire body.* Equipment used to heat the entire body to treat cases such as hypothermia includes thermal blankets and infant radiant warmers, which are discussed in Skill 3-8. The principles and precautions are similar in most types of heat application.

> ASSESSMENT

1. Assess the skin integrity in the area where heat is to be applied. If the client has preexisting skin breakdown, redness, or scar tissue, carefully evaluate before applying heat. Assess the level of pain or swelling in the area where heat is to be applied. **Heat treatment cannot be used over areas of blisters, burns, or redness indicative of burning.**
2. Assess the client's tolerance of heat. If there is scar tissue or any decreased sensitivity in the area of

treatment, the client will not be able to feel the sensation of burning. Assess the client's ability to perceive and report pain and sensation of burning. If sedated, confused, or agitated, the client should not be left alone with heat treatment in place. **Ensures client safety.**

3. Assess the client's vascular status. Dry heat should be used only with a physician's or qualified practitioner's orders and then cautiously in clients with diabetes or vascular disease. **Because heat increases**

circulation, adequate vasculature must be present to be effective and not cause further tissue and vessel damage.

4. Assess the client's preexisting illness. Heat should not be used over areas of malignancy.
5. Assess the skin for the presence of any lotion or ointments. Heat can be retained with the presence of these products and lead to increased risk of heat intolerance and burning.

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion
- 9.1.1 Pain
- 1.2.2.4 Ineffective Thermoregulation
- 1.6.1 Risk for Injury

> PLANNING

Expected Outcomes:

1. The patient will derive the benefits of the heat treatment such as increased circulation and heal-

ing; decreased swelling, inflammation, pain, or muscle spasms; or thermoregulation.

2. The patient will not experience any injury to skin integrity.

Equipment Needed:

- Equipment determined by type of heat treatment: disposable gel-filled packs (see Figure 3-7-2), aquathermia pad, heating pad, hot water bottle (generally used only in home setting if at all), heat lamp or heat cradle, hot blankets (see Figure 3-7-3), or hot air patient warming system (see Figures 3-7-4 and 3-7-5)
- Protective cover to be used between heat source and patient
- Electrical source for pads
- Timer or clock



Estimated time to complete the skill:

20 minutes for heating, 5–10 minutes for preparation



Figure 3-7-2 Disposable hot pack



Figure 3-7-3 Blanket warmer



Figure 3-7-4 Forced-air warming blanket



Figure 3-7-5 Forced-air warming blanket control unit

> CLIENT EDUCATION NEEDED:

1. Client understands the need to report any increase in pain or sensation of burning.
2. Client understands the purpose and desired outcome of the treatment.
3. Client understands that if heat source is over area of decreased sensitivity that this must be monitored closely.
4. Client understands that the temperature of the heating device should not be changed without the knowledge of the nurse or qualified practitioner.
5. Client understands that heat treatment must be discontinued if symptoms of heat intolerance are present.
6. Client understands that heat treatment should not be used beyond the recommended time, which is usually no longer than 20–30 minutes.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Check the physician's or qualified practitioner's order and the purpose of the heat treatment. 2. Determine if there are any underlying problems that may affect the use of heat treatment such as decreased sensation; decreased mentation; or a history of diabetes mellitus, bleeding disorders, peripheral vascular disease, or peripheral neuropathy.
Heat should not be used over areas of scarring. 3. Wash hands. 4. Check the skin for lotions or ointments and remove if present. 5. Explain the reasons for heat treatment, the expected outcomes, any potential complications, and the necessity to alert the nurse of heat intolerance. 6. Gather equipment and complete as follows:
For a disposable heat pack: <ul style="list-style-type: none"> • Activate the pack according to the manufacturer's directions. Some packs must be heated in boiling water, others can be heated by microwave, and some require bending and chemical activation. • Wrap the pack in a towel or protective covering (some manufacturers include cover). Do not use pins. Use tape if needed to secure the towel. | <ol style="list-style-type: none"> 1. An order is required. Because there are many purposes of heat treatment, it is helpful to know what outcomes are expected and the site/sites to be treated. 2. If the client has decreased sensation or mental status, heat treatment should be used only if the client can be observed closely.
Heat should not be applied over areas where the client cannot alert the nurse of sensation of burning. 3. Reduces the transmission of microorganisms. 4. Lotions and ointments retain heat and can lead to an increased risk of burning. 5. The client who understands the purpose of treatments will more likely comply, report any adverse responses (for example sensations of burning), and, therefore, avoid any complications. 6. <ul style="list-style-type: none"> • Manufacturer's directions should be followed because activation differs. If a microwave is used to heat a pack that should be heated in boiling water, the bag might break. • A barrier between the client's skin and the heat source is necessary to avoid burns. |
|---|---|

continues

- Discard after use.

For a heating pad:

- Note: Heating pads are generally not used in hospital facilities.
- Place a formed cover, usually a flannel, over the pad. Towels should not be used. Pins should never be used. If it is necessary to secure the cover, use tape.
- Instruct the client not to lie on the heating pad.
- Turn on the switch to low and place the heating pad on the affected area. The nurse may increase heat after the client adjusts to the heat. Instruct the client not to adjust the heat level.
Generally the highest setting is not used and is blocked from use by taping the control in place.
- Set a timer and remove the pad after 20 minutes.
- Clean appropriately after use.

For an aquathermia pad:

- Follow manufacturer's directions.
- Fill the control unit with distilled water or as indicated by manufacturer's directions.
- Check the control unit and tubing for leaks. Turn on the unit and check the temperature of the water with a thermometer after several minutes.

The proper temperature of the water is 105°F. Some units require that the control unit is level with the pad to function because overcoming gravity can put undue strain on the motor.

- Chemically activated packs will not reactivate once activated. In medical facilities, gel packs cannot be reheated in common areas without causing the transmission of microorganisms. In the home setting, packs that are activated by boiling or the use of the microwave can be used on the same clients again.

- Generally a heating pad is not used in medical facilities unless it belongs to an individual client because the pad cannot be cleaned appropriately to prevent the spread of microorganisms.
- A protective cover is necessary between the client's skin and the pad to prevent burning. If the pad is not fitted, it may slip out of place and cause direct exposure of the skin to the heating pad and cause burning. Pins may puncture the electric wires and shock the client.
- The heat will be excessive if the client lies directly on the heating pad.
- Burning can occur with high levels of heat. The client's skin may be sensitive to higher levels of heat.
- If a client falls asleep with the heating pad in place, heat over 20–30 minutes can cause burning and rebound vascular changes.
- Reduces the transmission of microorganisms.
- There are various brands of aquathermia pads and each one may have slight differences in operating instructions.
- Distilled water prevents the accumulation of mineral deposits that will damage equipment.
- This will ensure that the control unit is properly functioning. If there is a leak in the tubing, another pad should be obtained because this presents an electrical danger to the client and the staff.

For a heat lamp with a 60-watt or infrared bulb:

- Position client so that the area to be treated is exposed and drape the client to protect privacy. If the buttock or perineum is to be treated, it may be necessary to tape the buttock to hold apart and keep the area to be treated exposed (see Figure 3-7-6).

Figure 3-7-6 Tape the skin up if needed to expose the area being treated.

- Because the client will be positioned to expose the area to be treated, which many times includes the perineum, further draping is necessary to ensure privacy.



- Place the lamp 18–24 inches from the client and ensure that the lamp does not touch the client (see Figure 3-7-7). Instruct the client not to touch the lamp or move to avoid contact with the lamp (see Figure 3-7-8).



Figure 3-7-7 Place the heat lamp 18–24 inches from the client.

- The lamp should be not closer than 18 inches to protect the client from burning. Check the area shortly after the treatment is started because clients' sensitivity to heat will vary.



Figure 3-7-8 Instruct the client to remain still to ensure that the lamp does not touch the skin.

- Check the area after 5 minutes of heat. Remove the lamp after 20 minutes and check the area for burning, redness, rash, or any adverse reaction. Reposition the client in a comfortable position.
- Clean equipment.

For a heat cradle:

- Use a 25-watt bulb. Place the cradle over the affected area, positioned 18–24 inches from the client. Cover the cradle and client with a bath blanket.
- Check the client in 5 minutes and remove the cradle after 10–15 minutes.
Assess the skin for burning, redness, or any adverse reaction. Reposition the client for comfort. Clean the equipment.

- Do not use beyond 20 minutes or the client may have adverse reactions. Reposition the client because many times clients are placed in unnatural positions to expose the area to be treated.
- Reduces the transmission of microorganisms.
- A 25-watt bulb ensures that the temperature inside the cradle does not exceed 125°F and burn the client or alter systemic temperature.
- If the client is checked frequently, adverse reactions can be prevented.

For a hot water bottle:

- Hot water bottles are usually used only in home care settings.
- Fill the bottle with tap water, tighten the cap, turn the bottle upside down, then open the cap and empty.
- Fill the bottle or bag with hot water (40.5°–46°C or 105°–115°F). Fill bag only two-thirds full, expel any air from top, and secure cap. Wipe off excess moisture.
- Cover with protective cover or towel. Never use pins. Tape may be used.
- Keep the bottle in place for 20–30 minutes.

For diathermy:

Diathermy is usually used in a physical therapy department for deep treatment.

Prepare the clients by informing them that it is not dangerously invasive. Remove metal objects such as pins, rings, or watches. If clients have metal objects in the body such as a prosthesis or pacemakers, diathermy should not be used. Clients are generally transported to a physical therapy department for the treatment.

- Hot water bottles and bags cannot be cleaned appropriately between client use to follow universal standards.
- The bottle is first filled with tepid water to ensure that there are no leaks.
- The water temperature should be hot but not boiling so the client is not burned. The bag is not totally filled so that it will mold to the surface area to be treated.
- A protective cover helps prevent burns. Pins can puncture the bottle or bag.
- Longer than 30 minutes can lead to burns.

Diathermy works by electrical activation and deep heat; metal that is bombarded with diathermy waves becomes intensely hot and can burn the client.

7. Wash hands.

7. Reduces the transmission of microorganisms.

> EVALUATION

- Evaluate the client's response to the heat treatment such as was the level of pain or muscle spasms lessened, did the inflammation or swelling decrease, did the circulation increase, and so on. Also evaluate the client 15–20 minutes after heat treatment—redness is a natural response to heat and this redness should lessen after the heat is removed.
- Evaluate whether the client's systemic temperature changed.

> DOCUMENTATION

Nurses' Notes

- Document the time and date of the treatment.
- Document the procedure and the equipment used.
- Record the client's response to the procedure as determined in the evaluation.
- Document the length of time the heat treatment was in place.



▼ REAL WORLD ANECDOTES

Mrs. Piukkula is an 82-year-old client in a long-term-care facility. Her practitioner has ordered heat lamp treatments for the decubitus ulcer on her coccyx. The nurse placed Mrs. Piukkula on her right side, removed the dressing from the decubitus ulcer, and placed the heat lamp about 18 inches from Mrs. Piukkula's skin. Just as the nurse finished setting the treatment up, he was called away to care for another client. The nurse dealt with several issues and forgot about the heat lamp shining on Mrs. Piukkula's coccyx. About an hour later the nurses' aid assigned to Mrs. Piukkula asked the nurse about the heat lamp. He went to Mrs. Piukkula's room and turned off the heat lamp. As he was assessing Mrs. Piukkula's coccyx for possible damage from the prolonged heat treatment, he bumped against the hot light bulb with his arm. Mrs. Piukkula was unharmed despite the prolonged treatment, but the nurse suffered a second degree burn on his arm.

> CRITICAL THINKING SKILL

Introduction

Application of heat should always follow a plan from a nurse or qualified practitioner.

Possible Scenario

Mrs. Sullivan, a 72-year-old woman with a history of total hip prosthesis 3 years ago, turns on her call light. She informs the nurse that she brought her own heating pad and has had it on her hip set on high for 40 minutes. She has used an anesthetic cream, but she reports an increase of pain.

The nurse assesses the client's skin and asks her about pain before the heating pad was placed, if she has fallen recently, or if she has any underlying condition that may be causing the pain. Mrs. Sullivan may have been lying directly on the heating pad.

Possible Outcome

The client may have burned her skin or developed heat intolerance due to the cream on the skin in combination with the heat. It is also possible some underlying problems may be associated with the pain such as difficulty with prosthesis or fractures.

Prevention

Inform the client that a heating pad requires an order from a physician or qualified practitioner and that she should have informed you that she had brought her own heating pad. Explain that it is important for the nurse and physician or qualified practitioner to know that she has pain and that she is using heat. Alert her that heating pads should have protective covers and not be turned on high. Let the client know that you will inform the physician or qualified practitioner of the pain and the use of the heating pad.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients have thin skin and sometimes decreased sensitivity and usually develop heat intolerance more rapidly than younger clients.*



Pediatric Variations:

- *Gel packs should be used with children because heating pads can pose more dangers of electrical hazards and misuse.*



Home Care Variations:

- *Some clients may prefer to use hot water bottles at home because they have used these in the past. These should be washed carefully with soap and water and dried out when stored.*



Long-Term Care Variations:

- *If heat is required on a long-term basis, the client should be evaluated for other underlying problems or seek adjunct therapy.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Heat is applied beyond 20–30 minutes.

Ask Yourself:

How do I prevent this error?

Prevention:

Set a timer or find another way to remind yourself to remove the heat treatment after 20–30 minutes. It is easy to get busy and forget, so develop a method of reminding yourself when time is up.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Gel packs are placed in the microwave and rupture.

Ask Yourself:

How do I prevent this error?

Prevention:

If the microwave is the only way to heat a gel pack, set the oven for 10- or 15-second periods and check the gel pack in between. If the oven has a defrost cycle, use it as a lower heat setting. Microwave ovens vary in intensity. Do not assume that a setting that works in one microwave oven works in all microwave ovens.

> NURSING TIPS

- Check the client frequently to avoid adverse reactions; especially check in the first 5 minutes.
- Set time to avoid heat treatment beyond 30 minutes, especially if using electrical system.
- Tell the client to alert the nurse if there is increased pain or burning with the treatment.

SKILL 3-8

Using a Thermal Blanket and an Infant Radiant Heat Warmer

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Cooling blanket
Hyperthermia
Hypothermia

Hypothermia blanket
Treatment for
hyperthermia



> OVERVIEW OF THE SKILL

A thermal blanket is a fluid-filled blanket that can be used to heat or cool a client who is hypothermic or hyperthermic. For hyperthermia, the physician or qualified practitioner will order a cooling blanket. If a client is hypothermic, a warming blanket can be used to gradually raise the client's core temperature to a normal range. Some thermal blankets have a rectal probe, which monitors the client's core temperature and regulates the blanket temperature according to set parameters. Some types of warmers use warm air instead of warm water to increase the client's core temperature. The Bair Hugger, a plastic convective warming blanket that inflates and uses circulating warm air to warm the client (see Figures 3-8-2 and 3-8-3).

Infants have specialized body-warming needs, and there are several types of appliances available to help infants maintain a healthy body temperature. Isolette incubators keep infants warm by providing a heated pad for the infant to lie on. Overhead radiant warmers heat the infant with

overhead lights (see Figure 3-8-4). These and other products can be used to help maintain optimal body temperature when the infant cannot self-regulate temperature.



Figure 3-8-2 Circulating, warm air inflates the blanket and convection moves heat to the client.



Figure 3-8-3 The warm inflated blanket is placed on a client.



Figure 3-8-4 Overhead radiant warmer

> ASSESSMENT

1. Assess the client's temperature. Establishes a baseline measurement.
2. Assess the client's skin condition and integrity. If skin integrity is disrupted, protection must be applied to that area. Applications of extreme cold to already compromised vascular areas can cause injury. Heat or cold can injure areas of decreased sensitivity.
3. Assess client's knowledge regarding treatment. Determines client teaching needed.
4. Assess the client's mental status. Temperature extremes can cause confusion and agitation, and the client may not be able to cooperate with the treatment regime.

> DIAGNOSIS

- 1.2.2.1 Risk for Altered Body Temperature
- 1.2.2.2 Hypothermia
- 1.2.2.3 Hyperthermia
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client's core temperature will be maintained within the desired range.
2. The client will not incur any skin or tissue damage as a result of the hypothermia/hyperthermia treatment.
3. The client will be as comfortable as possible during the treatment.
4. The client's core temperature will not change rapidly enough to cause chilling or diaphoresis.

Equipment Needed:

- Warming/cooling blanket with machine and temperature probe (see Figures 3-8-5 and 3-8-6)
- Thermometer, if not provided with blanket, to do comparison checks
- Blanket or sheet to protect skin from direct contact with warming/cooling blanket if not provided with commercial setup
- Lubricating solution for rectal temperature probe
- If an infant warmer is to be used, radiant warmer with accompanying skin or rectal probe and bedding for warmer (see Figure 3-8-7)



Estimated time to complete the skill:
15 minutes for setup; time to reach optimal temperature will depend on the client's situation

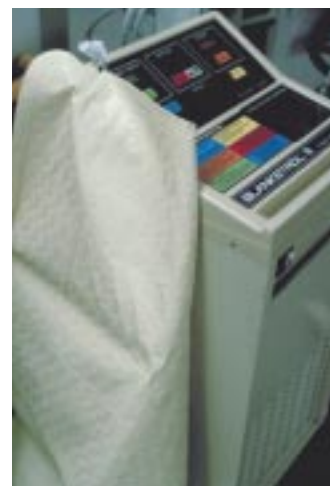


Figure 3-8-5 Blanketrol® circulating water hyper-hypothermia blanket



Figure 3-8-6 Bair Hugger® forced-air warming blanket control unit



Figure 3-8-7 Isolette

> CLIENT EDUCATION NEEDED:

1. Instruct clients to alert the nurse if they feel chilled or overheated.
2. Teach the purpose of the blanket.
3. Instruct clients to alert the nurse if the temperature probe comes out.
4. If an infant warmer is used, instruct the parents of the goal of the warmer and the need for the infant to remain in the isolette.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Assemble equipment and read manufacturer's directions. Check that equipment is functioning and that plug is grounded. 3. Check orders to ascertain desired systemic temperature to be attained. 4. Check the client's vital signs, especially temperature. 5. Explain the procedure to the client. 6. If necessary, add solution to the machine. Follow manufacturer's directions. <p>Hypothermia Blanket</p> <ol style="list-style-type: none"> 7. Place the blanket over or under the client, according to the manufacturer's instructions. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Prepares and ensures client's safety. 3. Achieves desired outcome and protects legally. 4. Provides baseline data for future comparisons. 5. Explanations help decrease anxiety. 6. Cooling blanket equipment varies and some require the addition of solutions. Allows for proper function of equipment. 7. Sheet protects client from tissue injury. If clients have wounds, heel breakdown, |
|--|--|

continues

Hypothermia Blanket *continued*

Place a sheet between the blanket and the client, and connect the machine. Protect any areas of disrupted skin integrity. Cover the client for privacy.

8. Insert the temperature probe rectally and tape it in place.
9. Set the machine on the desired temperature and turn on (see Figure 3-8-8). The temperature control should be set to gradually change the client's temperature. Some blankets will automatically make the adjustment.
8. Necessary for control of equipment to avoid overcooling or overheating. Securing the thermometer in place will help avert the danger of overheating or overcooling if the thermometer falls out of place.
9. Provides for appropriate effect from cooling blanket. The temperature should not be changed too rapidly so as to avoid chilling, increased metabolism, or excessive fluid loss by perspiration.

Figure 3-8-8 Set the machine on the desired temperature and start.



10. Check the client's temperature every 15 minutes (see Figure 3-8-9) and vital signs every 30 minutes (see Figure 3-8-10). Observe for any chilling or overheating effect.
10. If the client is cooled too quickly, chilling, increased metabolism, and adverse reaction may occur.



Figure 3-8-9 Check the client's temperature every 15 minutes.



Figure 3-8-10 Check the client's vital signs every 30 minutes.

11. Perform comparison check with another thermometer periodically (see Figure 3-8-11).
11. Avoids problems associated with equipment failure.



Figure 3-8-11 Comparison check the client's temperature using a different thermometer periodically to verify temperature readings.



Figure 3-8-12 Assess the client's skin condition every hour.

12. When the client's temperature is within close range of the desired temperature, turn off the machine and assess the client. Leave the blanket in place until the client is stabilized.
 13. While the blanket is on, turn the client every hour and assess the skin condition (see Figure 3-8-12). Remove the blanket after the client is stabilized.
- Infant Radiant Warmer**
14. Check the manufacturer's operating instructions. Check equipment, including caster locks, window seals, and heating system.
 15. Prepare the parents and inform them of the purpose of the warmer.
 16. Position the equipment in the room and plug electrical cord in a three-wire grounded receptacle. Turn on the equipment. Usually a red indicator light will glow.
 17. Turn on alarm switch and test alarm system. Turn on automatic temperature settings.
 18. Prewarm the isolette to the prescribed temperature.
 19. Put on nonsterile gloves.
12. The blanket will not immediately return to room temperature and will continue to cool or heat the client even after it is turned off. Turning it off shortly before the goal temperature is achieved will prevent altering the client's core temperature beyond the desired outcome. Avoids the need to reposition blanket until the client is stabilized.
 13. For cooling treatments, extended periods of cooling can cause areas of decreased perfusion, skin burns, and tissue injury. For heat treatments, extended periods of heat can cause skin irritation and burns.
 14. There are many different manufacturers of infant warmers and heaters. Each warmer may vary, so it is important to check instructions for operation and safety. It is important that the warmer function properly before placing the infant in the warmer.
 15. Decreases anxiety. Ensures that infant will be safe in enclosed environment.
 16. Ensures client and staff safety and ensures equipment is properly functioning.
 17. An alarm is necessary for the protection of the infant to avoid overheating.
 18. If the unit is prewarmed, the infant will not be at risk for a decrease in body temperature in an unheated isolette.
 19. Reduces the transmission of microorganisms.

continues

Infant Radiant Warmer *continued*

- | | |
|---|--|
| <p>20. Place infant in warmer. Remove clothing, except diaper. Attach a skin temperature probe or insert rectal probe. Insert a rectal or skin temperature probe and activate an audible alarm.</p> <p>21. For skin probe: Clean the skin surface and allow skin to dry. Place probe with surface next to skin, in right upper quadrant immediately below the right intercostal margin.</p> <p>22. For rectal probe: Use lubricant and insert according to manufacturer's recommendations.</p> <p>23. Check the infant's temperature with another thermometer. Inspect probe at regular intervals.</p> <p>24. If skin irritation appears, reposition the probe and allow 3–5 minutes for temperature probe to adjust to infant temperature.</p> <p>25. When the infant's optimal temperature is reached, the infant may be kept in the warmer until the core temperature is stabilized.</p> <p>26. After the infant is removed from the warmer, the equipment should be cleaned following universal standards, and preventive maintenance of the warmer should be performed, with inspection of all parts.</p> <p>27. Wash hands.</p> | <p>20. Alarm protects infant from overheating and adverse reactions.</p> <p>21. Oils on the skin may adversely affect adherence of the probe. Irritation can occur easily on the delicate skin of an infant, so careful assessment of the skin is necessary. Allergic or skin reactions can occur.</p> <p>22. Lubricant adds comfort for insertion of probe.</p> <p>23. Double-checking with another thermometer ensures that the equipment is functioning properly.</p> <p>24. Three to five minutes is the time necessary for the probe to sense the infant's temperature.</p> <p>25. The infant should be gradually heated. If heated too rapidly, the metabolism will be increased and body fluids lost.</p> <p>26. Reduces the transmission of microorganisms and provides for proper equipment function for future use.</p> <p>27. Reduces the transmission of microorganisms.</p> |
|---|--|

> EVALUATION

- The client's core temperature is stable within the desired range.
- The client did not incur any skin or tissue damage as a result of the hypothermia/hyperthermia treatment.
- The client was as comfortable as possible during the treatment.
- The client's core temperature did not change rapidly enough to cause chilling or diaphoresis.
- Document the client's temperature every 15 minutes, vital signs every 30 minutes, and the settings on the hypothermia/hyperthermia machine.
- Document any adverse outcomes such as chilling or tissue injury, and document any follow-up actions, such as notification of the physician or qualified practitioner, administration of medication to prevent shivering, and so on.

> DOCUMENTATION**Nurses' Notes**

- Document the procedure and results of the procedure.

Vital Signs Flow Sheet

- Note the client's core temperature according to the rectal probe, the core temperature according to the independent thermometer, and the client's other vital signs.



▼ REAL WORLD ANECDOTES

Carlos was brought to the emergency room by his wife. Carlos presented with complaints of chills. He was intermittently confused and belligerent. When the emergency room nurse took Carlos' oral temperature, she noted that it was 104.1°F. She took his temperature again using the aural thermometer. This reading was 104.2°F. The nurse reported her findings to the physician and Carlos was admitted to the hospital. The physician ordered a hypothermia blanket to keep Carlos' core temperature below 100°F. When the hypothermia blanket was started, however, Carlos became quite agitated and insisted that he was lying in a puddle of ice water. Despite the staff and family efforts to calm and reorient him, Carlos remained agitated and combative. Carlos' physician ordered sedation and Carlos was finally able to rest easily and allow the blanket to work.

> CRITICAL THINKING SKILL

Introduction

Consider what to do if the client's temperature does not change.

Possible Scenario

Samuel is working in the trauma unit. His 42-year-old client has a fever of 103.3°F. A hypothermia blanket has been ordered. Samuel sets up the blanket. Fifteen minutes later, the client's temperature is 103.7°F.

Possible Outcome

Samuel increases the cooling rate of the blanket and sets the goal temperature lower than normal body temperature to increase the rate of cooling in the

blanket. When he returns 15 minutes later, his client's core temperature is 104.0°F.

Prevention

When setting up a cooling/warming blanket, be sure it is working properly before placing it underneath the client. Know how much fluid is supposed to be in the machine and be sure that all of the hoses are patent. Check the connections for tightness and make sure that the mattress itself is intact and without holes or cracks. If the equipment does not seem to be working properly, have it replaced before using it on a client. If the blanket is working properly and the client's temperature is not decreasing, notify a physician or qualified practitioner.

▼ VARIATIONS



Geriatric Variations:

- Temperature changes that are too rapid may cause chilling in elderly clients.
- Elderly clients have thin skin and subsequently can receive tissue injury more rapidly.
- Elderly clients may be less sensitive to heat and cold and may not be as aware of temperature changes or extremes.



Pediatric Variations:

- Children may be fussy when temperature is elevated and may resist a blanket.
- Children may move frequently, decreasing the amount of skin exposed to the cooling surface.
- If a rectal temperature probe is used, this may be embarrassing or uncomfortable.
- Infant radiant warmers or isolettes are especially useful for premature infants who are unable to regulate their systemic temperature. Isolettes, which confine infants and require viewing through plastic, can be very frightening for a parent. Nurses should provide ways for parents to touch, feed, or hold their baby (once somewhat stabilized) to assist with maternal/paternal attachment.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- *Cooling blankets generally are not used in home care because of cost. Cool baths are more suited to the home setting. The client should be evaluated for long periods of increased temperature and the underlying cause treated.*



Long-Term Care Variations:

- *Make sure the equipment is kept in good condition and worn-out parts are repaired or replaced.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The temperature probe falls out and the probe reports that the client's core temperature is within parameters but the client still feels hot.

Ask Yourself:

How do I prevent this error?

Prevention:

Check the position of the probe frequently. Check the client's temperature with a thermometer that is not attached to the thermal blanket to verify the probe readings.

Possible Error:

The sheet comes off of the cooling blanket, and the client suffers areas of skin burn from lying directly on chilled plastic.

Ask Yourself:

How do I prevent this error?

Prevention:

Check the cover sheet often for placement. With restless clients it may be necessary to tape the cover sheet to the blanket. Do not use pins on or near the thermal blanket. Pins can puncture or tear the blanket, rendering it useless.

> NURSING TIPS

- Assess the client every 15 minutes after the cooling blanket is put in place.
- Be sure to check the functioning of the temperature probe by cross-checking with other systems.
- Protect clients from tissue injury.
- Protect any open wound areas and areas of decreased perfusion.
- Clean the rectal probe every 4 hours.

SKILL 3-9

Applying Cold Treatment

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Cold application
Cold compresses

Cold therapy
Vasoconstriction



> OVERVIEW OF THE SKILL

Cold therapy is used to decrease blood flow to an area by promoting vasoconstriction and increased blood viscosity. These changes facilitate clotting and control bleeding. Cold decreases tissue metabolism, reduces oxygen consumption, and decreases inflammation and edema formation. Cold therapy has a local anesthetic effect by raising the threshold of pain receptors. It causes a decrease in muscle tension. Cold is used to reduce fever.

Sources of cold include ice packs, ice bags, cold collars, or commercial cold packs. If the client's systemic temperature is elevated, cooling blankets or cooling tepid sponge baths can be used. Moist cold compresses or immersion of a body part can be used for large areas of acute inflammation or swelling. Cooling the extremity decreases blood flow and may also decrease pain and suppress inflammation.

> ASSESSMENT

1. Ascertain the client's sensation of hot and cold changes at the site where cold therapy is to be administered. **Certain areas of the skin have sensitivity to temperature variations, while other areas may not be as sensitive; the perineal areas are very sensitive.**
2. Assess if decreased circulation is present at the site where cold therapy will be applied such as areas with wounds and damaged tissue present because cold application may cause further tissue damage.
3. Check the client's systemic temperature. **If larger areas are exposed to cold, the total body temperature may be decreased. If the client is cooled too**

rapidly with extreme cold, a reverse chilling effect may occur, increasing body metabolism and defeating the cooling effect.

4. Assess age. **Tolerance to cold varies with individuals and is related to age, thinner layers of skin, or general sensitivity to cold.**

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion, related to inflammation or edema
- 1.2.2.1 Risk for Altered Body Temperature
- 1.6.1 Risk for Injury
- 1.6.2.1.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will experience decreased bleeding.
2. The client will have decreased inflammation and/or edema.
3. The client will experience decreased pain or discomfort.

Equipment Needed:

(Select equipment depending on the treatment chosen and supplies available.)

- Pan for cold soak
- Ice or ice bag
- Gauze or towel
- Water bottles or reusable containers if used for one client only
- Compresses (if moist cold) consisting of gauze dressing, iced or chilled solution, and a container of the appropriate size for the body part
- Commercially prepared ice pack (see Figure 3-9-2)

- Disposable ice pack
- Tape, elastic wrap, or bandage (see Figure 3-9-3)

> CLIENT EDUCATION NEEDED:

1. Report any pain or lack of sensation (if cold is being used as local anesthetic then decreased sensation is expected).
2. Report chilling from overexposure since this would increase general metabolism. This can especially happen if the client has a large area of the body exposed to cold; therefore, it may be necessary to add increased covers to the rest of the body.
3. Teach the client the basics of cold application, why it is used, and how long the treatment will remain in place (20–30 minutes). Modify the therapy for home use, and teach the client how to apply the treatment at home, if applicable.
4. Teach clients the reason for cold therapy vs. hot therapy.



Estimated time to complete the skill:
**20 minutes for application plus
preparation time of 5–10 minutes**



Figure 3-9-2 Ice pack



Figure 3-9-3 Elastic wrap

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Assess the client's sensation and skin color at the site of planned application. Determine if any tissue damage is present. Assess for bleeding or wound drainage (see Figure 3-9-4).

RATIONALE

1. Reduces the transmission of microorganisms.
2. Provides baseline data for post-treatment comparison.



Figure 3-9-4 Assess the skin at the site of planned application for color, sensation, wounds, or skin irritation.



Figure 3-9-5 Assess for circulatory impairment or neuropathy before beginning treatment.

3. Determine the diagnosis. Identify whether the client has a history of circulatory impairment or neuropathy (see Figure 3-9-5).
 4. Check the physician's or qualified practitioner's order and the reason for the application of cold.
 5. If using an ice bag with moist gauze or towels, fill the bag three-fourths full with ice and remove the remaining air from the bag. Close the bag. Check for leaks. Wrap the bag in a towel or protective cover and place it on the affected area. If cold soaks are being applied, use the appropriate-size basin for the body part to be soaked.
 6. If an ice collar is used, fill the collar three-fourths full with ice and remove the remaining air from the collar before closing the collar. Check for leaks. Place the collar in a protective cover and around the client's neck.
 7. If a disposable cold pack is used, activate the pack according to the manufacturer's directions, wrap the pack in a towel (see Figure 3-9-6), and place it on the affected area (see Figure 3-9-7). Some packs come with covers. Secure pack in place with tape, elastic wrap, or bandage (see Figures 3-9-8, 3-9-9, and 3-9-10). Dispose of the pack after the treatment.
3. Cold causes vasoconstriction and decreased metabolism and can cause tissue damage in people with impaired circulation and sensation.
 4. A physician's or qualified practitioner's order is needed in most situations of cold treatment, and the client should be informed of the reason for the application of cold.
 5. If air is removed from the bag, the bag will be easier to mold to the client's body. The bag is wrapped to prevent injury to the client's skin or exposed tissue because direct cold can cause damage.
 6. Easier to mold to the client's body. The collar is wrapped to prevent injury to the client's skin.
 7. When the pack is squeezed or kneaded, an alcohol-based solution is released, creating the cold temperature. The pack cannot be used again.

Figure 3-9-6 Wrap the cold pack in a towel.

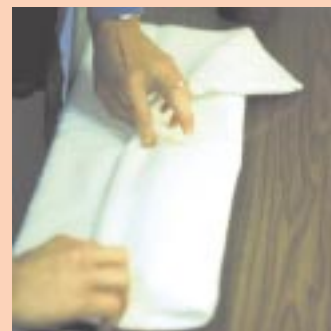




Figure 3-9-7 Place the cold pack on the affected area.



Figure 3-9-8 Use tape to secure the cold pack to the affected area.



Figure 3-9-9 This cold pack is properly wrapped in a towel and secured with tape.



Figure 3-9-10 Elastic wrap may be used to hold bulky cold packs in place.

8. Assess the client's skin periodically for signs of cold intolerance or tissue damage.
 9. If the client can tolerate the cold, leave the cold application in place for approximately 20–30 minutes at approximately 15°C (59°F).
 10. Reassess the condition of the client's skin or exposed tissue.
 11. Wash hands.
8. Signs of intolerance to cold are pallor, blanching, mottling, or numbness of the skin.
 9. Longer application can cause tissue damage, especially because the client's pain sensation is decreased in the presence of cold. A reflex vasodilatation occurs after 20–30 minutes, thereby negating the therapeutic effect of the cold treatment.
 10. The client's skin should be assessed, and any signs of cold changes and intolerance should be documented.
 11. Reduces the transmission of microorganisms.

> EVALUATION

- Evaluate decreased bleeding, inflammation, and/or edema.
- Evaluate pain level.
- Evaluate tissue integrity, especially for blanching, redness, or cold burns.

> DOCUMENTATION

Nurses' Notes

- Record the procedure and the client's response to the treatment such as whether bleeding was stopped, inflammation decreased, edema decreased.
- Record the client's skin condition after the procedure.
- Record the length of time of application.



▼ REAL WORLD ANECDOTES

Brittany just gave birth to her first child. She had an epidural and is in the recovery area waiting to return to her room. The recovery nurse placed a latex glove filled with ice over the site of Brittany's episiotomy. Brittany is recovering well and the nurse is called away to help with a second new mother. Brittany's nurse is gone longer than she had anticipated. Brittany cannot feel the ice pack or the numbness that is developing in her perineal area because of the epidural anesthesia. By the time Brittany's nurse returns, Brittany has started to experience tissue damage from the prolonged exposure to the cold. She can't feel it now, but when the epidural wears off, Brittany will experience more than the expected amount of perineal pain and a longer healing time.

> CRITICAL THINKING SKILLS

Introduction

When applying cold treatment, it is important to check your client and assess treated sites to prevent tissue damage.

Possible Scenario

You are working in the emergency room. A teenage girl arrives with a broken wrist from a fall at a roller rink. She is nauseous and shaking. She complains of pain, burning, and numbness from her elbow to her fingers, with particular numbness in her wrist area. You grab a splint, an ice pack, and an Ace bandage to hold it in place. The E.R. becomes really busy, and you leave her in an exam room with her companion.

Possible Outcome

Trying to rest and remain calm, and afraid to tamper with the Ace bandage and splint, she ignores the moderate discomfort she feels. The injury and subsequent swelling has caused burning and decreased sensations. She cannot feel the ice pack burning her skin. When she arrived at the E.R., the client had one problem. Now she has two—a fracture and tissue damage from the ice pack.

Prevention

If the client has swelling, it still is appropriate to apply cold treatment to reduce the swelling. You must, however, assess the injured site 10 minutes after cold application to check for sensation and tingling.

▼ VARIATIONS



Geriatric Variations:

- Older clients generally have reduced circulation, reduced sensation, and thin skin and are candidates for increased tissue damage from cold therapy.
- Older clients usually become cold more easily than the younger population and, therefore, may require covers on other parts of their body or may not be able to tolerate treatment as long.
- Older clients may have peripheral nerve damage and decreased sensation.
- Commercial ice packs may be appropriate for the elderly because ice is not directly on the skin.



Pediatric Variations:

- Children may dislike cold application and refuse to keep compresses in place. Holding an ice pack in place with a colorful scarf or cloth may help the child keep it in place. Allow the child to help place the pack. Placing crushed ice in a glove and drawing a face on the glove may increase acceptance of the treatment.
- Adolescents can take responsibility for their own cold therapy. Educate them to observe for signs of overexposure to cold and to limit their exposure. In this case, more is not necessarily better.
- Try to find a way to make cold therapy fun. A young child needing cold therapy on the fingers, for example, could play with "submarines" in a basin of ice water with "icebergs."

continues

▼ VARIATIONS *continued*



Home Care Variations:

- Clients may not watch time carefully and extend cold treatment beyond 20 minutes.
- In the home setting, clients may use their own equipment; however, these should be cleaned with soap and water and should not be used directly on open wounds.
- If the client will be breaking up ice cubes to use in home-based cold therapy, make sure they have a plan to do so safely. Instruct the home caregiver to keep fingers away from ice and not to use knives or other sharp instruments to break ice.
- One effective way to break ice cubes is to place them in a plastic bag, then in an old pillowcase or other heavy cloth bag. Take the bag outdoors to a smooth cement surface and crush the ice with the side of a hammer, a heavy metal pot, or a rolling pin. Do not hold the bag while crushing the ice.
- Think of creative sources of cold for appropriate applications. Frozen peas, frozen orange juice cans, or frozen french fries can be used in an emergency. Always wrap the cold source in a protective cloth before placing it next to the skin.
- Soak several hand towels or bath towels in a basin of water, wring them out, and place them in the freezer. After they are frozen, they make a flexible, comfortable source of cold. Always wrap the cold source in a protective cloth before placing it next to the skin.



Long-Term Care Variations:

- Make sure cold therapies used with multiple clients in the long-term setting are cleaned properly between clients to reduce the transmission of microorganisms.
- Allow clients to institute and monitor their own cold treatments when possible to improve a sense of control over pain, comfort, and healing.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Cold application is left in place beyond 20 minutes and reflex vasodilatation occurs.

Ask Yourself:

How do I prevent this error?

Prevention:

Check the pack after 5 minutes. Teach the client to remove the ice pack when the allotted time is up.

Possible Error:

Cold application remains on beyond 20 minutes and tissue damage occurs.

Ask Yourself:

How do I prevent this error?

Prevention:

Watch for signs and symptoms of burning or numbness, mottling of the skin, extreme paleness, redness, or bluish discoloration.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The client may fall asleep and forget about cold application, and tissue damage occurs.

Ask Yourself:

How do I prevent this error?

Prevention:

Choose a size or type of cold application that will warm up within the allotted period of time. Make sure another person is available to check the cold therapy, and remove it when necessary.

> NURSING TIPS

- Avoid cold therapy to extremities in clients with peripheral neuropathy.
- Take special precautions when cold application is used in elderly clients.
- Take precautions to avoid chilling effects in clients.
- If a large area of the body receives cold application, watch the time carefully and assess body temperature.

SKILL 3-10

Assisting with a Transcutaneous Electrical Nerve Stimulation (TENS) Unit

Debra A. Bovinett Wolf, RN, BSN, MPH

KEY TERMS

Acute pain

Chronic pain

Electrode gel
(conductive gel)

Electrodes

Intensity

Stimulator



> OVERVIEW OF THE SKILL

The overall purpose of the transcutaneous electrical nerve stimulation (TENS) is to manage acute and chronic pain. Pain is the body's warning system that protects from injury or damage. Without this mechanism our bodies would be injured or harmed without us knowing. There are two categories of pain. Acute pain is limited in duration and related to specific causes such as muscle sprains and strains, traumas, and postoperative pain. Chronic pain is longer in duration and very persistent. It can last a few months to many years. At this point the pain center in the brain has ceased to serve as a warning sign to the body and has become the problem itself. Chronic pain can be caused by such disorders as low back pain, arthritis, migraine headaches, or phantom limb pain. Sometimes the cause of the pain cannot be determined. The TENS unit, attached to electrodes placed on the skin's surface over the painful area, applies doses of low-voltage electricity to the electrodes to help relieve some types of acute and chronic pain by electrical stimulation on the large cutaneous axons.

There are two theories, gate control theory and pattern theory, that explain how electrical stimulation relieves pain. Gate control theory suggests that pain and nonpain impulses are sent to the brain from the local nervous system. These impulses travel through the skin's superficial cutaneous nerves to the

deeper afferent nerves. Next, the impulses travel to the spinal cord and then to the brain stem. When these impulses reach a certain level, "gates" open, allowing the impulses to travel to higher brain centers. These "gates" control which impulses continue on to the brain. Because the same nerve cannot carry a pain impulse and a nonpain impulse simultaneously, the stronger, nonpain impulse (TENS unit in this case) controls the gate. TENS provides continuous mild electrical stimulation, blocking the pain signals traveling along the nerves to the brain cells. It is thought that if the pain signals do not reach the brain, by using electrical stimulation as a distraction, the pain will be decreased or not felt. TENS works by sending these small electrical impulses through the skin's cutaneous layer to the body's deeper afferent nervous system.

In pattern theory, the effectiveness of TENS is thought to work by stimulating the body's own natural pain control mechanism. The theory suggests that the intensity of the impulses creates a pattern that the brain senses as pain. The body then creates natural pain relievers, enkephalins and endorphins. The TENS unit, which provides a short burst of mild electrical activity, is thought to stimulate the body's natural pain relievers, which interact with receptors, thus decreasing pain sensation.

Assisting with the application of TENS involves the correct placement of electrodes on peripheral nerves, exhausting the area of pain. Identification of trigger and acupressure points is essential for determining correct placement of the electrodes.

Moreover, an understanding of the TENS apparatus and its mechanical functions is essential. TENS is not a cure for pain and should be used in conjunction with other therapies such as massage and relaxation.

> ASSESSMENT

1. Consider the appropriateness of applying TENS to the client. For example, clients with cardiac pacemakers or cardiac defibrillators are contraindicated. TENS is considered electrical equipment and therefore has potential for electrical current leakage. This may interfere with the proper functioning of a pacemaker or a defibrillator.
2. Assess the client's knowledge regarding the TENS device. Positive preparation and understanding before a procedure promotes psychological safety by reducing fear and anxiety of the unknown. Safety feelings arise from familiar and predictable situations.
3. Assess the client's skin condition. Do not place electrodes on areas with skin irritation or breakdown. Application in these areas may affect the safety of clients, predisposing them to further skin problems or skin burns.

> DIAGNOSIS

- 9.1.1 Pain.
- 6.1.1.1 Impaired Physical Mobility, related to discomfort
- 5.1.1.1 Ineffective Individual Coping, related to pain control and functioning with pain
- 8.1.1 Knowledge Deficit, related to the theory and operation of the TENS unit

> PLANNING

Expected Outcomes:

1. Decreased pain sensation
2. Increased comfort level
3. Increased client mobility
4. Increased client coping skills for pain
5. Increased activities of daily living

Equipment Needed (see Figure 3-10-2):

- Cutaneous stimulator (TENS)
- Appropriate electrodes (leads)

- Electrode gel for lead placement
- 9-volt battery with charger
- Cordset (2)
- Soap and water or recommended cleanser to clean the skin if needed



Estimated time to complete the skill:
30–40 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the reason for the TENS device prescribed by the physician or qualified practitioner.
2. Explain the procedure step-by-step and allow the client to view the equipment being used.
3. Instruct the client on skin care for long-term application.
4. Instruct the client to call a health care professional if skin irritation is noted at the electrode site.
5. Explain necessary positioning to access certain areas.
6. Do not use TENS while operating potentially dangerous equipment such as automobiles, power mowers, and power tools.
7. Do not use while bathing. Clients may shower with TENS electrodes on but should not stand with the spray directly on them for long periods of time. This will cause the electrodes to come off.
8. Do not carry batteries in a pocket or purse or where battery terminals could be short-circuited.
9. Inform the client that TENS devices should be kept out of the reach of children.
10. Do not use for other than condition of pain.



Figure 3-10-2 TENS unit, electrodes, cordsets, battery, and charger

11. Use only appropriate battery rechargers.
12. Do not submerge the battery charger in water or other liquids.
13. The use of heat or cold applications affects the electrode or client circulation.
14. Instruct the client to turn the TENS device off before connecting the electrodes.
15. Instruct the client on usage frequency per physician's or qualified practitioner's orders, usually 30–40 minutes 3–4 times every day.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Obtain order from a physician or qualified practitioner.
2. Identify client through nurse/client verbalization and chart documentation.
3. Verify that the internal controls are correct. The physician, or qualified practitioner, or nurse presets internal controls prior to the procedure. The internal controls (pulse duration, rate, and mode) are located under the sliding cover of the stimulator and work together with the intensity setting to provide the correct stimulation sensation necessary for maximum pain control.
 - Pulse duration dial controls the width of each electrical pulse.
 - Rate indicates the number of electrical pulses that will be sent through the skin each second.
 - Modes indicate the different modes of stimulation. This will vary depending on type of unit (see Figure 3-10-3).



Figure 3-10-3 The internal controls for pulse duration, rate, and mode are located under the sliding cover of the stimulator.

4. Introduce yourself and the procedure you will be doing.
5. Wash hands.

1. TENS units require an order from a physician or qualified practitioner.
2. Provides positive identification of client.
3. Ensures proper electrical stimulation to client.



Figure 3-10-4 Using soap and water, gently cleanse the skin where the electrodes will be applied.

4. Builds trust and decreases anxiety and fear.
5. Reduces the transmission of microorganisms.

- 6.** Explain actions of application throughout the procedure.

Provide a clear description of the procedure confronting the client and verbally illustrate what can be expected to occur. Let the client view the equipment to be used.

- 7.** Cleanse skin area gently where electrodes will be applied. Use mild soap and water (see Figure 3-10-4).

- 8.** Rinse and dry skin in the area thoroughly.

- 9.** Apply conductive skin preparation product (electrode gel) between the skin and electrodes.

- 10.** Connect the cordset to the electrodes before applying the electrodes to the skin.

- 11.** Follow manufacturer's directions for electrode placement.

Place electrode on skin over or near the area of pain.

Identify trigger points—those specific areas that are more sensitive when stimulated. Identify acupressure points (see Figure 3-10-5).

Place electrode on peripheral nerves around the area of pain. Allow the client to assist with placement and adjustments to produce the sensation that is most pleasant and best relieves pain.

- 12.** Apply electrodes to the prepared skin area.

- 13.** Hold the insulated connector portion of the cordset and insert into the corresponding jack, marked by channel numbers.

- 14.** Set the stimulator controls to the appropriate configurations. There are usually two dials located at the top of the stimulator. They are used to increase or decrease the strength of stimulation (see Figure 3-10-6).

- 15.** Place the protective cap over the intensity controls.

- 6.** Verbal communication provides comfort and psychological safety to the client, reducing fear and anxiety of the unknown.

- 7.** Prevents bacterial growth, prevents infection, and promotes cleanliness and comfort.

- 8.** Ensures adequate preparation of skin to allow proper adhesion of electrodes.

- 9.** Decreases potential for skin irritation such as redness, small pimplelike lesions, or blisters.

- 10.** Reduces the possibility of dislodging the electrodes.

- 11.** Ensures correct application and safety of client.



Figure 3-10-5 Assess trigger and acupressure points prior to electrode placement. Let the client guide placement for the most effective pain relief.

- 12.** Prepares affected area for stimulation.

- 13.** Ensures proper connection for device to function properly.

- 14.** Provides electrical stimulation to relieve client's pain.

- 15.** Prevents accidental bumping of the dials and ensures safety of client.



Figure 3-10-6 Set the stimulator controls to the appropriate strength of stimulation.

- 16.** Turn the machine on and instruct the client to adjust the level of intensity.

Ensure that the green on/off indicator light is on. The green light indicates that the TENS unit is working. As intensity increases, the intensity of the light increases. The light flashes each time the unit stimulates the client.

Ensure that the yellow battery status light is not on. A flashing yellow light indicates that the battery voltage is low and battery replacement is needed.

- 17.** Wash hands.

- 18.** Record the application of TENS in the progress notes.

- 16.** Ensures that the TENS unit is on and the proper intensity level is set for each individual.
Ensures that the battery is functioning.

- 17.** Reduces the transmission of microorganisms.

- 18.** Provides documentation of event.

> EVALUATION

- Ask client to discuss basic functioning and operations of TENS unit.
- Client communicates decreased pain levels.
- Client demonstrates knowledge of TENS device.
- Effectiveness of unit is noted if client verbalizes decreased pain.
- Client demonstrates increased comfort.
- Reassess client after 15 minutes to evaluate response to therapeutic benefit, onset of side effects, or skin irritation.

> DOCUMENTATION

Progress Notes and/or Nurses' Notes

- Indicate the type of TENS unit. Give the manufacturer's information for tracking purposes.
- Record the TENS unit settings, rate, intensity, and frequency.
- Document the length of time the TENS unit was used by the client.
- Document any complications the client experienced during procedure, such as skin irritation, weakness, redness, and skin burns. Document if no complications occurred.
- Document the client's understanding of the TENS procedure.



▼ REAL WORLD ANECDOTES

Mr. Dyer was sent home with a TENS unit. He was instructed on how to turn the stimulator on and off, viewing the channel light indicator. The unit was working perfectly until one day Mr. Dyer saw a yellow light flashing and the unit stopped working. He called the physician's office in a panic and asked to speak with the nurse. He told the nurse that he was no longer getting pain relief because his

▼ REAL WORLD ANECDOTES *continued*

stimulator wasn't working and he didn't know why. He explained to the nurse that he had done nothing different than before. The nurse troubleshooted the problem and determined that the TENS unit had a dead battery. She then realized that she probably forgot to communicate to Mr. Dyer that a flashing yellow light means the battery is getting low and should be replaced.

If the nurse had instructed Mr. Dyer about the yellow battery status light or reviewed the troubleshooting literature in the manufacturer's booklet before discharge, Mr. Dyer would not have called the office in such a panic. In addition, Mr. Dyer would not have had to suffer during the resolution of this problem if he had been better instructed on how to operate the TENS device.

The nurse was reminded that clear, proper instruction to clients using TENS is necessary to ensure proper functioning. Moreover, providing educational information will increase a client's knowledge regarding the functions of the TENS unit. It will also decrease anxiety and frustration if the unit should malfunction as a result of battery failure.

> CRITICAL THINKING SKILL

Introduction

Clarify orders with the physician or qualified practitioner for the maximum benefit to the client

Possible Scenario

A physician ordered the application of a TENS unit for thoracic spine pain. Before applying the TENS, the nurse reviews the client's chart and notices that the primary diagnosis is low back (lumbar) pain, with a secondary diagnosis of mild thoracic pain. The physician may have written the order thinking it was the client's midspine that hurt most, instead of the lumbar region.

The nurse notifies the physician and questions the order for verification. The physician acknowledges the written error and informs the nurse that the correct area is the lumbar spine, which is where he wants the TENS to be applied.

Possible Outcome

If the nurse had not questioned and verified the order for the correct placement of TENS, the pads could have been placed on an improper area. The client may not have known that the TENS should have been placed farther down the spine, thus not communicating this to the nurse during application. The severity of this error would not be life threatening, but improper placement of TENS would not have been beneficial for the client's low back pain. In addition, the client may have experienced unpleasant sensations in the area less affected by pain.

Prevention

The nurse prevented improper placement by checking the order through review of the chart and notifying the physician through verbal verification before applying the TENS unit. The nurse should also confirm the area of pain with the client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have difficulty hearing and understanding information about the TENS unit instructions.*
- *Elderly clients may have trouble seeing the dial settings on the TENS unit.*
- *Elderly clients may be more sensitive to higher intensity settings.*
- *Elderly clients are more prone to falls and caution should be taken to ensure lead placement remains secure.*
- *Elderly clients may have unsteady hand movements or arthritic conditions making it difficult for them to adjust the dials on the stimulator.*

continues

▼ VARIATIONS *continued*



Pediatric Variations:

- *Different age groups will have different levels of educational needs.*
- *An adult must supervise children at all times.*
- *Children may be more sensitive to sensory stimulation. Caution should be taken when setting intensity parameters.*
- *Child activities should be limited during usage of TENS therapy. Falling or rough play may dislodge lead placement or accidentally change parameter settings.*



Home Care Variations:

- *Home usage requires continuous monitoring by a physician or qualified practitioner.*
- *All previous instructions for usage and functioning on TENS apply.*



Long-Term Care Variations:

- *There is a potential for skin irritation. The client's skin may not be accustomed to long-term exposure to electrode gels and adhesives used with TENS units. Skin must be assessed and cared for to avoid problems.*
- *Long-term usage requires cleaning and maintenance instructions on TENS components.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Stimulator does not seem to be working.

Ask Yourself:

How do I respond to this error?

Prevention:

If stimulator does not seem to be working properly and replacing the battery does not help, try troubleshooting the unit. First, check the dial setting to make sure unit is on.

Possible Error:

Battery is installed improperly.

Ask Yourself:

How do I prevent this error?

Prevention:

To avoid this error, be sure to observe proper polarity markings when installing or replacing the battery.

Possible Error:

Improper placement of electrodes.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure electrodes are making contact with skin and stimulator.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Worn-out electrodes.

Ask Yourself:

How do I respond to this error?

Prevention:

Replace both electrodes, following the instructions on the package.

Possible Error:

Malfunctioning cordset.

Ask Yourself:

How do I respond to this error?

Prevention:

Check and replace as necessary.

> NURSING TIPS

- Do not stimulate over the carotid sinus or its associated nerves, especially when sinus reflex sensitivity exists. Laryngeal or pharyngeal spasm may occur when electrodes are placed across the throat or in the mouth.
- Use caution in applying electrical stimulation to people suspected of having heart disease. There is scant clinical data on possible adverse results.
- Due to the risk of burns, areas of skin with reduced response to normal sensory stimuli should not be electrically simulated.
- To prevent skin burns, be sure metal electrode inserts and pins are fully inserted into electrodes and not lying directly on the client's skin.
- Be aware that some people find the electrical sensation extremely unpleasant and use should probably be discontinued.
- If the TENS unit is turned on, it may interfere with other electric monitoring such as cardiograph alarm systems, electrocautery equipment, or EKG machines.
- Defibrillation of a person wearing a TENS stimulator can damage the stimulator whether it is turned on or off. Also the client may be at risk of burns under the electrode site during defibrillation. To eliminate risk, remove the TENS electrode before defibrillation signals are applied. Consider having the client wear a Medic Alert bracelet to identify the potential problem.
- TENS devices should not be used for undiagnosed pain syndromes for which etiology has not been determined.
- The safety of TENS units has not been clinically established during pregnancy or delivery.

Basic Care

- Skill 4-1** Changing Linens in an Unoccupied Bed
- Skill 4-2** Changing Linens in an Occupied Bed
- Skill 4-3** Turning and Positioning a Client
- Skill 4-4** Moving a Client in Bed
- Skill 4-5** Assisting with a Bedpan or Urinal
- Skill 4-6** Assisting with Feeding
- Skill 4-7** Bathing a Client in Bed
- Skill 4-8** Oral Care
- Skill 4-9** Perineal and Genital Care
- Skill 4-10** Eye Care
- Skill 4-11** Hair and Scalp Care
- Skill 4-12** Hand and Foot Care
- Skill 4-13** Shaving a Client
- Skill 4-14** Giving a Back Rub
- Skill 4-15** Changing the IV Gown
- Skill 4-16** Assisting from Bed to Stretcher
- Skill 4-17** Assisting from Bed to Wheelchair, Commode, or Chair
- Skill 4-18** Assisting from Bed to Walking
- Skill 4-19** Using a Hydraulic Lift
- Skill 4-20** Administering Preoperative Care
- Skill 4-21** Preparing a Surgical Site
- Skill 4-22** Assessing Immediate Postoperative Care
- Skill 4-23** Postoperative Exercise Instruction
- Skill 4-24** Administering Passive Range of Motion (ROM) Exercises
- Skill 4-25** Postmortem Care

SKILL 4-1

Changing Linens in an Unoccupied Bed

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Draw sheet
Fan-fold
Fitted sheet
Mattress pad

Miter
Top sheet
Unoccupied bed



> OVERVIEW OF THE SKILL

After a bath, clean linens are placed on the bed to promote comfort. If the client is able to get out of the bed, assist the client to a chair and proceed with mak-

ing the bed. After surgery, the client should be returned to a clean bed with the linens folded to the foot of the bed to promote easy client transfer.

> ASSESSMENT

1. Assess your equipment. Check for all the linens necessary to change the bed. Check for a dirty linen hamper. **Facilitates a smooth procedure.**
2. Assess whether the bed itself needs cleaning prior to placing clean sheets on it. **Reduces the transmission of microorganisms.**
3. Assess the client's needs in the bed. Check for profuse drainage, incontinence, or special needs for comfort or skin integrity. **Determines how the procedure will be performed.**

> DIAGNOSIS

1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will have clean linens on the bed.
2. The clean linens will be appropriate to the client's needs and condition.

Equipment Needed (see Figure 4-1-2):

- Bottom sheet (fitted, if available)
- Top sheet



Figure 4-1-2 Clean linens and a laundry hamper for used linens are brought to the bedside to make the unoccupied bed. Gloves help reduce the transmission of microorganisms.

- Draw sheet (regular top sheet may be used)
- Pillowcase (each pillow on the bed)
- Mattress pad
- Antiseptic solution, washcloth, and towel
- Linen bag hamper outside the room
- Nonsterile gloves



Estimated time to complete the skill:

15 minutes

> CLIENT EDUCATION NEEDED:

Educate the client about the need for clean linen to increase comfort and to help prevent skin complications.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <p>1. Place hamper by client's door if linen bags are not available. Explain procedure to client. Assess condition of blanket and/or bedspread.</p> | <p>1. Provides for proper disposal of soiled linens. Encourages client cooperation. Allows for organization of supplies.</p> |
| <p>2. Gather linens and gloves. Place linens on a clean, dry surface in reverse order of usage at the client's bedside (pillowcases, top sheet, draw sheet, bottom sheet).</p> | <p>2. Provides easy access to items.</p> |
| <p>3. Apply gloves.</p> | <p>3. Reduces risk of infection from soiled, contaminated linens.</p> |
| <p>4. Inquire about the client's toileting needs and attend as necessary.</p> | <p>4. Provides for client comfort and prevents interruptions during bed making.</p> |
| <p>5. Assist client to a safe, comfortable chair.</p> | <p>5. Increases client's comfort and decreases risk of falls.</p> |
| <p>6. Position bed: flat, side rails down, adjust height to waist level.</p> | <p>6. Promotes good body mechanics and decreases back strain.</p> |
| <p>7. Remove and fold blanket and/or bedspread. If clean and reusable, place on clean work area.</p> | <p>7. Keeps reusable bed linens clean.</p> |
| <p>8. Remove soiled pillowcases by grasping the closed end with one hand and slipping the pillow out with the other. Place the soiled cases on top of the soiled sheet, and place the pillows on clean work area.</p> | <p>8. Allows easy removal of the pillowcases without contamination of uniform by soiled linens and keeps pillows clean.</p> |
| <p>9. Remove soiled linens: Start on the side of the bed closest to you; free the bottom sheet and mattress pad by lifting the mattress and rolling soiled linens to the middle of the bed. Go to the other side of the bed, repeat action.</p> | <p>9. Prevents tearing and fanning of linens. Linens are folded from cleanest area to most soiled to prevent contamination.</p> |

continues

10. Fold soiled linens: head of bed to middle, foot of bed to middle. Place in linen bag or hamper, keeping soiled linens away from uniform.
11. Check mattress. If the mattress is soiled, clean it with an antiseptic solution and dry it thoroughly.
12. Remove gloves, wash hands, and apply a second pair of clean gloves.
13. Open the clean mattress pad lengthwise onto the bed with the seamed side of the sheet toward the mattress. Unfold half of the pad's width to the center crease and smooth the pad flat. If there are elastic bands to hold the pad in place, slide them under the corners of the mattress.
14. Proceed with placing the bottom sheet onto the mattress. Linens differ from facility to facility. Bottom sheets may be fitted or they may be flat. Proceed to the appropriate Action for the linen available.

Fitted Bottom Sheet

15. Position yourself diagonally toward the head of the bed.
16. Start at the head with seamed side of the fitted sheet toward the mattress.
17. Lift the mattress corner with your hand closest to the bed; with your other hand, pull and tuck the fitted sheet over the mattress corner; secure at the head of the bed.
18. Pull and tuck the fitted sheet over the mattress corners at the foot of the bed.

Flat Regular Sheet

19. Unfold the bottom sheet with the seamed side toward the mattress. Align the bottom edge of the sheet with the edge of the mattress at the foot of the bed.
20. Allow the sheet to hang 10 inches (25 cm) over the mattress on the side and at the top of the bed.

10. Fanning linens increases the number of microorganisms in the air. Folding linens reduces the risk of transmission of infection to others.
11. Reduces the transmission of microorganisms.
12. Reduces the transmission of microorganisms to clean linens.
13. Facilitates making bed in an organized, time-saving manner by not having to go from one side of the bed to the other.
14. Use linen available at the facility.
15. Ensures good body mechanics and efficient procedure.
16. Placement of seamed side toward mattress prevents irritation to the client's skin.
17. Prevents straining of back muscles; decreases the chance that the sheet will pull out from under the mattress.
18. Prevents straining of back muscles; decreases the chance that the sheet will pull out from under the mattress.
19. Placement of the seamed side toward the mattress prevents irritation to the client's skin. Ensure proper placement of the sheet so that it can be tightly secured at the top and on both sides of the bed.
20. Proper placement of linens ensures adequate sheeting for all sides of the bed.

21. Position yourself diagonally toward the head of the bed. Lift the top of the mattress corner with the hand closest to the bed and smoothly tuck the sheet under the mattress.
 22. Miter the corner at the head of the bed using the following technique.
 23. Face the side of bed and lift and lay the top edge of the sheet onto the bed to form a triangular fold.
 24. With your palms down, tuck the lower edge of sheet (hanging free at the side of the mattress) under the mattress.
 25. Grasp the triangular fold, bring it down over the side of the mattress. Allow the sheet to hang free at the side of the mattress.
 26. Place the draw sheet on the bottom sheet and unfold it to the middle crease.
 27. Face the side of the bed, palms of hands down. Tuck both the bottom and draw sheets under the mattress. Ensure that the bottom sheet is tucked smoothly under the mattress all the way to the foot of the bed.
 28. Go to the other side of the bed, unfold the bottom sheet, and repeat the actions used to apply the mattress pad and bottom sheet.
 29. Unfold the draw sheet, if used, and grasp the free-hanging sides of both the bottom and draw sheets. Pull toward you, keeping your back straight, and with a firm grasp (sheets taut) tuck both sheets under the mattress. Use your arms and open palms to extend the linen under the mattress. Place the protective pad on the bottom sheet.
21. Prevents straining of back muscles; decreases the chance that the sheet will pull out from under the mattress.
 22. Secures sheet tightly to the mattress, with the triangular fold providing a smooth tuck to keep the linen in place.
 23. Forms the base for the tuck.
 24. Forms the first half of the tuck.
 25. Will form the final portion of the mitered corner when tucked in.
 26. Provides a sheet to lift and move the client in bed without having to use the bottom sheet and remake the bed. Helps to keep the bottom sheet clean.
 27. Keeps sheet taut, in place, and wrinkle-free, decreasing the risk of skin irritation.
 28. Unfolding decreases air current; air currents can spread microorganisms.
 29. Uses your body's weight in pulling the sheet taut and prevents strain on your back muscles.

Figure 4-1-3 The clean draw sheet is placed on top of the bottom sheet.



continues

Flat Regular Sheet *continued*

- 30.** Place the top sheet on the bed and unfold lengthwise, placing the center crease (width) of the sheet in the middle of the bed. Place the top edge of the sheet (seam up) even with the top of the mattress at the head of the bed. Pull the remaining length toward the bottom of the bed.
- 31.** Unfold and apply the blanket or spread. Follow the same technique as used in applying the top sheet (see Figure 4-1-4).



Figure 4-1-4 Place the blanket or spread over the top sheet.

- 32.** Miter the bottom corners. With your palms down, tuck the lower edge of the sheet under the mattress. Grasp the triangular fold and bring it down over the side of the mattress. Allow the sheet to hang free at the side of the mattress (see Figures 4-1-5, 4-1-6, and 4-1-7).



Figure 4-1-6 Tuck the lower edge of the sheet and blanket under the mattress.

- 33.** Face the head of the bed and fold the top sheet and blanket over 6 inches (15 cm). Fan-fold the sheet and blanket (from the foot to the middle of the bed) (see Figure 4-1-8).
- 34.** Apply clean pillowcase on each pillow (see Figure 4-1-9). With one hand, grasp the closed

- 30.** Saves time and movement, making one side of the bed at a time. Seam will be folded down to prevent contact with the client's skin, which can result in irritation.
- 31.** Provides warmth.



Figure 4-1-5 Lift and lay the hem of the sheet and blanket onto the bed to form a triangular fold.

- 32.** Secures linen at the foot of the bed.



Figure 4-1-7 Bring the triangular fold down and let it hang freely at the side of the mattress.

- 33.** Allows the client easy access to the bed.
- 34.** Keeps clean pillowcase away from your uniform.



Figure 4-1-8 Fold the top sheet and blanket over 6 inches.



Figure 4-1-9 Place a clean pillowcase on each pillow, keeping the clean pillowcase away from your uniform.

end of the pillowcase. Gather case and turn it inside out over hand. With same hand, grasp the middle of one end of the pillow. With the other hand, pull the case over the length of the pillow. The corners of the pillow should fit snugly into the corners of the case.

- | | |
|---|---|
| <p>35. Return the bed to the lowest position and elevate the head of the bed 30°–45°. Put side rails up on side, farthest from client.</p> <p>36. Inquire about toileting needs of the client; assist as necessary.</p> <p>37. Assist the client back into the bed and pull up the side rails; place call light in reach; take vital signs.</p> <p>38. Remove gloves and wash hands.</p> <p>39. Document your actions and the client's response during the procedure and to being up in a chair.</p> | <p>35. Provides for client safety.</p> <p>36. Saves client energy and provides time to care for the client's needs.</p> <p>37. Promotes client safety and a means to call for assistance. Sitting up in a chair and movement may cause changes in the client's vital signs.</p> <p>38. Reduces the transmission of microorganisms.</p> <p>39. Documents completion of procedure and assessment findings of client's tolerance.</p> |
|---|---|



▼ REAL WORLD ANECDOTES

Scenario 1

An elderly woman in a long-term care facility is using a silicone sand bed. The nurse's aides change her bed linens daily. The linens are simply laid on top of the sand mattress in accordance with the manufacturer's recommendations. Unnoticed by the aide, the fabric covering the sand is becoming frayed and worn. It finally tears, releasing sand into the client area of the bed. The sand slowly engulfs the client, drowning her in quicksand. The nurse needed to be aware of new equipment requirements and hazards.

continues

▼ REAL WORLD ANECDOTES *continued*

Scenario 2

The nurse has just finished removing soiled linen from an incontinent client's bed and replacing it with clean linen. She then picks up the soiled linen, tucks it under her arm and takes it out to the dirty linen hamper in the hallway. As she is washing her hands afterward, she notices that the stool from the client's sheets has smeared on her arm and uniform. She washes her arm but is unable to change her uniform.

This nurse learned not to carry dirty linen too close to herself or her uniform.

> EVALUATION

- Confirm that fresh linens were placed on the bed in a manner appropriate to the client's needs.

> DOCUMENTATION

Nurses' Notes

- Document the linen change and the client's tolerance to being out of bed.

> CRITICAL THINKING SKILL

Introduction

Throwing dirty linen on the floors endangers the nurse.

Possible Scenario

You have gotten Mr. Nelson out of bed and into a chair. You are changing the soiled linen on his bed. As you strip the dirty linens off the bed, you realize that you do not have a dirty linen hamper nearby. Mr. Nelson is

confused and cannot be trusted to stay in the chair if you leave the room. You are not comfortable leaving the soiled linen on his bedside table or other clean surface, so you put the dirty linens on the floor. You finish changing the bed linens, return Mr. Nelson to bed, and then take the soiled linen to a dirty linen hamper.

Possible Outcome

Dirty linen on the floor can be a safety hazard to the nurse as she moves about the room or to clients if they are moving around the room. Putting dirty linen on the floor is also a violation of the health code in most states and can lead to infraction citations if discovered by a health inspector.

Prevention

Be prepared with everything you will need before you start a procedure. If you discover you need something and can't leave the room, request assistance. Turn on the call light or call out the door for some help.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients often have thin, easily damaged skin. Be sure to use linen that doesn't have jagged tags or rough edges.



Pediatric Variations:

- Be aware that children put things in their mouths and only use linens that a child could safely chew on. Also be sure that there are no decorations or patches that a child could chew off and swallow.



Home Care Variations:

- In home care situations, a nurse does not usually make the bed. It is part of her function to examine the conditions, including the bed, and make suggestions regarding the safety and comfort of the client. She should check for bed rails, linens that the client could become entangled in, or a bed that is structurally unsafe.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Be sure to keep the linen smooth and fairly unwrinkled to prevent unwanted pressure areas in long-term clients.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While making a client's bed, the nurse flaps the linen to unfold it and cover the bed with it.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about what you may be stirring up with the flapping linen. Remember you are possibly spreading bacteria around the room as well as into the air you are breathing. Unfold linen on the bed, gently. Do not flap the bed linens around while making the bed.

Possible Error:

While making the bed, the nurse tucks the pillow under her chin to apply the pillowcase.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about where this pillow has been and if you may be infecting yourself by placing this pillow under your chin. Consider the possibility that you may be infecting pillows from different rooms using this technique. Put the pillowcase on by grasping the closed end of the pillowcase with one hand. Gather the case and turn it inside out over your hand. With the same hand, grasp the middle of one end of the pillow. With the other hand, pull the case over the length of the pillow (see Figure 4-1-9).

> NURSING TIPS

- If the bed raises and lowers, raise it up to a comfortable height to prevent back strain (see Figure 4-1-10).
- Make one side of the bed completely and then move to the other side to save time and steps.
- Be careful not to carry the dirty linen close to your uniform to prevent contamination.

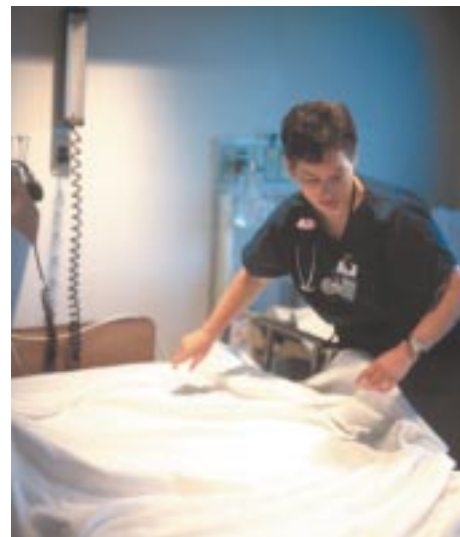


Figure 4-1-10 Raise bed to a comfortable height to prevent back strain.

SKILL 4-2

Changing Linens in an Occupied Bed

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Cross-contamination **Log roll**
Draw sheet **Miter**
Fan-fold



> OVERVIEW OF THE SKILL

After a bath, clean linens are placed on the bed to promote comfort. If the client is able to get out of the bed, assist the client to a chair and proceed to make the bed. If the client is unable to get out of bed, the linens must be changed around the client. Assistance will be needed if the client is in traction or cannot be turned. Care must be taken to avoid disturbing the traction

weights. If the client cannot be turned, change the linens from head to toe. Place a waterproof draw sheet on the beds of clients who are incontinent or have profuse drainage. The type and amount of linens placed on the bed will vary based on the type of bed the client is using. Air beds and Clinitron beds for example, use only minimal linens under the client.

> ASSESSMENT

1. Assess your equipment. Check for all the linens necessary to change the bed. Check for a dirty linen hamper. **Facilitates a smooth procedure.**
2. Assess whether the bed itself needs cleaning prior to placing clean sheets on it. **Reduces the transmission of microorganisms.**
3. Assess the client's needs in the bed. Check for profuse drainage, incontinence, or special needs for comfort or skin integrity. **Determines how the procedure will be performed.**
4. Assess the client's ability to assist with the procedure, including mobility, mental status, and muscle strength. **Determines whether**

assistance will be needed to change the client's linens.

> DIAGNOSIS

1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will have clean linens on the bed.
2. The clean linens will be appropriate to the client's needs and condition.
3. The linens will be changed with a minimum of trauma to the client.

Equipment Needed (see Figure 4-2-2):

- Linen hamper
- Top sheet, draw sheet, bottom sheet
- Pillowcase
- Blanket
- Bath blanket



Estimated time to complete the skill:
20 minutes

> CLIENT EDUCATION NEEDED:

Educate the client about the need for clean linen to increase comfort and to help prevent skin complications.



Figure 4-2-2 Top and bottom sheets, draw sheet, and pillowcase are used to make the occupied bed. Gloves reduce the transmission of microorganisms.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

1. Explain procedure to client.
2. Bring equipment to the bedside (see Figure 4-2-3).



Figure 4-2-3 Bring clean linen and empty linen hamper to the bedside.

3. Remove top sheet and blanket. Loosen bottom sheet at foot and sides of bed. Lower side rail nearest the nurse, if necessary for access. Client may be covered with a bath blanket (see Figure 4-2-4).
4. Position client on side, facing away from you. Reposition pillow under head.

1. Promotes client cooperation.
2. Facilitates a smooth procedure.



Figure 4-2-4 Client may be covered with a bath blanket for warmth and modesty while top sheet and blanket are removed.

3. Facilitates easy removal of linens. Lowering only side rail close to nurse reduces client's risk of falls. Bath blanket prevents exposure and chills.
4. Provides space to place clean linens.

continues

5. Fan-fold or roll bottom linens close to client toward the center of the bed.
6. Smooth wrinkles out of mattress. Place clean bottom linens with the center fold nearest the client. Fan-fold or roll clean bottom linens nearest client and tuck under soiled linen (see Figure 4-2-5). Maintain an adequate amount of sheet at head and foot of bed for tucking.



Figure 4-2-5 Place clean linens and protective pad on mattress. Tuck clean linen nearest client under soiled linen. Change gloves, if soiled, before handling clean linen.

7. Miter bottom sheet at head of bed, then at foot of bed. To miter, lift the mattress and tuck the sheet over the edge of the mattress, lift edge of sheet that is hanging to form a triangle, and lay upper part of sheet back onto bed; tuck the lower hanging section under the mattress. Repeat for each corner. Tuck the sides of the sheet under the mattress.
8. Fold the draw sheet in half. Identify the center of the draw sheet and place it close to the client. Fan-fold or roll draw sheet closest to client and tuck under soiled linen. Smooth linen. Add protective padding if needed. Tuck draw sheet under mattress, working from the center to the edges (see Figure 4-2-6). Draw sheet should be positioned under the lower back and buttocks.
9. Log roll client over onto side facing you. Raise side rail.
10. Move to other side of bed. Remove soiled linens by rolling into a bundle and place in linen hamper without touching uniform.
11. Unfold/unroll bottom sheet; then draw sheet. Look for objects left in the bed. Grasp each sheet with knuckles up and over the sheet

5. Keeps soiled linen together. Promotes comfort when client later rolls to other side.
6. Provides for maximum fit of sheets and decreases chance of wrinkles.



Figure 4-2-6 Tuck the sides of sheet and draw sheet under the mattress.

7. Holds linens firmly in place.
8. Draw sheet facilitates moving and lifting clients while in bed.
9. Positions client off soiled linen. Protects client from falling.
10. Prevents cross-contamination.
11. Tight sheets keep linens wrinkle-free and decrease the risk of skin irritation. Leaning back uses body weight for good body mechanics.

and pull tightly while leaning back with your body weight. Client may be positioned supine.

12. Place top sheet over client with center of sheet in middle of bed. Unfold top of sheet over client. Remove bath blankets left on client to prevent exposure during bed making. Place top blanket over client, same as the top sheet (see Figure 4-2-7).



Figure 4-2-7 Place the top blanket over the client.

12. Provides client with top sheet and blanket to prevent chilling.



Figure 4-2-8 Raise the foot of the mattress and tuck in the corner of the top sheet and blanket.

13. Raise foot of mattress and tuck the corner of the top sheet and blanket under. Miter the corner. Repeat with other side of mattress (see Figure 4-2-8).
14. Grasp top sheet and blanket over client's toes and pull upward, then make a small fan-fold in the sheet.
15. Remove soiled pillowcase. Grasp center of clean pillowcase and invert pillowcase over hand/arm. Maintain grasp of pillowcase while grasping center of pillow. Use other hand to pull pillowcase down over pillow. Place pillow under client's head. While changing pillowcase, client can be instructed to rest head on bed, or place a blanket under client's head (see Figure 4-2-9).

Figure 4-2-9 Changing the pillowcase is the final step in making the occupied bed.

13. Secures top sheet and blanket in place.
14. Permits client to move feet under the sheets. Provides room under the tight top sheet and blanket.
15. Provides clean pillowcase without shaking pillow or pillowcase. Promotes comfort.



16. Document procedure used to change linens and client's condition during the procedure.

16. Provides documentation of nursing care and assessment of client's status.

17. Wash hands.

17. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Nurse Simmons changed Mr. Trumbull's linens. Because Mr. Trumbull was not able to get out of bed, she used the occupied bed technique. She dutifully rolled up the soiled linen and placed it in the linen hamper while placing the clean linens on the bed and unrolling them under the client. By the time she was finished with Mr. Trumbull's care, it was breakfast time and Nurse Simmons started to prepare Mr. Trumbull for breakfast. As she was raising the head of his bed and arranging the bedside table, Mr. Trumbull reached under his pillow for his dentures. He was unable to find them and became disturbed and agitated. He noted to Nurse Simmons that he always kept his dentures under his pillow to keep people from stealing them. He felt certain that someone must have stolen his dentures during the night. Nurse Simmons, realizing that she must have rolled the dentures up in the soiled laundry, hurried out to the laundry hamper. After digging through the soiled laundry, Nurse Simmons was able to retrieve Mr. Trumbull's dentures.

The nurse was reminded to check the client's bed for personal belongings when changing the linens.

> EVALUATION

- The client has clean, unwrinkled linen.
- The linen placed on the bed is suitable for the client's special needs.
- The linen was changed with a minimum of pain and trauma to the client.

> DOCUMENTATION

Nurses' Notes

- Document the bed change, how the client tolerated it, and any unusual findings.

> CRITICAL THINKING SKILL

Introduction

Remember to consider safety at all times.

Possible Scenario

You are changing the linens for a client who is on bedrest. He is elderly and obese. You raise the bed to a comfortable height to work, put down the side rail, and

have the client roll to the opposite side of the bed. You remove and roll the soiled linens so they are underneath the client and place clean linens on the vacant side of the bed. You then proceed to the opposite side of the bed, put down the side rail, and have the client roll over the rolled-up linens to the now clean side of the bed. As you are trying to pull the rolled up linens from under the client, you push him a little farther away from you and off the roll of linen.

Possible Outcome

That little extra nudge from you as well as the rocking effect of pulling the linen out from under him has unbalanced the client. He does not have a side rail to lean on or hold on to because you did not put the rail back up before you moved to the other side of the bed, and so he falls to the floor with a thump and a groan.

Prevention

Be sure to keep the side rails up when you are not in the immediate area, especially with clients who are confused or unable to help themselves.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients often have thin, tender skin. Be careful not to tear it while pulling linens underneath the client.
- Be aware of wrinkles in the bed linens under the client to prevent damage to thin, tender skin.
- Provide towels, tissues, or washcloths within reach of clients to help them catch spills and keep their own linen clean.

▼ VARIATIONS *continued*

- *Elderly clients may have a certain way they “like” the bed linen to be most comfortable such as untucked at the bottom, top sheet at the chin or at the armpits, or with an extra blanket. Give choices and seek advice on how to make them most comfortable whenever possible.*



Pediatric Variations:

- *Small children can be moved physically from one side of the bed to another to avoid pulling linens underneath them.*
- *Children may be most comfortable with a familiar blanket or cover brought from home for the bed. Don't forget to put it back on when you have finished changing the linen.*



Home Care Variations:

- *The nurse may be called upon to teach a caregiver how to change the linens in an occupied bed.*
- *If a hospital bed is not in use, enlist the aid of a caregiver, neighbor, or friend to improvise side rails to use at night or when making an occupied bed. An L-shaped device of wood or PVC tubing could be anchored under the mattress for support, then come up the side of the bed for safety. Make sure rough surfaces are smoothed or padded.*
- *Provide towels or washcloths within reach of clients to help them catch spills and keep their own linen clean.*



Long-Term Care Variations:

- *Long-term care clients often have special padding in the bed for increased comfort. Be aware whether they have a sheepskin or egg-crate mattress and adjust your bed-making technique accordingly. Wash and replace special padding regularly.*
- *Provide towels, absorbent pads, or washcloths within reach of clients to help them catch spills and keep their own linen clean.*
- *Remember to mark a client's personal linens, blankets, sheets, or protective padding so they can be returned if lost in the laundry. A family member may take these items home to launder.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While making an occupied bed, the nurse pushes all the linens under the client (wadding up) rather than folding or rolling them up.

Ask Yourself:

How do I prevent this error?

Prevention:

Using this technique may make it harder to make the bed and could be harmful to the client's skin. Roll or fold linens under the client. If the linens are just stuffed under the client, they are more difficult to pull through to the other side. It also increases the possibility of damaging clients' skin as the wad of linen is pulled out from under them.

> NURSING TIPS

- Roll or fold the linens under the client. Don't just stuff them underneath the client.
- Be aware of wrinkles and seams that the client may be lying on. They can cause pressure areas in the client's skin.
- Check for personal belongings in the client's bed when changing the linens. Clients may keep important items near them in bed.
- Be sure to keep the side rails up on the opposite side of the bed.
- Get help from another caregiver if the client is combative or difficult to move.

SKILL 4-3

Turning and Positioning a Client

Carla A. Bouska Lee, PhD, ARNP C, FAAN, and
Dale B. Barb, PMS, PT

KEY TERMS

Alignment
Immobility
Infection
Mobility

Pressure Ulcers
Prone
Supine



> OVERVIEW OF THE SKILL

Clients are not always able to independently move and position themselves in bed. Proper turning and positioning techniques are often employed. Proper turning and positioning allows the health care provider to make clients as comfortable as possible, prevent contractures and pressure sores, make portions of the client's body available for treatment or procedures, and allows clients greater access to their environment. There are three key concepts to remember when positioning a client: pressure, friction, and skin shear.

Any area that contacts the surface the client is lying on is a pressure site. Because of circulatory compromise, the pressure sites over bony prominences are at the highest risk of skin breakdown and ulceration. Always assess the blood flow to skin and tissue areas you are putting under increased pressure when placing a client in a given position. When repositioning a client, be sure the sheets under the client are smooth. This will help prevent increased areas of pressure that could contribute to pressure sores (see Figure 4-3-2).

Skin shear is caused when the skin is dragged across a hard surface. The deep layers of skin are torn by the resistance of being dragged. This damage to the skin can lead to skin breakdown and ulceration. To prevent skin shear, or friction burn from the sheets,

do not drag a client across the bed. Lift the client into proper position or use a turning sheet.

Friction is caused when the skin is dragged across a rough surface, causing heat and damaging the skin's surface. Any damage to the skin's integrity can lead to infection and skin breakdown.

If clients cannot reposition themselves, they must be repositioned at least every two hours and more frequently if they are uncomfortable or incontinent or have poor circulation, fragile skin, decreased cognition, decreased sensation, or a poor nutritional status.



Figure 4-3-2 Any part of the body that contacts the surface the client is lying on is a pressure site and is at risk for skin ulceration.

Table 4-3-1 Pressure Sore Concerns**Side-lying position**

- Base of 5th metatarsal
- Lateral malleolus
- Fibular head
- Greater trochanter
- Iliac crest
- Greater tubercle
- Lateral epicondyle
- Ear and side of face and scalp

Prone position

- Distal phalanges and metatarsals
- Knee
- Anterior superior and inferior iliac spines
- Xiphoid process
- Sternum
- Ear and side of face and scalp

Supine position

- Calcaneus
- Coccyx
- Sacrum
- Posterior inferior and superior iliac spines
- Spinous processes
- Ribs
- Scapula
- Occiput

When repositioning a client, assess the skin for redness and integrity. Areas of redness should be resolved before the client is repositioned on that area. Areas of redness that do not resolve within 30 minutes after pressure relief should be documented. See Table 4-3-1, Pressure Sore Concerns. A plan to reposition

the client more frequently may need to be instituted. Areas of prolonged redness are more likely to sustain tissue damage, as are tissue areas covering bony prominences. Finally, remember that proper body mechanics are essential to protect the caregiver's back and to ensure client safety.

> ASSESSMENT

1. Assess the client's ability to move independently. **Determine if the client can assist with turning and repositioning.**
2. Assess the client's flexibility. **If clients have contractures or other flexibility limitations, their positions may need to be modified to allow for the restrictions.**
3. Assess the client's age, medical diagnosis, cognitive status, skin integrity, nutritional status, continence, altered sensation, as well as the overall condition of the musculoskeletal system. **Helps determine the client's potential for pressure sore development.**
4. Assess the physician's or qualified practitioner's orders for specific restrictions regarding client positioning **to ensure the correct positioning is implemented.**

2. The client will be comfortable as evidenced by verbal and nonverbal cues.

Equipment Needed:

- Pillows
- Rolled blankets or towels
- Footboard
- Heel protectors
- Hand rolls



Estimated time to complete the skill:
5–10 minutes

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 6.1.1.1 Impaired Physical Mobility
- 6.1.1.2 Activity Intolerance
- 9.1.1 Pain

> PLANNING**Expected Outcomes:**

1. The client will maintain skin integrity without skin burns, pressure areas, or pressure ulcers.

> CLIENT EDUCATION NEEDED:

1. Explain the reason for and importance of frequent turning and positioning.
2. Educate the client and the client's caregiver regarding the signs and symptoms of pressure sore development.
3. Teach the client and the caregiver the areas most at risk for skin breakdown and what to do if breakdown does occur.
4. Teach the client's family to inspect the client's skin and how to turn and position the client before the client is discharged.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Explain procedure to client. Elicit client cooperation and participation.
3. Gather all necessary equipment. Provide for client privacy.
4. Secure adequate assistance to safely complete task.
5. Adjust bed to comfortable working height. Lower side rail on side of bed from which you are assisting client.
6. Follow proper body mechanics guidelines:
When moving a client in bed, position the bed so that your legs are slightly bent at the knees and hips. Maintain the natural curves in your back while lifting. Position one foot slightly in front of the other and spread feet apart to create a wide base for balance. When your arms are placed under the client, slowly lean backward onto your back leg using your body weight to help you lift the client to one side of the bed. Do not extend or rotate your back to move a client in bed.
If you cannot move the client easily, always ask for and obtain assistance for both your and the client's safety (see Figure 4-3-3). Be sure the floor is not slippery and that the bed is locked. Always use a turning sheet when rolling a client if this gives you better support and control of the client (see Figure 4-3-4).

1. Reduces the transmission of microorganisms.
2. Decreases anxiety. Improves client compliance and cooperation.
3. Ensures client dignity and allows for a smooth procedure.
4. Prevents caregiver back and muscle strain as well as provides for client safety.
5. Prevents caregiver back and muscle strain.
6. Prevents caregiver back injury and muscle strain and promotes client safety. Spreading feet to create a wide base helps prevent loss of balance.



Figure 4-3-3 If the client is heavy or hard to move, always obtain assistance for both the client's and your safety.



Figure 4-3-4 When rolling a client, use a turning sheet for better support and control.

7. Position drains, tubes, and IVs to accommodate for new client position.
8. Place or assist client into appropriate starting position. Monitor client status, providing adequate rest breaks or support as necessary.
7. Prevents accidental dislodgment and/or discomfort from movement by reduced mechanical tension.
8. Prevents client injury.

Moving from Supine to Side-Lying Position

9. Slide your hands underneath the client. Move the client to one side of the bed by lifting the client's body toward you in stages—first the upper trunk, then the lower trunk, and finally the legs. Lift the client's body; do not drag the client across the sheets.
9. Prevents shearing of skin tissue. Maintains client body alignment. Protects caregiver's back and prevents muscle strain. Prevents client injury and shearing of skin tissue.

Roll the client to side-lying position by placing the client's inside arm next to the client's body with the palm of the hand against the hip. Cross the client's outside arm and leg toward midline and log roll the client toward you using the client's outside shoulder and hip for leverage while maintaining stability and control of top arm and leg.

Maintaining Side-Lying Position

10. Repeat Actions 1–8.
10. See Rationales 1–8.
11. Pillows may be placed to support the client's head and arms (see Figure 4-3-5). An additional pillow may be used to support the topside leg, fully and equally supporting the thigh, knee, ankle, and foot (see Figure 4-3-6). Move the lower arm forward slightly at the shoulder and bend the elbow for comfort. If the client is unstable, a pillow placed against the back will provide additional support and keep the client from rolling supine (see Figure 4-3-7).
11. Provide support and comfort.



Figure 4-3-5 Place pillows to support the head and arms.



Figure 4-3-6 Place pillows to support the leg, ankle, and foot.

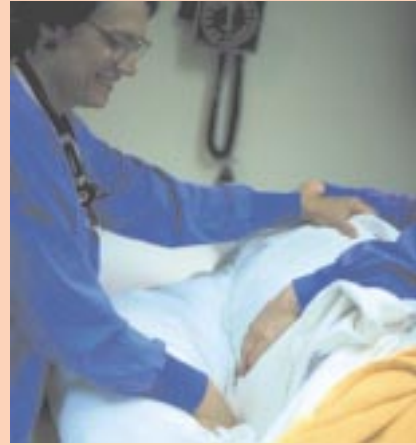


Figure 4-3-7 A pillow against the back will prevent a side-lying client from rolling into a supine position.

Moving from Side-Lying to Prone Position

12. Repeat Actions 1–8.
13. Remove positioning towels, pillows, or other support devices. Assess whether the client's position in bed needs to be adjusted to accommodate the continued movement into prone. Move the client's inside arm next to the client's body with palm against hip. Roll the client onto the stomach using the shoulder and hip as key points of control. The head must be placed in a comfortable position to one side without excessive pressure to sensitive areas. Pillows under the trunk are placed as needed to relieve pressure and increase comfort. The client's arms are placed comfortably at the client's side and the legs are uncrossed with the feet approximately a foot apart.

Maintaining Prone Position

14. A shallow pillow or a folded towel may be used to support the client's head comfortably as well as a pillow placed under the abdomen to support the back. An additional pillow may be placed under the lower leg to reduce the pressure of the toes and forefoot against the bed.

Moving from Prone to Supine Position

15. Repeat Actions 1–8.
16. Remove positioning towels, pillows, or other supporting devices. Slide your hands underneath the client. Move the client segmentally to one side of the bed to accommodate the

12. See Rationales 1–8.
13. Ensures comfort and safety in movement.

14. Provides support and comfort.

15. See Rationales 1–8.
16. Provides support and comfort.

new position. Position the inside arm next to the client's body with the client's palm next to the hip. Roll the client to supine by log rolling the client toward you using the client's outside shoulder and hip for leverage. Have the client's face positioned away from the direction of the roll to prevent undue pressure to the face or neck. When the client reaches supine, uncross the client's arms and legs and place them comfortably into anatomical positions.

Maintaining Supine Position

17. A footboard may be used to support the foot as well as heel protectors or a pillow placed between the heel and gastrocnemius muscle to reduce the pressure on the heels (see Figures 4-3-8 and 4-3-9). To prevent excessive external rotation of the lower extremity, a trochanter roll may be used. For comfort, additional pillows may be used to support the client's head, arms, or lower back.



Figure 4-3-8 Heel protectors are placed on the foot to provide support and comfort.

17. Provides support and comfort.



Figure 4-3-9 Heel protectors also provide padding to reduce the risk of skin breakdown where the heel rests on the mattress.

18. Be sure to replace side rails to upright position as well as lower bed to beginning position.

19. Place call light within reach of the client.

20. Move bedside table close to bed and place items of frequent use within reach of the client.

21. Wash hands.

18. Provides for client safety.

19. Provides for client safety.

20. Provides for client safety.

21. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

A nurse on a home care visit notes the wife, who weighs approximately 130 lb., is caring for a very weak husband, who weighs 220 lb. To move him in bed, she places a leather belt around his waist and uses it to drag the heaviest part of his body toward her. This client is at a risk for skin breakdown because of skin shear and friction from the dragging. The nurse taught the client's wife how to use a draw sheet to move her husband in bed as well as made recommendations regarding the wife's body mechanics. The nurse also recommended that a home health aide come to the house to assist the client's wife with his care.

Scenario 2

A nurse caring for a client in a skilled nursing facility was repositioning a client in the middle of the night. To avoid disturbing the client, she turned on the bathroom light and worked in the semidarkness. Placing a pillow under the client's head, the nurse did not realize that the pillow tag had escaped from the case and the edge of the tag was abrading the client's eye. The client suffered a scratched cornea. While the nurse was right to be concerned about her client's comfort, client safety should never be sacrificed for client comfort.

> EVALUATION

- Safe and proper body alignment and movement were achieved for both client and caregiver.
- The client is comfortable in the new position as evidenced by verbal and nonverbal cues.
- The client's skin and underlying organs and tissues were protected from pressure, friction, and shear.

> DOCUMENTATION

Nurses' Notes

- The client's new position and the time of the position change.
- Note any report or observation of pain, discomfort, or dyspnea.
- Note the findings of your integumentary assessment, including color and integrity of skin and the length of time redness persists over bony prominences.

> CRITICAL THINKING SKILL

Introduction

The nurse strains her back by not calling for assistance when needed.

Possible Scenario

A heavily sedated obese man has just been returned to his room from the special procedures lab. As the nurse is walking down the hall, she hears the sounds of retching and realizes he is vomiting. As she hurries into the room, she notes that vomitus has covered the floor and bedside railing. She quickly turns the client on his side and holds him in position with her left hand and forearm. She reaches behind her for a basin. As she reaches for the basin, her foot slips in the vomitus on the floor.

Possible Outcome

The nurse's body alignment is twisted and off balance. She falls hard and wrenches her back.

Prevention

Immediately turning the client to his side to clear his airway was appropriate. The nurse could have grabbed a pillow and placed it at his back to support his side-lying position and free up her hands. She could have summoned assistance.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have more compromised body systems such as delicate skin, a more brittle skeletal system, cardiovascular shifts, more difficulty with balance, and less muscle strength to assist during positioning.*



Home Care Variations

- *Assess the ability of the primary caregiver to adequately turn and position the client in the home care setting. Does the caregiver know proper body alignment technique, as well as basic information on the prevention and detection of pressure sores?*
- *Assess if the home caregiver has enough support and help (friends, neighbors, or family) to turn the client as often as needed to avoid prolonged pressure over bony prominences.*
- *Examine the bed or chair where the client spends most of the day and night. Can the sheets be tucked tight? Is the upholstery on the chair a rough fabric, or plastic? Could the fabric on the bed or the chair contribute to friction or shearing forces when the client is moved?*



Pediatric Variations:

- *Take care not to place babies in the prone position to sleep because this may contribute to sudden infant death. Infants should be propped in a side-lying position to sleep.*



Long-Term Care Variations:

- *Long-term clients may have a “favorite” position and may shift back to this position, even if turned at regular intervals. Such a client needs to be assessed more frequently than every 2 hours.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse leaves the client's arm under his torso when turning him to a side-lying position.

Ask Yourself:

How do I prevent this error?

Prevention:

Be aware of the client's position and relative comfort. After repositioning a client, step back and look. Does this position look comfortable? Could you lie this way for 2 hours? Does the client appear to be in pain?

> NURSING TIPS

- If client is assessed as a candidate for skin care precautions, post a turning schedule for the client in an easy-to-locate area in the client's room.
- Have all equipment necessary for proper positioning readily available in the client's room.
- Regularly check status of all splints and other devices to make sure they fit properly.
- Safe, proper body alignment for the nurse includes back aligned and straight, knees bent, and a wide base with feet apart.
- Have the client assist as much as possible to reduce the risk of injury for the caregiver.

SKILL 4-4

Moving a Client in Bed

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Bed gatch

Draw sheet

Pressure sores

Shearing force

Trapeze

Turn sheet



> OVERVIEW OF THE SKILL

Prolonged immobility is uncomfortable. It can cause muscle wasting, promotes clot formation, and encourages skin breakdown. Clients who are unable to move themselves in bed or are only able to assist with moving in bed are at risk for discomfort and skin breakdown. Often clients' restlessness in bed will cause them to slide down toward the foot of the bed. This is especially true in beds where the head raises up to a Fowler's or semi-Fowler's position. If the client slides down toward the foot of the bed while the head is elevated, it can lead to reduced respiratory effort and reduced lung capacity. This can impair the client's recovery.

The nurse is often called upon to move a client to a more comfortable position. Repositioning a client

can sometimes be done by a single staff member, but often it requires two or more people to do this procedure safely (see Figure 4-4-2).



Figure 4-4-2 Two or more people may be needed to reposition a client safely.

> ASSESSMENT

1. Assess the client's ability to assist with repositioning. Determine if the client can move with the aid of an overhead trapeze or the side rail. Judge how much assistance will be needed. **Determines safety for the client and the nurse and good body mechanics for the nurse.**
2. Assess the client's ability to understand and follow directions and assist and cooperate with the move.

Affects how the procedure will be carried out. Affects client teaching.

3. Assess the client's environment. Check the bed for cleanliness. Has the client been restless, sweaty, or incontinent? Check to see if the sheets have been turned or twisted. Tubes, lines, wires, traction, casts, or splints must be moved carefully (see Figure 4-4-3). **Affects how the procedure will be carried out. Affects what additional procedures will**



Figure 4-4-3 Before repositioning the client, assess the environment for items that could become dislodged or tip or pull.

be performed. Prepares the caregivers to keep tubes and equipment from becoming dislodged or tipping or pulling.

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility
- 6.1.1.2 Activity Intolerance
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will be moved in bed without injury.
2. The client will be moved in bed without injury to the staff.
3. The client will report an increase in comfort following the move.
4. All tubes, lines, and drains will remain patent and intact.



Figure 4-4-4 Overhead trapeze

Equipment Needed:

- Hospital bed with side rails
- Trapeze if required (see Figure 4-4-4)
- Turn sheet or draw sheet



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need to move in bed to maintain circulation and lung capacity.
2. Teach clients about “1-2-3 go” so they will be able to cooperate with the move.
3. Teach clients not to use their elbows to help push themselves up in bed. The elbows quickly become sore and abraded when the client moves this way. Instead, encourage use of an overhead trapeze.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Moving a Client Up in Bed with One Nurse

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Inform client of reason for the move and how to assist (if able). 3. Elevate bed to just below waist height. Lower head of bed if tolerated by client. Lower side rails on the side where you are standing. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Reduces anxiety; helps increase comprehension and cooperation; promotes client autonomy. 3. Lessens strain on nurse’s back muscles. |
|---|---|

continues

Moving a Client Up in Bed with One Nurse *continued*

4. Remove the pillow and place it against the headboard.
5. Have the client fold arms across the chest.
6. Have client hold on to the overhead trapeze, if available (see Figure 4-4-5).



Figure 4-4-5 Have client hold on to the overhead trapeze, if one is available, to assist in the move.

7. Have the client bend the knees and place the feet flat on the bed if able (see Figure 4-4-6).
8. Stand at an angle to the head of the bed, feet apart, knees bent, feet toward the head of the bed.
9. Slide one hand and arm under the client's shoulder, the other under the client's thigh.
10. Rock forward toward the head of the bed, lifting the client with you. Simultaneously have the client push with the legs.
11. If the client has a trapeze, have the client pull up holding onto the trapeze as you move the client upward in bed.
12. Repeat these steps until the client is high enough in bed.
13. Return the client's pillow under the head.
14. Elevate head of bed, if tolerated by client.

4. Prevents having to move against the pillow. Provides padding of the headboard if the client should be moved too high in the bed.
5. Prevents getting the client's arms trapped or injured during the move.
6. Promotes client autonomy by allowing the client to assist with the move.



Figure 4-4-6 Have the client bend the knees and place feet flat on the bed.

7. Allows the client to assist in the move; promotes client autonomy.
8. Promotes good body mechanics.
9. Distributes the client's weight more evenly. Promotes good lifting technique.
10. Allows a smooth motion to lift the client. Client assistance lessens strain on nurse's back muscles; promotes client autonomy.
11. Client assistance lessens strain on nurse's back muscles; promotes client autonomy.
12. Large or very immobile clients are often not moved far enough in one step.
13. Promotes client comfort.
14. Promotes comfort; facilitates eating and drinking; facilitates communication.

15. Assess client for comfort.
16. Adjust the client's bedclothes as needed for comfort.
17. Lower bed and elevate side rails.
18. Wash hands.

Moving a Client Up in Bed with Two or More Nurses

19. Wash hands and apply gloves if needed (see Figure 4-4-7).

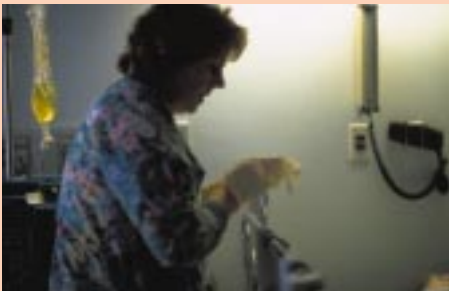


Figure 4-4-7 Apply gloves before repositioning the patient, if needed.

20. Inform client of reason for the move and how to assist (if able).
21. Elevate bed to just below waist height. Lower head of bed if tolerated by client. Lower side rails (see Figure 4-4-8).
22. With two nurses, place turn/draw sheet under client's back and head.
23. Roll up the draw sheet on each side until it is next to the client (see Figures 4-4-9 and 4-4-10).



Figure 4-4-9 Roll up the draw sheet tightly on each side of the client.

15. Comfort is subjective.
16. Comfort is subjective.
17. Promotes client safety.
18. Reduces the transmission of microorganisms.
19. Reduces the transmission of microorganisms.



Figure 4-4-8 Lower the side rails to allow the nurse to use good body mechanics.

20. Reduces anxiety; helps increase comprehension and cooperation; promotes client autonomy.
21. Lessens strain on nurse's back muscles.
22. Reduces shearing force, which can precipitate skin breakdown.
23. Provides support under the heavy parts of the body and places the nurse's hands close to the weight to be moved.



Figure 4-4-10 Rolling the draw sheet up tightly next to the client places the nurse's hands close to the weight of the client.

Moving a Client Up in Bed with Two or More Nurses *continued*

- | | |
|---|--|
| <p>24. Follow Actions 4–7.</p> <p>25. The nurses stand on either side of the bed, at an angle to the head of the bed. They stand with knees flexed, feet apart in a wide stance.</p> <p>26. The nurses hold their elbows as close as possible to their bodies.</p> <p>27. The lead nurse will give the signal to move: 1-2-3 go. The nurses will lift up (off the bed) on the turn/draw sheet and forward (toward the head of the bed) in one smooth motion (see Figure 4-4-11). The move is coordinated to transfer the client toward the head of the bed. Simultaneously, have the client push with the legs or pull using the trapeze.</p> | <p>24. See Rationales 4-7.</p> <p>25. Promotes good body mechanics.</p> <p>26. Allows the muscles of the torso to assist the arm muscles in bearing and moving the weight of the client.</p> <p>27. Allows a smooth motion to lift the client. Client assistance lessens strain on the nurse's back muscles; promotes client autonomy.</p> |
|---|--|
- Figure 4-4-11** At the signal from the lead nurse, lift and pull in one smooth motion.
- | | |
|---|---|
| <p>28. Repeat until the client is high enough in bed to be comfortable.</p> <p>29. Return the client's pillow under the head.</p> <p>30. Elevate head of bed, if tolerated by client.</p> <p>31. Assess client for comfort.</p> <p>32. Adjust the client's bedclothes for comfort.</p> <p>33. Lower bed and elevate side rails.</p> <p>34. Wash hands.</p> | <p>28. Large or very immobile clients are often not moved far enough in one step.</p> <p>29. Promotes client comfort.</p> <p>30. Promotes comfort; facilitates eating and drinking; facilitates communication.</p> <p>31. Promotes comfort.</p> <p>32. Promotes comfort.</p> <p>33. Promotes client safety.</p> <p>34. Reduces the transmission of microorganisms.</p> |
|---|---|



▼ REAL WORLD ANECDOTES

Scenario 1

Mrs. Jovanovich was 2 days postsurgery. She was receiving analgesia through an epidural catheter. Her nurse noted that Mrs. Jovanovich had slid down in bed and was now hunched over and appeared to be uncomfortable. Mrs. Jovanovich did not have a turn sheet, but she was able to assist the nurse with moving up in bed. As the nurse slid her up, Mrs. Jovanovich pushed with her heels. Mrs. Jovanovich was successfully moved up in bed and the nurse elevated the head of the bed and made the client comfortable. As the nurse started to leave the room, Mrs. Jovanovich asked the nurse about a wet spot she

▼ REAL WORLD ANECDOTES *continued*

had suddenly found in the bed. While searching for the source of the liquid, the nurse discovered that the move up in bed had dislodged Mrs. Jovanovich's epidural catheter. Without an intact epidural catheter, Mrs. Jovanovich will have to either risk another lumbar puncture procedure or settle for less effective pain relief. It is important to always check the client prior to moving to avoid injury.

Scenario 2

A new nurse on the floor had been used to moving the client on the count of three, when the word "three" was spoken. The nurses on the floor were used to moving the client 1 second after the word "three" was spoken. The first few "moves" were not well-coordinated and resulted in some confusion and, in one case, peals of laughter by the nurses and the client. Finally, the nurses found that shaking their heads "no" on each count and "yes" on the actual move helped the new nurse wait the extra beat, and coordination was restored.

> EVALUATION

- The client was moved without injury to self or staff.
- The client reported an increase in comfort following the move.
- All tubes, lines, and drains remained intact.

> DOCUMENTATION

Nurses' Notes

- Note the time and position the client was moved.
- Document any unusual findings.

> CRITICAL THINKING SKILL

Introduction

Consider all the factors that could affect the safety and effectiveness of the procedure.

Possible Scenario

You have been asked to help move Mr. Miller up in bed. Mr. Miller is an elderly client with a large, foul-smelling, open abdominal wound. The nurse who has requested your help is obviously repelled by the client. As you prepare to pull the client up in bed,

the other nurse stands back from the bed grasping the very edge of the turn sheet.

Possible Outcome

Because of the lack of leverage, pulling this client up will be more difficult and require more energy from the nurse who is standing close to the client using good body mechanics.

By standing too far back, the nurse risks injuring herself by having to use poor body mechanics to actually move the client.

By standing too far back, the nurse risks injuring the client because she does not have control of the motion she is initiating. The client could fall against the side rails or pull on a tube accidentally, and the nurse is not in a position to be able to quickly deal with the situation.

Prevention

Part of good body mechanics is standing close to the object you are trying to move. Standing too far away makes the weaker lower back muscles take too much of the load. By standing close to the object to be lifted with feet apart, the bigger, stronger leg muscles can do most of the work.

▼ VARIATIONS



Geriatric Variations:

- Older clients often have thin, fragile skin. Be sure not to drag clients across the sheets because this could tear their skin.



Pediatric Variations:

- Children may be small enough to lift bodily in bed.
- Children tend to be more active in bed and may need to be repositioned more often.

▼ VARIATIONS *continued*



Home Care Variations:

- Often a family member is caring for the home care client. The family member should be taught proper body mechanics to prevent injury to the caregiver.
- Very often, beds in the home care setting, even rented hospital beds, are in small rooms, positioned against the wall, or wedged in by furniture. Enlist the assistance of a family member or caregiver to assess whether the nurse has good access to the bed or if the care area should be rearranged. Consider moving the sick room to another part of the home such as the dining room.
- When using the home linens, remember they are often old and worn or not as strong as hospital linen. Bring a draw sheet with you, if needed. Check the linen to see whether it is strong enough to hold and pull without tearing.
- The family member should be encouraged to demonstrate and use proper lifting skills to become more comfortable with them.
- If the home bed is a regular double, queen, or king-size bed, think how you will modify the moving technique to maintain good body alignment. For example, extra care and thought will be needed to move a client in a waterbed.



Long-Term Care Variations:

- Long-term care clients are pulled up in bed fairly often. They are at increased risk for pressure ulcers on their coccyx and heels. Check these areas often and be sure they aren't dragged across the sheets during the move. Make sure heels have protectors on them prior to moving the client. Use draw sheets as much as possible to avoid shearing fragile skin.
- Encourage independence as much as possible. Give clients "something to grab on to" to help them move up in bed. A trapeze, a cloth tied to the headboard, or something to brace against may help. Make sure clients are able to move themselves without tearing or shearing the skin and that they are able to assess this.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not get enough help to safely and adequately move the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about what could happen if you don't have enough help to perform this procedure. You could injure yourself trying to lift too much. You could injure the client by trying to lift too much and dropping or inadequately supporting the client. Be sure to assess the client's ability to help and the complexity of the move. If in doubt, get help. Too much help is always better than too little.

> NURSING TIPS

- Position in bed can be maintained using bed gatch, if tolerated by client.
- Have client take a deep breath and then breathe out as he is moved to prevent him from performing a Valsalva's maneuver, which can cause hypotension.

SKILL 4-5

Assisting with a Bedpan or Urinal

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Bedpan
Bowel
Defecation
Elimination

Fracture pan
Toilet
Urinal
Urination



> OVERVIEW OF THE SKILL

Voiding and bowel elimination for the client confined to bed require a bedpan and/or a urinal. The bedridden client may have altered elimination patterns. Reduced mobility, pain, privacy issues, the need for assistance, delays in getting assistance when needed, and the fear of interruption can all alter normal elimination patterns.

Fear of creating embarrassing noises, sights, or odors may compel the client to reduce fluid intake or avoid the urge to eliminate while in the hospital. Constipation, embarrassment, incontinence, and discomfort can result. Sensitivity, proper technique, and client education by the nurse support the client on bedrest.

> ASSESSMENT

1. Assess your equipment. Do you have the necessary items within reach? **Prevents having to stop the procedure and leave the client's bedside.**
2. Assess how much the client can assist in positioning and removing the bedpan. **Determines how the procedure will be done and whether assistance will be required.**
3. Check whether the client is confused, combative, in traction, or immobile. **Determines how the procedure will be done and whether assistance will be required.**
4. Check for casts, braces, or dressings, which need to be protected from accidental contamination with waste products. **Determines how much preparation will need to be done prior to toileting.**
5. Check for privacy and unexpected interruptions. **Determines if extra steps need to be taken to ensure privacy prior to toileting.**

> DIAGNOSIS

- 1.3.1.1 Constipation
- 1.3.1.2 Bowel Incontinence
- 1.3.2.1.3 Urge Incontinence
- 1.3.2.2 Urinary Retention
- 6.5.4 Toileting Self-Care Deficit
- 7.1.2.2 Situational Low Self-Esteem
- 7.3.2 Powerlessness

> PLANNING

Expected Outcomes:

1. Clients will be able to void and defecate when necessary.
2. Clients will have as much privacy and comfort as allowable, given their physical condition.

3. Intake and output will be accurately measured as needed.
4. The urinal or bedpan will be placed without skin damage.
5. The bedpan will be removed and emptied without spillage.

Equipment Needed (see Figure 4-5-2):

- Bedpan (regular or fracture) or urinal
- Disposable gloves
- Bedpan cover
- Toilet paper
- Washcloth and towel



Figure 4-5-2 The bedpan and/or urinal are used for elimination when clients are confined to bed. A graduated container measures urine for intake and output records.



Estimated time to complete the skill:

10–15 minutes

> CLIENT EDUCATION NEEDED:

1. Educate the client about the need for using a bedpan instead of a bedside commode or bathroom.
2. Discuss privacy concerns.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Positioning a Bedpan

- | | |
|---|--|
| 1. Close curtain or door. | 1. Provides for privacy. |
| 2. Wash hands; apply gloves. | 2. Reduces the transmission of microorganisms. |
| 3. Lower head of bed so client is in supine position. | 3. The supine position will increase ability of client to move to side-lying position. |
| 4. Elevate bed. | 4. Ensures proper body mechanics. |
| 5. Assist client to side-lying position using side rail for support. | 5. Provides for best position for proper placement of bedpan. |
| 6. Warm bedpan under warm water if needed; powder if necessary (see Figure 4-5-3). | 6. For comfort; prevents bedpan from sticking to the skin. |
| 7. Place bedpan under buttocks. Place a fracture pan with the lower end near the client's lower back region. Place large bedpans with the opening near the client's thighs. | 7. Ensures proper placement of the bedpan before client rolls on top of bedpan. |
| 8. While holding the bedpan with one hand, help the client roll onto the back, while pushing against the bedpan (toward the center of the bed) to hold it in place. | 8. Prevents dislocation or alignment of bedpan. |

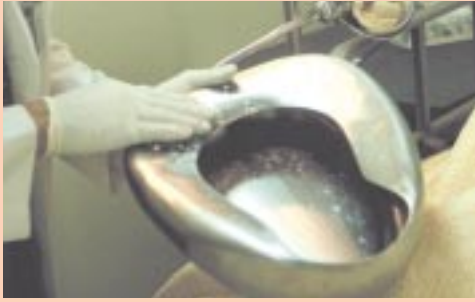


Figure 4-5-3 Applying powder to the bedpan prevents it from sticking to the skin.



Figure 4-5-4 A fracture pan is used when the client is unable to turn or raise hips.

9. Alternate: Help the client raise the hips using the overbed trapeze, and slide the pan in place. Alternate: If the client is unable to turn or raise hips, use a fracture pan instead of a bedpan. With a fracture pan, the flat side is placed toward the client's head (see Figure 4-5-4).
 10. Check placement of bedpan by looking between client's legs.
 11. If indicated, elevate head of bed to 45° angle or higher for comfort.
 12. Place call light within reach of client; place side rails in upright position, lower bed, and provide privacy.
 13. Remove gloves; wash hands.
- Positioning a Urinal**
14. Repeat Actions 1 and 2.
 15. Lift the covers and place the urinal so the client may grasp the handle and position it. If the client cannot do this, you must position the urinal and place the penis into the opening (see Figures 4-5-5 and 4-5-6).
 16. Remove gloves; wash hands.
- Removing a Bedpan**
17. Wash hands; apply gloves.
 18. Gather toilet paper and washing supplies.
9. Provides an alternate way to position the pan. Fracture pan reduces the amount of movement and lift required to place the pan.
 10. May prevent spillage due to misalignment of bedpan.
 11. Check order of physician or qualified practitioner; bed remains flat if client has a spinal cord injury or spinal surgery. Elevating the head of bed creates a more normal elimination position.
 12. Privacy allows for a more comfortable elimination environment; elevated side rails provide for safety.
 13. Reduces the transmission of microorganisms.
 14. See Rationales 1 and 2.
 15. Ensures proper placement of the urinal and reduces the risk of spillage.
 16. Reduces the transmission of microorganisms.
 17. Reduces the transmission of microorganisms.
 18. Having supplies at the bedside allows smooth and safe completion of the procedure.

Removing a Bedpan *continued*

Figure 4-5-5 Lift the covers and place the urinal. Allow the client to adjust the position.



Figure 4-5-6 If the client is unable to assist, place the penis into the opening of the urinal.

19. Lower head of bed to supine position.
20. While holding bedpan with one hand, roll client to side and remove the pan, being careful not to pull or shear skin sticking to the pan and being careful not to spill contents (see Figure 4-5-7).

19. Increases client's ability to move to side-lying position.
20. Prevents possible spillage of bedpan contents.

Figure 4-5-7 Roll the client to one side and remove the pan.



21. Assist with cleaning or wiping; always wipe with a front to back motion.
22. Empty bedpan (measure urine output if ordered), clean bedpan, and store it in proper place; if bedpan is to be emptied outside client's room, cover it during transport.
23. Remove soiled gloves. Wash hands.
24. Allow client to wash hands.
25. Place call light within reach; recheck that side rails are in the upright position.

21. Client may not be able to clean herself; wiping from front to back decreases chances of cross-contamination from anus to urethra.
22. Promotes privacy and decreases the chance of spilling contents.
23. Reduces the transmission of microorganisms.
24. Provides for physical hygiene and comfort.
25. Ensures client safety and comfort.

26. Wash hands.

26. Reduces the transmission of microorganisms.

Removing a Urinal

27. Wash hands and apply gloves.

27. Reduces the transmission of microorganisms.

28. Empty the urinal, measuring urine output if ordered, rinse the urinal and replace it within the client's reach.

28. Provides a way to measure the client's output. Keeping the urinal within reach promotes client autonomy.

29. Remove soiled gloves. Wash hands.

29. Reduces the transmission of microorganisms.

30. Allow client to wash hands.

30. Provides for physical hygiene and comfort.

31. Place call light within reach; recheck that side rails are in the upright position.

31. Ensures client safety and comfort.

32. Wash hands.

32. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

A 69-year-old woman was brought to the emergency room at approximately 3 AM with a fractured left hip. She had fallen in her home on her way to the bathroom. An IV inserted by paramedics at the scene has been running at a rapid rate for approximately 45 minutes. While waiting for the x-ray technician, the client appeared to be in distress but did not voice any complaints in the presence of the physician and the assistant. Alone with the nurse, the client explained that she had never made it to the bathroom and had to “go.” She was certain she could not void without a bedpan under her, but attempting to place the fracture pan was too painful. The nurse solved the problem by moving the fracture pan as close as possible so the client could feel it under her, then placing absorbent padding and blue pads to catch the voided urine.

Scenario 2

A nursing student was working in a busy unit where one bathroom served two rooms, with a door to each. The student very efficiently flung open the bathroom door and in one smooth motion emptied the bedpan directly onto the lap of the other client, who was sitting on the toilet and had forgotten to lock the doors. The student quickly learned to always look first.

> EVALUATION

- The client was able to void or defecate as needed.
- The client's request for assistance was answered promptly.
- The bedpan or urinal was removed and emptied without spillage.
- Ordered tests were performed and samples were collected.
- The client's skin integrity was maintained without skin shear or tearing.
- The client was provided with as much privacy and comfort as possible.

> DOCUMENTATION

Nurses' Notes

- Document elimination and voiding. Include color, odor, consistency and any unusual findings such as blood or mucus.

- Note any client complaints such as constipation or burning with urination.
- Document the condition of the client's skin.

Intake and Output Record

- Record the time the client voided and the amount of urine voided.

> CRITICAL THINKING SKILL

Introduction

Toileting is a very private personal activity, which has some unpleasant aspects. Some clients will be acutely embarrassed when they need assistance. The nurse must be as supportive as possible to lessen the discomfort of the client.

Possible Scenario

Mrs. Mun is an orthopedic client, confined to bed. In the evening, she needs to use the bedpan. Her anxiety

over hospitalization has increased her peristalsis, causing her to have a very loose, gassy stool. Without thinking, the nurse reacts to removing the bedpan with a grimace and a loud “Phew!!”

Possible Outcome

The client is mortified by the nurse's reaction. Her anxiety over toileting increases, and she avoids further urges to defecate, especially during the evening shift. She experiences distress and discomfort and eventually requires treatment for constipation.

Prevention

The nurse's facial expressions, verbalizations, and actions need to convey support and avoid indications of disgust or displeasure when assisting the client with toileting. Providing privacy, odor-eliminating spray, and talking with the client about embarrassment will help decrease the trauma of using a bedpan.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients often have thin, tender skin. Be careful not to shear or tear the skin when placing or removing the bedpan.
- Geriatric clients may have more difficulty with incontinence of urine or stool because of reduced muscle tone.
- The use of diuretics may increase the risk of incontinence.
- Reduced mobility in an elderly client may both increase the risk of constipation and increase the risk of incontinence because the client may not be able to “make it to the bathroom” in time. Clients may benefit by having a bedpan placed within reach.



Pediatric Variations:

- Children may be more comfortable with assistance from a parent.
- Adolescents may need extra privacy and control over their toileting time.



Home Care Variations:

- In the home care setting, the client does not have a call button. Make sure the client can summon you when needed.
- A pillowcase can be used as a bedpan cover in the home setting.
- A client who would be able to use a bedside commode in the hospital, but doesn't have one at home, can use a bedpan while sitting on the edge of the bed, or on a bedside chair. Make sure there is adequate support and handholds. Assess for the potential risk of falling.



Long-Term Care Variations:

- If the client is very thin, a folded towel placed on the bedpan to pad the bony sacrum area will increase comfort.

▼ VARIATIONS *continued*

- *If the bedpan will be used for an extended period of time, take extra care to keep the skin from sticking to the pan, which can increase the risk of pressure sores.*
- *The bedpan can contribute to breakdown over pressure points if the client is left on it too long.*
- *Try to promote independence in toileting when possible. Encourage the client to assist in positioning the pan and with perineal care as much as able.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not assist a male client to be as upright as possible to void.

Ask Yourself:

How do I prevent this error?

Prevention:

Males usually void standing up. Assist the client into the most normal position possible to ease elimination.

Possible Error:

Not cleaning the bedpan completely.

Ask Yourself:

How do I prevent this error?

Prevention:

Rinse the bedpan or urinal well. Be sure the outside is clean also. This eliminates odors and increases client comfort.

> NURSING TIPS

- Bedpans are uncomfortable. Warm the pan by running it under warm water; dry it and powder it with talcum or cornstarch to improve comfort.
- Place the towel or bedpan cover next to the side of the bed where you will be removing the pan. You may want to slip it between the mattress and springs so it is close and easy to reach after removing the pan.
- Never place a full bedpan on the bedside or overbed table. Place it on a blue pad on a chair or take it away immediately.
- Males voiding large amounts of urine may be more comfortable with a second urinal within reach.
- It may help to remind the client that elimination and defecation are normal parts of everybody's functioning. Assisting with these tasks does not make you uncomfortable or embarrassed.
- Leaving deodorant spray within reach of clients so they can use the spray after defecating can help reduce their embarrassment.
- Be aware that clients may have a regular schedule for bowel elimination, such as immediately after a meal, or at a certain hour of the day. Note any such pattern and offer the bedpan or urinal at the appropriate times.
- The need to void or defecate can be sudden and intense, and delays in providing a bedpan or urinal may lead to incontinence and patient embarrassment. Plan to offer privacy and the bedpan or urinal when the patient requests, and to be responsive to urgent requests.

SKILL 4-6

Assisting with Feeding

Valerie Coxen, RN, PhD, and Karrin Johnson, RN

KEY TERMS

Appetite
Feeding

Nutrition
Oral intake



> OVERVIEW OF THE SKILL

Many clients, because of illness, weakness, paralysis, or disorientation, are unable to take in the amount of nutrition required to sustain their bodies. If the client is able to swallow, oral feeding is preferred over tube feedings. Being fed involves complex cultural

and esteem issues for clients and their family. Food preferences are often very specific and highly personal. As much as possible, a client's food preferences should be respected to promote increased nutritional intake.

> ASSESSMENT

1. Assess the appropriateness of the ordered diet for the client's needs. The diet should take food preferences into consideration as well as abilities to swallow, chew, and digest foods.
2. Assess the client's needs for specialized utensils, a specialized feeding area, or even a certain layout of food on the tray. Mealtime should be as pleasant as possible, and the client should be provided with as many opportunities as possible to successfully enjoy the meal.
3. Assess the client's immediate nutritional needs. If clients are diabetic, their nutritional needs may vary from day to day and meal to meal. If clients are scheduled for lab tests or procedures, they may be NPO (nothing by mouth) until after the tests have been performed.
4. Assess the client's ability to chew and swallow. The food should be served in a manner appro-

- priate to the client's ability to chew and swallow while still being as palatable in taste and appearance as possible. Be aware of the possible need for thick liquids or foods with special textures.
5. Assess the client's level of understanding. Clients' level of understanding influences their ability to participate in eating the meal.

> DIAGNOSIS

- 1.1.2.1 Altered Nutrition: More than Body Requirements
- 1.1.2.2 Altered Nutrition: Less than Body Requirements
- 6.5.1 Feeding Self-Care Deficit
 - 6.5.1.1 Impaired Swallowing

> PLANNING**Expected Outcomes:**

1. Clients will ingest calories adequate for their body requirements.
2. Clients will report their appetite being satiated and that they are comfortable.

Equipment Needed:

- Food appropriate to the client's condition
- Any specialized utensils the client may require
- Protective covering for the client's gown or bed linen



Estimated time to complete the skill:
20–30 minutes

> CLIENT EDUCATION NEEDED:

1. If clients have trouble swallowing, encourage them not to talk while eating. Talking and eating at the same time may encourage choking.
2. Encourage clients to take small bites of food. This will make swallowing easier.
3. Educate the client or caregiver regarding the best foods for the client's needs. Thick food and fluids are easier to swallow than thin food and fluids. The client may need pureed food rather than food that is cut up into small pieces.
4. Teach the client to swallow twice after each bite. This encourages all the food to be swallowed and decreases the chance of choking or aspiration.
5. Teach the client to sit up for at least 15 minutes after eating to encourage digestion and help prevent reflux.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Help the client wash hands and face in preparation for eating. Clean the client's dentures if needed and give the client her glasses if appropriate. 3. Remove or move any unpleasant visual stimuli such as commodes, bedpans, and urinals. Be sure there are no unpleasant smells noticeable. 4. If possible, raise the head of the client's bed or have the client sit on the side of the bed or in a chair. 5. Check to be sure that the food presented is in fact this client's food and corresponds to what the client ordered. Be sure the food is in a form the client can eat. Check for the presence of any specialized utensils the client may require. Check for tubes, braces, or dressings that may make eating more difficult. 6. Place a napkin or protective cover over the client if needed. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. This promotes client comfort and helps clients prepare mentally for a pleasant experience. 3. Unpleasant sights and smells can decrease a client's appetite. 4. The upright position reduces the risk of aspiration and reflux. 5. The correct diet and the correct utensils promote increased intake. 6. Promotes cleanliness and improves client esteem. |
|---|---|

continues

7. Prepare the food on the tray in a manner that will help the client eat it. Cut up large pieces of food, open cartons and pour fluids (see Figure 4-6-2), open straws and place them in glasses (see Figure 4-6-3).



Figure 4-6-2 Prepare the food. Open cartons and cut up food if needed.

7. Doing some of the steps for the client encourages increased independence in the rest of the meal.



Figure 4-6-3 Place straws in cups and glasses to help the client drink.

8. If you will be feeding the client, try to sit at the client's eye level. Try to sit on the client's unaffected side if the client has one-sided weakness.
9. Allow the client to do as much as possible for herself during the meal (see Figures 4-6-4 and 4-6-5). Allow her to make choices regarding the order food is eaten, the speed at which she eats, and the amount she will eat. Do not hurry the client through her meal.



Figure 4-6-4 Promote client independence during the meal as much as possible.

8. This promotes a feeling of well-being and connection to the caregiver.
9. This promotes client independence and self-esteem. If hurried, a client may aspirate in the rush to finish the meal.



Figure 4-6-5 Encourage the client to feed himself as much as possible, and do not hurry the client through the meal.

10. Use this time as an opportunity to connect with the client. Discuss everyday subjects with the client, attempting to orient her if needed. Do not discuss stressful events with the client.

10. Clients often view mealtime as a conversational time, and feeling as though someone cares about them can help promote good nutrition via increased intake. Stressful topics at mealtime can delay digestion and decrease appetite, however.

11. When the client decides she is finished with the meal, remove the tray. Encourage the client to keep her head up or to continue to sit up for at least 15 minutes following the meal. Make sure the client is positioned properly and the call light is within reach (see Figure 4-6-6).

Figure 4-6-6 Place the call light within the client's reach.

11. This decreases the risk of reflux and aspiration.



12. Help the client to clean up following the meal. Allow her to wash her hands and face and clean her dentures if needed.

12. Helps promote client comfort.

13. Wash hands.

13. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

Penny was a client with advanced Huntington's disease. She had dementia and exaggerated choreiform movements, including thrashing and jerking, especially of her upper extremities. Penny was expending large amounts of energy and was often ravenously hungry but could not take in enough nutrition because of the high risk of aspiration. One day Penny was so hungry, she was gulping her food and choked. There was no portable suction available on the floor at the time. By the time a suction machine was brought to the bedside, and her breathing was restored, she had suffered brain damage. Nurses and nursing assistants caring for Penny needed to make sure suction was available and ready for immediate use when feeding her. Her risk of aspiration during feeding needed to be noted in the chart and at the bedside.

Scenario 2

Mrs. Scotts was an 87-year-old home care client. Once vibrant and active in community and charity events, she had experienced several strokes in the past year, which had left her almost completely disabled and very depressed. She slept most of the day and rarely spoke to friends or family. Mealtimes were often a dance of struggle and refusal. One day, her 93-year-old husband woke up early to make her a "special" breakfast—scrambled eggs, extra runny on toast, with a little nest of grape jelly buried inside the middle. That recipe was a secret they shared from many years ago, when they were newlyweds. The meal brought back vivid memories. They sat at her bedside, he fed her very slowly, and he talked to her about their lifetime and reminiscences together. She was more alert than she had been in weeks and was listening closely as she ate every bite. Later that day, she wanted to get up and go outside in her wheelchair for the first time in several months.

> EVALUATION

- Evaluate whether the client had an appetite for the meal.
- Evaluate whether there were certain foods that the client enjoyed more or less than others.
- Document any foods the client had trouble chewing or swallowing.
- Determine whether the meal was as relaxed and enjoyable as possible, given the limitations of the setting.
- Evaluate whether the client consumed adequate liquids with the meal.
- Evaluate whether the client's independence, intake, or enjoyment of the mealtime could be improved with alterations in the setting, meal time, or type of foods brought to the client.

> DOCUMENTATION

Nurses' Notes

- Document how much the client ate and how well the client tolerated the meal.
- Note any eating difficulties or food preferences the client exhibited.

Kardex

- Indicate any special preparation, utensils, or assistance the client needs while eating.
- Note the diet the client is on.
- Note any food preferences, allergies or restrictions.

Intake and Output Record

- Record the time and amount of fluid intake.

> CRITICAL THINKING SKILL

Introduction

A nurse was feeding an elderly man of the Jewish orthodox faith who could not assist himself. As she car-

ried the meal to the bedside, she noted that the meal slip indicated that the tray contained a kosher meal. She began to feed the client. After a few bites, she noticed there was no beverage on the tray, and the soup was clam chowder. She went to the floor refrigerator and obtained a carton of 2% milk.

Possible Scenario

The client resisted any attempts to be fed the meal. Impatient, the nurse tried to force the liquids—the chowder and the milk—on the client, who became increasingly agitated.

Possible Outcome

The client pushed the tray onto the floor and onto the nurse. He appeared angry and upset for several hours into the evening. He did not get his dinner and suffered emotional distress because of the mix-up and his inability to communicate his needs or control his environment. Later, the family paid a visit to the charge nurse and the hospital administrator, complaining that the client had been force-fed a meal that contained foods forbidden under Jewish law.

Prevention

As a nursing professional, this nurse needed to be aware of cultural, ethnic, and religious variations that might affect health care delivery. Orthodox Jews are not allowed to eat shellfish, and there are strict guidelines on how milk and meat are to be consumed. The nurse needed to check the chart for any cultural or religious food guidelines and to seek assistance if further clarification was needed. When this previously cooperative client became agitated, the nurse needed to stop and assess the situation, remembering the special dietary needs of this client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have teeth in poor condition, or dentures. Check to make sure dentures are in place before feeding. Pay attention to complaints of inability to chew, or dental pain.*
- *The elderly client may have a less responsive thirst mechanism. Pay special attention to fluid intake.*



Pediatric Variations:

- *Adolescents are influenced by peer groups and peer pressure regarding what, where, and when to eat. Provide choice and independence where possible, and encourage the adolescent to participate in dietary choices.*

▼ VARIATIONS *continued*

- Adolescents may be sensitive to needing assistance eating in front of others. Plan with the adolescent to set mealtimes and companionship.
- Children may do better if a parent helps them to eat.



Home Care Variations:

- Educate the primary caregiver who will be feeding the client. Educational needs include how to respond to choking, how to assist the client to eat while supporting their independence, and shopping for foods for clients on special diets. Monitor intake and output, watching for signs of malnutrition.
- Allow the client to assist in food preparation when possible. Remember, the home setting is where the individual is generally used to being more independent. Placing a spoonful of jam on toast, or other simple tasks, helps reduce the feeling of dependence on a caregiver and may help lessen feelings of helplessness or depression that arise from losing independence over basic care.



Long-Term Care Variations:

- For a client who has had a stroke, direct the food toward the unaffected side of the mouth.
- Long-term inactivity will decrease kilocaloric requirements because the individual is expending less energy in daily activities.
- Encouraging the intake of high-fiber foods and plenty of liquids will help the inactive client avoid constipation.
- Work with caregivers, friends, and family to have a familiar friend present at mealtimes to assist with meals when possible. Family and friends can create a more relaxed atmosphere and can make mealtime a social time as well.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Something on the bedside table along with the meal tray is mistaken for food and consumed by the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess with a critical eye. Remove any items that might be accidentally ingested. If a poisonous substance is ingested, review the emergency policy manual for accidental poisonings. Determine what was ingested, contact the physician, and follow the procedure manual for contacting the poison control center and initiating poisoning responses.

Possible Error:

The client receives the wrong tray or the wrong diet.

Ask Yourself:

How do I prevent this error?

Prevention:

Check the client's identification band. Check the chart to make sure the client's diet orders have not changed in the past several hours. Even if this is the right tray, still check that it is the right meal.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The meal is delayed and has become unappetizing.

Ask Yourself:

How do I prevent this error?

Prevention:

Make every effort to schedule procedures so they do not overlap with mealtimes. If the meal is delayed, check that foods are hot enough and/or cold enough to still be enjoyable.

> NURSING TIPS

- Carry extra straws and prewrapped forks and spoons during mealtimes to save steps if items are dropped or missing from the trays.
- Test hot foods by placing a small portion on the inside of your wrist prior to feeding.
- If it is hard to get clients to open their mouth or accept the food, try bringing an extra-small spoon, such as a demitasse spoon, to begin. Then move to a regular spoon as the client becomes more comfortable.
- Start the meal with extra-small bites until the client gets used to food in her mouth, and starts to taste the food.
- Start the meal with a sip of cool beverage to lubricate the inside of the mouth.
- Many clients are used to water with their meals. Water is usually not delivered on the food tray. Placing a cold glass of water on the tray will encourage oral intake of fluids and may improve clients' enjoyment of the meal.
- Allow the client to pick what foods to eat in what order and to pick unusual combinations of foods. Some clients will eat dessert first and should have that freedom of choice, even when being fed.
- Even though the client may appear to be chewing, check the oral cavity to make sure food is not being pocketed between the teeth and cheek.

SKILL 4-7

Bathing a Client in Bed

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. Delaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Axilla

Bath blanket

Canthus

Distal

Interdigit

Perineal

Proximal

Suprapubic

Umbilicus



> OVERVIEW OF THE SKILL

Bathing of clients is an essential component of nursing care. Whether the nurse performs the bath or delegates the activity to another health care provider, the nurse retains the responsibility for ensuring that the hygienic needs of the client are met. The type of bath provided will depend on the purpose of the bath and the client's self-care ability. The two categories of baths are cleaning and therapeutic. Cleaning baths are provided as routine client care. The purpose of a cleaning bath is personal hygiene. Following are the five types of cleaning baths:

1. Shower
2. Tub

3. Self-help, or assisted bed bath
4. Complete bed bath
5. Partial bath

For clients who are confined to bed, the bed bath is used to provide hygienic care. There are several variations of bed bath depending on the client's ability to assist with care. The complete bed bath is provided to dependent clients confined to bed. The nurse washes the client's entire body during a complete bed bath. A partial bed bath and a self-help bed bath are variations of the complete bed bath.

> ASSESSMENT

1. Assess the client's level of ability to assist with the bath. **Determine if the client is able to follow directions. Check the client's ability to assist with cleaning any portion of the body.**
2. Assess the client's level of comfort with the procedure. Check into potential cultural, sexual, or generational issues. **Determine whether the client is**

uncomfortable, tense, or nervous about being bathed by someone else.

3. Assess the environment. Verify that the equipment needed is available. Check whether clean, warm water is available. **Determine whether the need for modesty and privacy can be met. The environment should be conducive to a clean and comfortable procedure.**

> DIAGNOSIS

1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Clients will be cleaned without damage to their skin.
2. Clients' privacy will be maintained throughout the procedure.
3. Clients will participate in their own hygiene as much as possible.
4. Clients will not become overly tired or experience increased pain, cold, or discomfort as a result of the bath.

Equipment Needed (see Figure 4-7-2):

- Bath towels
- Washcloths
- Bath blanket
- Washbasin
- Soap
- Soap dish
- Lotion
- Deodorant
- Powder
- Clean gown
- Clean linen
- Disposable gloves



Estimated time to complete the skill:

30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need for routine cleanliness, especially if you note that the client does not seem to maintain a regular bathing routine.
2. Explain that bathing will help increase the client's comfort even though the client has not been doing anything to "get dirty."
3. Explain the step-by-step procedure of the bed bath so the client will know what to expect.



Figure 4-7-2 Emesis and bath basins, soap, towels, and lotion are used to bathe the client. A razor and shaving cream are used to groom the male client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Assess the client's preferences about bathing.
2. Explain procedure to client.
3. Prepare environment. Close doors and windows, adjust temperature, provide time for elimination needs, and provide privacy (see Figure 4-7-3).
4. Wash hands. Apply gloves. Gloves should be changed when emptying water basin.
5. Lower side rail on the side close to you. Position client in a comfortable position close to the side near you.

RATIONALE

1. Provides client opportunity to participate in care.
2. Enhances cooperation.
3. Protects from chills during bath and increases sense of privacy.
4. Reduces the transmission of microorganisms.
5. Prevents unnecessary reaching. Facilitates use of good body mechanics.



Figure 4-7-3 Close doors and/or curtains and provide privacy prior to beginning the bath.



Figure 4-7-4 Wet the washcloth and wring out the excess water. The nurse is wearing a mask because the client is in isolation.

6. If bath blankets are available, place bath blanket over top sheet. Remove top sheet from under bath blanket. Remove client's gown. Bath blanket should be folded to expose only the area being cleaned at that time. (Top sheets or towels may also be used for bath blankets.)
7. Fill washbasin two-thirds full. Permit client to test temperature of water with hand. Water should be changed when a soap film develops or water becomes soiled.
8. Wet the washcloth and wring it out (see Figure 4-7-4).
9. Make a bath mitten with the washcloth. To make a mitten, grasp the edge of the washcloth with the thumb; fold a third over the palm of the hand; wrap remainder of cloth around hand and across palm, grasping the second edge under the thumb; fold the extended end of the washcloth onto the palm and tuck under the palmar surface of the cloth.
10. Wash the face (see Figure 4-7-5). Ask the client about preference for using soap on the face. Use a separate corner of the washcloth for each eye, wiping from inner to outer canthus. Wash neck and ears. Rinse and pat dry. Male clients may want to shave at this time. Provide assistance with shaving as needed.
11. Wash arms, forearms, and hands (see Figure 4-7-6). Wash forearms and arms using long,
 6. Prevents exposure of client. Promotes privacy. Protects from chills.
 7. Prevents accidental burns or chills.
 8. Prevents unnecessarily wetting of client.
 9. Prevents ends of washcloth from dragging across skin. Promotes friction during bath.
 10. Some clients may not use soap on their face. Using separate corners of washcloth reduces risk of transmitting microorganisms. Patting dry reduces skin irritation and drying.
 11. Long strokes promote circulation. Soaking hands softens nails and loosens soil from skin

continues



Figure 4-7-5 Wash the client's face first.



Figure 4-7-6 Wash the hands and arms next.

firm strokes in the direction of distal to proximal (see Figure 4-7-7). Arm may need to be supported while being washed. Wash axilla. Rinse and pat dry. Apply deodorant or powder if desired. Immerse client's hand into basin of water. Allow hand to soak about 3–5 minutes. Wash hands, interdigit area, fingers, and fingernails. Rinse and pat dry.



Figure 4-7-7 Wash from distal to proximal—from hands to forearms to upper arms.

and nails. Strokes directed distal to proximal promote venous return.



Figure 4-7-8 Place feet in basin. Clean interdigits and soles of feet.

12. Wash chest and abdomen. Fold bath blanket down to umbilicus. Wash chest using long, firm strokes. Wash skin fold under the female client's breast by lifting each breast. Rinse and pat dry. Fold bath blanket down to suprapubic area. Use another towel to cover chest area. Wash abdomen using long, firm strokes. Rinse and pat dry. Replace bath blanket over chest and abdomen. Cover chest or abdomen area in between washing, rinsing, and drying to prevent chilling.

13. Wash legs and feet. Expose leg farthest from you by folding bath blanket to midline. Bend the leg at the knee. Grasp the heel, elevate the leg from the bed, and cover bed with bath towel. Place washbasin on towel. Place client's

12. Promotes privacy and prevents chills. Long strokes promote circulation. Perspiration and soil collect within skin folds.

13. Supports joints to prevent strain and fatigue. Soaking foot loosens dirt, softens nails, and promotes comfort.

foot into washbasin (see Figure 4-7-8). Allow foot to soak while washing the leg with long, firm strokes in the direction of distal to proximal. Rinse and pat dry. Clean soles, interdigits, and toes. Rinse and pat dry. Perform same procedure with the other leg and foot.

14. Wash back. Assist client into prone or side-lying position facing away from you. Wash the back and buttocks using long, firm strokes. Rinse and pat dry. Give back rub and apply lotion.

15. Perineal care: Assist client to supine position. Perform perineal care (see Figures 4-7-9 and 4-7-10).



Figure 4-7-9 Wash perineal area.

14. Exposes back and buttocks for washing. Back rub promotes relaxation and circulation.

15. Removes genital secretions and soil.



Figure 4-7-10 Dry perineal area carefully to prevent moisture from contributing to skin irritation or skin breakdown.

16. Apply lotion and powder as desired. Apply clean gown.

17. Document skin assessment, type of bath given, and client outcomes and responses.

18. Wash hands.

16. Lotion lubricates skin. Powder absorbs excess perspiration.

17. Provides evidence of nursing care.

18. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Nurse Duncan was assigned the newly admitted client from the emergency room, Mrs. White. She was an elderly woman admitted with a diagnosis of malnutrition. While doing the initial admission examination, the nurse noted that Mrs. White's hair was matted and her clothes and skin were quite dirty. After finishing the admission exam, Nurse Duncan set Mrs. White up for a bed bath. Mrs. White was weak and unable to assist much with the bath. During the bed bath, Nurse Duncan noticed small white spots, resembling dandruff, adhering to Mrs. White's pubic hair. Nurse Duncan finished Mrs. White's bath and proceeded to the nurse's station to chart his findings. While seated at the nurse's station, Nurse Duncan mentioned the white spots he had found while bathing Mrs. White. The charge nurse asked Nurse Duncan to show her the spots. Upon examination the charge nurse noted that the white spots were, in fact, nits, or the white ovoid eggs deposited by lice. The charge nurse then checked for, and found, pubic lice. Nurse Duncan notified Mrs. White's doctor, who prescribed medicated shampoo for both Mrs. White and Nurse Duncan.

> EVALUATION

- The client was cleaned adequately without skin damage.
- The client's modesty was maintained throughout the procedure.
- The client participated in the procedure as much as possible.
- The client remained comfortable during the procedure.

> DOCUMENTATION

Nurses' Notes

- Note that the client was bathed. Indicate how much of the bath the client assisted with and how well the client tolerated the activity.
- Note any unusual findings including rashes, open sores, poor turgor, and so on.

> CRITICAL THINKING SKILL

Introduction

Wash from the cleanest area to the dirtiest.

Possible Scenario

You are bathing Mr. Marshall. His biggest complaint at this time is that his wound site is draining and caus-

ing itching and discomfort. He is insistent that you wash around his dressing before doing anything else. You wash the skin around his dressing and note that the site is draining and the dressing is wet with drainage. You had already planned to change his dressing following the bath, and this decision is reinforced as you wash the skin around the dressing. Once Mr. Marshall is more comfortable at the dressing site, you rinse the washcloth in the basin and proceed to complete Mr. Marshall's bath.

Possible Outcome

If Mr. Marshall's wound is infected, you are potentially infecting other sites on Mr. Marshall's body while finishing his bath.

Prevention

Always wash from cleanest to dirtiest areas and change the bathwater when it becomes contaminated or soiled or has a soapy scum on the surface. Warm water and a wet washcloth are excellent media for contamination and infection. When performing routine care, ask yourself how you would feel about this procedure. If you would not be comfortable using the same washcloth and bathwater that had just been used to clean wound drainage, the client probably won't like it either.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients often have very thin skin. Handle the skin carefully to avoid tearing or shearing the delicate tissue.*
- *The bath is an excellent opportunity to scan the skin for possible skin cancers. Review photos of the basic appearance of skin cancers in a dermatology text or web site so they are recognizable to you.*
- *Make sure to check for hearing aids, and remove them prior to bathing the head and neck area. Water can damage many hearing aids.*
- *Be sure to replace necessary items such as eyeglasses, call light, bedside lighting, and hearing aids after the bath to help the elderly client remain independent.*



Pediatric Variations:

- *Children are easily embarrassed about strangers seeing and touching their bodies. Be sure to explain everything you are doing and why. Be sure to preserve the child's modesty as much as possible.*
- *With the heightened awareness regarding inappropriate touching, be aware of how you touch children while caring for them. If possible, have an appropriate family member present when you bathe a child.*
- *Make bath time play therapy if possible. A smaller child may enjoy playing with the slippery soap or hearing a nursery rhyme or song that changes with each part of the bath.*

▼ VARIATIONS *continued*

- *Adolescents may be especially concerned over body image. The focus on the body during the bath draws attention to changes in body image due to illness or surgery. Be sensitive and practice active listening to help adolescents communicate their concerns.*



Home Care Variations:

- *Take extra care not to spill bathwater or soak the mattress in the home care setting. It may not be protected with a waterproof cover like those in the hospital. Bring along protective linens to protect the bed against accidental spills.*
- *In the more relaxed home care setting, the bath can be a perfect opportunity to do range of motion and gentle stretching exercises.*



Long-Term Care Variations:

- *Focus on independence and autonomy in the bathing process as much as possible to help clients avoid developing unnecessary dependence on caretakers. A feeling of being overly dependent on others for basic care can lead to lowered self-esteem and possibly depression.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not change the bathwater and washcloth often enough.

Ask Yourself:

How do I prevent this error?

Prevention:

Frequently assess the condition of the water, washcloth, and towels you are using. Are they clean and uncontaminated? Are the towels dry enough to dry the client's skin or so wet they are just pushing water around? How soapy is this washcloth? How soapy is the water? Is the soap floating in the water, keeping it from being clear enough to rinse with? When did you change the water last? How would you feel about bathing in the water now in the washbasin? Take the time to change the bathwater frequently and be sure to use enough linen to do the job right.

> NURSING TIPS

- Be sure to rinse the soap off the client well. Soap can cause drying and chafing.
- Be sure to dry the client well, especially in skin folds and areas that rub together often. Leaving water in these areas can cause cracking and irritation.
- Use this time to assess the client's skin integrity. Do you see any rashes, open areas, or reddened areas?
- Encourage clients to assist in the bath as much as they are able. Self-care of basic needs is a way to maintain a sense of control and self-esteem during illness.

SKILL 4-8

Oral Care

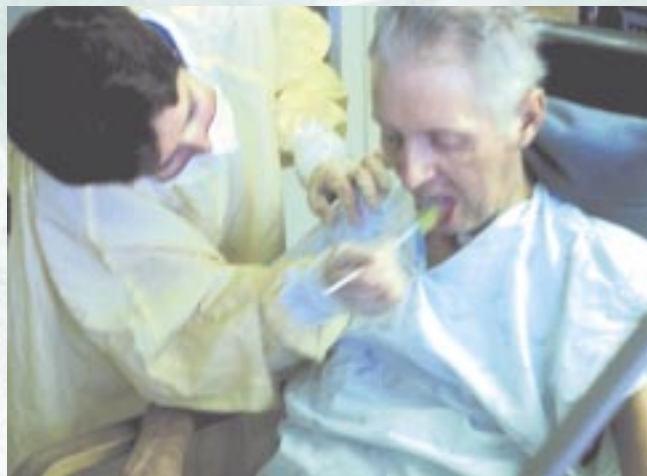
Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Caries
Dentifrice
Gingivitis
Halitosis

Hydrogen peroxide
Plaque
Pyorrhea
Stomatitis



> OVERVIEW OF THE SKILL

The oral cavity functions in mastication, secretion of mucus to moisten and lubricate the digestive system, secretion of digestive enzymes, and absorption of essential nutrients. Common problems occurring in the oral cavity include the following:

- Bad breath (halitosis)
- Dental cavities (caries)
- Plaque
- Periodontal disease
- Inflammation of the gums (gingivitis)
- Inflammation of the oral mucosa (stomatitis)

Poor oral hygiene and loss of teeth may affect a client's social interaction and body image as well as nutritional intake. Daily oral care is essential to maintain the integrity of the mucous membranes, teeth, gums, and lips. Through preventive measures, the oral cavity and teeth can be preserved. Preventive oral care consists of fluoride rinsing, flossing, and brushing.

Fluoride

Researchers have determined that fluoride can prevent dental caries. This finding has led to the fluoridation of water supplies in many communities. Fluoride

is a common component of many mouthwashes and toothpastes. However, people with excessive dryness or irritated mucous membranes should avoid commercial mouthwashes because of the alcohol content, which causes drying of mucous membranes.

Fluoride supplements are available without a prescription. Infants as young as 2 weeks of age can be given fluoride drops to prevent dental caries. Nurses should educate clients about fluoride being an excellent preventive measure against dental caries. However, excessive fluoride exposure can affect the color of tooth enamel.

Flossing

Flossing should be performed daily in conjunction with brushing of teeth. Flossing prevents the formation of plaque, removes plaque between the teeth, and removes food debris. Dental caries and periodontal disease can be prevented by regular flossing. There are several methods of flossing. The nurse should instruct the client to use the technique that is most comfortable. Some clients find holding the floss difficult. There are many floss holders available to facilitate flossing.

Brushing

Teeth should be brushed after each meal. Brushing should be performed using a dentifrice (toothpaste) that contains fluoride to aid in preventing dental caries. An effective homemade dentifrice is the com-

bination of two parts salt with one part baking soda. Brushing removes plaque and food debris and promotes blood circulation of the gums. Dentures should be brushed using the same brushing motion as that used for brushing teeth.

> ASSESSMENT

1. Assess whether the client is able to assist with oral care and to what extent. **Promotes independence where possible.**
2. Evaluate whether the client has an understanding of proper oral hygiene. **Promotes self-care and teaching.**
3. Check whether the client has dentures. **Determines how oral care will be performed.**
4. Assess the condition of the client's mouth. **Determines how oral care will be performed.**
5. Assess whether inflammation, bleeding, infection, or ulceration is present. **Determines how oral care will be performed. Determines the need for additional assessment and intervention.**
6. Assess what cultural practices must be taken into consideration. **Determines how oral care will be performed.**
7. Assess whether there are any appliances or devices present in the client's mouth such as braces, endotracheal tube, or bridgework. **Determines how oral care will be performed.**
8. Check that the proper equipment is available to perform oral care. **Ensures a smooth procedure.**



Figure 4-8-2 Toothbrush, dental floss, mouthwash, and emesis basin are all used in providing oral care.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.1 Altered Oral Mucous Membrane
- 6.5.2 Bathing/Hygiene Self-Care Deficit
- 8.1.1 Knowledge Deficit/Oral Hygiene

> PLANNING

Expected Outcomes:

1. Client's mouth, teeth, gums, and lips will be clean and free of food particles.
2. Any inflammation, bleeding, infection, or ulceration present will be noted and treated.
3. The oral mucosa will be clean, intact, and well hydrated.

Equipment Needed (see Figure 4-8-2):

Brushing and Flossing

- Toothbrush
- Toothpaste with fluoride
- Emesis basin
- Towel
- Cup of water
- Nonsterile gloves
- Dental floss
- Mirror
- Lip moisturizer

Denture Care (see Figures 4-8-3 and 4-8-4)

- Denture brush
- Denture cleaner
- Emesis basin
- Towel
- Cup of water
- Nonsterile gloves
- Tissue
- Denture cup

Special Care Items for Clients with Impaired Physical Mobility or Who Are Unconscious (comatose)

- Soft toothbrush or toothette
- Tongue blade



Figure 4-8-3 Denture brush and denture cup are added to oral care equipment when the client has full or partial dentures.



Figure 4-8-4 Dentures may include full upper or lower plates, or partial plates.

- 3 × 3 Gauze sponges
- Cotton-tip applicators
- Prescribed solution
- Plastic Asepto syringe
- Suction machine and catheter

> CLIENT EDUCATION NEEDED:

1. Teach the client the importance of daily oral care, including flossing, fluoride, and brushing.
2. Instruct the client regarding brushing all surfaces of the teeth.



Estimated time to complete the skill:
20 minutes

3. Instruct the client regarding the importance of flossing between all teeth.
4. Infants may benefit from fluoride drops as a supplement. Educate the child’s family regarding the benefits of fluoride, even for very young children.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Self-Care Client: Flossing and Brushing

1. Assemble articles for flossing and brushing.
2. Provide privacy.
3. Place client in a high-Fowler’s position (see Figure 4-8-5).
4. Wash hands and apply gloves.
5. Arrange articles within client’s reach.
6. Assist client with flossing and brushing as necessary. Position mirror, emesis basin, water with straw near the client and a towel across the chest (see Figure 4-8-6).

1. Promotes efficiency.
2. Relaxes the client.
3. Decreases risk of aspiration.
4. Reduces the transmission of microorganisms.
5. Facilitates self-care.
6. Flossing and brushing decrease microorganism growth in the mouth. Use of mirror permits cleaning back and sides of teeth.



Figure 4-8-5 Place client in sitting position in a chair or in bed if possible.



Figure 4-8-6 Promote independence, but assist with flossing or brushing as necessary.

7. Assist client with rinsing mouth.
8. Reposition client, raise side rails, and place call button within reach.
9. Rinse, dry, and return articles to proper place.
10. Remove gloves, wash hands, and document care.

Self-Care Client: Denture Care

11. Assemble articles for denture cleaning.
12. Provide privacy.
13. Assist client to a high-Fowler's position.
14. Wash hands and apply gloves.
15. Assist client with denture removal:
 - a. Top denture:
 - With tissue, grasp the denture with thumb and forefinger and pull downward.
 - Place in denture cup.
 - b. Bottom denture:
 - Place thumbs on the gums and release the denture. Grasp denture with thumb and forefinger and pull upward.
 - Place in denture cup.
16. Apply toothpaste to brush, and brush dentures either with cool water in the emesis basin or under running water in the sink. Pad sink with towel to protect dentures in case they are dropped.

7. Removes toothpaste and oral secretions.
8. Promotes comfort, safety, and communication.
9. Promotes a clean environment.
10. Reduces the transmission of microorganisms and documents nursing care.

11. Promotes efficiency.
12. Relaxes the client.
13. Facilitates removal of dentures.
14. Reduces the transmission of microorganisms and exposure to body fluids.
15. Breaks seal created with dentures without causing pressure and injury to oral membranes. Prevents breaking of dentures.
16. Facilitates removal of microorganisms.

Self-Care Client: Denture Care *continued*

17. Rinse thoroughly.
18. Assist client with rinsing mouth and replacing dentures.
19. Reposition client, with side rails up and call button within reach.
20. Rinse, dry, and return articles to proper place.
21. Remove gloves, wash hands, and document care.

Full-Care Client: Brushing and Flossing

22. Assemble articles for flossing and brushing.
23. Provide privacy.
24. Wash hands and apply gloves.
25. Position client as condition allows: high-Fowler's; semi-Fowler's; or lateral position, head turned toward side (see Figure 4-8-7).



Figure 4-8-7 If client is unable to sit up, turn head to the side.

26. Place towel across client's chest or under face and mouth if head is turned to one side.
27. Moisten toothbrush, apply small amount of toothpaste, and brush teeth and gums.
28. Grasp the dental floss in both hands or use a floss holder and floss between all teeth, hold-

17. Removes toothpaste.
18. Freshens mouth and facilitates intake of solid food.
19. Promotes comfort, safety, and communication.
20. Maintains a clean environment.
21. Reduces the transmission of microorganisms and documents nursing care.

22. Promotes efficiency.
23. Relaxes client.
24. Reduces the transmission of microorganisms and exposure to body fluids.
25. Decreases risk of aspiration.



Figure 4-8-8 After completing oral care, dry the lips and face gently and carefully.

26. Catches secretions.
27. Moistens mouth and facilitates plaque removal.
28. Removes plaque and prevents gum disease.

ing floss against tooth while moving floss up and down sides of teeth.

- | | |
|---|---|
| <p>29. Assist the client in rinsing mouth.</p> <p>30. Reapply toothpaste and brush the teeth and gums using friction in a vertical or circular motion. On inner and outer surfaces of teeth, hold brush at 45° angle against teeth and brush from sulcus to crowns of teeth. On biting surfaces, move brush back and forth in short strokes. All surfaces of teeth should be brushed from every angle.</p> <p>31. Assist the client in rinsing and drying mouth (see Figure 4-8-8).</p> <p>32. Apply lip moisturizer, if appropriate.</p> <p>33. Reposition client, raise side rails, and place call button within reach.</p> <p>34. Rinse, dry, and return articles to proper place.</p> <p>35. Remove gloves, wash hands, and document care.</p> | <p>29. Removes toothpaste and oral secretions.</p> <p>30. Permits cleaning of back and sides of teeth and decreases microorganism growth in mouth.</p> <p>31. Removes toothpaste and oral secretions.</p> <p>32. Maintains skin integrity of lips.</p> <p>33. Promotes comfort, safety, and communication.</p> <p>34. Provides an orderly environment.</p> <p>35. Reduces the transmission of microorganisms and documents nursing care.</p> |
|---|---|

Clients at Risk for or with an Alteration of the Oral Cavity

- | | |
|---|---|
| <p>36. Assemble articles for flossing and brushing.</p> <p>37. Provide privacy.</p> <p>38. Wash hands and apply gloves.</p> <p>39. Bleeding:</p> <ol style="list-style-type: none"> a. Assess oral cavity with a padded tongue blade and flashlight for signs of bleeding. b. Proceed with the actions for oral care for a full-care client except: <ul style="list-style-type: none"> • Do not floss. • Use a soft toothbrush, toothette, or a tongue blade padded with 3 × 3 gauze sponges to gently swab teeth and gums. • Dispose of padded tongue blade into a biohazard bag according to institutional policy. • Rinse with tepid water. | <p>36. Promotes efficiency.</p> <p>37. Relaxes client.</p> <p>38. Reduces the transmission of microorganisms and exposure to body fluids.</p> <p>39.</p> <ol style="list-style-type: none"> a. Determines whether bleeding is present, amount, and specific areas. <ul style="list-style-type: none"> • Decreases risk of bleeding and trauma to gums. • Decreases risk of bleeding and trauma to gums. • Promotes proper disposal of contaminated waste. • Cleanses mouth. |
|---|---|

continues

Clients at Risk for or with an Alteration of the Oral Cavity *continued*

40. Infection:

- a. Assess oral cavity with a tongue blade and flashlight for signs of infection.
- b. Culture lesions as ordered.
- c. Proceed with the actions for oral care for a full-care client except:
 - Do not floss.
 - Use prescribed antiseptic solution.
 - Use a tongue blade padded with 3 × 3 gauze sponges to gently swab the teeth and gums.
 - Dispose of padded tongue blade into a biohazard bag according to institutional policy.
 - Rinse mouth with tepid water.
 - Apply additional solution as prescribed.

41. Ulceration:

- a. Assess oral cavity with a tongue blade and flashlight for signs of ulceration.
- b. Culture lesions as ordered.
- c. Proceed with actions for oral care for a full-care client except:
 - Do not floss.
 - Use prescribed antiseptic solution.
 - Use a tongue blade padded with 3 × 3 gauze sponges to gently swab the teeth and gums.
 - Dispose of padded tongue blade into a biohazard bag according to institutional policy.
 - Rinse mouth with tepid water.
 - Apply additional solution as prescribed.

Unconscious (Comatose) Client

42. Assemble articles for flossing and brushing.

43. Provide privacy.

44. Wash hands and apply gloves.

45. Explain the procedure to the client.

46. Place the client in a lateral position, head turned toward the side.

40.

- a. Determines appearance, integrity, and general condition.
- b. Identifies growth of specific microorganisms.
 - Prevents irritation, pain, and bleeding.
 - Antiseptic solutions decrease growth of microorganisms.
 - Promotes proper disposal of contaminated materials.
 - Cleanses mouth.
 - Provides a coating that promotes healing of the tissue.

41.

- a. Determines appearance, integrity, and general condition.
- b. Identifies growth of specific microorganisms.
 - Prevents irritation, pain, and bleeding.
 - Antiseptic solutions decrease growth of microorganisms.
 - Promotes proper disposal of contaminated materials.
 - Cleanses mouth.
 - Provides a coating that promotes healing of the tissue.

42. Promotes efficiency.

43. Relaxes client.

44. Reduces the transmission of microorganisms and exposure to body fluids.

45. Demonstrates respect for the client.

46. Prevents aspiration.

- | | |
|--|--|
| <p>47. Use a floss holder and floss between all teeth.</p> | <p>47. Prevents transfer of microorganisms from a client bite.</p> |
| <p>48. Moisten toothbrush, and brush the teeth and gums using friction in a vertical or circular motion. Do not use toothpaste. On inner and outer surfaces of teeth, hold brush at 45° angle against teeth and brush from sulcus to crowns of teeth. On biting surfaces, move brush back and forth in short strokes. All surfaces of teeth should be brushed from every angle.</p> | <p>48. Permits cleaning of back and sides of teeth and decreases microorganism growth in mouth. Toothpaste may foam and cause aspiration.</p> |
| <p>49. After flossing and brushing, rinse mouth with an Asepto syringe (do not force water into the mouth) and perform oral suction.</p> | <p>49. Promotes cleansing and removal of secretions and prevents aspiration.</p> |
| <p>50. Dry the client's mouth.</p> | <p>50. Prevents skin irritation.</p> |
| <p>51. Apply lip moisturizer.</p> | <p>51. Maintains skin integrity of lips.</p> |
| <p>52. Leave the client in a lateral position with head turned toward side for 30 to 60 minutes after oral hygiene care. Suction one more time. Remove the towel from under the client's mouth and face.</p> | <p>52. Prevents pooling of secretions and aspiration.</p> |
| <p>53. Dispose of any contaminated items in a bio-hazard bag and clean, dry, and return all articles to the appropriate place.</p> | <p>53. Promotes proper disposal of contaminated materials.</p> |
| <p>54. Remove gloves, wash hands, and document care.</p> | <p>54. Reduces the transmission of microorganisms and documents nursing care.</p> |



▼ REAL WORLD ANECDOTES

Scenario 1

Nurse Rodriguez was assigned to care for Mr. Cunningham, a comatose, intubated client. Previous caregivers had charted that oral care had been performed and nothing unusual had been noted. When Nurse Rodriguez started Mr. Cunningham's oral care, she noticed that the interior of his mouth looked unusual. After repositioning the endotracheal tube, she found maggots thriving in Mr. Cunningham's mouth. Oral care and charting took longer than Nurse Rodriguez had expected that day.

Scenario 2

Mr. Chang, a client in the V.A. hospital for treatment of lung cancer, was experiencing a lot of nausea, dry mouth, cracked lips, and general discomfort. He was also experiencing a sense of loss of control and helplessness because he spent most of his day in bed waiting for tests and treatments. The nurse recognized his need for increased control over his care. She set him up with a pitcher and basin, soft toothettes, toothpaste, mouthwash, and lip balm. Mr. Chang was able to perform his own oral care as frequently as he desired. His comfort level improved, and his sense of control improved as well.

> EVALUATION

- The client's mouth, teeth, gums, and lips are clean and free of food particles.
- Inflammation, bleeding, infection, or ulceration was noted and cared for.
- The oral mucosa is clean, intact, and well hydrated.
- The oral care was performed with a minimum of trauma to the client.

> DOCUMENTATION

Nurses' Notes or Care Flow Sheet

- Note any unusual findings.

> CRITICAL THINKING SKILL

Introduction

Simple oral care can be a life-threatening procedure if not performed correctly.

Possible Scenario

You have been assigned to perform oral care on Mr. Foster, a confused and very debilitated client. You have positioned Mr. Foster on his side with an emesis basin under his mouth. While rinsing his mouth, Mr. Foster begins to choke.

Possible Outcome

If the choking is not dealt with immediately, Mr. Foster could aspirate the fluid, leading to pneumonia or apnea resulting in death.

Prevention

If a client chokes on the fluids used for oral care, position the head and mouth downward farther to allow gravity to drain the fluid. If this is not effective, hyperextend the neck and perform oral-pharyngeal suctioning to remove the fluid. Always have suction readily available when there is any possibility of aspiration during oral care.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients often wear dentures. Wet dentures are slippery; take care not to drop them in the sink and possibly break them. Broken dentures cause undue stress, extra expenses, lack of nutrition, and possibly mouth sores from adjusting to new dentures. Fill the sink halfway with water or pad the bottom of the sink with a towel to break the fall of the dentures if dropped.*
- *Assess an elderly denture wearer's mouth carefully for ulceration or inflammation caused by poorly fitting dentures.*



Pediatric Variations:

- *Children who don't have teeth yet should have their gums massaged and cleaned with a soft gauze.*
- *Be aware that children might bite. Keep your fingers out of harm's way.*
- *Use a pea-sized amount of toothpaste on child's toothbrush as the child often swallows toothpaste. Ingesting too much toothpaste causes excess fluoride consumption, which can affect tooth coloration.*
- *Braces or orthodontic appliances may require special handling. A child with appliances may need more thorough oral care to clean all surfaces of the appliance as well as the teeth. Ask the client or the client's parents about any special oral care needs the child may have and how to remove orthodontic devices, if applicable.*
- *Infants may benefit from fluoride drops given as a supplement.*
- *Children might be more comfortable using their own toothbrush or toothbrush brand. Parents can bring in these items.*



Home Care Variations:

- *Oral care is especially important for clients who are receiving oxygen. Oxygen is drying to the mucous membranes. Teach home care clients the importance of diligent oral care.*
- *If clients have dentures, teach them or their caregivers to remove the upper dentures first and then the lower dentures.*

▼ VARIATIONS *continued*

- When replacing dentures in the mouth, the upper dentures should be placed first.
- When storing dentures in water a few drops of white vinegar or mouthwash in the water can help prevent odor from clinging to the dentures.



Long-Term Care Variations:

- Clients with nasogastric tubes or feeding tubes require diligent oral care. Their mouths are at a higher risk of dehydration, leading to cracking, bleeding, and infections.
- Don't use oral care products that contain lemon juice, which can etch the teeth, or glycerin, which actually absorbs moisture from the tissues.
- In unconscious clients an oral cleansing solution of hydrogen peroxide and water (half and half; or one part peroxide to three parts water; or one third water, one third peroxide, and one third mouthwash) may be used. If the stronger solution causes discomfort, use a weaker solution by increasing the percentage of water.
- In some facilities, milk of magnesia or buttermilk has been used in the oral care of unconscious clients. Both of these products can cause caries, so a noncarious solution, such as peroxide and water, is now preferred.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Oral care is not done frequently enough.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about how often you brush your teeth and clean your mouth. Be aware of your client's comfort, especially if the client is unable to ask for himself. In the conscious client, offer oral care opportunities frequently, especially if the patient is NPO. In the unconscious client, perform oral care at least as often as you would do it for yourself. Remember that unconscious clients often mouth breathe, and they require oral care more frequently than a conscious person.

> NURSING TIPS

- Never place your fingers in a client's mouth. A bite block or padded tongue blade can be used to hold the client's mouth open.
- The unconscious client's head should be turned to one side with a basin placed under the mouth. Oral suction should be available. Only small amounts of water should be used.
- Be careful when handling and cleaning dentures or other oral appliances. They can be slippery when wet and may break if dropped into the sink or on the floor.
- Clients with orthodontic appliances may have special oral care needs. Ask the client or the client's parents about any special cleaning needs or special appliance care.
- Avoid using oil-based products around oxygen and oxygen equipment because oil and grease are flammable. Petroleum jelly may be used on clients receiving oxygen, but it should not be used on oxygen equipment.

SKILL 4-9

Perineal and Genital Care

Pam Talley, MN, CNS

KEY TERMS

Circumcised
Foreskin
Glans penis
Incontinence
Lochia

Peri-care
Perineum
Postpartum care
Smegma
Vulva



> OVERVIEW OF THE SKILL

The perineum is the external structure of the pelvic floor. It is composed of the skin and muscle surrounding the genitalia; it is the area between the scrotum and anus in the male and between the vulva and anus in the female. Care of the perineum and genitalia is directed toward maintaining a hygienic perineal environment. Perineal and genital care is usually self-care; however, alterations in the client's ability to perform self-care or alterations in the perineum and genitalia are reasons for nurses or other care providers to perform this skill. Perineal and genital care is an emotionally and culturally difficult subject. Many cultures have specific beliefs and taboos regarding the perineal/genital area. Many people are embarrassed by the idea of anyone else seeing or touching their genitals, particularly a stranger. The nurse must be aware of these possibilities when approaching genital/perineal care. In general, a professional, nonjudgmental approach will put the client more at ease with the procedure. Ask the client or the client's caregiver if possible about any preferences the client may have in this area. During labor, amniotic fluid, urine, and feces may be expelled. While the client is ambulatory, encourage frequent peri-care with urination. If the client is anesthetized, perform frequent peri-care to prevent infection and before any invasive procedure such as vaginal examination, internal monitoring, or rupture of membranes.

Obstetrics presents special perineal care needs. In the postpartum period for vaginal birth: If the client is ambulatory, perform peri-care at the toilet. Use a peri-bottle with water at a temperature comfortable to the mother. Teach her to use the entire contents of the bottle and spray from the front to the back, across the perineum (not into the vagina) to remove urine and fecal material. If there is an episiotomy or laceration, she will want to blot with tissue or a washcloth until the perineum is no longer sore. Also, if perineal medications are to be used (witch hazel, topical anesthetics, and so on), teach the client to do this with each urination and to use a clean sanitary pad. Ice should be considered to help alleviate pain and edema.

In the postpartum period for Cesarean birth: Until the mother is ambulatory, peri-care must be performed in the bed. Assist the mother to a bedpan, which has been padded underneath with waterproof pads. Use the water bottle to spray vaginal secretions from the perineum from the front to the back, across the perineum (not into the vagina). If an episiotomy is present, apply perineal medications as required and consider ice compresses for the first 12 hours to alleviate pain and edema. Once the mother is ambulatory, this care may be performed at the toilet and the client instructed in the technique.

> ASSESSMENT

1. Evaluate client status: level of consciousness, ability to ambulate, ability to perform self-care, frequency of urination and defecation, skin condition. **This allows the nurse to decide who, where, how, and when to perform perineal care.**
2. Identify cultural preferences for perineal care. **Perineal care is strongly associated with cultural practices, who may touch the perineal area and how as well as the proper way to “wipe.” To the extent possible, these preferences should be identified and incorporated into the client’s care.**
3. Assess the client’s perineal health. Ask the client if he has any perineal/genital itching or discomfort. Ask the client if she has any urethral, vaginal, or anal discharge. **Determines the presence of signs and symptoms that may need additional assessment and intervention.**
4. Determine if the client is incontinent of urine or stool. **Affects how the procedure will be done and what additional procedures may be necessary.**
5. Assess whether the client has recently had perineal/genital surgery. **Affects how the procedure will be done and what additional procedures may be necessary.**

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
6.5.2 Bathing/Hygiene Self-Care Deficit

> PLANNING

Expected Outcomes:

1. Perineum and genitalia will be dry, clean, and free of secretions and unpleasant odors.
2. The client will report feeling comfortable and clean in the perineal area.
3. The client will not experience discomfort or undue embarrassment during the procedure.
4. The perineum will be free of skin breakdown or irritation.

Equipment Needed (see Figure 4-9-2):

- Personal protective equipment (gloves, gown)
- Toilet paper/washcloths
- Waterproof pads

- Cleansing solution if needed
- Perineal wash bottle (fill with plain, warm water).
- Water receptacle (bedpan or toilet if client is ambulatory)
- Dry towels
- Perineal treatment (i.e., ointment or lotions) if necessary
- Linen receptacle
- Room deodorizer



Estimated time to complete the skill:
10 minutes

> CLIENT EDUCATION NEEDED:

1. Ask the client or the client’s caregiver about preferences the client may have in this area. Discuss the procedure with the client if this is the first time it is being done.
2. Teach clients to wash their hands after performing peri-care.
3. Warm water washes may provide comfort to the skin and reduce the need to repeatedly wipe the perineum if the area is tender.



Figure 4-9-2 Toilet paper, soap, lotion, towels, gloves, and a basin are all used to provide perineal care.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands and wear gloves. If appropriate and splashing is likely, wear gown and goggles.
2. Close privacy curtain or door.
3. Position client.
4. Place waterproof pads under the client in the bed or under bedpan if used (see Figure 4-9-3).



Figure 4-9-3 Use waterproof pads to protect mattress and linen from getting wet.

5. Remove fecal debris with disposable paper and dispose in toilet.
6. Spray perineum with washing solution if indicated. Alternatively, plain water may be used.
7. • Cleanse perineum with wet washcloths (front to back on females), changing to clean area on washcloth with each wipe.
 - Cleanse the penis on the male (see Figure 4-9-4).

RATIONALE

1. Reduces the transmission of microorganisms.
2. Provides privacy.
3. If client is ambulatory, perineal care may be done either with client on or standing at the toilet. If perineal care is to be performed in the bed, place the client on her side or over a deep bedpan.
4. Protects bed linen.



Figure 4-9-4 Cleanse the penis with a warm wet washcloth.

5. May require several attempts. If performing at the bedside, may collect paper in disposable pad or linens until end of procedure.
6. Several perineal solutions are available, which may or may not require rinsing. Carefully evaluate this requirement. Solutions that require rinsing may cause skin breakdown if left on the skin.
7. • Maximizes cleaning; prevents spread of rectal flora to vagina.

- | | |
|--|--|
| <p>8. Carefully examine gluteal folds and scrotal folds for debris. Gently visualize vulva for debris.</p> <p>9. If soap is used, spray area with clean water from the peri-bottle.</p> <p>10. Change gloves.</p> <p>11. Dry perineum carefully with towel.</p> <p>12. If indicated, apply barrier lotion or ointment.</p> <p>13. Reposition or dress client as appropriate.</p> <p>14. Dispose of linens and garbage according to hospital policy.</p> <p>15. Wash hands.</p> <p>16. Deodorize room if appropriate.</p> | <p>8. Fecal material causes irritation and skin breakdown rapidly when left in contact with skin.</p> <p>9. Rinses soap, which can irritate the skin, from the area.</p> <p>10. Reduces the transmission of microorganisms.</p> <p>11. Residual moisture provides an ideal environment for the growth of microorganisms.</p> <p>12. Barrier ointments may be used if client is incontinent or skin folds tend to harbor moisture.</p> <p>13. Promotes client comfort.</p> <p>14. Prevents spread of disease or bacteria.</p> <p>15. Reduces the transmission of microorganisms.</p> <p>16. Promotes client comfort. This may also be done at the beginning of the procedure.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

Arnold Green, age 72, was being treated for end-stage liver cancer and was receiving parenteral nutrition. He had severe diarrhea and was continent most of the time. However, the frequency of diarrhea stools caused irritation and pain. His compromised immune status and occasional incontinence predisposed him to infection. Arnold was embarrassed about his occasional incontinence and did not want to have the nursing staff help him clean himself. He was weak and often could not maintain his efforts to perform his own peri-care.

Recognizing Arnold's high risk for skin breakdown and infection, Nurse Mark instituted a routine perineal care regime for Arnold. Perineal wash was provided for each defecation, and Arnold managed this himself. In cooperation with the primary care provider, a barrier skin cream was prescribed and Arnold administered this to himself per his request. Using therapeutic technique, Nurse Mark problem solved with Arnold about allowing staff to assist him when he was incontinent.

> EVALUATION

1. The perineum and genitalia are dry, clean, and free of secretions and unpleasant odors.
2. The client reports feeling comfortable and clean in the perineal area.
3. The client did not experience discomfort or undue embarrassment during the procedure.

> DOCUMENTATION

Nurses' Notes

- Document the time and type of perineal care provided.
- Document any unusual findings such as skin breakdown, infection, or unusual drainage.

- If the client has special preferences or cultural considerations be sure to document that these were respected.

Kardex

- Note any special preferences or cultural considerations.

> CRITICAL THINKING SKILL

Introduction

Sherry Jacobs just returned from surgery after her first baby by uncomplicated Cesarean birth. She had epidural anesthesia and is not having any pain. On admission from the recovery area, you note that she has moderate lochia and you assess that she needs peri-care.

Possible Scenario

Sherry wants to get up to go to the bathroom to wash up. She states she can feel her legs and would like to try. You, however, recognize that Sherry is 4 hours post-op and even though she can feel her legs, she may not be stable.

Possible Outcome

You discuss this situation with Sherry and together decide that you will provide her peri-care until she is ambulatory. You teach her the basic principles of peri-care as you perform them.

Prevention

Until Sherry is ambulatory, alternatives for perineal care must be provided for her safety.

▼ VARIATIONS



Geriatric Variations:

- *Incontinence in the elderly is a major influence in decisions to seek long-term care.*
- *Loss of ability to perform perineal self-care may be a source of embarrassment and a serious threat to ego integrity. Be sensitive to the emotional and self-image needs of the elderly client in need of perineal care.*
- *Some elderly clients, whether due to disease or as a way to compensate for poor self-image, may behave inappropriately during perineal care. Gently but firmly discourage the client from inappropriate touching or comments. If the behavior continues, a same sex caregiver might be appropriate.*



Pediatric Variations:

- *Encourage parents to change the child's diapers frequently to minimize skin contact with urine and feces.*
- *Be sensitive to cultural concerns, particularly in regard to genital care for female children. Some societies have strict cultural taboos. Some societies have deep concerns regarding inappropriate touching. A same sex caregiver is more appropriate in this situation. If there are concerns regarding touch, it may be appropriate to have two caregivers provide peri-care or perhaps have a same sex family member present during care.*
- *Be aware that the child might revert to bedwetting because of the stress of hospitalization.*
- *Teach children to wipe from front to back when cleaning themselves.*



Home Care Variations:

- *Consideration should be given to using supplies that do not increase the caregiver burden. For example, linens should be minimized and soft disposable cloths may be a solution. Also, there are some products that can modify the toilet and provide a bidet-type cleansing alternative.*



Long-Term Care Variations:

- *Incontinence may be a major factor in long-term care settings. Institutional practices must provide for sanitary and timely attention to perineal care needs.*

▼COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse fails to clean the glans penis under the foreskin.

Ask Yourself:

How do I prevent this error?

Prevention:

Cleaning under the foreskin of an uncircumcised male reduces the risk of urinary tract infections and infections under the foreskin.

> NURSING TIPS

- When performing perineal care on a client in bed, make sure the bed height is adjusted to permit proper body mechanics.
 - Perineal care and bed linen changes may be performed at the same time. Begin by performing peri-care, then wrap soiled linens under the client and place clean linens to the edge of soiled linens. Roll the client to the other side and proceed with the linen change.
 - Always wash your hands after performing perineal care. Gloves do not provide a flawless barrier.
 - When performing peri-care for an adult or child, it is important to be sensitive to developmental considerations. Peri-care is usually learned early and inability or difficulty performing this basic task for oneself can evoke feelings of embarrassment, worthlessness, and incompetence. It is critical that the nurse convey respect in an age-appropriate and culturally sensitive manner.
 - Perineal care should be performed as often as necessary. Some procedures will necessitate a schedule.
- If peri-care is necessary after elimination, do not delay. Even short delays can result in unnecessary suffering.
- Ask the client about soap/iodine allergies. Often, clients will not disclose this on admission. Some perineal procedures will require use of iodine preparations.
 - In uncircumcised males, gently retract the foreskin to clean smegma and other debris from the area around the glans. This procedure is not universal, however, and it is appropriate to ask the client whether this is acceptable. Care should be taken to replace the foreskin as soon as possible to prevent edema of the glans.
 - Many cultures prescribe cleansing from the “front to the back” of the female perineum to prevent rectal debris and germs from coming in contact with the vulva. Be aware that this is also a cultural preference and if necessary may be followed for medical reasons (for example, interruptions in vaginal or perineal integrity).

> **DIAGNOSIS**

- 6.4.2 Altered Health Maintenance
- 6.5.2 Bathing/Hygiene Self-Care Deficit
- 7.2 Sensory/Perceptual Alteration (Visual)

> **PLANNING**

Expected Outcomes:

1. The client's contact lenses will be safely removed and stored.
2. The client's ocular prosthesis will be safely removed, cleaned, and either stored or returned to the client's eye socket.
3. The client's contacts or prosthesis will be cared for with a minimum of trauma to the client's eyes.
4. The client's eyes will be free of crusts and exudate.

Equipment Needed (see Figure 4-10-2):

Artificial Eye

- Storage container
- Mild soap
- 3 × 3 Gauze sponges
- Cotton balls
- Towel
- Emesis basins
- Eye irrigation syringe (optional)
- Running water
- Sterile gloves
- Biohazard bag
- Saline solution

Contact Lenses

- Lens container
- Soaking solution—type used by client
- Towel

- Suction cup (optional)
- Scotch tape (optional)
- Nonsterile gloves



Estimated time to complete the skill:
15 minutes

> **CLIENT EDUCATION NEEDED:**

1. Instruct the client to wash hands before handling contact lenses or an ocular prosthesis.
2. Explain to the client that using saliva to wet lenses is hazardous to the cornea because of digestive enzymes in the saliva.
3. Instruct the client that daily wear lenses need to be removed at night to prevent hypoxia and possibly ulcers of the cornea.
4. Ocular prostheses should be stored in saline or clean tap water, not left on the bedside stand.



Figure 4-10-2 Commercial soaking and eye care solutions. There are many types of soaking solutions available. Select the type normally used by the client when possible.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Artificial Eye Removal

1. Inquire about client's care regimen and gather equipment accordingly.
2. Provide privacy.
3. Wash hands; apply gloves.

1. Promotes continuity of care.
2. Relaxes the client.
3. Reduces the transmission of microorganisms.

continues

Artificial Eye Removal *continued*

4. Place client in a semi-Fowler's position.
5. Place the cotton balls in emesis basin filled halfway with warm tap water.
6. Place 3 × 3 gauze sponges in bottom of second emesis basin, and fill halfway with mild soap and tepid water.
7. Grasp and squeeze excess water from a cotton ball. Cleanse the eyelid with the moistened cotton ball, starting at the inner canthus and moving outward toward the outer canthus. After each use, dispose of cotton ball in biohazard bag. Repeat procedure until eyelid is clean (without dried secretions).
8. Remove the artificial eye:
 - a. Using dominant hand, raise the client's upper eyelid with index finger and depress the lower eyelid with thumb.
 - b. Cup nondominant hand under the client's lower eyelid.
 - c. Apply slight pressure with index finger between the brow and the artificial eye and remove it. Place it in an emesis basin filled with warm, soapy water.
9. Grasp a moistened cotton ball and cleanse around the edge of the eye socket. Dispose of the soiled cotton ball into biohazard bag.
10. Inspect the eye socket for any signs of irritation, drainage, or crusting.

Note: If the client's usual care regimen or physician order requires irrigation of the socket, proceed with Action 11; otherwise, go to Action 12.
11. Eye socket irrigation:
 - a. Lower the head of the bed and place the client in a supine position. Place protector pad on bed; turn head toward socket side and slightly extend neck.
 - b. Fill the irrigation syringe with the prescribed amount and type of irrigating solution (warm tap water or normal saline).
 - c. With nondominant hand, separate the eyelids with your forefinger and thumb, resting fingers on the brow and cheekbone.
4. Facilitates procedure and client participation.
5. Dry cotton balls could cause irritation.
6. Gauze serves as padding to prevent breakage of the prosthesis.
7. Eliminating the excess water prevents water from running down the client's face. Cleansing the eyelid prevents contamination of the lacrimal system (inner canthus area). Disposal of cotton balls reduces transmission of microorganisms to other health care workers.
8. Cleanses the artificial eye.
 - a. Promotes removal of artificial eye.
 - b. Cupping reduces dropping and possible breaking of the eye.
 - c. Applying pressure will help the prosthesis to slip out.
9. Cleanses the eye socket. Disposal of cotton ball reduces transmission of microorganisms to other health care workers.
10. Indicates an infection.
11. Cleanses the eye socket and removes secretions.
 - a. Positioning of client facilitates ease in performing the procedure and client comfort.
 - b. Ensures compliance with client's regimen or prescribed orders.
 - c. Keeps the eyelid open and the socket visible.

- d. Hold the irrigating syringe in dominant hand several inches above the inner canthus; with thumb, gently apply pressure on the plunger, directing the flow of solution from the inner canthus along the conjunctival sac.
 - e. Irrigate until the prescribed amount of solution has been used.
 - f. Wipe the eyelids with a moistened cotton ball after irrigating. Dispose of soiled cotton ball in biohazard bag.
 - g. Pat the skin dry with the towel.
 - h. Return the client to a semi-Fowler's position.
 - i. Remove gloves, wash hands, and apply clean gloves.
- 12.** Rub the artificial eye between index finger and thumb in the basin of warm, soapy water.
 - 13.** Rinse the prosthesis under running water or place in the clean basin of tepid water. Do not dry the prosthesis.
Note: Either reinsert the prosthesis (Action 14) or store in a container (Action 15).
 - 14.** Reinsert the prosthesis:
 - a. With the thumb of the nondominant hand, raise and hold the upper eyelid open.
 - b. With the dominant hand, grasp the artificial eye so that the indented part is facing toward the client's nose and slide it under the upper eyelid as far as possible.
 - c. Depress the lower lid.
 - d. Pull the lower lid forward to cover the edge of the prosthesis.
 - 15.** Place the cleaned artificial eye in a labeled container with saline or tap water solution.
 - 16.** Grasp a moistened cotton ball and squeeze out excessive moisture. Wipe the eyelid from the inner to the outer canthus. Dispose of the soiled cotton ball in a biohazard bag.
 - 17.** Clean, dry, and replace equipment.
 - 18.** Reposition the client, raise side rails, and place call light in reach.
 - 19.** Dispose of biohazard bag according to institutional policy.
- d. Prevents injury to the client.
 - e. Ensures compliance with client's regimen of prescribed orders.
 - f. Reduces the transmission of microorganisms to prosthesis.
 - g. Prevents maceration of the skin.
 - h. Promotes client comfort.
 - i. Reduces the transmission of microorganisms.
- 12.** Creates cleaning with friction and prevents breakage of the prosthesis.
 - 13.** Removes soap and secretions. Keeping the artificial eye wet prevents irritation from lint or other particles that might adhere to it and facilitates reinsertion.
 - 14.** Allows for client comfort.
 - a. Facilitates reinsertion of the prosthesis without discomfort to the client.
 - b. Positions the prosthesis for insertion.
 - c. Allows the prosthesis to slide into place.
 - d. Holds the prosthesis in place.
 - 15.** Protects the prosthesis from scratches and keeps it clean.
 - 16.** Squeezing the cotton ball removes moisture. Cleansing the eyelid prevents contamination of lacrimal system. Disposal of cotton ball reduces the transmission of microorganisms to other health care workers.
 - 17.** Promotes a clean environment.
 - 18.** Promotes client's comfort, safety, and communication.
 - 19.** Reduces the transmission of microorganisms to other health care workers.

Artificial Eye Removal *continued*

- 20. Remove gloves and wash hands.
- 21. Document procedure, client's response and participation, and client teaching and level of understanding.

Contact Lens Removal

- 22. Assemble equipment for lens removal.
- 23. Assess level of assistance needed, provide privacy, and explain the procedure to the client.
- 24. Wash hands (see Figure 4-10-3).



Figure 4-10-3 Wash hands prior to performing eye care. Have client wash hands if he will be performing his own eye care.

- 25. Assist the client to a semi-Fowler's position if needed.
- 26. Drape a clean towel over the client's chest.
- 27. Prepare the lens storage case with the prescribed solution.
- 28. Instruct the client to look straight ahead. Assess the location of the lens. If it is not on the cornea, either you or the client should gently move the lens toward the cornea with pad of index finger (see Figure 4-10-4).

- 20. Same as Rationale 19.
- 21. Demonstrates that the procedure was done and the level of client participation and learning.
- 22. Promotes efficiency.
- 23. Level of assistance determines level of intervention. Privacy reduces anxiety. Explanation of procedure promotes cooperation.
- 24. Reduces the transmission of microorganisms.



Figure 4-10-4 If the lens is not on the cornea, gently move it toward the cornea with the pad of the index finger.

- 25. Facilitates removal of lens.
- 26. Provides a clean surface and facilitates the location of a lens if it falls during removal.
- 27. Hard lenses can be stored dry or in a special soaking solution. Soft lenses are stored in sterile normal saline without a preservative.
- 28. Client's position promotes easy removal of lens. Positioning lens on the cornea aids removal. Use of the finger pad of the index finger prevents damage to cornea and lens.

29. Remove the lens.**a. Hard lens:**

- Cup nondominant hand under the eye.
- Gently place index finger on the outside corner of the eye and pull toward the temple and ask client to blink. Catch the lens in your nondominant hand.

b. Soft lens:

- With nondominant hand, separate the eyelid with your thumb and middle finger.
- With the index finger of the dominant hand gently placed on the lower edge of the lens, slide the lens downward onto the sclera and gently squeeze the lens.
- Release the top eyelid (continue holding the lower lid down) and remove the lens with your index finger and thumb.

Note: If Action 29 is unsuccessful, secure a suction cup to remove the contact lens. If you are unable to remove the lens, notify the physician or qualified practitioner.

30. Store the lens in the correct compartment of the case (“right” or “left”). Label with the client’s name.

31. Remove and store the other lens by repeating Actions 29 and 30.

32. Assess eyes for irritation or redness.

33. Store the lens case in a safe place.

34. Dispose of soiled articles and clean and return reusable articles to proper location.

35. Reposition the client, raise side rails, and place call light in reach.

36. Remove gloves and wash hands.

37. Document procedure, client’s response and assessment findings, and the storage place of the lenses.

29. Provides for cleaning and storage of the lens.

a.

- Cupping the hand under eye helps to catch the lens and prevent breakage.
- Pulling the corner of the eye tightens the eyelid against the eyeball. Pressure on the upper edge of lens causes the lens to tip forward.

b.

- Separating the eyelid exposes the lower edge of lens.
- Positions lens for easy grasping with the pad of the index finger, which prevents injury to the cornea and lens. Squeezing the lens allows air to enter and release the suction.
- Ensures control of the lens.
- Suction cup is used to remove a lens from an unconscious or dependent client.

30. Storage prevents damage to the lenses and ensures that each lens will be reinserted into the correct eye.

31. Refer to Rationales 29 and 30.

32. Signs of corneal irritation.

33. Prevents damage or loss.

34. Reduces the transmission of infection.

35. Promotes client comfort, safety, and communication.

36. Reduces the transmission of infection.

37. Documents the removal of lenses, condition of the cornea, and where the lenses are stored.



▼ REAL WORLD ANECDOTES

Student nurse Anderson was removing Mr. Molloy's artificial eye to clean it. Although she cupped her hand under his eye while removing the prosthesis, it was slippery and it slid out of her hand and onto the client's bed. While she searched through the blankets to find the prosthesis, the eye fell to the floor and rolled under the chair occupied by Mrs. Molloy. To retrieve the prosthesis, the student had to get down on her hands and knees and reach under the chair. Fortunately, the only damage was to the student's dignity; the eye survived intact.

> EVALUATION

- The client's contact lenses were safely removed and stored.
- The client's ocular prosthesis was safely removed, cleaned, and either stored or returned to the client's eye socket.
- The client's contacts or prosthesis were cared for with a minimum of trauma to the client's eyes.
- The client's eyes are free of crusts and exudate.
- The client is comfortable.

> DOCUMENTATION

Nurses' Notes

- Document that the client wears contact lenses.
- Note the location and condition of the lenses.
- Document whether the client requires assistance to place and remove the contact lenses.
- Document whether the client has an ocular prosthesis. Note which eye is prosthetic.
- Note the condition of the prosthesis and the condition of the eye socket.
- Indicate the care performed on the prosthesis and the socket and how the patient tolerated the activity.
- Note any patient teaching.

Kardex

- Note whether the client wears contact lenses or glasses or has an ocular prosthesis.
- Note any special care requirements.

> CRITICAL THINKING SKILL

Possible Scenario

While working in the emergency room, you are called upon to remove an unconscious client's contact lenses. You remove the client's right lens only to realize that you have no container or solution ready.

Possible Outcome

The client's contact could get contaminated as you wander around with it in your hand searching for a container and sterile saline solution. It could become airborne, dropped, and lost, or it could dry out and become ruined. Any of these scenarios would be costly and inconvenient for the client (see Figure 4-10-5).

Prevention

Be sure you have the equipment ready and prepared before you start this or any procedure.

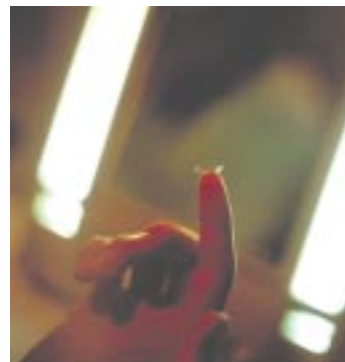


Figure 4-10-5 Be careful with the lens when it is out of the client's eye or out of the case. It may be easily dropped or lost.

▼ VARIATIONS



Geriatric Variations:

- *Elderly people often have very thin, delicate skin. When replacing or removing contacts or a prosthesis, be careful not to tear or bruise the skin surrounding the eye.*
- *Make sure eyewear is within reach. Clients could become more confused and less able to communicate if they cannot see clearly.*

▼ VARIATIONS *continued*

- If your client is an elderly person with limited income or restricted social contact, verify that the client's eyeglass prescription is up-to-date.
- If the elderly person is wearing or caring for contacts, mark the containers clearly with a large L and R for left and right eye. This will help keep the lenses in the right place.



Pediatric Variations:

- Children grow quickly and can outgrow an ocular prosthesis. When caring for a child with an ocular prosthesis, be sure to note the fit.
- If a child needs glasses to see, make sure they are within reach. A colorful cord or cloth may be attached to the glasses to help keep them around the neck and to help locate them in the bed. Do not fasten any cord too tightly to avoid the risk of strangulation.
- Young children may not be able to tell you if they have injured or scratched their eye. Carefully examine the eye for signs of infection or injury if a discharge, redness, or irritation is present. To remove contacts in a child, an additional staff member or parent may be needed to help hold and support the child.



Home Care Variations:

- Home care clients can become careless about the proper cleaning and storage of their contacts or prosthesis. Reinforce the proper techniques for cleaning and storage and the reasons proper technique is important.
- Bring a magnifying mirror on your home care visit to help clients do their own eye care when bedridden.



Long-Term Care Variations:

- Long-term care clients may keep contacts or a prosthesis beyond the point of effectiveness. Examine the prosthesis or contacts to be sure they are not worn or ragged.
- Make sure eyewear prescriptions are kept up-to-date.
- Keep contacts in carefully labeled containers at the bedside to prevent damage or loss.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

When removing a client's contact lenses, the nurse becomes confused regarding her right and the client's left. As a result she placed the left lens in the container for the right lens.

Ask Yourself:

How do I prevent this error?

Prevention:

The nurse should take her time to be careful and note which side is which.

> NURSING TIPS

- Be aware of right and left. Take care not to mix up a client's contacts.
- Prostheses are slippery. Be careful not to drop them while you are handling them.
- Place a towel or washcloth over the bottom of the sink when cleaning contacts or a prosthesis to prevent breakage if dropped and to prevent loss down the drain.
- If the client has glasses as well as contacts, encourage the client to send the contacts home with family and wear glasses while in the hospital.
- Place a towel in front of the client when an eye prosthesis is removed to catch it if it slips out of your hand.

SKILL 4-11

Hair and Scalp Care

Claretta D. Munger, MSN, CPNP, ARNP

KEY TERMS

Brushing	Hygiene
Combing	Infection
Conditioner	Infestation
Cornrow braids	Scaling
Dandruff	Scalp
Hair	Shampoo tray
Hydration	Shampooing



> OVERVIEW OF THE SKILL

Healthy hair is dependent on maintaining a healthy scalp. Combing, brushing, and shampooing stimulates circulation; removes dead cells, dirt, and debris; and distributes hair oils, preventing skin irritation

and producing a healthy sheen. These procedures, and styling the hair, relax clients and improve their appearance and self-esteem.

> ASSESSMENT

1. Assess client need for hair and scalp care to determine what procedures need to be done.
2. Assess structure and functional integrity of the hair and scalp, identifying possible need for medicated shampoo, conditioners, or treatments.
3. Assess client preferences for frequency of care and care products to determine possible allergies to products and client preferences for personal hygiene.
4. Confirm client is not allergic to latex or any ingredients/products to be used during the procedure to prevent adverse reactions to the procedures.
5. Assess client's medical condition and health status such as contraindications to head manipulation and ability to tolerate sitting, prone, or side-lying positions to prevent adverse reactions to the procedures.
6. Assess client's knowledge of the procedure to determine possible teaching needed.

7. Assess client's ability to perform/assist with the procedure to determine and plan how the procedure will be performed.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity, related to inadequate circulation to the scalp
- 6.5.3 Dressing/Grooming Self-Care Deficit
- 6.5.2 Bathing/Hygiene Self-Care Deficit
- 7.1.2 Self-Esteem Disturbance, related to the inability to perform or maintain grooming

> PLANNING

Expected Outcomes:

1. The client will have healthy hair and scalp free from infestation, infection, irritation, or alterations in hydration and oils.

2. The client will experience improved circulation to the scalp.
3. The client's comfort, self-esteem, and sense of well being will be improved.

Equipment Needed (see Figure 4-11-2):

- Bedside/chair-side table
- Clean comb (with dull teeth) and hairbrush (soft but firm bristles)
- Washcloth
- 2 or 3 bath towels
- Shampoo tray
- Washbasin, plastic trash can, or pail
- Water pitchers/container: 1–2 large (1–2 gal.) and 1 small (2–3 cup)
- Linen saver or plastic trash bag
- Nonsterile gloves
- Liquid shampoo
- Other: bath thermometer, conditioner, detangler (spray is convenient)
- Hair dryer (safety approved)



Estimated time to complete the skill:
30 minutes

> CLIENT EDUCATION NEEDED:

1. Before the procedure, inform clients that you will be assisting them with care of their hair.
2. Explain each step of the procedure and help identify what assistance is needed.
3. During the procedure, educate the client about what potential problems to observe for and points to remember in self-care.

4. Jointly evaluate needs for the next time the procedure is to be performed.
5. Six glasses of water a day are essential, as is daily exercise. Vitamin B complex supplements are helpful (and are water soluble so clients are unlikely to get too much).
6. Teach clients to use shampoo designed for their texture of hair and scalp condition.
7. Teach clients to recognize their hair's need for shampooing vs. "routine daily."
8. Teach the client that scalp care is essential to hair care. Teach "gentle but vigorous."
9. Teach about signs of disease and infection (persistent dandruff, breaking, falling out, sudden loss or increases, lesions, anything crawling, spontaneous color changes other than gray, and changes in texture).



Figure 4-11-2 Warm water and a pitcher are used to provide hair care for the client confined to bed.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Inform client you will be assisting them with hair care.
2. Prepare room environment: provide privacy, adjust temperature, eliminate drafts.
3. Review client history for allergies and confirm/obtain provider's orders for medicated shampoo or scalp treatment as needed.

RATIONALE

1. Shows respect for client, maximizes cooperation and comfort.
2. Maximizes client comfort and prevents chilling.
3. Need Rx for medicated supplies.

continues

4. Organize equipment at side of bed or chair.
 5. Adjust bed to comfortable height, or position chair.
 6. Wash hands and apply gloves.
 7. Remove pillow from under client's head or assist client to chair.
 8. Place linen saver (or plastic bag) covered by a towel under client's shoulders and head.
 9. Fan-fold a second bath towel and place around client's neck, pulling the edge over the shoulders toward midline of chest to drape the shoulders.
 10. Gently comb/brush client's hair, observing scalp and hair for color, texture, distribution, scaling, infestation, or infection.
 - Comb fingers through hair with slight fingertip massage of scalp.
 - Turning the client's head away from you, hold the hair with one hand and comb/brush gently with the other on the hair side facing you. Work from the ends toward the scalp.
 - Part the hair into small sections and comb one section at a time, working from the ends toward the scalp.
 - Turn the client's head and repeat on the other side.
 - Facing back of client's head, brush entire head.
 11. Fill the large pitcher/s with warm water (105°–110°F), checking temperature with thermometer or volar surface of your arm. Place on bedside table.
 12. Place the shampoo tray under the client's neck and head with neck in the U-shaped opening. Adjust the fan-folded neck towel to cushion the tray.
 13. Position pail/washbasin/trash can in direct line with the spout of the shampoo tray. Position as close to the spout as possible. You may need to set it on a chair, a stool, or a low table (see Figure 4-11-3).
4. Promotes efficiency.
 5. Prevents back strain.
 6. Reduces the transmission of microorganisms.
 7. Positions for comfort and efficiency.
 8. Catches loose hair and dirt and prevents wetting of linens.
 9. Protects client's clothing, catches loose hair and dirt, and supports client's neck.
 10. Removes tangles, loosens dead cells and debris, distributes oils, stimulates scalp circulation, and identifies abnormalities early.
 - Assesses degree of tangling and status of scalp and increases circulation to scalp.
 - Anchors each section above the area being brushed to avoid discomfort to the client.
 - Provides for easier handling.
 - Provides care to remainder of hair and scalp.
 - Stimulates circulation, loosens debris, distributes oils, and relaxes client.
 11. Warm water promotes scalp circulation and prevents chilling and skin injury. Water at bedside promotes efficiency.
 12. Positions to facilitate drainage of water, maintain client comfort, and avoid pressure to neck.
 13. Provides reservoir for water and minimizes splashing as water runs into the pail.



Figure 4-11-3 Position a basin to catch waste water from the shampoo tray.



Figure 4-11-4 Pour the warm water over the hair, moistening thoroughly.

14. Offer washcloth for client to hold over or above eyes and cotton balls to place in ears during shampooing.
15. Fill small pitcher with water by dipping it into the larger pitcher. Double-check water temperature. Carefully pour the warm water over the hair, moistening thoroughly. Take care not to overflow the shampoo tray. (See Figure 4-11-4.)
16. Place a small amount of shampoo into your palms and massage it into the hair, working the shampoo into a lather (see Figure 4-11-5). Using your fingertip, gently massage the shampoo into the scalp.
14. Prevents shampoo or water from irritating eyes/ears and moisture from collecting in ear canals.
15. Smaller container is easier to manipulate and prevents splashing. Water temperature can change while sitting. Moistened hair facilitates the cleansing action of the shampoo.
16. Shampoo lather facilitates removal of dirt, debris, and excess oils from scalp and hair. Massage promotes lather, stimulates scalp circulation, and relaxes client.



Figure 4-11-5 Massage the shampoo into a lather.



Figure 4-11-6 Rinse the hair using the pitcher to pour warm water over the scalp.

17. Rinse the hair by using the small pitcher to pour warm water over the hair and scalp (see Figure 4-11-6).
18. Repeat application of shampoo and massage scalp and hair gently but vigorously for a longer period of time. Observe hair and scalp
17. Removes shampoo and debris.
18. Promotes thorough cleansing of hair and scalp, provides opportunity to observe hair and scalp abnormalities as fingers move

for lesions, scaling, infection, and so on. Observe client for signs of relaxation and comfort.

19. Rinse again using several pitchers of water until hair and scalp are free of shampoo.
20. Apply conditioner or rinse as per product directions.
21. Support client's head while you remove the shampoo tray. Set to one side (see Figure 4-11-7).



Figure 4-11-7 Support the client's head while removing the shampoo tray.

22. Wrap client's hair/head by gently pulling fan-folded bath towel from shoulders up and over scalp. Gently and briskly massage the scalp and hair with the towel (see Figure 4-11-8). Repeat with a dry towel as needed. Leave hair covered with the towel until ready to use the dryer.
23. Remove the linen saver and towel from the bed by carefully folding inward.
24. Elevate the head of bed to desired angle within prescribed and/or client-tolerated limits.
25. Thoroughly dry your hands and/or change gloves.
26. Turn on hair dryer to warm setting and check the temperature on your inner arm.
27. Dry hair, concentrating on one section at a time, moving your fingers, comb, or brush gently through the hair while drying.
28. Gently comb/brush the hair.

through hair and across scalp, and massage relaxes scalp and shoulder muscles.

19. Removes remaining residue of shampoo.
20. Conditions hair and maintains client preferences.
21. Clears area for completion of procedure. Prevents inadvertent injury.



Figure 4-11-8 Dry the hair and scalp with a towel.

22. Absorbs water from the hair and scalp while stimulating scalp circulation. Prevents chilling while waiting to dry the hair.
23. Prevents debris from falling onto the bed or floor.
24. Promotes access to hair and client comfort.
25. Promotes safety in next steps.
26. Prevents injury from dryer heat.
27. Facilitates drying and removes tangles.
28. Removes all tangles and stimulates the scalp.

- | | |
|--|--|
| <p>29. Style hair per client preference.</p> <p>30. Reposition the client comfortably, adjust bed as requested within medical orders, safety measures, communication needs (call light).</p> <p>31. Empty the water. Remove, clean, and return equipment.</p> <p>32. Remove gloves and wash you hands.</p> | <p>29. Maintaining personal appearance increases sense of well-being.</p> <p>30. Maintains client comfort, rest, and safety.</p> <p>31. Provides clean environment.</p> <p>32. Reduces the transmission of microorganisms.</p> |
|--|--|

> EVALUATION

- The client has healthy hair and scalp free from infestation, infection, irritation, or alterations in hydration and oils.
- The client experienced improved circulation to the scalp.
- The client's comfort, self-esteem, and sense of well being are improved.

> DOCUMENTATION

Nurses' Notes

- Document the time and date of the hair care.
- Note any unusual findings such as scaling, infestation, or infection.

Medication Record

- Record any prescription shampoo used or medications applied to the scalp.

> CRITICAL THINKING SKILL

Introduction

Be aware of all treatments a client is receiving.

Possible Scenario

An elderly nursing home client has had dandruff since admission 3 years ago. You have used over-the-counter dandruff shampoos followed by prescription shampoos when the dandruff returned. It clears for a while but always returns. The family has been coming in and applying oil to the hair in an attempt to get rid of the dry scalp.

Possible Outcome

The dandruff will persist and the client may get a scalp infection as well. The hair could start falling out due to occlusion of the scalp by the oils.

Prevention

Perform good hair and scalp care using a dandruff shampoo. Alter the brand of shampoo every 2 to 3 months. Educate the family regarding scalp and hair care including discontinuing the oil treatment. Recommend instead that the family encourage water and juice intake.

▼ VARIATIONS

NOTE: The major variations are caused by the hair texture. Fine hair is typical in the elderly, those with fair skin (e.g., Scandinavians), and African Americans (whose hair is often mistaken as coarse). This is very important in their hair care. Fine hair usually does not need shampooing as frequently as other types. Twice a week is often appropriate.

Hair of medium texture is typical of Hispanics.

Coarse hair is typical in gray-haired individuals, Native Americans, and Asians. Blonde hair actually has fewer strands than brunette, and red hair generally has the greatest number of strands. Be sure to use a shampoo and conditioner designated for the texture of the hair.

continues

▼ VARIATIONS *continued*



Geriatric Variations:

- *Elderly clients may need adjustments in positioning due to loss of joint function or health restrictions.*
- *Gray hair needs routine (at least weekly) conditioning.*



Pediatric Variations:

- *Children may cooperate better if sitting, leaning forward, prone, or side-lying rather than lying supine.*
- *Encourage children to hold a washcloth over their eyes and use the cotton in their ears to reduce the child's fear of getting soap and water in their eyes and ears.*
- *Infants and small children can be positioned on your lap for hair and scalp care.*



Home Care Variations:

- *Explore possible sites in the home. Be creative.*
- *A sprayer on the kitchen sink works well for rinsing. Inexpensive attachments are available for the tub as well.*
- *Plastic baby bathtubs can be used as a shampoo tray.*
- *Plastic shower liners are inexpensive protectors for under the towel. A liner can also be made into a shampoo tray by using rolled towels under it to shape a shallow U reservoir that drains into a plastic pail on the floor.*



Long-Term Care Variations:

- *Long-term care clients often need adjustments in positioning as with geriatric clients.*
- *Hair should be combed 2–3 times a day. In addition to the traditional combing when the client is getting up or having company, combing the hair before the client rests may assist in relaxation.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not ask about the client's preferences and uses the wrong shampoo.

Ask Yourself:

How do I prevent this error?

Prevention:

Determine if the shampoo is appropriate for the client's hair. Assess the texture, client's activity level, medical condition, and medications. Ask clients what type of shampoo they normally use. Have a family member bring in shampoo.

Possible Error:

The nurse assumes that because clients are in bed all day they don't need shampooing as frequently.

Ask Yourself:

How do I prevent this error?

Prevention:

The client needs hair care when the hair becomes oily; matted; or soiled with dandruff, perspiration, food, medications, or bodily fluids. This can be daily or every few days.

▼ COMMON ERRORS—ASK YOURSELF *continued*

Possible Error:

The nurse does not assess the hair for possible problems that need treatment.

Ask Yourself:

How do I prevent this error?

Prevention:

Don't assume hair loss results from "old age." Evaluate the client for poor circulation to the scalp; infection of hair follicles; overuse of conditioners, dyes, lubricants, straighteners, or braiding; poor nutrition; or medications. Dandruff may actually be dry skin. Real dandruff flakes are often greasy and may increase with stress, weather changes, poor hygiene, poor diet, or fungus.

> NURSING TIPS

- A folded bath blanket under the client's shoulders helps position the head in a slight hyperextension to facilitate water drainage during rinsing. A folded towel under the nondraining end of the shampoo tray helps drainage as well.
- If you detect flaking early, use a conditioner on the hair and avoid oils on the hair and scalp. Garlic shampoos or those with sulfur-containing compounds may help, too. Changing shampoo brands every 2–3 months seems to help as well.
- Broken hair strands indicate weakened hair usually secondary to dyes, tints, bleach, perms, medications, or poor nutrition. Hair preparations (other than shampoo and conditioning) must be stopped for 6–24 months (until hair has grown out naturally—about 1 half-inch per month) to restore hair.
- Perming can be imitated by braiding wet hair overnight and styling the next morning.
- Vitamin B complex 2–3 times a day promotes healthy hair.
- Hair that is naturally tightly curled is often configured in whorls, which causes burrowing and trapped hairs. You must comb out carefully but thoroughly. Be gentle and take your time.
- Braiding is nice to prevent tangling in long or curly hair, but be sure braids and hair ties are loose at the scalp and positioned so they won't press against the scalp during the position assumed for the majority of the day or night.
- The less expensive hair care products often create a "waxy" buildup on the hair.
- Medications, especially for the thyroid and kidneys, often make hair oily and dirty faster.
- Braids (including cornrows) still need to be shampooed regularly. Dilute the shampoo by half and gently work it into the braids and over any exposed scalp. Rinse well as the lather can get trapped in the braids.
- Vitamin E oil, petrolatum, and mineral oil, are often used to control and moisten what is perceived as dry hair. These occlude the pores and are not healthy for the scalp. The hair needs to be properly and consistently conditioned instead.
- Artificially colored hair requires more frequent conditioning—every shampoo in addition to a deeper weekly conditioning.
- Oily hair is usually hereditary and can be helped by daily shampooing with warm water followed by rinsing with lemon juice or dilute vinegar followed by a clear rinse.
- Styling can be facilitated by mousse to the roots, blow-drying small sections at a time with gentle guiding using a brush and recurling the ends by wrapping them around a small round brush, hot rollers, or a medium curling iron (take care to avoid burns by keeping away from the scalp).
- A minimum of six glasses (8 oz. each) of water a day will significantly contribute to healthy skin and hair (and it's inexpensive).
- Be sure to use a shampoo and conditioner designated for the texture of the hair.

SKILL 4-12

Hand and Foot Care

Claretta D. Munger, MSN, CPNP, ARNP, and Carla A. Bouska Lee, PhD, ARNP C, FAAN

KEY TERMS

Calluses
Foot care
Hand care
Maceration

Peripheral vascular disease
Pumice stone



> OVERVIEW OF THE SKILL

Daily hand and foot care maintains the structure and function of two major body areas vital to mobility and to the ability to carry out activities of daily living.

It promotes cleanliness, controls odor, prevents infection, and stimulates circulation.

> ASSESSMENT

1. Assess skin integrity to identify early intervention for abnormalities.
2. Assess nail integrity to identify present or potential disease or harm to skin.
3. Assess structural integrity of hands and feet to identify special needs of hands or feet.
4. Assess functional status of hands and feet to identify special needs of hands or feet.
5. Identify allergies prior to the procedure to avoid inadvertent client exposure.
6. Assess client's knowledge and performance ability of basic hand and foot care to identify baselines for client education.
7. Assess client's preferences for cleansing agents, moisturizing agents, protective devices (socks,

shoes, slippers), and equipment to be used in the procedure, and evaluate them in light of function and safety.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 6.1.1.1.1 Risk for Peripheral Neurovascular Dysfunction
- 6.5.2 Bathing/Hygiene Self-Care Deficit

> PLANNING

Expected Outcomes:

1. The client's hands and feet will be clean and odor free, with soft, hydrated skin.

2. The client will experience maximized functional ability of hands and feet.
3. The client will be comfortable and relaxed.

Equipment Needed (see Figure 4-12-2):

- Gloves
- Bath/washbasin (plastic dishpan, bucket, or waste-basket will work as well)
- Warm water
- Towels (1–2)
- Washcloth (soft but textured)
- Soap (liquid preferable) or Cetaphil
- Nail brush (soft)
- Cotton-tip applicators
- Nail clippers: one for fingernails, plier-type for toenails
- Nail scissors (for cutting hangnails)
- Emery board
- Talcum powder (water absorbent without cornstarch)
- Body cream, petrolatum, or oil
- Optional/bath blanket
- Optional/linen-saver pad
- Optional/pillow
- Optional/cotton or lamb's wool pieces
- Optional/2 × 2 gauze pads
- Optional/bath thermometer



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Before the procedure, inform clients that you will be assisting them with care of their hands and/or feet.
2. Explain each step of the procedure and help identify what assistance is needed.
3. During the procedure, educate about what to observe for and points to remember in self-care.
4. After the procedure, review steps, reminders, and recommendations.
5. Jointly evaluate needs for next time the procedure is to be performed.



Figure 4-12-2 Equipment needed in providing hand and foot care.

Table 4-12-1 Client Teaching Tips for Foot Care

1. The majority of foot problems are caused by tight-fitting shoes.
2. Report signs or symptoms of abnormalities in hands or feet:
 - a. Pain, numbness, tingling
 - b. Decreased sensation to touch or temperature
 - c. Swelling, shiny appearance to skin
 - d. Coldness (when previous sensation has been normal)
 - e. Decreased hair growth or pulses
 - f. Skin discoloration, bruising, cuts, cracks, scaling, itching
 - g. Thickening or layering of skin or nails
3. Examine hands and feet daily. Report any changes. Use a mirror to see the bottoms of your feet.
4. Feel the inside of the shoes for foreign objects or rough spots before putting them on.
5. Check the water temperature before putting your hand or foot in. If using a thermometer, don't use glass; if no thermometer, test the temperature on the volar surface of the arm or drop a few drops of the water on your abdomen.
6. Avoid temperature extremes.
7. Put on extra socks if your feet are cold.
8. Be sure shoes are wide enough and that there is room for a double pair of socks.

continues

Table 4-12-1 Client Teaching Tips for Foot Care *continued*

9. Shoes should provide good gentle support and soft arch support (running shoes are usually good). Sandals, leather, and canvas are good choices; they allow air to your feet.
10. Wear nonslip shower shoes in locker rooms, at camp, and so on to protect from injury and infection.
11. Break in new shoes slowly—30 minutes a day. Check your feet often for pressure points.
12. Shake shoes and slippers out as you take them off and before you put them on.
13. Change shoes 2–3 times a day to help prevent pressure areas. Change to a different style or brand so arch, sole, and heel supports vary. If this is not possible, change shoe inserts (soft ones) to vary the pressure.
14. Stuff shoes with newspaper at night to absorb extra moisture. Let your shoes “rest” every other day if possible (don’t wear the same shoes 2 days in a row).
15. Drink more water and juice if your skin is dry.
16. Exercise 5–10 minutes every day to maintain good circulation.
17. Rest feet for brief periods throughout the day.
18. Maintain ideal body weight by eating a balanced diet high in vegetables.
19. Avoid using a heating pad. Double your socks or gloves instead: put on a thin cotton sock and then a thicker wool sock (if not allergic).
20. Avoid hot water immersion. Use warm or cool.
21. Avoid wearing high-heeled, narrow-heeled, or pointed-toe shoes.
22. Avoid knee-high stockings that leave a mark or indentation in your skin.
23. Avoid crossing legs at the knees.
24. Avoid smoking (it decreases the circulation to hands and feet).

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Explain to client planned procedure and confirm that client has no allergies (especially ask about latex, soaps, fragrances, creams, talc). 2. Assemble equipment. 3. Seat client in stable, comfortable chair.

For feet: <ul style="list-style-type: none"> • Remind patient not to sit on side of bathtub. • If bedridden, pull bedding out at the foot of the bed and fold upward to expose feet/lower legs. • If bedridden and bathing concurrently, cover client with bath blanket. 4. Place linen saver (or towel) under client’s hands/feet. 5. Wash your hands; apply gloves. | <ol style="list-style-type: none"> 1. Enlist client compliance. Confirm that the client is not allergic to materials to be used. 2. Organization saves time, increases efficiency. 3. Ensure safety and maximize client ability to assist. <ul style="list-style-type: none"> • Bathtub side becomes slippery and dangerous. • Keep client warm while washing extremities. 4. Protects the floor/bed from moisture. 5. Reduces the transmission of microorganisms. |
|---|--|

- 6.** Fill basin halfway with warm (not hot) water. Test temperature and place basin on the linen saver (see Figure 4-12-3).



Figure 4-12-3 Fill basin halfway with warm water.

- 6.** Allows room for water to rise with immersion. Water temperature should not exceed 105°F (40.6°C).



Figure 4-12-4 Wash with a small amount of antibacterial soap.

- 7.** Assist (place) client's hand/foot into the basin. Immerse.

- If bedridden, have client bend knees to immerse foot in the water, place a pillow under the knees, cushion the basin rim with the edge of the towel.

- 8.** Soak hand/foot 2–10 minutes, depending on client's health and tolerance.

- 9.** Wash hand/foot with scant amount of a mild antibacterial soap; Cetaphil lotion may be used in place of soap (see Figure 4-12-4).

- 10.** Rinse well to be sure all soap is removed.

- 11.** Remove hand/foot from the basin and place directly onto clean towel

- 12.** Pat and then gently rub dry paying close attention to between and under the fingers/toes.

- 13.** Using the towel, or cuticle stick, gently push the cuticle and subungual skin back, checking nail edges. Do not "disturb" cuticles (see Figure 4-12-5).

- 14.** Use a towel or stone pumice on any thickened, dry skin areas (usually heels and medial side of large toe).

- 7.** Provides support.

- Prevents pressure on legs.

- 8.** Softens skin, nails, and debris. Relaxes muscles, promoting client comfort. Limit time if systemic disease: minimizes possible skin injury/infection.

- 9.** Soap is drying but a helpful surfactant. Cetaphil is a soapless, mild, antibacterial cleanser.

- 10.** Soap can irritate skin, so remove all residual.

- 11.** Absorbs moisture.

- 12.** Dries without harsh rubbing to prevent skin damage.

- 13.** Cuticle functions to prevent infection. Discourages ingrown nails and hangnails.

- 14.** Discourages formation of corns and calluses.



Figure 4-12-5 Using a cuticle stick, gently push the cuticle and subungual skin back.

- 15.** Lightly powder between and under fingers/toes. (Don't shake directly onto client. Put in your hand or on a towel to apply.)
 - 16.** Concurrently assess skin and function. Observe color, shape, texture. Note dryness, redness, cracks, blisters, discoloration, trauma, pain, numbness, tingling, swelling, muscle wasting, decreased sensation, hair growth, or pulses.
 - 17.** Check pulses, turgor, and capillary refill.
 - 18.** Empty basin and refill. Repeat procedure with other hand/foot.
 - 19.** While other hand/foot soaks, perform nail care on the first hand/foot.
 - Ask client's permission prior to cutting nails, especially fingernails.
 - Note any areas where toenails may be injuring adjacent toes. Trim to prevent further damage.
 - Cut toenails straight across.
 - Trim fingernails according to client taste. If the client is confused or comatose, trim to prevent the client from injuring self or others.
 - 20.** Lightly apply cream (not lotion), massaging into the hand/foot. Pay special attention to dry areas. Avoid between and under fingers/toes.
 - 21.** "Towel" off any excess cream.
 - 22.** Perform range of motion (ROM) exercises (repeat each movement 3–10 times): flex-extend, rotate clockwise, rotate counterclockwise, abduct-adduct fingers/toes.
- 15.** Maintains dryness between fingers and toes to discourage infection and skin breakdown. Talc absorbs moisture, but too much is counterproductive.
 - 16.** Observation for early prevention. Extremities are vulnerable to infections and need prompt treatment.
 - 17.** Assesses circulation and hydration to extremity.
 - 18.** Provides warm water for opposite extremity.
 - 19.** Maximizes use of time.
 - Keep nails trimmed to avoid injury to skin on opposite limb as well as to the digit.
 - To prevent ingrown nails.
 - 20.** Maintains hydration, rehydrates skin.
 - 21.** Avoids buildup and skin maceration.
 - 22.** Maintains function.

- | | |
|--|---|
| <p>23. Place lamb’s wool or cotton to protect areas that are rubbing or irritated. Put on clean, dry, absorbent (cotton) socks after foot care.</p> <p>24. Run your hand around the interior of shoes and slippers to be sure there are no foreign objects or scratchy edges prior to putting them on.</p> <p>25. Remove, clean, and/or replace equipment/supplies.</p> <p>26. Dispose of gloves and wash hands.</p> | <p>23. Protects skin.</p> <p>24. Protects skin.</p> <p>25. Avoids accidents and maintains cleanliness.</p> <p>26. Reduces the transmission of microorganisms.</p> |
|--|---|



▼ REAL WORLD ANECDOTES

Mr. Facundo was a middle-aged, grossly obese male with type II diabetes. Mr. Facundo lived independently and worked full time. Because of his size, he was unable to reach his feet to wash them or to perform foot care. When he went to see his endocrinologist, he complained of pain in his feet. The endocrinologist referred Mr. Facundo to a podiatrist. The podiatrist noted that Mr. Facundo’s feet were heavily callused and covered in dead skin. While trimming the calluses from Mr. Facundo’s feet with a razor blade, the podiatrist’s hand slipped and cut Mr. Facundo’s foot. Because of Mr. Facundo’s diabetic peripheral vascular disease, the cut failed to heal properly and became infected, requiring extensive treatment to prevent necrosis and the need for amputation.

> EVALUATION

- The client’s hands and feet are clean and odor free, with soft, hydrated skin.
- The client experiences maximized functional ability of hands and feet.
- The client is comfortable and relaxed.

> DOCUMENTATION

Nurses’ Notes

- Record the time and date care was performed.
- Note any unusual findings, open areas, or significant changes.

> CRITICAL THINKING SKILL

Introduction (see Figure 4-12-6)

Mr. Espinosa is a 75-year-old obese man with Alzheimer’s, hypertension, and a family history of diabetes. Although he has not been diagnosed with diabetes, he does have symptoms of peripheral vascular disease. He kidded about his “wooden” ankle and feet, noting some pain but little feeling in them. His provider had not instructed him in foot care, usually addressing the more

global, multiple concerns. His nurse neighbor was chatting one day midwinter in the yard with him when Mr. Espinosa mentioned that he thought he probably needed to go inside and change his socks. The nurse noticed him feeling his socks with his fingers to check for moisture. When she asked whether he could feel the cold and moisture, he admitted he could not feel it on his feet. She asked if his doctor had instructed him in foot care and how to take care of his feet if he could not



Figure 4-12-6 Clients may have feet in poor condition with skin breakdown, decreased sensation, or poor circulation.

feel them. Because he did not have a home health nurse, she offered to stop over later, when it would be convenient for him, to be sure his feet were OK and review some points of foot care that may help him.

Possible Scenario

As a result of his neighbor's visit, Mr. Espinosa remembered to soak his feet in warm water. However, because of his advanced peripheral vascular disease, he is unable to accurately assess the temperature of the water.

Possible Outcome

Mr. Espinosa's feet were numb secondary to his diabetic peripheral neurovascular disease. However, he was not aware of that and thought that his feet were numb from the winter cold. Despite soaking his feet, they did not seem to warm up. Mr. Espinosa continued to add more and more hot water to his footbath. He was not aware that the water was too hot and scalding his feet. When his neighbor returned later in the week to check on Mr. Espinosa, she noticed that his feet were badly scalded

and took him to see his doctor. The burns on his feet required months of daily dressing changes to heal.

Mr. Espinosa's neighbor was careful to explain about the need for temperature control. She was aware that he would not be able to accurately judge the water temperature without a thermometer. Before stopping over to show Mr. Espinosa some foot care techniques, his neighbor stopped by a drug store and purchased a bath thermometer as a gift for Mr. Espinosa.

Prevention

Instruct him to *always* test the temperature of the water *before* inserting his feet by using a thermometer (*not* glass) or by dropping a few drops onto the volar surface of his arm or onto his abdomen (check to be sure sensation there is normal). Instruct him to time how long his feet are in the water, recommending no more than 2 minutes at a time. Suggest that he put on a thin pair of cotton socks followed by a thicker pair of wool socks to warm up rather than keeping his feet in the water longer. Reinforce his self-discovered habit of checking his foot environment.

▼ VARIATIONS



Geriatric Variations:

- *Elderly skin is very similar to that of premature infants: lacking subcutaneous tissue, frail, easily injured, and slow to repair. Use Cetaphil rather than soap, avoid tape on the skin, and exercise extra caution in preventive measures.*



Pediatric Variations:

- *Give the child a toy to “play” with in the water.*
- *Children's fingernails and toenails are much smaller. Be sure to use implements of the proper size.*



Home Care Variations:

- *Utilize whatever the client prefers for supplies and equipment as long as they are safe.*
- *Be sure to teach caregivers how to perform this care as well as teaching the client.*



Long-Term Care Variations:

- *If client is bedridden and foot care is part of bathing, soak the foot while you wash the leg.*
- *Place a pillow under the client's knees to increase comfort.*

▼COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not get the area between and under fingers and toes dry.

Ask Yourself:

How do I prevent this error?

Prevention:

Skin between and under fingers and toes macerates easily if left moist. Warm, moist areas also promote the growth of fungal infections. Dry area thoroughly.

> NURSING TIPS

- Observe hand posturing and if necessary to maintain neutral position, position a hand roll in the client's hands after care.
- Insert 2 × 2 gauze pads or pieces of lamb's wool (if not allergic to wool) between overlapping toes to protect the adjacent skin.
- Check shoe size by drawing around the client's foot (standing if possible) and placing the shoe on the drawing. Be sure the forefoot has plenty of room. Teach the client to do likewise when shoe shopping.
- If the client is ticklish, use the heel of your hand and press firmly when massaging the bottom of the foot.
- Oil (olive, mineral, Vitamin E) or petrolatum may be used in place of cream if the skin is extremely dry or the client prefers it.
- If edema has been present, massage the foot 2–3 minutes in an elevated position and then leave it in a supported elevated position for 20 minutes if possible.
- Rub excess cream or oil on knees, elbow, or hands to use it up. Combine with exercise by rubbing the bottom of the foot down the opposite shin.
- An emery board may be used as a pumice stone if used very gently and the callus is large.
- Don't use a pumice stone or emery board on the skin of clients with peripheral vascular disease or systemic disease.
- If clients are "bored" with exercising, or need more variety, have them use their toes to pick up marbles and put them in a container. Also exercise and observe cerebellar function by touching thumb tip to each fingertip, counting them forward and backward: 1-2-3-4-4-3-2-1. Then rotate the wrist with rapid alternating hand movements by tapping the finger pads then backs of hand on the palm of the opposite hand in a "flipping the pancake" motion. Change hands.
- Shoes are not necessary for infants until they start walking. Infant shoes should be flexible (able to be flexed with one hand). A flat-footed appearance is normal. Large arch supports and rigid shoes are unnecessary and unhealthy (and usually the most expensive).
- Barefoot is healthy only if feet are safe from injury.
- Educate parents that it is normal for children to outgrow 2–4 pair of shoes a year.

SKILL 4-13

Shaving a Client

Gaylene Bouska Altman, RN, PhD

KEY TERMS

After-shave lotion	Electric razor
Anticoagulants	Mustache
Beard	Shaving
Disposable razor	Shaving cream



> OVERVIEW OF THE SKILL

Shaving the male client is done to remove facial hair if the client is unable to complete this self-care. It is usually done after a bath or shower and as often as required to remove unwanted facial hair. Most men shave every day, although the facial

hair of older clients does not grow as rapidly. If a beard or mustache is present, it should be groomed daily and trimmed as appropriate. Do not shave off beards or mustaches without the client's permission.

> ASSESSMENT

1. Assess whether the client is able to perform self-care. **Promote independence when possible.**
2. Assess the client's skin for areas of redness, skin breakdown, moles, or skin lesions. **Shaving could irritate the skin further.**
3. Assess whether the client has a bleeding tendency or is on anticoagulants. **If there is an increased risk of bleeding, an electric razor should be used.**
4. If the client prefers to shave himself, assess the client's ability to manipulate the razor. **The client must be able to shave safely.**
5. Assess the client's preference for the type of shaving, type of equipment, and type of lotion (if there are options). **This promotes independence.**

> DIAGNOSIS

- 6.5.3 Dressing/Grooming Self-Care Deficit
- 1.6.1 Risk for Injury
- 7.1.2 Self-Esteem Disturbance

> PLANNING

Expected Outcomes:

1. The client will be neat, and well-groomed.
2. The client's skin integrity will remain intact.
3. If the client is able to shave or able to assist, the client will attain a sense of independence.
4. The client will be comfortable following the procedure.

Equipment Needed (see Figure 4-13-2):

- Electric razor or disposable razor
- Shaving cream or soap
- Warm water
- Washcloth and bath towel
- Washbasin
- After-shave lotion (if the client has no skin irritation and if the client prefers lotion)
- Mirror
- Sharp scissors and comb if mustache care required
- Gloves



Estimated time to complete the skill:
10 minutes

> CLIENT EDUCATION NEEDED:

1. Most clients are obviously experienced at shaving themselves and can share preferences and techniques with staff.
2. In clients who require facial surgery, all hair should be shaved to avoid microorganisms in the wound site.
3. If the client has unsteady hands, an electric razor should be used.



Figure 4-13-2 Razor, shaving cream, towel, washcloth, and basin are equipment used to shave the male client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and apply gloves (see Figure 4-13-3).



Figure 4-13-3 Wash hands and apply gloves.

2. Assist the client to a comfortable position. If the client can shave himself, set up the equipment and supplies, including warm water, and watch the client for safety. Adjust lighting as needed.
3. Place a towel over the client's chest and shoulder (see Figure 4-13-4).
4. Position the client. Raise the bed to a comfortable height, move the client to the sink, or have the client sit in a comfortable position.

1. Reduces the transmission of microorganisms.



Figure 4-13-4 Place a towel over the client's chest and shoulders to keep them dry.

2. Facilitates comfort and ease of shaving. Encourages sense of self-control and independence.
3. Protects the client and gown from soil.
4. Facilitates comfort of staff and prevents injury to client.

continues

5. Fill a washbasin with water at approximately 44°C (110°F). Check temperature for comfort.
6. Place the washcloth in the basin and wring out thoroughly (see Figure 4-13-5). Apply the cloth over the client's entire face.



Figure 4-13-5 Wet the washcloth in warm water and wring out thoroughly.

7. Apply shaving cream.
8. Take the razor in the dominant hand and hold it at a 45° angle to the client's skin. Start shaving across one side of the client's face. Use the non-dominant hand to gently pull the skin taut while shaving. Use short, firm strokes in the direction hair grows. Use short, downward strokes over the upper lip area (see Figure 4-13-6).
9. Dip the razor in water as cream accumulates.
10. Check the face to see if all the facial hair is removed.
11. After all the facial hair is removed, rinse the face thoroughly with a moistened washcloth (see Figure 4-13-7).

Figure 4-13-7 When finished shaving, rinse the face thoroughly with a warm washcloth.

12. Dry the face thoroughly and apply after-shave lotion if desired.

5. Warm water helps to soften the skin and beard. Warmth can be relaxing.
6. Warm water helps to soften the skin and beard. Warmth can be relaxing.



Figure 4-13-6 Shave with short, firm strokes in the direction the hair grows.

7. Helps soften the whiskers.
8. Holding the skin taut prevents razor cuts and discomfort during shaving.
9. Keeps the cutting edge of the razor clean.
10. Ensures a neat appearance.
11. Promotes comfort and cleanliness.



12. Stimulates and lubricates the skin.

- | | |
|---|---|
| <p>13. Assist the client to a comfortable position and allow him to inspect the results of your shave.</p> <p>14. Dispose of equipment in proper receptacle.</p> <p>15. Wash hands.</p> | <p>13. Facilitates comfort and a sense of control.</p> <p>14. Equipment should not be shared between clients in accordance with universal precautions since disruption of skin and bleeding may occur. The client may, however, keep his own razor. Clean and store it at the bedside.</p> <p>15. Reduces the transmission of microorganisms.</p> |
|---|---|



▼ REAL WORLD ANECDOTES

While performing Mr. Alfred's daily care, the nurse decided to trim his mustache which had grown long enough to cover his upper lip. Mr. Alfred agreed that his mustache could use a trim and the nurse proceeded to snip away. As she was finishing the trim she noticed that Mr. Alfred's mustache was now lopsided. As she tried to even his mustache out, trimming first one side and then the other, Mr. Alfred watched in horror as his mustache slowly disappeared. Finally, in a desperate effort to save at least a little of his mustache, he stopped the nurse, explaining that he was very happy with its current look.

> EVALUATION

- The client is neat and well-groomed.
- The client's skin integrity remained intact.
- If the client was able to shave or able to assist, the client attained a sense of independence.
- The client is comfortable following the procedure.

> DOCUMENTATION

Nurses' Notes

- Document the procedure, if the client was able to assist and how the client tolerated the activity.
- Note any unusual findings or injury that may have occurred.

> CRITICAL THINKING SKILL

Introduction

You are caring for a client with a decreased platelet count. You grab a disposable razor and hand it to the

client, who is quizzical but proceeds to shave. He mentions to his wife that he has brought his own electric razor from home.

Possible Scenario

Patient cuts himself deeply. He starts bleeding.

Possible Outcome

He has prolonged bleeding, then continues to ooze the rest of the morning. He mentions that he has used an electric razor for 20 years and had lost the "knack" of shaving with foam and a blade.

Prevention

Remember to be aware when shaving any male client with bleeding problems. Use an electric razor that the family has brought from home. Listen to the client and assess skill level before allowing the client to perform any procedure.

▼ VARIATIONS



Geriatric Variations:

- Older clients have thin, wrinkled skin and may be more easily cut.
- Older clients may have unsteady hands and require some assistance and patience.
- Some older clients have not used an electric razor or may prefer their own equipment.

continues

▼ VARIATIONS *continued*

- Older clients may need a warm towel in place for a longer time to soften the skin.
- Facial hair grows slower in elderly clients, and they may not require daily shaving.



Pediatric Variations:

- Adolescents may be embarrassed to have staff shave them and may feel a lack of independence.
- Provide privacy if needed.
- Adolescents may have unusual tastes in grooming and toiletries. Support choice, and enlist the aid of a parent if you are uncertain.
- Children need careful explanations if they must have their hair shaved that the hair will grow back and other reassurance to minimize bodily image disturbance.



Home Care Variations:

- If clients are unsteady, they may require an electric razor. Make sure the home razor has fresh, sharp blades.
- Listen to the routines of the client when you are in his home. Routines convey a sense of control and normalcy for the client. The client may be able to perform self-care tasks much more independently in the home setting than in the unfamiliar hospital setting. Facilitate independence as much as possible.



Long-Term Care Variations:

- Don't overlook the psychosocial benefits of hands-on care. Shaving and grooming can be a special time for social contact and caring between the client and friends and family. Family members often feel a sense of helplessness watching a loved one struggle. These frustrations may be lessened if they can become involved in feeding and caring for someone they love. The client may enjoy the time and special attention and improved self-esteem as he is well-groomed for friends, family, and staff.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse is too rushed and does not involve client.

Ask Yourself:

How do I prevent this error?

Prevention:

Plan ahead so you are not rushed. A family member might wish to come in and assist with shaving.

Possible Error:

The nurse is too rushed and cuts the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Plan ahead so you are not rushed. Ask the client how best to shave him. He is the expert.

Possible Error:

Warm towels not kept in place long enough to soften skin.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Plan ahead so you are not rushed. Have the client or family member hold the towel in place long enough to soften the skin.

Possible Error:

Hair not shaved daily and allowed to grow longer will be more difficult to shave.

Ask Yourself:

How do I prevent this error?

Prevention:

Set aside time to shave your client. If you do not have time, enlist the aid of a family member or other caregiver.

> NURSING TIPS

- Shave daily or as needed.
- Be careful to use a 45° angle to avoid cuts.
- Use new and disposable razors.
- Sometimes a client may be shaking and slow. This requires patience on the part of the staff.

SKILL 4-14

Giving a Back Rub

Tom Ewing, RN, BSN

KEY TERMS

Back massage

Back rub

Body mechanics

Contraindications

Effleurage

Kneading

Lymphatic drainage

Petrissage



> OVERVIEW OF THE SKILL

Giving a back rub is a basic nursing skill. Back massage can be an effective means of building a sense of trust and increased rapport between the nurse and client. Clients are often touch-deprived in the busy health care industry of today. The small amount of time that it takes to do a simple back massage can often soothe and relax a “difficult” client, increasing the effectiveness of the nurse-client relationship.

Massage can be performed in many different ways, from light strokes to heavy kneading. Various forms in-

clude effleurage, deep or gentle stroking, and petrissage, a kneading performed with the tips of the fingers and thumbs or palm of the hand. Massage can stimulate circulation and promote lymphatic drainage, helping to rid the body of metabolic wastes and speed healing, along with providing gentle relaxation. Massage can open lines of communication and improve the therapeutic relationship between a nurse and client. A simple back massage is easily learned by nurses and caregivers and can be done in as little as 5–10 minutes.

> ASSESSMENT

1. Assess the client’s willingness to have a massage. The client may not want a massage or may not enjoy the tactile experience of a massage.
2. Assess the client for contraindications of a back rub. Conditions include open sores or lesions, vertebral fractures, burns, and signs of decubitus ulcers. To prevent injuring the client.
3. Assess any limitations the client has in positioning to determine if the client has any conditions that prohibit them from a side-lying or prone position.
4. Assess the client for fatigue, stiffness, or soreness in the back and shoulders. Knowing areas of particular concern allows you to focus your energies toward “trouble areas.”
5. Assess the client for anxiety or emotional disturbances. Massage can help to reduce anxiety and calm people in distress.

6. If possible, have the client quantify the degree of discomfort using a 1 to 10 rating scale. Quantifying the results can provide more validity to the intervention.

> DIAGNOSIS

- 9.3.1 Anxiety (mild, severe, panic), related to (client’s situation), evidenced by client’s physical tension and statement of feeling anxious
- 9.1.1 Pain (acute, chronic), related to (client’s area of tension), evidenced by client’s report of pain
- 6.1.1.1 Physical Mobility Impaired, related to stiffness and tension evidenced by limited range of motion of (client’s affected area)

> PLANNING

Expected Outcomes:

1. The client will experience a reduction in tension, anxiety, pain, and fatigue.
2. The nurse will establish a better rapport with the client.

Equipment Needed:

- Quiet environment, free of interruptions, with a comfortable room temperature
- Comfortable bed or massage table that allows a client to lie in a side-lying or prone position
- Bath blanket
- Bath towel, to absorb excess moisture, oils
- Lotion, baby powder, or massage oil
- Gloves if necessary



Estimated time to complete the skill:
5–10 minutes, as tolerated by client

> CLIENT EDUCATION NEEDED:

1. Explain the procedure and potential benefits to the client.
2. Arrive at a mutually agreed upon time that you will massage.
3. Assure clients that they may discontinue the massage at any time.
4. Encourage clients to give you feedback regarding the amount of pressure you are giving them.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash your hands and apply gloves if necessary.
2. Help client to a prone or side-lying position (see Figure 4-14-2).



Figure 4-14-2 Position client in a prone or side-lying position.

3. Drape the bath blanket, and undo the client's gown, exposing the back, shoulder, and sacral area, keeping the remainder of the body covered (see Figure 4-14-3).
4. Pour a small amount of lotion in your hand and warm between your palms for a few moments. The lotion bottle can also be submerged in a bowl of warm water for a few minutes to warm up the lotion. Baby powder may be substituted for oils or lotions (see Figure 4-14-4).

RATIONALE

1. Reduces the transmission of microorganisms.
2. This exposes back and shoulder area.



Figure 4-14-3 Expose the back, shoulder, and sacral area.

3. This prevents chilling and excess exposure.
4. This prevents the shock of cold lotion being applied to the body. Some clients may be sensitive to oils or lotions.

continues



Figure 4-14-4 Pour lotion on your hand and warm between your palms.



Figure 4-14-5 Apply firm continuous pressure without breaking contact between your hands and the client's skin.

5. Begin in the sacral area with smooth, circular strokes, moving upward toward the shoulders. Gradually lengthen the strokes (effleurage) to the upper back, scapulae, and upper arms. Apply firm, continuous pressure without breaking contact with the client (see Figures 4-14-5 and 4-14-6).



Figure 4-14-6 Use long circular strokes from the sacral area upward toward the shoulders.

5. Applying firm, continuous pressure increases circulation and relaxation.



Figure 4-14-7 Use firm kneading massage on areas of increased muscle tension.

6. Assess client's back as you are massaging for areas of redness and signs of decreased circulation.
 7. Provide a firm, kneading massage (petrissage) to areas of increased tension if desired, in areas such as the shoulders and gluteal muscles (see Figure 4-14-7).
 8. Complete the massage with long, very light brush strokes, using the tips of the fingers (see Figure 4-14-8).
 9. Gently pat or wipe excess lubricant off of the client and cover the client up (see Figure 4-14-9).
 10. Wash hands.
6. Monitor for signs of early skin breakdown.
 7. Firm, kneading strokes can decrease muscle tension, reducing pain and increasing relaxation.
 8. This is a very relaxing stroke and signals an end to the massage.
 9. This prevents soiling of the bed with excess lotions and keeps the client warm.
 10. Reduces the transmission of microorganisms.



Figure 4-14-8 Finish the massage with light brush strokes, using the fingertips.



Figure 4-14-9 Cover client after the massage for warmth and modesty.



▼ REAL WORLD ANECDOTES

Mrs. Mai was a client admitted to the hospital for failure to thrive. She was admitted to the oncology floor because it was the only floor with an available bed. Mrs. Mai was cold to the nurses, withdrawn, and obviously depressed. She told the nurses on many occasions that nobody really cared about her. During her morning bed bath, a nurse noticed that she was developing some redness over the bony areas of her shoulders and buttocks. The nurse informed Mrs. Mai that she was going to massage some lotion on her back. Mrs. Mai reluctantly agreed to the massage. After about 10 minutes of massage, Mrs. Mai stated that her back “felt a little better.” The next morning, during her bed bath, Mrs. Mai asked the nurse if she would do another one of those “back rubs.” This became an every-morning activity with Mrs. Mai with each nurse. She became more animated with the nurses and less withdrawn, looking forward to her morning massage.

> EVALUATION

- The client experienced a reduction in tension, anxiety, pain, and fatigue.
- The nurse established a better rapport with the client.

> DOCUMENTATION

Nurses' Notes

- Record the time and date the back rub was performed.
- Note the client's response to the back rub.
- Record any complaints of pain or tension the client reported.
- Document any unusual findings.

> CRITICAL THINKING SKILL

Introduction

The aged are often touch-deprived even though they need touch as much as or more than other age groups. Often, they have fewer friends or family members, and touch can serve as an effective means of communication when other channels of communication have been reduced.

Possible Scenario

Mrs. Zaricor, an 84-year-old female, has been in a nursing home for a month. She is hard-of-hearing and has extremely poor eyesight despite glasses. She has had no visitors and has been reluctant to interact with any other clients in the home. She has been withdrawn from staff, voicing few complaints other than nagging aches and pains in her shoulders and back. The nurses doing her morning care have been giving her a 5- to 10-minute back massage this past week.

Possible Outcome

Mrs. Zaricor has reported fewer problems with her back and shoulders. She has been warming up to the nurses and has been talking to the nurse about her past. She still is not taking part in group activities; however, she has been going to the group room to be around others.

Prevention

Taking the time for a simple back massage has opened up a channel of communication with Mrs. Zaricor that was otherwise inaccessible. Massage has built a level of trust and assurance that the nurses care about her as a person and are willing to take time to be with her.

▼ VARIATIONS



Geriatric Variations:

- Assess for and avoid areas of chronic pain related to arthritis or injury.
- Assess for contraindications such as cancer within the past 5 years, blood-clotting disorders, or hypertension.
- Be sure to assess the client's cognitive and sensory abilities. You may need to speak louder or vary the pressure/intensity of the massage.
- Be sure to assess the client's willingness for massage. Some people are uncomfortable with touch.



Pediatric Variations:

- Children generally enjoy massage.
- Some are uncomfortable with touch, especially those with histories of physical or sexual abuse.
- Children may be more comfortable with their parent or guardian with them.
- Be sure to use very light pressure with children.



Home Care Variations:

- Encourage caretakers to take part in the session so that they can give massage in the future.
- Assess for ongoing changes in skin condition or complaints of pain.



Long-Term Care Variations:

- Be sure to assess cognitive and sensory abilities.
- Assess for ongoing changes in skin condition or complaints of pain.
- Make sure that massage is offered by all appropriate staff.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse gives a stressful massage.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure that you are comfortable giving a massage. Do not do the massage hastily; “be with” the client. If you are in a hurry or are uncomfortable, the client will sense those feelings. Encourage frequent feedback regarding pressure or pain from the massage.

Possible Error:

The nurse experiences back strain from giving a massage.

Ask Yourself:

How do I prevent this error?

Prevention:

Use good body mechanics. Adjust the level of the bed. Brace your feet to balance your weight and bend your knees rather than lean over the client.

> NURSING TIPS

- Be sure to use good body mechanics while doing massage. Elevate the bed and keep your center of balance. Try to let the movements come from your legs, not just your hands and arms. Try to keep shoulders in alignment with your hips (don't twist your spine) as you perform the procedure.
- Encourage clients to ask for a massage.
- If time allows, massage of the feet or hands can be very therapeutic.
- Pass on the client's response to massage at report.
- Be sure to chart the client's responses to massage in the nurses' notes.
- Be aware of your own feelings regarding massage. If you have difficulty with touch, these feelings will be transmitted to the recipient.
- Sometimes those who are uncomfortable with massage can feel better with simple handholding.
- Be aware that some clients' comfort levels are affected by the sex of the nurse and the area of the body being touched. Studies have shown that female clients are not as comfortable being touched by older male nurses, though handholding did not evoke such a response.

SKILL 4-15

Changing the IV Gown

Kathy Lilleby, RN

KEY TERMS

**Dislodge
Gown**

**IV bottle or bag
IV tubing**



> OVERVIEW OF THE SKILL

All clients require clean gowns at regular intervals. Clients receiving IV therapy are no exception to this rule. However, clients with IV access in one or both arms require a different technique to change their gown without disrupting their IV access. Some institutions have special gowns with snaps at the shoulders, which provide an easy method of applying a client's gown over arms, with IV access. In this case, the snaps can be undone and the gown easily removed and changed. If the client's gown has no

snaps, it can be changed by passing the IV bag through the sleeve of the gown, or briefly disconnecting the IV tubing, so the client can benefit from clean and comfortable linens. In some cases, it may be necessary to cut the gown sleeve to safely remove the gown; however, this should only be done if no other option is available. Care must be taken not to compromise the IV access. Also, some IV medication rates cannot be stopped or slowed without endangering the client.

> ASSESSMENT

1. Assess the client for the presence of an IV line or lines so the necessary supplies can be gathered.
2. Assess the client's current gown to determine how the old gown will be removed.
3. Assess the contents of the IV infusion to determine whether the infusion can be turned off

briefly so the adjustment can be made using a special gown or procedure to change the gown.

> DIAGNOSIS

- 6.5.3 Dressing/Grooming Self-Care Deficit
- 1.6.1 Risk for Injury
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING**Expected Outcomes:**

1. The IV line will remain intact while the gown is being changed.
2. The privacy of the client will be preserved.
3. The IV gown will be changed without becoming twisted or tangled in the IV line.
4. The client's gown will be changed without compromising the client's health.

Equipment Needed:

- Client gown
- Betadine or alcohol
- Tubing clamps
- Sterile gloves



Estimated time to complete the skill:

5 minutes**> CLIENT EDUCATION NEEDED:**

1. Instruct the client on the rationale for changing the gown.
2. Tell clients they will need to move their arms to change the gown.
3. Reassure the client that all precautions will be taken to guard the current IV access.
4. Tell clients not to remove their gowns by themselves because there may be an increased risk of dislodging their IV.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

1. Wash hands.

1. Reduces the transmission of microorganisms.

2. Untie or unsnap the back fasteners on the old gown.

2. Facilitates removal of the old gown.

Gown with Shoulder Snaps

3. Unsnap the gown sleeves.

3. Facilitates removal of the gown without disrupting the IV access.

4. Cover the client with the clean gown.

4. Provides privacy.

5. Keeping the client covered, pull the old gown out from underneath the clean gown. Be sure the IV lines are not tangled in the old gown.

5. Provides privacy.

6. Snap the sleeves of the clean gown around the client's arms.

6. Secures the gown, providing client privacy without disrupting the IV access.

Gown with Solid Sleeves 1

7. Place the clean gown over the client with the sleeves in the proper orientation. Keep the client covered with the clean gown throughout the procedure (see Figure 4-15-2).

7. Provides privacy. Smooths the transition from old gown to clean gown.

8. Remove the old gown from the arm without IV access. Slide the old gown to the IV access side.

8. Allows the old gown to be removed without pulling on the client's other arm.



Figure 4-15-2 Place the clean gown over the client with the sleeves in the proper orientation.

9. Determine if the client can tolerate a brief interruption in the IV infusion.
10. If the IV can be shut off briefly, clamp the IV tubing. If the IV is regulated by a pump, shut off the IV pump and remove the tubing from the pump (see Figure 4-15-3).
11. Remove the IV bottle from the IV stand.
12. While holding the IV bottle in the nondominant hand, use the other hand to slide the old gown off the arm with IV access, over the IV tubing, over the IV bottle, and onto the nondominant hand (see Figure 4-15-4).



Figure 4-15-4 Slide the IV bag or bottle through the arm of the gown.

13. Take the IV bottle in the dominant hand and remove the client's gown from the nondominant hand. Dispose of the old gown appropriately.



Figure 4-15-3 If the patient can tolerate a brief interruption in the IV, clamp the tubing and shut off the IV pump.

9. Some infusions cannot be interrupted, even briefly, without endangering the client.
10. Frees the IV line and bottle to be passed through the sleeve of the gown. Clamping the tubing prevents free flow of the IV fluids into the client.
11. Facilitates changing the gown. Do not hold the IV bottle below the IV access site to prevent blood backflow into the IV tubing.
12. Allows removal of the old gown without disrupting IV access.



Figure 4-15-5 Fasten the clean gown in back.

13. Promotes a clean environment.

Gown with Solid Sleeves 1 *continued*

- 14.** With the IV bottle in the dominant hand, place the nondominant hand through the sleeve of the clean gown, from the distal end of the sleeve toward the proximal end of the sleeve.
 - 15.** Place the IV bottle in the nondominant hand, with the clean gown on it. Use the dominant hand to slide the sleeve of the clean gown over the IV bottle, down the IV tubing, and over the client's arm.
 - 16.** Replace the IV bottle on the IV stand. Reinsert the IV tubing into the IV pump and open the clamp on the IV tubing.
 - 17.** Check the IV flow rate to ensure that it is still at the ordered rate. Check the IV access site to ensure the IV is still intact and patent.
 - 18.** Slide the gown sleeve over the client's other arm.
- 14.** Prepares for placing the clean gown.
 - 15.** Allows placement of the clean gown without disrupting IV access.
 - 16.** To resume the IV infusion.
 - 17.** Ensures proper infusion of the IV fluids without injury to the client.
 - 18.** Provides client privacy.

Gown with Solid Sleeves 2

- 19.** Examine the IV tubing. Determine whether there is a junction in the IV tubing that can be disconnected to aid removal of the old gown.
 - 20.** Determine if the client will tolerate a brief interruption in the IV infusion.
 - 21.** Place the clean gown over the client with the sleeves in the proper orientation. Keep the client covered with the clean gown throughout the procedure.
 - 22.** Remove the gown from the arm without IV access. Slide the old gown to the IV access side and slide the IV access sleeve down to the site of the tubing junction.
 - 23.** Cleanse the IV tubing junction with alcohol and/or Betadine.
 - 24.** Apply sterile gloves.
 - 25.** Clamp the IV above and below the tubing junction.
- 19.** If there is no connection point, this technique cannot be used.
 - 20.** If the client cannot tolerate an interruption in IV flow, this technique cannot be used.
 - 21.** Provides privacy and smoothes the transition from the old gown to the clean gown.
 - 22.** Allows for a smoother removal of the old gown.
 - 23.** Reduces the transmission of microorganisms.
 - 24.** Reduces the transmission of microorganisms.
 - 25.** Prevents free flow of IV fluids and introduction of air into the IV tubing.

- | | |
|--|--|
| <p>26. Using sterile technique, disconnect the IV tubing at the junction and remove the old gown from the tubing. Place the new gown on the patient.</p> <p>27. Reconnect the IV tubing. Unclamp the IV tubing.</p> <p>28. Check the IV flow rate to ensure that it is still at the ordered rate. Check the IV access site to ensure the IV is still intact and patent.</p> <p>29. Fasten the client's gown in back. Straighten the bedclothes and provide for the client's comfort (see Figure 4-15-5).</p> <p>30. Wash hands.</p> | <p>26. Reduces the transmission of microorganisms.</p> <p>27. To resume the flow of the IV fluids.</p> <p>28. Ensures proper infusion of the IV fluids without injury to the client.</p> <p>29. Provides privacy and client comfort.</p> <p>30. Reduces the transmission of microorganisms.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

Randy was a 7-year-old boy who had an appendectomy. The day after his surgery, he got up to bathe at his bedside. The IV bottle was too large to thread through the sleeve of his client gown, but the IV tubing had an extension set on it with a connector about 6 inches from the IV site. The nurse turned off the IV and clamped the extension tubing leading to the client. The nurse removed the gown from Randy's arm. Using sterile technique, she protected the IV tubing connection while slipping the tubing through the sleeve. She had already obtained a special gown with snaps at the shoulder to put on Randy until his IV was discontinued. The nurse was thankful that Randy's IV fluids could be interrupted briefly. If she could not have clamped and disconnected the IV, she may have had to cut the gown sleeve to safely remove the gown.

> EVALUATION

- The IV line remained intact while the gown was being changed.
- The privacy of the client was preserved.
- The IV gown was changed without becoming twisted or tangled in the IV line.
- The client's gown was changed without compromising the client's health.

> DOCUMENTATION

Nurses' Notes

- Document the date and time of the gown change when documenting the reason for the change such as daily care, client was incontinent, and so on.
- Note the condition of the IV access site.
- Note any unusual findings or client concerns.

> CRITICAL THINKING SKILL

Introduction

Clients with IV lines need help changing their gowns because the risk of dislodging the IV is high.

Possible Scenario

A confused client has soiled his gown and tried to take it off by himself. The gown has become entangled in the IV tubing. The client says, "I have to go to the bathroom now." The client pulls at the IV tubing as he tries to remove it.

Possible Outcome

The nurse grabs a new gown to protect his privacy and folds the soiled gown on itself as she carries it to the bathroom with the client. She protects the IV site and tubing as she holds the gown. Later, she settles the client and carefully removes the soiled gown and replaces it with a new one.

Prevention

Tell the client the nurse will help him change his gown to protect the IV needle, tubing, and bottle. If the client

is confused, reassure the client that the nurse will help him. Ask family members to reinforce this instruction to the client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may need more help changing their gowns with an IV in place.*
- *Careful handling of the IV site is especially crucial in elderly clients because they may have fragile veins.*



Pediatric Variations:

- *Children's gowns may be too small to slip the IV bottle or bag through the sleeve of the gown.*
- *Children may be more active and get their gown tangled more easily.*



Home Care Variations:

- *Clients receiving IV therapy at home will probably wear their own clothing, which can be altered to accommodate an IV.*
- *Caregivers should be taught how to change clothing of a client with an IV in place.*



Long-Term Care Variations:

- *Special gowns may be necessary for clients receiving IV therapy in a long-term care facility.*
- *Staff should be taught how to manage clothing change in clients receiving IV therapy.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You remove the gown from the client's arm and forget to thread the IV bottle through the sleeve. The tape at the IV site is pulled and the needle is slightly dislodged.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember to check that the gown is completely free of the tubing before pulling it away from the client. If this error does occur, assess the IV for patency. If it is intact, retape the needle in place. Then remove the gown and replace it with a fresh one.

> NURSING TIPS

- It may be easier in some situations to simply leave the gown off the arm where an IV is in place. Be sure to secure the gown as well as possible and use a second gown to cover the exposed arm.
- Position the gown over the client so it will be placed on the client correctly.
- Disconnect the IV only if other methods of removing the gown cannot be used. Disconnecting the IV increases the risk of infection.

SKILL 4-16

Assisting from Bed to Stretcher

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Contractures
Gurney
Horizontal

Lift sheet
Shearing force
Stretcher



> OVERVIEW OF THE SKILL

Some clients must remain horizontal when they are moved. If they are not strong enough to sit erect in a wheelchair or there is some injury that prevents them from sitting, clients must be moved while lying flat. The most commonly used equipment for transferring a client is a stretcher or gurney. A

stretcher is a narrow, cartlike bed that rolls on wheels. For client safety, stretchers are equipped with side rails or safety straps to prevent accidental falls during transport. The wheels on a stretcher lock to prevent accidental movement during client transfers.

> ASSESSMENT

1. Assess the client's current level of mobility. Knowing whether a client is able to assist with the transfer will affect how the transfer is performed.
2. Assess for injury. Caregivers may need to keep the client in the same alignment as much as possible.
3. Assess for any impediments to mobility such as a cast, drainage tubes, IVs, or intubation. This will affect how the transfer is performed.
4. Assess the client's level of understanding of the procedure. This will affect client comfort, anxiety, and cooperation.
5. Assess the client's environment. Assess how close the stretcher will move to the bed. Assess the height of the bed. This allows for a safe transfer. Plan for good body mechanics.

6. Make sure the stretcher is safe to use. Check for working brakes, side rails, safety straps that are intact and usable, and an IV pole attachment if needed. This allows for a safe transfer. Plan for good body mechanics.

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility
- 6.1.1.2 Activity Intolerance

> PLANNING

Expected Outcomes:

1. The client will be transferred from the bed to the stretcher without pain or injury.

2. Drainage tubes, IVs, or other devices will remain intact.
3. The client's skin will be intact and undamaged.

Equipment Needed:

Transferring a Client with Minimum Assistance

- Bed
- Stretcher

Transferring a Client with Maximum Assistance (see Figure 4-16-2)

- Bed
- Stretcher
- Pillows
- Transfer/slider boards
- Lift sheet
- Other qualified personnel to assist



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. If the client has an injury or condition that requires immobility, explain the need and rationale for immobility to the client.
2. Be sure to remind the client that the gurney is narrow and to move carefully while on it. Remember that if the client is confused, and explanation won't help, safety straps and side rails are needed.



Figure 4-16-2 Transfer or slider boards reduce the friction when sliding the client on or off the stretcher.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

Transferring a Client with Minimum Assistance

1. Inform client about desired purpose and destination.
2. Raise the height of bed to 1 inch higher than the stretcher and lock brakes of bed.
3. Instruct client to move to side of bed close to stretcher. Lower side rails of bed and stretcher. Leave side rails on opposite side up (see Figure 4-16-3).

RATIONALE

1. Reduces client anxiety and increases cooperation.
2. Reduces distance nurse must bend, thus preventing back strain; prevents bed from moving.
3. Decreases risk of client falling.



Figure 4-16-3 Lower side rails of bed and stretcher.

- | | |
|---|--|
| <p>4. Stand at outer side of stretcher and push it toward bed.</p> <p>5. Instruct client to move onto stretcher with assistance as needed.</p> <p>6. Cover client with sheet or bath blanket.</p> <p>7. Elevate side rails on stretcher and secure safety belts about client. Release brakes of stretcher.</p> <p>8. Stand at head of stretcher to guide it when pushing.</p> <p>9. Wash hands.</p> | <p>4. Diminishes the gap between bed and stretcher; secures the stretcher position.</p> <p>5. Promotes client independence.</p> <p>6. Promotes comfort; protects privacy.</p> <p>7. Prevents falls.</p> <p>8. Pushing, not pulling, ensures proper body mechanics.</p> <p>9. Reduces the transmission of microorganisms.</p> |
|---|--|

Transferring a Client with Maximum Assistance

- | | |
|--|--|
| <p>10. Repeat Actions 1 and 2.</p> <p>11. Assess amount of assistance required for transfer. Usually 2–4 staff members are required for the maximum-assisted transfer.</p> <p>12. Lock wheels of bed and stretcher.</p> <p>13. Have one nurse stand close to client's head.</p> <p>14. Log roll the client and place a lift sheet under the client's back, trunk, and upper legs. The lift sheet can extend under the head if client lacks head control abilities.</p> <p>15. Empty all drainage bags (e.g., T-tube, Hemo Vac, Jackson-Pratt). Record amounts. Secure drainage system to client's gown prior to transfer.</p> <p>16. Move client to edge of bed near stretcher. Lift up and over to avoid dragging.</p> <p>17. Because the client is now on the side of the bed, without the side rail up, the nurse on non-stretcher side of bed holds the stretcher side of the lift sheet up (by reaching across the client's chest) to prevent the client from falling onto the stretcher or off the bed.</p> <p>18. Place pillow or slider board overlapping the bed and stretcher (see Figure 4-16-4).</p> | <p>10. See Rationales 1 and 2.</p> <p>11. Promotes client independence; ensures that enough staff are present before beginning transfer.</p> <p>12. Prevents falls.</p> <p>13. Supports client's head during the move.</p> <p>14. Prevents flexion and rotation of client's hips and spine; maintains correct body alignment.</p> <p>15. Decreases possibility of spills; prevents dislodging of tubes.</p> <p>16. Prevents dragging, which causes shearing force.</p> <p>17. Protects the client from falling.</p> <p>18. Protects head from injury. Slider board eases movement of the client.</p> |
|--|--|

Transferring a Client with Maximum Assistance *continued*



Figure 4-16-4 Place pillow or slider board overlapping the bed and stretcher.



Figure 4-16-5 Firmly grasp edges of lift sheet.

- | | |
|---|---|
| <p>19. Have staff members grasp edges of lift sheet. Be sure to use good body mechanics (see Figure 4-16-5).</p> <p>20. On the count of three, have staff members pull lift sheet and the client onto the stretcher.</p> <p>21. Position client on stretcher, place pillow under head, and cover with a sheet or bath blanket (see Figure 4-16-6).</p> | <p>19. Provides surface for client to slide on. Prevents dragging and shearing.</p> <p>20. Working in unison makes the overall job easier and prevents staff injury.</p> <p>21. Promotes comfort and provides for privacy.</p> |
|---|---|

Figure 4-16-6 Place pillow under head and cover client with blanket.



- | | |
|--|--|
| <p>22. Secure safety belts and elevate side rails of stretcher.</p> <p>23. If IV pole is present, move it from bed IV pole to stretcher IV pole after client transfer.</p> <p>24. Wash hands.</p> | <p>22. Prevents falls.</p> <p>23. Prevents tubing from being pulled and IV from being dislodged.</p> <p>24. Reduces the transmission of microorganisms.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

Scenario 1

Mr. Cao arrived in the emergency room on a backboard with a hard cervical collar on. He had been involved in an automobile accident. The emergency room doctor ordered a CT scan to check for spinal damage. The client denied any numbness or tingling in any of his extremities. The client

▼ REAL WORLD ANECDOTES *continued*

complained of pain from the discomfort of the backboard, and the restraining straps were loosened while the client waited for the scan. While he was being transferred from the stretcher back to the emergency room bed, the nurses performing the transfer did not keep Mr. Cao's lower back in alignment. Shortly after the CT scan had been read, showing a fractured lumbar vertebra but no nerve damage, Mr. Cao began to complain of tingling in his feet and legs. A second spinal CT showed new damage that had not been present in the first CT. Mr. Cao was taken to emergency surgery, but the damage had been done and Mr. Cao was paralyzed from the waist down. The nurse needed to take precautions to protect the spinal cord from movement until the possibility of a fracture had been ruled out.

Scenario 2

A small hospital emergency room was in a separate building from the main hospital. To admit a client on a gurney from the E.R. to the hospital, the gurney had to be pushed out the door, immediately swung hard left to avoid the sloping driveway, then pushed hard across the pavement to the main hospital elevator. Most of the regular E.R. nurses knew the tricks and often transferred clients alone. One night a 125 lb. nurse tried to transfer a 270 lb. client. She got him out the door but could not turn the stretcher left in time. The stretcher, the client, and the nurse started a slow descent down the sloping driveway. Fortunately, help was at hand, but the nurse strained her back, and the client was stressed. The nurse needed to assess the task and get help for this extra-heavy client.

> EVALUATION

- The client was transferred from the bed to the stretcher without pain or injury.
- All drainage tubes, IVs, or other devices remain intact.
- Assess whether the client's skin is intact and undamaged.

> DOCUMENTATION

Kardex

- Document how much assistance the transfer required and how much the client was able to assist.

Nurses' Notes

- Document the time, date, reason for transfer, type of transfer, and how the client tolerated the activity.

> CRITICAL THINKING SKILL

Introduction

Some transfers are more difficult and need a little extra planning.

Possible Scenario

Mr. Khalif is a client in the ICU. He is comatose and intubated. His doctor has ordered a CT scan of Mr. Khalif's head to determine the extent of any damage. While Mr. Khalif is being transferred from the bed to a stretcher, you note that he has a multitude of lines, wires, and tubes that must be carefully coordinated during the move.

Possible Outcome

Some of the tubes, lines, or wires could become dislodged or pulled out entirely. With some of these devices, this could be a life-threatening situation. If Mr. Khalif's ET tube becomes dislodged or pulled out, he could die of respiratory failure. If a pacemaker wire becomes dislodged, he could die of cardiac failure.

Prevention

Carefully assess which devices can be safely removed prior to transferring a client and which ones must be carefully guarded to prevent accidental removal. Be sure to get enough help to move complex clients. It may take one or two nurses just to watch the lines and tubes to move a client safely.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients may have contractures or other disabilities that impair their ability to lie flat. Be aware that your transfer technique may need to be altered to accommodate this.
- Elderly clients may have thin, fragile skin. Care should be taken during the transfer not to tear or damage their skin.



Pediatric Variations:

- A child may be small enough to lift onto a stretcher. If the parent is lifting, make sure the parent can hold the weight of the child. Give brief instructions on proper body mechanics prior to the lifting of the child.
- Children may be small enough to slip through the side rails on a gurney. Be sure to fasten any safety straps or restrain the child some other way.



Home Care Variations:

- Stretchers are rarely used in the home care situation.



Long-Term Care Variations:

- Long-term care clients may have contractures or other disabilities that impair their ability to lie flat. Be aware that your transfer technique may need to be altered to accommodate this.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not have enough help to move the client safely.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about what will happen if you try to move this client without enough help: You could be seriously injured. If you try to move this client with too much help, you may get in each other's way, but the client and the staff are more likely to be safe from harm. Be sure to ask for help when transferring a client. Unless the client is very capable, a bed-to-stretcher transfer usually requires at least two nurses. Don't be embarrassed to ask for help.

> NURSING TIPS

- Count to three and have everyone move the client on the count of three. Designate a "team leader" to coordinate the move and call the count.
- If possible, fold the client's arms across the chest to prevent them from being caught underneath the body during the transfer.
- Be careful to support the client's head and neck during the transfer.
- Don't allow the urinary catheter drain bag to be held above the level of the client's bladder. Holding it up encourages backflow of urine and can lead to bladder infections.
- Even though both the stretcher and bed wheels are locked, leaning your body into the stretcher will help prevent gaps between the stretcher and bed.

SKILL 4-17

Assisting from Bed to Wheelchair, Commode, or Chair

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Dangle
Peristalsis
Transfer

Venous return
Wheelchair



> OVERVIEW OF THE SKILL

Client activity is an important part of the healing process. Activity improves muscle tone, increases venous return to the heart, and stimulates peristalsis. Moving a client from the bed to a chair is an important part of client activity.

Moving a client from the bed to a chair, wheelchair, commode, or stretcher is called a transfer. Transferring a client requires good planning to avoid injury to the client and the nurse. When transferring a client, the nurse needs to consider the client's ability to assist with the transfer. If the client is unable to provide any assistance or is large, the nurse may need one or more staff members to help her perform the transfer safely.

The most frequent complication in transferring a client is falling during the transfer. If a client does start to fall while being transferred, lower him gently to the floor, making sure his head does not strike anything. If a client does fall, obtain assistance and perform a thorough assessment of the client before moving him.

Another possible hazard in client transfers is pulling on or dislodging indwelling tubes or catheters. Think ahead about ways tubes will move with

the transfer and try to avoid snagging them. Care should be taken to appropriately anchor all tubes and catheters prior to transferring a client.

Clients are also at risk of damage to their skin during a transfer. Sliding across the sheets, side rails, and wheelchair armrest can bruise or injure the client. Using a transfer board or padding any sharp exposed areas can help prevent injury to the client.

Be sure the client is wearing shoes or slippers with firm, nonslip soles when transferring a client. Even if the client will be standing only briefly, the feet need to be protected from potential injury and contamination from the floor. The client needs to be protected from slipping.

When transferring a client with weakness on one side of the body, use the "Good to go" maxim. This means that the client needs to lead off with the "good" or strong side of the body. Perform the transfer in the direction of the good side so the client pivots and supports the weight on the good side. This will allow for maximum strength and stability on the client's part.

> ASSESSMENT

1. Assess the client's current level of mobility. Determine how much the client is able to assist with the transfer. Assess for pain or confusion, which might impair ability to assist. Check for a "weak" side. **Affects how the procedure will be carried out.**
2. Assess for any impediments to mobility, including casts, drainage tubes, catheters, IVs, or intubation.

Affects how the procedure will be carried out.

Prepares caregivers to keep tubes and equipment from becoming dislodged, tipping, or pulling.

3. Assess the client's level of understanding and anxiety regarding the procedure. Affects how the procedure will be carried out. Affects client teaching.
4. Assess the client's environment. Assess the available space for maneuvering the wheelchair to the bed. Affects how the procedure will be carried out. Affects safety and good body mechanics for caregivers.
5. Assess the equipment. Check the bed and chair height. See whether they are adjustable. Check for chair footings and wheelchair brakes. Affects safety for client and caregivers.

> DIAGNOSIS

6.1.1.1 Impaired Physical Mobility

6.1.1.2 Activity Intolerance

1.6.1 Risk for Injury

> PLANNING

Expected Outcomes:

1. The client will be transferred from the bed to the wheelchair, commode, or chair without pain or injury.
2. Drainage tubes, IVs, or other devices will be intact.
3. The client's skin will be intact and undamaged.

Equipment Needed:

- Bed
- Wheelchair, chair, or commode (see Figure 4-17-2)
- Any splints, braces, or supportive equipment specific to the client
- Shoes or slippers with nonskid soles
- Gait belt
- Transfer board (if necessary)



Estimated time to complete the skill:

20 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need for activity and its importance in the recovery process.
2. Teach the client about “Good to go” if one side of the client's body is weaker than the other. “Good to go” reminds the client to lead off with the stronger limb when walking or transferring.
3. Advise the client of the need for sturdy shoes or slippers with nonslip soles.



Figure 4-17-2 Wheelchair

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Inform client about desired purpose and destination.
2. Assess client for ability to assist with the transfer and for presence of cognitive or sensory deficits.
3. Lock the bed in position.

RATIONALE

1. Reduces client anxiety and increases cooperation.
2. Allows planning regarding the amount of assistance and cooperation to expect from the client.
3. Prevents the bed from rolling during the procedure.

4. Place any splints, braces, or other devices on the client.
5. Place the client's shoes or slippers on the client's feet.
6. Lower the height of the bed to lowest possible position.
7. Slowly raise the head of the bed if this is not contraindicated by the client's condition.
8. Place one arm under the client's legs and one arm behind the client's back. Slowly pivot the client so the client's legs are dangling over the edge of the bed and he is in a sitting position on the edge of the bed (see Figure 4-17-3).
4. Provides support and prevents injury to the client.
5. Provides a nonslip surface for stability.
6. Reduces distance client has to step down, thus decreasing risk of injury.
7. Minimizes lifting.
8. Supports the client while sitting him upright.



Figure 4-17-3 Pivot the client to a sitting position on the edge of the bed.



Figure 4-17-4 Support the client, if needed, while the client adjusts to the sitting position.

9. Allow client to dangle for 2–5 minutes. Help support client if necessary (see Figure 4-17-4).
10. Bring the chair or wheelchair close to the side of the bed. Place it at a 45° angle to the bed. If the client has a weaker side, place the chair or wheelchair on the client's strong side.
11. Lock wheelchair brakes and elevate the foot pedals. For chairs, lock brakes if available.
12. If you will be using a gait belt to assist the client, place it around the client's waist.
13. Assist client to side of bed until feet are firmly on the floor and slightly apart.
14. Grasp the sides of the gait belt or place your hands just below the client's axilla. Using a
9. Allows time for assessing client's response to sitting; reduces possibility of orthostatic hypotension.
10. Minimizes transfer distance. Allows the client to pivot on the stronger leg.
11. Provides stability.
12. Provides a secure handhold for the nurse during the transfer.
13. Moves client into proper position for transfer. Provides stable footing for client.
14. Wide stance increases nurse stability and minimizes strain on the back. Avoids putting

wide stance, bend your knees and assist the client to a standing position (see Figure 4-17-5).



Figure 4-17-5 Bend your knees, grasp the client firmly, and help him into a standing position.

15. Standing close to the client, pivot until the client's back is toward the chair.
16. Instruct the client to place hands on the arm supports, or place the client's hands on the arm supports of the chair.
17. Bend at the knees, easing the client into a sitting position.
18. Assist client to maintain proper posture (see Figure 4-17-6). Support weak side with pillow if needed.
19. Secure the safety belt, place client's feet on foot pedals, and release brakes if you will be moving the client immediately. Make sure tubes and lines, arms, and hands are not pinched or caught between the client and the chair (see Figure 4-17-7). If the client is sitting in a chair, offer a footstool if available (see Figure 4-17-8).
20. Wash hands.



Figure 4-17-7 Once the client is moved, make sure skin, tubing, or equipment is not pinched between the client and the chair.

pressure directly on the axilla, risking nerve damage or shoulder subluxation.



Figure 4-17-6 Assist client to maintain proper position.

15. Moves client into proper position to be seated.
16. Allows client to gain balance and judge distance to seat.
17. Increases stability and minimizes strain on back.
18. Increases client comfort.
19. Ensures client safety; prepares client for movement.
20. Reduces the transmission of microorganisms.



Figure 4-17-8 Position the wheelchair footrests or use a footstool if the client is sitting in a chair.



▼ REAL WORLD ANECDOTES

Scenario 1

Mr. Bridges is an insulin-dependent diabetic. Because of his diabetes, he is now blind and his left leg was amputated above the knee. He is requesting an enema and the commode because of perceived constipation. After administering a tap water enema, the nurse prepared to transfer Mr. Bridges to the commode. As the nurse was pivoting from the bed to the commode, the commode slid out from under Mr. Bridges. Mr. Bridges fell to the floor, fracturing his right leg. In the ensuing lawsuit, Mr. Bridge's nurse was found negligent for not securing the commode's wheel locks prior to attempting the transfer.

Scenario 2

A nurse is transferring a frail, anxious elderly person from a bed to a bedside chair. He reaches his arms behind him and grabs the armrests of the chair. He locks his elbows in place because he is so frightened. The nurse can't sit him down, and his arms push the chair back. They both "walk" the chair across the room. Finally, the nurse literally lifts and carries the client and sets him back on the bed. The nurse needed to explain the procedure carefully to the client prior to attempting a transfer and to make sure he is comfortable and able to follow instructions prior to attempting a transfer with no one else in the room to assist.

> EVALUATION

- Determine whether the client was transferred from the bed to the wheelchair without pain or injury.
- Check that drainage tubes, IVs, or other devices remain intact.
- Assess whether the client's skin is intact and undamaged.

> DOCUMENTATION

Nurses' Notes

- Record the client's tolerance of the activity, any aids that were required, how much assistance was required, and the client's ability to assist.
- Note any unusual events during the transfer.

> CRITICAL THINKING SKILL

Introduction

It takes only 1 second to acquire 2 months of pain.

Possible Scenario

You are preparing Mrs. Richards to go to radiology for x-rays. She is very sleepy and not very cooperative, but you are in a hurry. As you transfer Mrs. Richards from the bed to the wheelchair, Mrs. Richards sags to the ground. You try to hold her up and make it to the wheelchair, but she is too heavy. You lock your knees and bend at the waist as her weight pulls you down. As you gently lower her to the ground, you feel a sharp pain in your lower back.

Possible Outcome

You get help for the rest of your transfers and lifts, but it is too late. By the end of your shift, you are in agony. You visit the doctor for a series of muscle relaxants, exercises, and pain medications.

Prevention

You remembered reading about good body mechanics. Now you will practice them religiously. You also decide to always have enough assistance before starting any transfer, even if it is a "hassle" to find someone.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients are more likely to be weak or to get dizzy easily. Assess their abilities throughout the transfer. If dangling at the bedside does not ease the dizziness or if the client seems less stable than previously thought, lie the client back down and get assistance.*

continues

▼ VARIATIONS *continued*



Pediatric Variations:

- Children may be small enough to simply lift into the wheelchair. Be sure to use good body mechanics while lifting.
- Children need wheelchairs fitted to their size. Adult-size wheelchairs are uncomfortable and can be dangerous for a child.



Home Care Variations:

- The bed of a home care client may be at a poor height for safe transfer from bed to wheelchair. If the bed is too low, the nurse may be required to lift the client farther than is safe. If the bed is too high, the risk of a client fall is increased. Advise the client or caregiver of the proper height for bed-to-wheelchair transfers and the reason it is important. Problem-solve with the caregiver to outline ways to use proper body mechanics, adjust the height of the bed, or acquire an adjustable bed.
- Assess the wheelchair of home care clients. Home care clients may have modified their equipment or failed to maintain it for safe use. Check for sharp, exposed edges; frayed or damaged material; and other damage or modification that might be unsafe for the client.



Long-Term Care Variations:

- Long-term care clients may have contractures or pressure ulcers that will affect their ability to transfer safely and their ability to sit in a wheelchair comfortably. Be sure to assess for these possibilities prior to transferring a client.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse transfers a client with his weaker side first.

Ask Yourself:

How do I prevent this error?

Prevention:

If the client has one-sided weakness, be sure to lead the transfer with strong leg and arm. This increases the client's stability and decreases the risk of injury to the client and the nurse.

> NURSING TIPS

- Be sure to place any splints, braces, or other appliances on the client prior to transfer.
- When transferring a client with weakness on one side of the body, use the “Good to go” maxim. Perform the transfer on the client's strong, or good, side for maximum strength and stability on the client's part.
- Sliding across the sheets, side rails, and wheelchair armrest can bruise or injure the client. A transfer board or placing padding on any sharp, exposed areas can help prevent injury to the client.

SKILL 4-18

Assisting from Bed to Walking

Carla A. Bouska Lee, PhD, ARNP C, FAAN, and
Dale B. Barb, PMS, PT

KEY TERMS

Ambulation

Assistive device

Balance

Deconditioning

Gait belt

Immobility

Mobility

Orthostatic

hypotension

Posture



> OVERVIEW OF THE SKILL

Clients are often unable to get out of bed and ambulate independently while in the hospital. Because of the multisystem effects of prolonged bedrest, it is medically advantageous for clients to resume ambulating as quickly as possible as well as emotionally and mentally advantageous to resume purposeful activity within their environment. The adverse effects of bedrest include muscle weakness, decreased range of motion, decreased endurance, orthostatic hypotension, deconditioning, depression, as well as clots, constipation, decreased elimination leading to ulcer and abrasion responses, and possible consequences to skin integrity.

Depending upon how deconditioned the client is and the effects of orthostatic hypotension, the client may need to progress to ambulation slowly. After the client is comfortably able to tolerate sitting on the side of the bed and then standing at the side of the bed, progressive ambulation activities can be initiated. If a client is unable to bear full weight on either leg or has difficulty with balance and ambulation, aid is often necessary. It is often helpful to

have the client set ambulation goals and to monitor progress either with ambulating distance, speed of ambulating, or by the amount of assistance necessary to ambulate. For both client and caregiver safety, a gait belt should always be used during ambulation activities. The gait belt should be secured about the waist of the client. Because the gait belt is close to the client's center of gravity, the caregiver's ability to assist the client to maintain his balance is enhanced. For foot protection, the client should also always wear a stable shoe while ambulating. Disturbances in balance, coordination, proprioception, as well as weakness, low endurance, and deconditioning often occur as a result of the consequences of medical/surgical procedures. This can cause clients to need assistance with ambulation. Therefore, the client's blood pressure, respiration rate, pulse rate, color and moisture of skin, and subjective comments should be monitored closely, as well as neurological responses such as orientation, tremors, tetany change in consciousness state, or other neurological compromised states.

> ASSESSMENT

1. Assess the client's ambulating potential. This includes the client's age, medical diagnosis, cognitive status, and altered sensation, as well as assessment of the client's neuromuscular, musculoskeletal, and cardiovascular systems. Also, check the physician's or qualified practitioner's orders for specific restrictions to client ambulation. To determine the client's potential tolerance for the procedure as well as any limitations he may experience.
2. Assess client's limitations to functional mobility and ability to perform safe and effective activities of daily living (ADL). To determine the safest way to perform the procedure.

> DIAGNOSIS

- 6.1.1.1. Impaired Physical Mobility
- 1.6.2.1.2.2. Risk for Impaired Skin Integrity
- 6.1.1.3. Risk for Activity Intolerance

> PLANNING

Expected Outcomes:

1. The client's functional abilities will improve.
2. The client's strength and endurance will improve.

3. The effects of immobility on the client will be minimized or avoided.

Equipment Needed (see Figures 4-18-2 and 4-18-3):

- Ambulation device, as required
- Proper-fitting shoes



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Inform the client of the adverse effects of prolonged immobility.
2. Inform the client of the advantages of progressive mobility. Help the client set reasonable and obtainable ambulation goals.
- 3 Encourage the client during progressive mobility activities.
4. Inform the client of the signs and symptoms of fatigue, orthostatic hypotension, disequilibrium, or other untoward responses to activity.
5. If necessary, problem-solve with the client to make necessary changes to the home environment to allow for safe and effective ambulation.



Figure 4-18-2 Gait belts



Figure 4-18-3 Walker

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | ACTION | RATIONALE |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Explain procedure to the client, elicit client cooperation and participation. | 2. Decreases anxiety, improves client compliance and cooperation. |
| 3. Provide for client privacy. | 3. Practices respect and ensures client dignity. |
| 4. Adjust bed to a comfortable working height. Lower side rail on side of bed from which you are assisting client. | 4. Prevents caregiver back and muscle strain. |
| 5. Gather all necessary equipment. Position drains, tubes, and IVs to accommodate for the new client position. | 5. Prevents accidental dislodgment and/or discomfort from movement by reduced mechanical tension. |
| 6. Flatten bed and assist client in rolling toward you in balanced, orthopedically sound movements. Encourage client to actively move legs, or may be done passively. | 6. Provides for client and caregiver safety. Client movement stimulates flow of blood, especially elevation of systolic blood pressure to prevent possible orthostatic hypotension. |
| 7. While client is in the side-lying position, assist him, as necessary, to bring his legs off of the bed. Assist client into the sitting position. Client's feet should be resting on the floor for support. If this is not possible, a footstool can be used. | 7. Provides for client and caregiver safety. |
| 8. As necessary, assist client to maintain the sitting position and monitor vital signs, as appropriate. | 8. Provides for client safety and prevents possible baroreceptor/orthostatic hypotension response. |
| 9. Secure gait belt around client's waist. Place ambulation device such as a walker within reach of the client, if necessary (see Figure 4-18-4). Assist client into standing position. Make sure bed is locked and floor is not slippery. It is helpful if client has shoes with nonslip soles. If footstool is used, have client step down to the floor, then remove footstool. | 9. Provides for client and caregiver safety. |
| 10. As necessary, assist client to maintain the standing position and monitor vital signs, as appropriate (see Figure 4-18-5). | 10. Provides for client safety and secures equilibrium prior to walking experience. |

continues



Figure 4-18-4 Place the walker in front of the client.



Figure 4-18-5 Assist the client into a standing position.

11. If client is able to proceed with ambulating, assume a position beside the client and assist the client as necessary using the gait belt. Place yourself in a guarding position so as to assist client quickly and safely, if necessary. Use additional assistance, as necessary (see Figure 4-18-6).

Figure 4-18-6 Assist the client to maintain the standing position if needed.

12. During ambulation, monitor client vital signs, as necessary, including neurological assessment.
13. Following ambulation, return client to bed, remove gait belt, and monitor vital signs, as necessary. Note cardiovascular and neurological “rest” responses in monitoring.
14. Replace side rails to upright position.
15. Place the call light within reach of the client.

11. Provides for client and caregiver safety.



12. Provides for client safety.
13. Provides for client safety and comfort.
14. Provides for client safety.
15. Provides for client safety.

16. Move the bedside table close to the bed and place items of frequent use within reach of the client.

16. Provides for client safety.

17. Wash hands.

17. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Those who work in long-term care, rehabilitation, and many other areas, know that ambulation is a powerful, basic human need. People need and crave movement, freedom, and flexibility. Compromised, vulnerable states of decreased functioning may result in anxiety, depression, anger, and frustration.

Billie was an 87-year-old female recuperating from abdominal surgery at her home of 55 years. She was depressed and did not want to be up from her bed. One day the home care nurse remarked to Billie that the neighbors four doors down had embarked on an extensive remodeling project. Billie wanted exact details—reports from the nurse were simply inadequate. When the nurse suggested they set a goal to walk down and observe the construction crews, Billie became very motivated. The nurse carried a folding chair down in advance, and each day they would go a little farther. It took 2 days. Billie visited the site every day for the next month, long after the home care nurse had moved on to another assignment. The nurse provided a reason for ambulating, which helped Billie leave the illness role and resume her former role—that of neighborhood supervisor.

> EVALUATION

- Client's functional abilities improved.
- Client's strength and endurance improved.
- The effects of immobility were minimized or avoided.

> DOCUMENTATION

Nurses' Notes

- Distance walked
- Amount of assistance required
- Ambulation device used, if any
- Client response to ambulating (including vital sign assessment)
- Client/family education
- Client's response to activity, biophysical as well as psychosocial.

> CRITICAL THINKING SKILL

Introduction

Clients have basic need for physical homeostasis and safety. Assisting, facilitating, strengthening, and maintaining this movement toward increased freedom and esteem, is crucial.

Possible Scenario

A client has an orthopedic surgical procedure in which walking initially is not ordered or permitted. The nurse recognizes that this loss of control is perceived to decrease self-control. During this period, she actively promotes moving, turning, coughing, passive range of motion, and isotonic exercises. Her goal is to help the client maintain muscular functioning and realize the effects of exercise, including better peripheral and central circulation, prevention of clots and subsequent possible embolism, decreased constipation, improved urinary elimination, and less depression.

Possible Outcome

The client keeps his muscle strength and suffers no complications from his period of immobility. His gradual return to walking strengthens his muscles, improves his neurological responses, and equilibrium, as well as enhancing his ego strength and esteem. Throughout his recovery, the nurse is supportive of his continued ambulation, knowing that walking is vital to maintaining central and peripheral body perfusion, skin and neurological functioning.

Prevention

Movement, from changes in bed position to walking, prevents the effects of immobility. Walking is also important in the prevention of social isolation, improving

orientation to time, place, person by increasing contact with the external environment. Often during walking, memories, thoughts, and wishes are revisited, thus improving morale, temperament, and esteem.

▼ VARIATIONS



Geriatric Variations:

- *Compromised cardiovascular or neurological systems may signal a need for slower, careful movements to lessen occurrence of faintness, change in pulse from baseline, disequilibrium, or other untoward sensory/motor responses to physical stress.*
- *Some cardiovascular, psychotropic, and sedative medications may lessen or compromise stability and equilibrium.*
- *The walking experience may also be a motivator for enhanced attention to self-care/hygiene and respect.*



Pediatric Variations:

- *Attention to age-appropriate movement, to improve balance and posture, facilitates the experience of walking.*
- *Specific, fun, age-appropriate goals, such as a trip to a social/creative/recreational activity, increases motivation for the walking experience.*



Home Care Variations:

- *Evaluate the home environment for obstacles to safe ambulation such as slippery floors, throw rugs, and narrow stairs.*
- *Remember to plan for the extra exertion that sloping walkways or driveways require.*
- *Lighting and visibility should be evaluated for safety.*
- *Evaluate the presence or lack of assistive devices bearing in mind that this may be related to socioeconomic/access issues.*



Long-Term Care Variations:

- *Environmental safety, including lighting, noise level, stair rails, and the condition of the floors are essential in the long-term care setting.*
- *Combine the ambulation experience with a pleasurable motivation such as social, recreational, or creative activities.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not use a gait belt when assisting the client with ambulation.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to have the proper equipment available before starting any procedure. Be sure the equipment is in good working order.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The client is not wearing nonslip supportive shoes.

Ask Yourself:

How do I prevent this error?

Prevention:

Be aware of the footwear available to the client. Know how to obtain nonslip footwear if it is available. Have a family member or caregiver bring the footwear the client will be wearing most of the time, if possible.

> NURSING TIPS

- Have all equipment necessary for ambulating readily available in the client's room.
- If the client becomes dizzy after standing, check blood pressure in lying, sitting, and standing positions to assess for orthostatic hypotension.
- Progressively advance the client toward independent ambulation, as possible.
- Encourage client with positive reinforcement during mobility activities.
- Attend to environmental or potential obstacles prior to the walking experience.

SKILL 4-19

Using a Hydraulic Lift

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Center of gravity
Hoyer lift
Hydraulic lift

Mechanical lift
Sling
Stability



> OVERVIEW OF THE SKILL

The hydraulic or Hoyer lift may be used to transfer or weigh a client who is immobile or obese. A client may be transferred to a stretcher, chair, bedside commode, or scale using a hydraulic lift. Generally, the manufacturer's directions accompany equip-

ment and should be followed. Weight limits should not exceed manufacturer's specifications. Two personnel are needed to use equipment safely. Do not use on spinal cord injury clients.

> ASSESSMENT

1. Identify clients with any injuries of the vertebrae. **The use of the lift may be contraindicated.**
2. Identify any equipment that is connected to the client, such as intravenous tubing or a catheter. **Determines how the procedures will be performed. Allows planning to avoid stretching, tipping, or dislodging tubes and equipment.**
3. Assess client's need for transfer and physical and mental condition, including assessment of vital signs before transfer. **Allows for safe transfer.**
4. Assess client's ability to assist and understand transfer. **Affects safety and good body mechanics for caregivers.**
5. Assess number of staff needed for transfer. Generally at least two staff members are needed for a

safe transfer with a hydraulic lift. **Affects safety and good body mechanics for caregivers.**

6. Determine whether client is in appropriate clothes and ready for transfer. **Ensures the smoothness of the procedure.**

> DIAGNOSIS

6.1.1.1 Impaired Physical Mobility

> PLANNING

Expected Outcomes:

1. Client will be transferred safely.
2. Client will not experience anxiety during the transfer.
3. Client will incur no injuries.
4. Privacy will be maintained.

Equipment Needed (see Figure 4-19-2):

- Mechanical lift, such as hydraulic or Hoyer lift
- Equipment should include lift, plus canvas or mesh sheet and bars to slide into sheet
- Protective disposable cover or disinfectant to clean canvas
- Gloves (when applicable)



Estimated time to complete the skill:
**15 minutes; may vary depending
on assistance and client condition**

> CLIENT EDUCATION NEEDED:

1. The client understands the purpose of the procedure such as to obtain weight or to transfer.
2. The client understands that she will be suspended temporarily above the bed and moved to a chair or stretcher.

3. The client understands that she should lie still during the procedure.
4. The client understands the purpose of keeping hands crossed over her chest as the client is moved.



Figure 4-19-2 Raise the client from the bed and steer the lift away from the bed.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|--|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Check the physician's or qualified practitioner's order to determine the length of time the client may sit. | 2. The physician or qualified practitioner may want the client to sit only for a specified length of time or for as long as possible. |
| 3. Check the client's medical diagnosis and any other medical problems. | 3. Assists you in determining any problems that sitting may cause or any restrictions needed. |
| 4. Ask the client how long ago he last sat. | 4. If the client has been in the bed several days, he may complain of dizziness or faintness. |
| 5. Lock the wheels of the bed. | 5. Prevents the bed from rolling when the client is moved. |
| 6. Position the chair close to the bed. | 6. Always transfer the client the shortest possible distance. |
| 7. Position urine drainage, NG, and IV tubing on the side of the bed where the chair will be placed. Ensure slack in the tubing. | 7. Prevents the tubing from being dislodged when the client is moved. |

continues

8. Clamp and disconnect any tubing if permitted.
9. Roll the client on his side and position the sling on the bed behind the client (see Figure 4-19-3).



Figure 4-19-3 Adjust the sling so it is smooth and flat under the client.

10. Roll the client on his opposite side, pull the sling through, and position the sling smoothly on the bed.
11. Roll the client back onto the sling and fold his arms over his chest (see Figure 4-19-4).
12. Make sure the sling is centered.
13. Lower the side rail and position the lift on the side of the bed with the chair. Be sure to spread the base of the hydraulic lift as indicated in manufacturer's instructions to provide stability (see Figure 4-19-5). Protect the client from falls while the side rail is down.

Figure 4-19-5 Spread the base of the hydraulic lift to provide stability.

14. Lift the frame and pass it over the client. Carefully lower the frame and attach the hooks to the sling (see Figures 4-19-6 and 4-19-7).

8. NG suction tubing and tube-feeding tubing are often allowed to be clamped. This will make moving the client easier.
9. The sling is positioned behind the client so that he can be turned in the opposite direction and the sling can be pulled through.



Figure 4-19-4 Roll the client back onto the sling. Position the client's arms across his chest.

10. Prevents skin breakdown.
11. Prevents injury to the client's arms during the transfer.
12. Evenly distributes the client's weight.
13. The side rail must be down to use the lift. Always transfer the client the shortest possible distance. The wheels and base of the lift should be spread to provide a wide, stable base to prevent the lift from tipping.



14. Safely attaches sling to frame.



Figure 4-19-6 Locate the correct hook for each corner of the sling.



Figure 4-19-7 Attach the hooks to the sling.

- 15.** Raise the client from the bed by pumping the handle.
- 16.** Secure the client with a safety belt and cover the client with a blanket.
- 17.** Steer the client away from the bed and slide a chair through the base of the lift.
- 18.** The sling can be disconnected and the lift can be moved out of the way while the client is sitting in the chair. If the lift will be used to return the client to bed, the sling may be left in place beneath the client.
- 19.** Reposition and reconnect any tubing necessary.
- 20.** Assess how well the client tolerated the move and whether any dizziness was experienced.
- 21.** Place call light, appropriate covers, and padding as needed after transfer. Place protective restraints as needed. Cover feet with slippers if in sitting position.
- 22.** Reverse the procedure to return the client to the bed.
- 23.** Wash hands.
- 15.** Read the manufacturer's directions to determine the mechanism for raising the particular lift you are using. The various models do not operate in the same manner.
- 16.** Provides safety and comfort.
- 17.** It is safer to slide the chair through the base than to slide the base around the chair.
- 18.** The sling can be disconnected and the lift can be moved out of the way while the client is sitting in the chair.
- 19.** Tubing should not be left disconnected. The client may sit for a while and will need all the equipment to function properly.
- 20.** The data is necessary for charting whether the client experienced any problems.
- 21.** Ensures privacy and protection.
- 22.** Transfers client safely and comfortably.
- 23.** Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Nurse Andrews was using the hydraulic lift to move Mrs. Gunderson from her wheelchair into the hydrotherapy tub. Mrs. Gunderson's primary care nurse had used a hydraulic lift and sling to move her into the wheelchair and had left the sling underneath Mrs. Gunderson to facilitate the move into the hydrotherapy tub. Because she had not been involved in the original transfer from bed to wheelchair, Nurse Andrews was not aware that the sling was badly worn and fraying. Nurse Andrews successfully lifted Mrs. Gunderson from the wheelchair and was maneuvering her over the water-filled hydrotherapy tub when she heard a tearing sound. As she heard the sound, Mrs. Gunderson cried out that she was falling. Nurse Andrews realized that the sling was tearing and that Mrs. Gunderson was in danger of falling and being injured. She quickly maneuvered the sling into position over the tub and lowered Mrs. Gunderson into the water. The sling gave way, just as Mrs. Gunderson was almost in place in the tub. Fortunately, the water cushioned Mrs. Gunderson as she fell the last few inches into the tub and she was unharmed. However, as a result of this incident, Mrs. Gunderson refused further hydrotherapy treatments and any other use of the hydraulic lift. This delayed her healing and prolonged her hospital stay.

> EVALUATION

- Client was transferred safely.
- Client did not experience anxiety during the transfer.
- Client incurred no injuries.
- Privacy was maintained.

> DOCUMENTATION

Nurses' Notes

- Document the date and time of the procedure.
- If the client was transferred to a chair, document how the client tolerated sitting and if he/she experienced any dizziness.
- Note how the client tolerated the transfer and any unusual findings.

> CRITICAL THINKING SKILL

Introduction

A 400 lb. male is to be moved to a cardiac chair in a room with limited space. He states that he is very frightened because the last nurses had a hard time and the sling was swinging back and forth. It was also difficult to position him in this type of chair. He was sure he was going to fall.

Possible Scenario

If the client is moved too fast and the center of gravity changes abruptly, it can be frightening to the client as well as cause swinging back and forth and the lift might tip.

Also, cardiac chairs have high backs, and it can be difficult to position clients in them.

Possible Outcome

If the lift is moved too quickly, the center of gravity could change enough to cause the lift to tip, dropping the client. Due to the lack of space to maneuver the lift it may be difficult to adequately position the client in the cardiac chair.

Prevention

It is not always possible to have ideal circumstances when moving patients. If the room is too crowded to maneuver in, it may be necessary to move some of the furniture into the hallway temporarily. Be sure the bed and chair are positioned as close together as possible to avoid undue manipulation of the lift. Move them if necessary. Be sure to have adequate staff available to ensure client safety and client confidence.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have difficulty with sudden moves; therefore, take time to explain procedures and move slowly.
- Make sure the client can see and hear what you are doing.
- Make sure eyeglasses and hearing aids are in place.

▼ VARIATIONS *continued*



Pediatric Variations:

- *Children may be fearful of the suspension above the bed and being moved to the chair.*
- *Explain the procedure and first demonstrate how the lift is locked in place and then released to allow the sling to lower. Smaller children can often just be picked up. The weight of a child who must be moved with a hydraulic lift may be determined by hospital policy.*



Home Care Variations:

- *Check hydraulic fluid and functioning of the lift to ascertain that the equipment works.*
- *Have appropriate maintenance performed.*
- *Make sure any caregiver who is using the lift is trained in the procedure. The client can often instruct the caregiver and control the procedure in the home setting.*
- *Make sure there is enough space to maneuver the lift.*
- *Launder the sling periodically to keep it clean.*



Long-Term Care Variations:

- *These are the same as home care variations. In the long-term setting, increase the independence and control the client has over the procedure as much as possible.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The lift is lowered too rapidly.

Ask Yourself:

How do I prevent this error?

Prevention:

Take your time; lower the handle slowly.

Possible Error:

Base is not widened to provide stability.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to know and understand the manufacturer's instructions regarding use of the equipment. Remember to widen the base of the lift to provide stability.

Possible Error:

The client is moved too fast and swinging occurs.

Ask Yourself:

How do I prevent this error?

Prevention:

Take your time.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Body parts, tubes, linens get pinched or pulled.

Ask Yourself:

How do I prevent this error?

Prevention:

Plan ahead to move tubes and lines. Make sure the client's and caregiver's hands and fingers are away from the moving parts of the lift.

> NURSING TIPS

- Read directions before entering the room.
- Note open and closed position of hydraulic lift.
- Check that the handle is in the proper position.
- Ask clients to keep their hands crossed over the chest to provide stability and avoid hands changing the center of gravity.

SKILL 4-20

Administering Preoperative Care

Sam C. Taylor, RN, and Gaylene Bouska Altman, RN, PhD

KEY TERMS

Informed consent	Pre-op checklist
Intraoperative period	Preoperative period
NPO	Surgical prep
Postoperative exercises	



> OVERVIEW OF THE SKILL

For most people surgery is a frightening prospect. Multiple fears, ranging from loss of control to death, are aroused in a client when confronted with the need for surgery. The preoperative period is the time to allay the client's fears by preparing the client mentally and physically for surgery. The preoperative phase starts when the client first considers surgery and ends when the client enters the operating room.

During the preoperative period, the nurse performs a baseline assessment of the client's mental, emotional, and physical condition. This baseline will be essential for evaluating the client's postoperative condition. The nurse determines the client's level of understanding regarding the surgery and what to expect postoperatively. Teaching during the preoperative phase is

essential. The client is generally open to learning as much as possible at this time. Preoperative teaching includes teaching postoperative exercises; what to expect regarding pain, physical changes, and length of recovery; and the reason for the surgery and the various preoperative procedures. The nurse also determines the client's physical condition and prepares the client physically for surgery. This may include assisting with a preoperative shower, shaving the surgical site, administering cleansing enemas, or keeping the client from eating.

Most institutions have forms that outline the assessment and preparation required during the preoperative period. It is the nurse's responsibility to be sure that the client has been properly prepared for the next stage of surgery, the intraoperative period.

> ASSESSMENT

1. Assess the client's diagnosis and the planned surgery to determine what care will be needed and what complications might be expected.
2. Assess the client's surgical history. Determine if the client has had any previous surgical experiences that may affect the current surgery, such as a poor reaction to anesthesia or a particularly traumatic surgical history to reduce unnecessary frustration or discomfort and provide care that is optimal for the particular client.
3. Assess for complicating factors, including diabetes, either treated or borderline; overweight; underweight; advanced age; malnourishment; addictions; or psychiatric disorders to establish a baseline for intraoperative and postoperative care.

4. Assess for any allergies to drugs, food, tape, latex, iodine, and so on. Place an appropriate armband on the client and clearly note the allergy in the appropriate places in the chart to **reduce the risk of the client receiving a drug he is allergic to.**
5. Assess the client for false teeth, contact lenses, artificial eyes, rings, jewelry, or mementos that cannot accompany the client to the operating theater to **prevent possible loss or physical trauma resulting from wearing these items during surgery.**
6. Determine when NPO status was initiated. In emergency situations, establish when the client last ate and what was eaten to **help the surgeon determine appropriate care and precautions.**
7. Assess the client's level of understanding regarding the plan of care during the recovery period to **determine what education and support will be needed.**
8. Make sure signed consent has been obtained to **provide legal coverage for the planned surgery.**

> DIAGNOSIS

- 8.1.1 Knowledge Deficit, related to the surgery and the postoperative course
- 9.3.1 Anxiety
- 9.3.2 Fear

> PLANNING

Expected Outcomes:

1. The client will experience decreased anxiety subsequent to appropriate instruction.
2. The client will not experience any adverse reactions caused by inadequate physical preparation.
3. The client will not experience any loss of belongings or possessions during the surgery or recovery period.
4. The client will not experience any disruption or delay of the surgery caused by poor preoperative care or planning.

Equipment Needed (see Figure 4-20-2):

- Blood pressure cuff
- Stethoscope
- Flashlight

- Preoperative checklist
- Container for dentures, glasses
- Appropriate storage for valuables and clothes
- Information packets regarding surgery
- Surgical consent forms indicating risks
- Intravenous fluids, needles, and equipment as needed
- Preoperative medications
- Transfer cart



Estimated time to complete the skill:
20–30 minutes

> CLIENT EDUCATION NEEDED:

1. Ascertain what information has been provided to the client by the physician or qualified practitioner.
2. If the client has further questions, answer as appropriate.
3. Remind the client that there are no “dumb” questions.
4. Explain the need for removal of rings, dentures, prostheses, contacts, or glasses.
5. Explain the reason for not eating prior to the surgery.
6. Inform the client of what to expect preoperatively and postoperatively. Long waits in the operating suite can be frightening if this is not anticipated, especially if clients do not know what to expect.
7. Transfer the client directly to another staff member. Do not move the client to operating room waiting area and leave unattended.



Figure 4-20-2 A stethoscope is used for preoperative assessment.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Verify admission orders regarding type of surgery, any risks (including recent changes in vital signs), and client preparation. 3. Verify the client by checking name tag and asking name. 4. Check whether the client has any questions regarding the surgery and understands the procedure and explain accordingly. 5. Complete the preoperative checklist, including history, physical assessment, and check of valuables. 6. Perform neurological assessment, including checks for orientation, eye coordination, hand-grips, knee bends, and plantar and dorsi flexion of the feet (see Figure 4-20-3). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Provides accurate information and baseline information. 3. Provides safety and protects legally. 4. Decreases anxiety. Clients who are uninformed may be more vulnerable and at higher risk for complications. 5. Provides baseline data. 6. Provides baseline data for postoperative assessment and changes. |
|---|--|



Figure 4-20-3 Perform a neurological assessment.

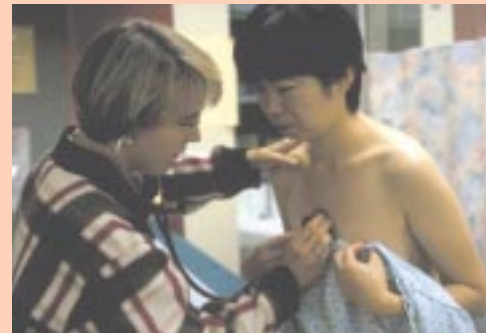


Figure 4-20-4 Perform a vascular assessment, including peripheral pulses.

- | | |
|--|--|
| <ol style="list-style-type: none"> 7. Perform vascular assessment including checks of pulse, blood pressure, and apical pulse (see Figure 4-20-4) rhythm, peripheral pulses, and temperature. Compare with previous information. Clients over 50 may require baseline electrocardiogram. 8. Auscultate the lungs bilaterally front and back (see Figure 4-20-5). If any wheezes, rhonchi, coughs, upper respiratory infections, or in- | <ol style="list-style-type: none"> 7. Provides baseline data. If any irregularities, notify physician to avoid complications. 8. Provides baseline data and avoids potential complications such as postoperative pneumonia. Surgery may need to be |
|--|--|

continues



Figure 4-20-5 Auscultate the lungs.

creased temperature, notify physician or qualified practitioner.

9. Assess the gastrointestinal system (time of last meal, food allergies, bowel sounds, last bowel movement, time of last fluids).
10. Assess the genital/urinary system (last menstrual period, last void, state of pregnancy, estrogen replacement therapy).
11. Assess skin and muscle tone for any skin breakdown, redness, bruises, decreased skin integrity (see Figure 4-20-6).



Figure 4-20-6 Assess skin condition and look for signs of breakdown, redness, or bruises.

12. Ascertain any allergies or adverse reactions during previous surgeries or use of anesthesia.
13. Obtain medication history, including the time and date of the last dose of medication.

rescheduled if there is an upper respiratory infection.

9. Provides baseline data and prevents postoperative nausea, vomiting, and aspiration pneumonia. If the client has eaten recently, surgery may need to be rescheduled. Usual instructions are NPO after midnight on the day of scheduled surgery.
10. Provides baseline data.
11. Provides baseline data.



Figure 4-20-7 Administer intravenous fluids according to orders.

12. Provides baseline data. Of special importance are allergies to iodine because povidone-iodine is a common antiseptic used in surgical site preparation.
13. Provides baseline data and avoids drug interaction. Provides for daily medications that need to be administered. Ascertain that surgeon is cog-

- nizant of daily medications. Especially important is insulin use. Orders must be written regarding insulin use preoperatively and postoperatively. Other medications that can affect surgical outcome are aspirin, anticoagulants (increase bleeding); steroids (suppress immunity); non-steroidal anti-inflammatories (increase risk of stress ulcers and displace other drugs from blood proteins); bromide medications (signs and symptoms of dementia; and drugs with anticholinergic effects (increase confusion).
- 14.** Ascertain any history of drugs/alcohol use and when they were last used.
 - 15.** Check weight.
 - 16.** Check if family is available and who is present.
 - 17.** Ascertain if client has signed the surgical consent. Determine if the client has a living will or has designated resuscitation status.
 - 18.** Remove all valuables with the exception of wedding rings if requested. Tape rings in place. Check and document whether valuables are placed in a locked area, safe storage area, or given to family.
 - 19.** Check if eyeglasses and dentures are removed; place in a labeled container.
 - 20.** Administer intravenous fluids according to orders (see Figure 4-20-7).
 - 21.** Administer medications according to orders.
 - 22.** Ascertain that preoperative checklist is complete.
 - 23.** Transport the client to appropriate area.
 - 24.** Inform family members where surgical waiting area is and establish a way to contact them when surgery is completed.
- 14.** Prevents alcohol/drug withdrawal during or after surgery. Withdrawal from alcohol can occur 8 hours after the last drink and may require treatment. Withdrawal can cause major complications in combination with surgery. The use of drugs/alcohol could alter the way pain medications are used and their effect.
 - 15.** Provides a baseline for postsurgical assessment.
 - 16.** Presence of family or significant others may decrease anxiety and provide support.
 - 17.** Surgical consents must be signed by client, legal guardian, or next of kin to provide legal basis for surgery. A living will or resuscitation status provides legal guidelines for client requests.
 - 18.** Provides security for items.
 - 19.** Provides security and safety. Dentures can interfere with intubation and become dislodged, broken, or misplaced during surgery.
 - 20.** Follows orders and protocol.
 - 21.** Follows orders.
 - 22.** Appropriate protocol.
 - 23.** Appropriate protocol.
 - 24.** Provides assurance to the client and family.



▼ REAL WORLD ANECDOTES

Mrs. Avdic was admitted for an exploratory laparoscopy. When the nurse asked her to sign the informed consent, she wanted to wait until her husband was present. As the nurse prepared Mrs. Avdic for surgery, the unsigned informed consent was pushed to the bottom of the stack of paperwork to be filled out. By the time Mr. Avdic arrived to be with his wife, the orderly was waiting with a gurney to transport Mrs. Avdic to the operating room. Hurriedly the nurse placed the entire stack of paperwork in the front of Mrs. Avdic's chart and sent it with the client to the operating room.

As Mrs. Avdic was being prepped in the operating room, the anesthesiologist asked her whether she had signed the informed consent. She told him that she had signed a bunch of papers and she was sure that was one of them. In a hurry, the anesthesiologist did not pursue the matter.

During surgery Mrs. Avdic was found to have endometriosis. The surgeon decided to perform a hysterectomy because he felt that the endometriosis had spread too far. After surgery, when Mrs. Avdic was awake, the surgeon explained his findings and what he had done. Mrs. Avdic burst into tears and was inconsolable. She and her husband had been trying to have children for several years, and as a result of this surgery, they would never have a chance to have children of their own.

About a year later the surgeon received notice that the Avdics were suing him, the nurse who cared for Mrs. Avdic preoperatively, and the hospital. Without a signed consent in the chart, Mrs. Avdic was able to prove her case for malpractice.

> EVALUATION

1. The client experienced decreased anxiety subsequent to appropriate instruction.
2. The client did not experience any adverse reactions caused by inadequate physical preparation.
3. The client did not experience any loss of belongings or possessions during the surgery or recovery period.
4. The client did not experience any disruption or delay of the surgery caused by poor preoperative care or planning.

> DOCUMENTATION

Preoperative Checklist (see Table 4-20-1)

- Fill out and initial the preoperative checklist.
- Note any unusual findings.

Nurses' Notes

- Document any unusual findings from the preoperative checklist.
- Note any preoperative teaching.
- Document the disposition of client valuables, noting whether they were left at the client bedside, given to a family member, or placed in a locked area.

Medication Administration Record (MAR)

- Note any preoperative medications given and the IV insertion site if an IV was ordered.

> CRITICAL THINKING SKILL

Introduction

A complete client history can turn up unexpected information.

Possible Scenario

A 62-year-old woman is being readied for surgery when the nurse discovers there is a history of diabetes in the family. Further questioning reveals that the client was diagnosed 4 years prior to admission with noninsulin dependent diabetes. The nurse asks about her current diabetic treatment and monitoring. She states that she doesn't monitor her condition and that her surgeon is not aware of her diabetes.

Possible Outcome

The surgeon is informed. She delays the surgery until a medical consult can be arranged. The client will have a longer hospital stay. However, the risk of serious complications will be lessened.

Prevention

Any client scheduled for surgery should have a complete medical and nursing history, physical exam, and appropriate blood and diagnostic work before surgery.

Table 4-20-1 Preoperative Checklist			
	CK (√)	COMMENTS	NURSE CK (√)
COMPLETE NIGHT BEFORE SURGERY			
List allergies			
Procedure scheduled			
Surgical permit signed/witnessed			
History/physical on chart and/or dictated			
Pre-anesthetic evaluation done			
Able to state type and purpose of surgery			
Demonstrates ability to perform: Deep breathing, turning and coughing exercises			
Leg exercises			
P.M. care with shower or bath given			
Nail polish removed and make-up removed			
Old chart requested and obtained			
Type and crossmatch for _____ units of blood			
Blood consent signed and witnessed			
Labor work a. CBC _____ b. UA _____			
Tonsillectomy and Adenoidectomy patients: a. __PTT b. __PT c. __Platelets			
If ordered by MD: a. EKG ___ b. Chest X-ray _____			
Add other lab work ordered (specify)			
Notify surgeon of abnormal lab work			
New progress note and physician order sheet on chart			
Weight			
NPO after midnight (if applicable)			
Signature of Nurse _____		Date _____	
COMPLETE DAY OF SURGERY			
Jewelry removed and secured with responsible party			
Dental prosthesis and contact lenses removed			
Hospital gown/cap on and undergarments removed			
Voided on call to surgery			
Indwelling catheter ordered and inserted			
Tampon removed			
Identiband and/or bloodband on/checked for accuracy			
Time _____ Pulse _____ Resp _____ B/P _____ Temp. _____			
Pre-op medicine given Medication _____ Time _____ AM PM			
Siderails up and bed to lowest level			
Patient instructed not to get out of bed without nursing assistance			
Addressograph plate/MARs on chart			
VS 30 minutes after pre-op (if remains on unit)			
BP _____ P _____ R _____ T _____			
Old chart sent to surgery per request			
Surgical prep done and checked			
To surgery Time _____ Via _____			
Signature of Nurse _____		Date _____	
Holding Room Nurse Signature _____		Date _____	

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients are at much greater risks for complications postoperatively such as pneumonia and deep venous thrombosis.*
- *Elderly clients may be poor historians; therefore, family may need to be consulted for history and medication use.*
- *Sensitivity to medications may be more pronounced in older adults; therefore, any potential sensitivity should be elicited.*
- *Skin integrity is decreased in elderly clients and tape sensitivity should be noted. Shear injuries can be caused by moving or transferring the client incorrectly.*
- *Previous fractures or the presence of osteoporosis should be noted because injuries can occur when transferring elderly clients.*
- *Because short-term memory or depth of understanding may be a problem, repeated explanations of surgery and purpose may be necessary.*
- *Hearing deficit may be present; therefore, ascertain whether the client can hear explanations.*



Pediatric Variations:

- *Because children are usually very frightened by the hospital and especially surgical experiences, explanations that are age appropriate should be done. Parents should be present to assure the child while explanations are made and to answer questions.*
- *Drawings and the use of toys with explanations may help. Involving the child in explanations through play may be helpful.*
- *Allowing the child to take a favorite toy into surgery may allay some anxiety.*
- *Having the same nurse care for the child as much as possible may help decrease fear. Adequate time with the child may help gain trust.*
- *Medication doses are adjusted to weight, and both weight and dosage of the medications should be carefully checked.*
- *Allowing the parents to stay with the child as long as possible may be helpful unless the parent is overly anxious.*



Home Care Variations:

- *If the client is having outpatient surgery, be sure the client understands the surgical preparation she is being asked to perform at home, such as remaining NPO, taking laxatives or other medication prior to admission, or showering with antibacterial soap prior to admission.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

There is no name band or an inadequate name band on the client, making the surgical team unable to identify the sedated client or whether the client has allergies or sensitivities, especially if the chart is not with the client at all times.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the client has a legible name band in a place that won't interfere with IV placement or the surgical site. Be sure the name band or a second allergy band correctly identifies the client's allergies and sensitivities, even if this is "no known allergies (NKA)." This will indicate that the client has been asked about allergies.

> NURSING TIPS

- Recheck surgery consent forms for signature and type of surgery.
- If a client questions the type of surgery, follow up and obtain correct information and inform the surgeon.
- Recheck that presurgery forms are completely filled with assessment, valuables, and so on.
- Recheck the name band with the chart so that the appropriate chart is sent.
- Be careful not to provide inappropriate information because all laboratory and diagnostic tests may not be available to the nurse and certain questions should be referred to the physician or qualified practitioner. Inappropriate misinformation may increase unnecessary anxiety.
- If the client does not speak English as the native tongue, it may be necessary to involve an interpreter to obtain informed consent.
- If the client has a wedding ring that he does not remove, it should be taped to the finger and a note placed in his chart. If the surgery is going to be lengthy and the client could receive a large amount of IV fluids, every attempt should be taken to remove the ring prior to surgery.
- When listing valuables in the chart, do not specify the type of metals or stones present. Rather than list a “diamond ring with a gold band,” it should be noted as a “ring with a clear stone and gold-colored band.”

SKILL 4-21

Preparing a Surgical Site

Hsin-Yi (Jean) Tang, RN, MS, and Gaylene Bouska Altman, RN, PhD

KEY TERMS

Infection

Intraoperative

Perioperative

Postoperative

Preoperative

Scrub

Shaving

Surgery

Surgical scrub

Timed scrub



> OVERVIEW OF THE SKILL

Once the client arrives in the operating room there are more preparations necessary before surgery can begin. The client must be positioned on the operating table in a way that will optimize the surgeon's access to the surgical site without compromising the client's neurovascular status. Once the client is in position the surgical site must be shaved and a final cleansing performed.

The client's position on the operating table will vary according to the type of surgery to be performed. There are several kinds of positions: supine position, Trendelenburg position, reverse Trendelenburg position, lithotomy position, modified Fowler's position, prone position, jackknife (Kraske) position, lateral position for a chest operation, and lateral position for a kidney operation, to name just a few. The client must be positioned to allow optimal access to the needed body part. The nurse must also bear in mind the client's inability to move during surgery when positioning a client. Because the client cannot move or tell anyone if the position is painful or impairing circulation, the nurse must position the client in a way that will not impair the client's neurovascular status during a lengthy procedure.

Once the client is positioned, the surgical site must be cleansed and prepared in a way that will reduce the possibility of infection. Site preparation is important to reduce infections, promote visualization of the area, and to provide a clean surface for sutures and dressings. In general, surgical sites can be categorized as head and

neck, lateral neck, chest, hand and forearm, thorax and abdominal, abdomen, abdominal and pubic, abdominal and perineal, perineal, thigh, lower extremity, lower leg, sacro and perineal, upper back, lower back, and flank. The prepared area should be larger than the anticipated incision site because of the possibility of an unexpected extension of the incision and to reduce possible accidental contamination of the surgical field. Hair should be removed from the surgical site only as necessary. The three common methods of hair removal are clipping, depilatory, and wet shaving. To reduce the risk of infection, shaving should be performed as close to the time of surgery as possible. Shaving is the most common method of hair removal. It has the advantage of being easily performed with commonly available instruments. It has the disadvantage of causing microscopic cuts and skin irritation, damaging the skin's integrity, and increasing the possibility of infection. In some cases, a depilatory (hair removing cream) may be ordered the night before surgery. Depilatories use a chemical agent that destroys the hair at the root and causes the hair shaft to break down. The advantage of a depilatory is that it has less potential for cutting the skin compared with shaving. The disadvantage is that the chemical used in depilatories may cause skin irritation and possibly allergic reactions. A patch test using a small area of skin must be performed before using a depilatory on a surgical site. Clipping the hair close to the skin without actual shaving is gaining popularity as a

method of surgical site preparation. It has the advantage of not causing skin damage or irritation. The disadvantage of this method is reduced visibility of the site during surgery as well as the increased possibility of harboring microorganisms among the hair shafts.

After the site is shaved it must be thoroughly cleansed to remove as many microorganisms as possible. This further reduces the risk of infection. The

solutions used for skin cleansing and disinfection vary according to each hospital policy. The solution should not irritate the skin or in any way interfere with the skin's normal functioning. The commonly used solutions are soap, detergent, and antiseptic agents such as povidone-iodine, tincture of iodine, 70% alcohol, hexachlorophene, benzalkonium chloride, chlorhexidine, and iodophor.

> ASSESSMENT

1. Assess the client for sensitivity or allergies to the scrub solution. Iodine preparations are most often used to reduce the risk of skin irritation or allergic reaction.
2. Assess skin integrity because open areas may increase the risk of infection.
3. Assess the client's knowledge of the surgical preparation procedure to determine what teaching needs to be provided.
4. Assess for existing appliances, catheters, or other instrumentation to determine if the preparation requires any modification.
5. Assess the client's level of mobility at the surgical site to determine any perioperative positioning modifications.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to surgical preparation procedures
- 6.1.1.1.2 Risk for Perioperative Positioning Injury

> PLANNING

Expected Outcomes:

1. The surgical preparation will be performed without injury or trauma to the client.
2. The client will understand the procedure and the reason for it.
3. The client will not experience any allergic reaction or skin sensitivity secondary to the surgical preparation.
4. The client will not experience any infections secondary to poor site preparation.
5. The client will not experience disruption to any existing appliances, catheters, or other instrumentation.
6. The client will not experience any injury secondary to perioperative positioning.

Equipment Needed (see Figure 4-21-2):

- Gloves (clean for shaving; sterile for cleaning surgical site)
- Razor and sharp blades
- Sterile gauze (to clean the razor)
- Warm water
- Antibacterial cleansing agent
- Sterile cotton swabs
- Sterile cotton sponges
- Transfer forceps in antiseptic solution
- Solution for surgical site cleaning, such as 70% alcohol
- Solution basins



Estimated time to complete the skill:
30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the reason for the surgical preparation and any shaving of the area. If the area to be prepped and shaved is cosmetically important, reinforce the need for a thorough preparation of the site.
2. Assure the client that the surgery may not involve the total area prepped.
3. Explain the need for proper positioning during surgery so the surgeon can easily access the site.



Figure 4-21-2 Basins, povidone-iodine, and sponges are used to prepare the surgical site.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Review chart for surgery to be performed and determine the exact area to be prepped.
2. Wash hands.
3. Assess client's level of consciousness and mobility.
4. Explain the procedure to client.
5. Be sure that hairpins, jewelry, nail polish, contact lenses, prostheses, and dentures were removed during the preoperative preparation.
6. Assist client with transfer from wheelchair or bed to the surgical table.
7. Position the client for optimal access to the surgical site according to institutional protocol.
8. Cover with blanket (see Figure 4-21-3).



Figure 4-21-3 Covering the client with blankets helps maintain body temperature.

9. Cover hair if required (see Figure 4-21-4).
10. Assemble equipment needed (see Figure 4-21-5).
11. Remove ring(s) and watch. Wash hands and apply clean gloves.
12. The surgical prep sites follow, depending on the type of surgery to be performed.
Head and neck: The site extends from above the eyebrows, over the top of the head, and in-

1. Avoids errors regarding site to be prepped.
2. Reduces the transmission of microorganisms.
3. Determines client's ability to cooperate with the skill.
4. Provides comfort and support for the client.
5. Removes artifacts that may interfere with the assessment and procedure.
6. Ensures client safety.
7. Allows the surgeon access to the body part requiring surgery.
8. Maintains body temperature and provides privacy. The temperature in the operation room is often lower than in the client's room.



Figure 4-21-4 Covering the client's hair helps maintain a sterile field.

9. Keeps loose hairs from entering sterile field.
10. Ensures a smooth procedure.
11. Reduces the transmission of microorganisms. Infection control.
12. The area to be shaved and cleansed for surgery varies with the type of surgery to be performed. The prepared site should optimize the surgeon's access to the necessary body structures.



Figure 4-21-5 Assemble equipment next to the client.

cludes the ears and both anterior and posterior areas of the neck. The face and eyebrows are not shaved (see Figure 4-21-6).

Lateral neck: Clean the external auditory canal with a cotton swab. Anteriorly, prepare the side of the face, from above the ear to the upper thorax to just below the clavicle. Posteriorly, prepare from the neck to the spine including the area above the scapula.

Chest surgery: The site extends from the neck to the bottom of the rib cage and to the lateral midline. The shoulder and arm of the operative side should be included (see Figure 4-21-7).

Abdominal surgery: The preparation site extends from the axilla to the pubis extending bilaterally to the lateral midline. All visible pubic hair should be shaved (see Figure 4-21-7).

Perineal surgery: Shave all pubic hair and the inner thighs to the midthigh. The area starts above the pubic bone anteriorly and extends beyond the anus posteriorly.

Cervical spine surgery: Posteriorly from the top of the ears to the waist. The area extends on each side to the midaxillary line.

Lumbar spine surgery: Posteriorly from the axilla down to the midgluteal level of the buttocks. The area extends on each side to the midaxillary line (see Figure 4-21-7).

Rectal surgery: Shave the buttocks from the iliac crest down to the upper third of the thighs, including the anal region. The area extends to the midline on each side.

Flank surgery: Extends anteriorly from the axilla, down to the upper thigh, including the external genital area. Posteriorly the area extends from the midscapular to the midgluteal regions (see Figure 4-21-7).

Hand and forearm surgery: The area includes the full circumference of the affected arm, from the axilla to the fingertips.

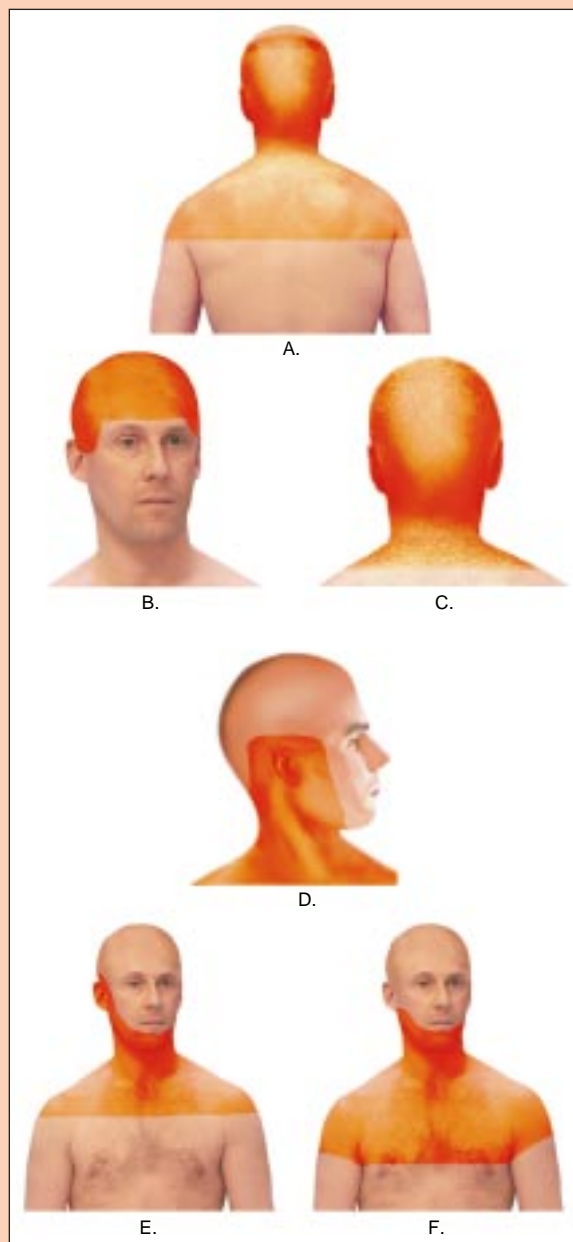


Figure 4-21-6 Preparation of the head for surgery: **A–C.** Head for craniotomy; **D.** Neck for otological surgery; **E, F.** Upper thorax for thyroidectomy.

continues

Lower extremity surgery: The area includes the entire leg, toes, and foot of the affected leg from the umbilicus anteriorly and the top of the buttocks posteriorly.

Lower leg surgery: The area to be prepared includes the circumference of the entire region from midhigh to the distal toes of the affected leg.



Figure 4-21-7 Preparation of the upper extremities and trunk for surgery.

13. Arrange for adequate light on the area to be prepared.
14. Using warm water, hold the skin taut and hold the razor at a 45° angle. Shave the area carefully by stroking in the direction of hair growth. Rinse the razor carefully to remove accumulated hair from the blade.
15. Dry the client's skin with a sterile towel.
16. Clear the shaving supplies from the preparation area.
17. Apply sterile gloves and gown.
18. Scrub the surgical site with an antibacterial cleaner (see Figure 4-21-8). Using a rotary movement to clean the skin, begin in the center and gradually enlarge the area with each rotation.
13. Light provides for good visualization and safe shaving.
14. Holding skin taut will decrease chance of cutting the client. Stroking in the direction of hair growth will reduce ingrown hairs when the hair grows back. Rinsing the razor will improve performance of the blade, decreasing the amount of skin irritation.
15. Prevents the spread of microorganisms.
16. Prevents contamination of the area with used supplies.
17. Prevents the spread of microorganisms.
18. Removes dirt and transient microbes from the skin. Reduces the resident microbial count as much as possible.



Figure 4-21-8 Scrub the surgical site using a rotary movement, starting at the center and working outward.



Figure 4-21-9 Cover the area with sterile drapes.

19. Continue this process for three to ten minutes as prescribed by institutional policy.
20. Clean any hidden areas in the surgical site (the ear canals, under the fingernails, the umbilicus) using cotton swabs.
21. Rinse the area with sterile water. Wait for the site to dry or pat dry with a sterile towel.
22. Cover the area with sterile drapes leaving the surgical site exposed (see Figures 4-21-9 to 4-21-12).
19. Be sure to use a clean brush or swab whenever returning to the center of the surgical site to prevent recontamination of the site.
20. Decreases transmission of microorganisms.
21. Decreases transmission of microorganisms.
22. Provides a sterile field for the surgical procedure.



Figure 4-21-10 Follow institution protocol for draping specific areas of the body.

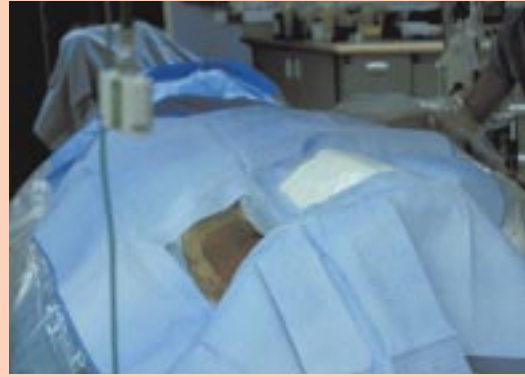


Figure 4-21-11 Use proper technique to avoid contaminating the drape or the patient's skin.



Figure 4-21-12 The scrubbed and draped surgical site



▼ REAL WORLD ANECDOTES

Mrs. McKenzie, a 38-year-old female, presented to the hospital for a vaginal hysterectomy. The surgery went well and she was to be released that evening. Prior to her discharge from the hospital, Mrs. McKenzie complained of numbness in her right leg. The nurse practitioner found that Mrs. McKenzie had movement, circulation, and some feeling in her leg. She reassured Mrs. McKenzie that the numbness would go away. When Mrs. McKenzie returned to see her physician for a postoperative follow up, she complained that her leg was numb and weak. Her physician suggested that it might be secondary to nerve pressure from intraoperative positioning and reassured her that it would improve with time. Mrs. McKenzie's condition did not improve with time. Her leg continued to be numb and weak. She needed a cane to walk. After a year without improvement, Mrs. McKenzie sued the physician and the nurses for a perioperative positioning injury. Both the nurses and the physician needed to take Mrs. McKenzie's symptoms seriously from the onset. Documenting and reporting Mrs. McKenzie's symptoms early would have alerted the physician to the presence of a problem.

> EVALUATION

- The surgical preparation was performed without injury or trauma to the client.
- The client voices understanding of the procedure and the reason for it.
- The client did not experience any allergic reaction or skin sensitivity secondary to the surgical preparation.
- The client did not experience any infections secondary to poor site preparation.
- The client did not experience disruption to any existing appliances, catheters, or other instrumentation.
- The client did not experience any injury secondary to perioperative positioning.

> DOCUMENTATION

Preoperative Checklist

- Review checklist for completeness.
- Check the medical record to ensure the presence of a properly signed and witnessed surgical consent.
- Report client's response to surgical preparation.
- Report positioning of the client for surgery.

Nurses' Notes

- Record the method of shaving and site cleaning. Include the area, type of shaving, solution for sterilizing, client's responses before, during, and after the procedure.
- Note any discrepancies such as dentures still in or a lack of preoperative documentation in the chart.
- Report if the client requires any special preparation, such as medication or a new IV site.

Medication Record

- If a new IV site was needed, record the date, time, location, and type of equipment used.
- Record any medications administered with date, time, route, and dosage.

> CRITICAL THINKING SKILL

Introduction

Client's skin is being prepped and the client complains of burning.

Possible Scenario

While prepping the surgical site for abdominal surgery, your client begins to complain of burning and itching at the preparation site.

Possible Outcome

The worst case scenario is that the client could potentially have a systemic reaction and even anaphylactic shock. Lesser reactions may be hives, redness, itching, or burning sensation. Stop the procedure, evaluate the client's skin and overall condition, clean the solution off the surgical site and notify the client's physician or practitioner.

Prevention

Always check the client's chart for a history of allergies to iodine, other topical medications, or skin products. Note any earlier site preparation. Iodine preparations are often used for surgical site cleansing. Be sure to question the client specifically regarding any iodine or seafood allergies as well as any allergies to topical products. Using the cleaning solution, test for sensitivity on a small patch of the skin before the actual skin preparation.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients in general have very sensitive skin and even though no history of allergic reactions was reported, clients may react to cleaning solutions.*
- *Elderly clients have very thin skin that is difficult to hold taut during preparing and can easily tear or be cut during shaving or scrubbing.*



Pediatric Variations:

- *Children may be frightened by the skin preparation; therefore, this procedure may be performed after the child is sedated. Otherwise carefully explain the purpose, and have a parent or other trusted person in the room while the prep is being performed.*



Home Care Variations:

- *Not applicable.*



Long-Term Care Variations:

- *Not applicable.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The nurse fails to remove the client's jewelry. After surgery, the client's hands may swell and rings may be difficult to remove. In a cold operating room rings may fall off.

Ask Yourself:

How do I prevent this error?

Prevention:

Explain to the client the reason for removing or taping jewelry. Remove as much jewelry as possible, ideally sending it home with family members. Tape any jewelry that the client does not wish to remove or cannot remove. Ask the client about any piercings or other permanent body jewelry. If the client has permanent body jewelry in a critical area (mouth, nose, or at the surgical site) notify the physician prior to surgery. When in the surgical suite, double check the client's hands, neck, ears, nose, and mouth prior to draping the client.

> NURSING TIPS

- Double check the physician's orders regarding the type and location of the surgery.
- Check protocol regarding type of surgical prep required and positioning of client.
- If x-rays or other reports are available, ascertain that appropriate area is prepped.
- Check the most recent progress notes for any changes in preparation or positioning.
- Because operating rooms tend to be cold, drape the client and use warmed covers if available.
- Warm solutions if possible.
- Cleanse and shave an area greater than the anticipated surgical incision area to prevent accidental contamination of the surgical field.
- If a depilatory is used for hair removal, check the client's skin for sensitivity by applying a small amount to the skin of the forearm. Wait 10 minutes. If redness occurs, do not continue. Notify the physician or practitioner.

SKILL 4-22

Assessing Immediate Postoperative Care

Gaylene Bouska Altman, RN, PhD, and Samuel C. Taylor, RN

KEY TERMS

Anesthesia	Postoperative
Oximeter	Surgical intensive
Perioperative	care
positioning injury	Surgical ward
Postanesthesia	
recovery unit	
(PACU)	



> OVERVIEW OF THE SKILL

The postoperative period extends from the completion of the surgical procedure through the time the client's condition is stabilized following surgery. During the immediate postoperative period the client is usually sent to a special area called the recovery room, postoperative unit, or a postanesthesia care unit (PACU). During this time the client is closely monitored while recuperating from the effects of the anesthesia and the surgical procedure. Both anesthesia and surgical procedures can have profound effects on the body and this recovery period is critical. During the immediate postoperative period the client is closely monitored to ensure that the body's systems are returning to normal.

As soon as the client is received from the operating theater the recovery room nurse assesses the client's baseline status checking alertness, vital signs,

cardiac rhythm, respiratory rate and efficiency, blood oxygen saturation, IV patency, and the condition of the surgical site. Every five to fifteen minutes for the next few hours the nurse will reassess the client's status. Careful and frequent monitoring is essential during the immediate postoperative stage in order to detect and prevent potentially life-threatening complications. Once the client's condition is stabilized, as indicated by stable vital signs for at least one hour, an intact surgical site and an adequate respiratory status, he is transferred to an area with less intensive monitoring, generally a surgical intensive care unit or a surgical ward. Following this transfer, the nurse assuming care will repeat the thorough baseline assessment and will continue to monitor the client's condition every fifteen minutes for at least an hour.

> ASSESSMENT

1. Assess the client's sedation level and mental status to evaluate the effects of anesthesia and any neurological changes.
2. Assess the client's cardiovascular status as indicated by heart rate, blood pressure, and electrocardiogram to evaluate the stability of the client's condition following surgery.
3. Assess the client's respiratory status as indicated by respiratory rate, oxygen saturation, and breath sounds to evaluate the client's oxygenation following surgery.

4. Assess the client's level of pain as indicated by appropriate pain scale to **determine the type and amount of medication and/or treatment needed to provide adequate pain control.**
5. Assess the surgical site and surgical appliances to **evaluate the client's needs and the client's response to the surgery.**
6. Assess the client's fluid status by reviewing the intake and output record to **determine the client's fluid status and respond appropriately.**
7. Assess the neurovascular status of the client's extremities to **evaluate for possible perioperative positioning injury.**

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.2.2.1 Risk for Altered Body Temperature
- 1.4.1.1 Altered Tissue Perfusion, cardiopulmonary, if general anesthesia was administered
- 1.4.1.2.2 Risk for Fluid Volume Deficit
- 1.6.1.4 Risk for Aspiration
- 1.6.2.1 Impaired Tissue Integrity
- 6.1.1.1.2 Risk for Perioperative Positioning Injury
- 7.2 Sensory/Perceptual Alterations secondary to anesthesia
- 9.1.1 Pain
- 9.3.2 Fear

> PLANNING

Expected Outcomes:

1. The client's airway will be patent.
2. The client's vital signs will be stable for at least one hour.
3. The client will be alert and oriented when stimulated.
4. The client's respiratory status, including oxygen saturation, respiratory rate, and tidal volume will be adequate.
5. The client's pain control will be adequate.
6. In clients receiving regional anesthesia, motor and sensory function will be at an adequate level.
7. The client's surgical site will be intact with a dry or appropriately reinforced dressing present when the client is discharged from the recovery area.
8. The client's intravenous access will be intact and patent without signs or symptoms of infiltration

or infection when the client is discharged from the recovery area.

9. The client's output will be within normal limits.
10. The client's temperature will be within normal limits.

Equipment Needed:

- Stethoscope
- Sphygmomanometer
- Oximeter
- Blankets
- Cardiac monitoring equipment
- Sterile dressings as needed
- Client's chart with postoperative orders
- Incentive spirometer (may be optional)
- Supplemental oxygen, if needed (See Figure 4-22-2.)
- Sequential stockings and/or antiembolic stockings (as ordered)
- Thermometer



Estimated time to complete the skill:
15 minutes for initial assessment
1–2 hours for client to recover from anesthesia and stabilize, depending on surgery

> CLIENT EDUCATION NEEDED:

1. Inform client of purpose of various equipment to ease the fear of the unknown.
2. Inform the client of required position changes.
3. Inform the client to let nurse know when pain or shivering is noted.



Figure 4-22-2 Supplemental oxygen equipment

4. Explain the reason deep breathing, turning, and coughing are encouraged right away despite the client's recent surgery and some discomfort.
5. Reinforce the client's preoperative teaching regarding postoperative expectations and exercises.
6. Explain the reason for frequent vital sign and neurovascular checks. Note that the frequent checks do not indicate anything is "wrong." Assure client that regular checks are part of the routine to prevent problems.
7. Instruct the client to tell you if he is in pain, is nauseated, or is uncomfortable in other ways.
8. Encourage the client to ask questions regarding the surgical procedure, the postoperative routine, or any surgical changes that might have taken place.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and apply gloves.
2. Check the client's temperature, pulse, respiratory rate, and blood pressure upon the client's arrival in the unit.
3. Identify client via armband and verify the client's identity with the chart.
4. Inform the client that he is out of the operating room and in the recovery room.
5. If bedside electrocardiogram monitoring is available, attach the leads to the client (see Figure 4-22-3) and run a baseline electrocardiogram strip.



Figure 4-22-3 If bedside electrocardiogram monitoring is available, attach the leads to the client.

6. Attach the oximeter to the client and monitor the client's oxygen saturation (see Figure 4-22-4).
7. Check intravenous (IV) site using gloves. Check IV solution(s) (see Figure 4-22-5), flow rate, and that the IV line is taped as necessary.

1. Reduces the transmission of microorganisms.
2. Establishes a baseline and is indicative of the client's status.
3. Protects the client from errors.
4. Decreases anxiety. If the client has had general anesthesia you may need to reorient the client several times.
5. Establishes baseline rhythm and provides constant monitor of client's cardiac rate and rhythm.



Figure 4-22-4 Attach the oximeter to the client.

6. Establishes baseline data and ongoing monitor of client's need for supplemental oxygen.
7. Prevents complications from infiltration of IV, allows appropriate rehydration, verifies appropriate solution, prevents the line from disconnecting.

continues



Figure 4-22-5 Check the intravenous (IV) site, pump, solution, and tubing.

8. Check surgical dressing and site, if visible (see Figure 4-22-6). Assess dressings for amount and type of drainage (see Figure 4-22-7). Reinforce the dressings as needed. Change the dressing only with the physician's approval.



Figure 4-22-7 Check the surgical dressings and site(s). Assess dressings for amount and type of drainage.

9. Complete a total head to toe assessment. A complete assessment should include the following:
 - Airway**
 - Check the patency of the client's airway.
 - Assess for the presence of breath sounds that are equal on both sides, especially if the client is intubated.
 - Note the presence of rhonchi, rales, or wheezes while assessing breath sounds.
 - Respiratory**
 - Note the presence of any supplemental oxygen and the type of oxygen delivery system (see Figure 4-22-8).
 - Assess the client's blood oxygen saturation as well as the type, depth, and efficiency of the client's respirations.



Figure 4-22-6 Check surgical dressing and site, if visible. Assess dressings for amount and type of drainage.

8. Establishes the condition of the surgical site, including the presence of any drains, bleeding, purulence, or other notable conditions.



Figure 4-22-8 Oxygen is critical for all organs, especially the brain. Assess respiratory and oxygen supplemental or support systems.

9. Provides baseline data and prevents complications of surgery. Start with the ABCs of assessment: airway, breathing, circulation. Oxygen is the primary need of all clients and without a patent airway all other measures are useless.

Oxygen is critical for all organs, especially the brain. Lack of oxygen to the brain and other body organs can be life threatening. Poor oxygenation despite supplemental oxygen could indicate complications such as respiratory or cardiac failure, pulmonary embolus, atelectasis, inadequate lung expansion, mucous plugs, or lung consolidation.

Cardiovascular

- Check apical pulses, radial pulses, and peripheral pulses especially those distal to the surgical site.
- Note the color and temperature of extremities, and the capillary refill rate.
- Check the client's cardiac rate and rhythm, blood pressure, and any indications of bleeding.

Temperature

- Check the client's core temperature. Note any complaints of coldness or shivering.

Neurological

- Assess the client's level of awareness, orientation, level of cooperation, equality of pupils, verbal response, equality of movement and feeling in the extremities.

Gastrointestinal

- Evaluate for the presence of nausea or vomiting. If a nasal gastric (N/G) tube is present auscultate the placement of the tube. If the NG tube is hooked to suction, note if the suction is intermittent or continuous and whether it is functioning properly.
- Assess gastric secretions for color and amount. Record the amount of gastric output (check for bleeding and pH as indicated) and replace fluids if indicated. If the client is vomiting N/G placement may be necessary.

Genitourinary

- Evaluate the amount and color of the client's urinary output. If indicated check for the presence of blood, evaluate the pH, specific gravity, presence of glucose, ketones, sediment, etc.
- Assess that the catheter is draining appropriately.

Pain

- Assess the client's level of pain on a 1 to 10 pain scale and treat as appropriate. If a client controlled analgesic (PCA) system is employed, as the client recovers from sedation instruct the client on the use of the PCA.
- Assess other means of controlling pain, such as repositioning. Sometimes anti-inflammatory agents are used alone or in conjunction with

- Changes in distal pulses could indicate blockage of circulation to the surgical site.

- Changes in blood pressure or cardiac rate or rhythm can indicate bleeding or life-threatening vascular failure.

Postoperative clients often have hypothermic body temperatures following surgery. A low core temperature can slow the metabolic rate and slow the client's recovery. Shivering, which often accompanies postoperative hypothermia, can increase the client's oxygen needs dramatically. Most institutions have standard postoperative treatments for warming postoperative clients.

- Sedation level is one of the indicators of readiness to be transferred out of PACU. Any change in neurologic function could indicate brain damage, nerve damage, or circulatory changes.

- If the client is nauseated or vomiting, turn the client to his side if indicated to prevent aspiration. Treat nausea and vomiting with medication, N/G tube insertion, or reevaluation of pain medications.

- Urinary output can indicate the client's hydration state, pituitary dysfunction, or cardiac output status. Output should be at least 30 cc/hr.

- Clients who are in pain may not recover from surgery as fast and may experience complications. If clients are in pain, deep breathing and coughing may not be achieved and the client may get pneumonia. Increased pain may be indicative of complications. All complaints of pain should be taken seriously.

Pain *continued*

sedatives or narcotics. If the client experiences vomiting reevaluate pain medication employed.

Fluid Balance

- Evaluate the client's fluid status. Check the client's fluid intake and output status.
- Check for peripheral edema or jugular venous distention. Note and report any extremes of intake or output.

Vital signs

- Reevaluate the client's vital signs and status as needed, at least every fifteen minutes.

10. Encourage the client to deep breathe, cough, and use the incentive spirometer (see Figure 4-22-9). For more information on the use of incentive spirometer, see Skill 7-3.



Figure 4-22-9 Encourage the client to use the incentive spirometer to reduce the risk of respiratory complications.

11. Check and implement postoperative orders.
12. Inform the client's family or significant other that the client is in the recovery room.
13. Turn the client every hour, maintaining proper alignment (see Figure 4-22-10).
14. Upon discharge by the postanesthesia caregiver, a full report of the postanesthesia phase and intraoperative course of events should be given to the nurse assuming care of the client.
15. Remove gloves and wash hands.

- Peripheral edema or jugular venous distention that might indicate fluid overload. Fluid loss or overload can further stress the client's cardiovascular status.

- Monitors any changes in the client's condition.

10. Improves lung expansion, prevents respiratory complications, and hastens clearance of anesthesia from the lungs.



Figure 4-22-10 Turn the client every hour to reduce the risk of respiratory and circulatory complications, or skin breakdown.

11. Provides appropriate and safe postoperative care.
12. Decreases anxiety for client and others.
- 13 Prevents venous stasis and prevents decreased circulation and disruption of skin integrity. Turning increases lung expansion and reduces the chance of pneumonia.
14. Provides continuity of care following transfer.
15. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Jason is an 8-year-old boy admitted for placement of Harrington rods to correct severe scoliosis. Prior to surgery, Jason had full movement and feeling in both feet and legs. Following surgery, and two hours of recovery, Jason was moved to the pediatric surgery ward. When Jason arrived in the surgery ward his nurse noted that he was sleepy, able to follow commands, and denied numbness or tingling in his feet and legs.

Following hospital protocol, Jason's nurse monitored his vital signs and neurovascular status every 15 minutes for the first hour and every 30 minutes for the next two hours. Over the course of this three-hour period, Jason began to complain of numbness in his toes, gradually spreading to his feet. Two and one-half hours after Jason returned to the surgical floor, he could no longer move or feel his feet. After patiently observing and recording the progress of Jason's paralysis for two and one-half hours, the nurse called the physician. Jason's doctor ordered emergency surgery to remove the Harrington rods. Unfortunately, the rods were not removed in time and Jason was rendered a spastic paraplegic. Conducting regular assessments did not help, because the nurse did not interpret the findings correctly, and did not recognize that the spreading numbness and paralysis was abnormal and should have been reported.

> EVALUATION

- The client's airway is patent.
- The client's vital signs are stable for at least one hour.
- The client is alert and oriented when stimulated.
- The client's respiratory status, including oxygen saturation, respiratory rate, and tidal volume is adequate.
- The client's pain control is adequate.
- In clients receiving regional anesthesia, motor and sensory functions are at an adequate level.
- The client's surgical site was intact with a dry or appropriately reinforced dressing present when the client was discharged from the recovery area.
- The client's intravenous access was intact and patent without signs or symptoms of infiltration or infection when the client was discharged from the recovery area.
- The client's output is within normal limits.
- The client's temperature is within normal limits.

> DOCUMENTATION

Vital Signs Flow Sheet

- Document the client's vital signs.
- Record neurologic checks, level of consciousness, and oxygen saturation.
- Note the condition of the surgical site and any drains or appliances.

Intake and Output Record

- Record the client's IV and oral intake, urine output, and any drainage.

Medication Administration Record

- Record any medications administered, including date, time, route, and dosage.

Nurses' Notes

- Document the time the client was received.
- Record any unusual findings and note the findings of the total systems assessment.

> CRITICAL THINKING SKILL

Introduction

Operating rooms are often cooled to temperatures that are comfortable for the staff rather than for the client.

Possible Scenario

Mrs. Larkspur has just been moved to the recovery area following surgery. On initial assessment, her tympanic temperature is 96.2°F. You place warmed blankets over Mrs. Larkspur and send for a bed warmer to help raise her body temperature. Before the bed warmer arrives, Mrs. Larkspur begins to shiver violently. She complains of the shivering and of the cold.

Possible Outcome

Mrs. Larkspur's respiratory rate increases and her oxygen saturation level drops due to the increased energy demands placed on her body. She requires an increase in supplemental oxygen and her body is unnecessarily stressed due to the shivering.

Prevention

Shivering increases the body's oxygen use dramatically, placing a stress on the cardiopulmonary system. In clients whose cardiopulmonary system is already compromised, this stress can be life threatening. Be sure to

have warm blankets and bed warming equipment ready when the client is admitted to the recovery area to prevent having to wait. IV Demerol is sometimes used postoperatively to control shivering, which can compromise the client's recovery.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may become confused or agitated following the use of general anesthesia. Be prepared for possible confusion and the need for frequent reorientation to time and place.
- Elderly clients may be at risk for respiratory complications prior to surgery and may require a vigorous pulmonary toilet.



Pediatric Variations:

- Children recovering from anesthesia may not always understand directions. Physical restraint or client repeated instructions may be necessary.
- If the child's parent is available and supportive, have the parent sit with the child as he comes out of anesthesia to provide emotional comfort.
- Children may suffer from postanesthesia excitement. They may be confused, delirious, uncooperative, or combative. Be sure to have enough help available. Restraints may be necessary.



Home Care Variations:

- Teach the client and caregiver about what will happen when client returns home (e.g., follow-up care and appointments, caring for the wound, medication administration, returning to normal levels of activity, and assessing for short- and long-term complications of the surgery).



Long-Term Care Variations:

- People with multiple surgeries may develop anticipatory fear. Assess the client for history and discuss the procedure.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not encouraging the client to cough and deep breathe due to complaints of surgical site pain.

Ask Yourself:

How do I prevent this error?

Prevention:

Following general anesthesia the lungs are not re-expanded properly and some of the inhaled anesthesia lingers. Having the client deep breathe and cough helps the anesthesia clear from the lungs faster and complications such as pneumonia and atelectasis can be prevented.

> NURSING TIPS

- Do not raise the client's head until you have determined the type of surgery and anesthesia used. Some procedures require the client to lie flat for several hours.
- Be sure to have emergency resuscitation equipment handy as well as functioning suction and oxygen.
- The motion of moving the client to a room may cause vomiting.
- Position the patient to keep the airway clear and have suction available.
- Provide regular updates to family and friends to provide comfort during stressful times. What may be routine to the nurse can be a frightening experience for family members.
- A client may forget things he was told while recovering from anesthesia. Be prepared to explain more than once.

SKILL 4-23

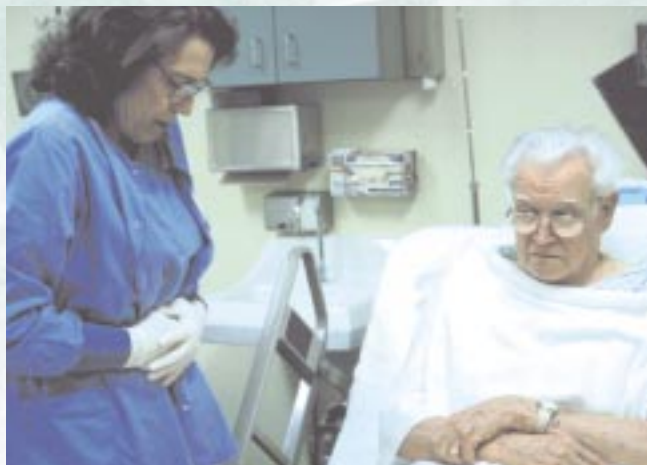
Postoperative Exercise Instruction

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Alveoli	Splinting
Atelectasis	Sustained maximum
Incentive spirometer	inspiration (SMI)
Peristalsis	Thrombophlebitis
Pulmonary embolism	Viscosity



> OVERVIEW OF THE SKILL

Preoperative teaching of postoperative exercises prepares the client physically and emotionally for the impending surgery. The goal of instruction is to have the client demonstrate the performance of exercises while verbalizing why the exercises are used during the postoperative phase.

There are several postoperative exercises that help to speed recovery from surgery. Deep breathing and coughing facilitate removal of accumulated pulmonary secretions. Clients may experience their worst postoperative pain while coughing, deep breathing, and exercising. Clients with abdominal or chest surgery may avoid using muscles in the affected areas to take deep breaths or to cough effectively. Certain anesthetic agents depress the central nervous system, causing some clients to experience shallow respirations. Inhaled gases and oxygen have a direct drying effect on the respiratory mucosa, which increases the viscosity of mucus, making the secretions difficult to raise with coughing. These factors place the client at risk for respiratory complications.

To prevent respiratory complications, the nurse teaches clients to use a breathing technique in which the client turns, coughs, and deep breathes to achieve sustained maximum inspiration (SMI). SMI promotes

the reinflation of the alveoli and the removal of mucous secretions.

Several devices help encourage clients to perform SMI exercises. The breathing devices, called incentive spirometers, measure the client's ventilatory volume and provide the user with a tangible reward for generating an adequate respiratory flow. Devices range from simple types, a Ping-Pong ball in a plastic tube, to sophisticated models. When the client takes a deep breath, the ball moves upward and the amount of air is measured, making the results visible to the client.

Turning, deep breathing, coughing, and using spirometry prevent respiratory complications by doing the following:

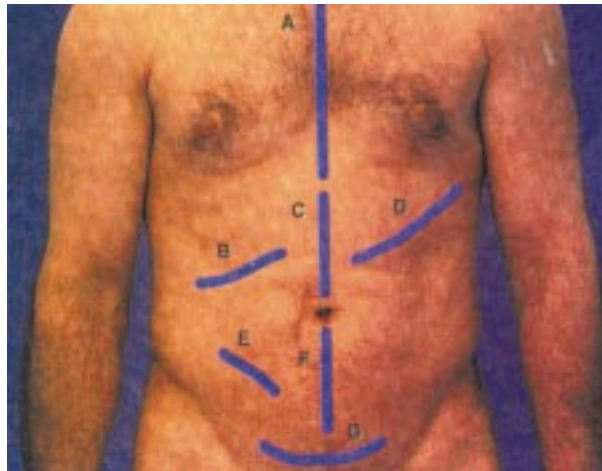
- Promoting pulmonary circulation
- Promoting the exchange of gases by increasing lung compliance
- Facilitating the removal of mucous secretions from the tracheobronchial tree

Postoperatively the client is encouraged to move in bed and perform leg exercises. These exercises assist in preventing circulatory complications that can arise from anesthetic agents that depress the metabolic and heart rates. Early ambulation also increases respiratory function and the return of peristalsis.

Types of Surgical Incisions

Nurses need to be knowledgeable about common surgical incisions to reinforce the surgeon's teaching and to answer the client's questions. Two main factors gov-

ern incisions: direction and location. Incisions may be vertical, horizontal, transverse, or oblique. Figure 4-23-2 illustrates and describes the location of common surgical incisions.



INCISION	LOCATION	ORGAN
A. Sternal Split	Begins at the top of the sternum and extends downward to the sternal notch.	Heart
B. Oblique Subcostal	Begins in the epigastric area and extends laterally and obliquely below the lower costal margin.	Right side: Gallbladder Biliary Left side: Spleen
C. Upper Vertical Midline	Begins below the sternal notch and distally around the umbilicus	Stomach, Duodenum, Pancreas
D. Thoracoabdominal	Begins midway between the xiphoid process and the umbilicus and extends across the seventh or eighth intercostal space to the midscapular line.	Thorax, Heart
E. McBurney	Begins below the umbilicus, goes through McBurney's point, and extends toward the right flank.	Appendix
F. Lower Vertical Midline	Begins below the umbilicus, downward toward the symphysis pubis.	Bladder, Uterus
G. Pfannenstiel	Begins 1.5 inches above the symphysis pubis with a curved transverse cut across the lower abdomen.	Uterus, Fallopian tubes, Ovaries

Figure 4-23-2 Common surgical incisions

> ASSESSMENT

1. Assess the client's current understanding of post-operative procedures. **Establishes baseline for teaching.**
2. Assess the client's ability to understand the post-operative exercise instructions. **Establishes baseline for teaching. Affects how the teaching and the procedures will be performed.**
3. Assess any preoperative limitations the client may have that would prevent or impair the ability to perform the postoperative exercises accordingly.

Establishes baseline for teaching. Affects how the teaching and the procedures will be performed. Allows modification of the exercises.

> DIAGNOSIS

- 9.1.1 Pain
- 6.1.1.1 Impaired Physical Mobility
- 1.5.1.1 Impaired Gas Exchange
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will be able to successfully demonstrate postoperative exercises, deep breathing, coughing, pillow splinting, turning and proper body alignment, leg and foot exercises, and out-of-bed transfers.



Figure 4-23-3 Incentive spirometers encourage deep breathing. A pillow may be used to splint the incision site. Tissues are used to cover the mouth when coughing.

2. The client will be able to successfully demonstrate proper use of the incentive spirometer.

Equipment Needed (see Figure 4-23-3):

- Educational materials
- Pillow
- Tissue
- Nonsterile gloves
- Disposable, volume-oriented incentive spirometer



Estimated time to complete the skill:
45 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need for SMI.
2. Explain to the client the need for leg exercises.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands and organize equipment. 2. Check the client's identification band. 3. Apply gloves. 4. Place client in a sitting position. 5. Demonstrate deep breathing exercises. <ul style="list-style-type: none"> • Place one hand on abdomen (umbilical area) during inhalation. • Expand the abdomen and rib cage on inspiration. • Inhale slowly and evenly through your nose until you achieve maximum chest expansion. • Hold breath for 2–3 seconds. • Slowly exhale through your mouth until maximum chest contraction has been achieved. <p>(For more information on deep breathing exercises see Skill 7-2, Assisting a Client with Controlled Coughing and Deep Breathing.)</p> | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms and promotes efficiency. 2. Facilitates proper identification of client. 3. Reduces the transmission of microorganisms. 4. Promotes full chest expansion. 5. Shows the client how to breathe deeply. <ul style="list-style-type: none"> • Exerts counterpressure during inhalation. • Promotes maximum chest expansion. • Maintains full expansion of the alveoli. • Increases the pressure, preventing immediate collapse of the alveoli. • Promotes maximum chest contraction. |
|--|--|

continues

6. Have the client return demonstrate deep breathing.
7. Have the client repeat the exercise 3–4 times.
8. Instruct the client on the use of an incentive spirometer (see Figure 4-23-4).
 - Hold the volume-oriented spirometer upright.
 - Take a normal breath and exhale, then seal lips tightly around the mouthpiece; take a slow deep breath to elevate the balls in the plastic tube, hold the inspiration for at least 3 seconds.
 - The client simultaneously measures the amount of inspired air volume on the calibrated plastic tube.
 - Remove the mouthpiece, exhale normally.
 - Take several normal breaths.

(For more information on using the incentive spirometer see Skill 7-3, Assisting a Client with an Incentive Spirometer.)



Figure 4-23-4 Use a pillow to support the abdominal muscles when coughing.

9. Have the client repeat the procedure 4–5 times.
10. Have the client cough after the incentive effort. See the following section.
11. Demonstrate splinting and coughing.
 - Have the client slowly raise head and sniff the air.
 - Have the client slowly bend forward and exhale slowly through pursed lips.

6. Fosters learning.
7. Reinforces learning. Promotes increased air exchange.
8. Reinflates the alveoli and removes mucous secretions.
 - Promotes proper functioning of the device.
 - Allows for greater lung expansion; holding the inspiration increases the pressure, preventing the immediate collapse of the alveoli.
 - Encourages the client to do respiratory exercises.
 - Allows normal expiration.
 - Provides the client the opportunity to relax.



Figure 4-23-5 Instruct the client to take a slow deep breath to elevate the ball in the tube.

9. Encourages sustained maximal inspiration and loosens secretions.
10. Facilitates the removal of secretions.
11. Shows the client how to raise mucous secretions from the tracheobronchial tree.
 - Increases the amount of air and helps to aerate the base of the lungs.
 - Dries the tracheal mucosa as air flows over it. There is a slight increase in carbon dioxide level, which stimulates deeper breathing.

- Repeat breathing 2–3 times.
 - When the client is ready to cough, have client place a folded pillow against the abdomen with clasped hands.
 - Have client take a deep breath and begin coughing immediately after inspiration is completed by bending forward slightly and producing a series of soft, staccato coughs.
 - Have a tissue ready.
(For more information on deep breathing exercises see Skill 7-2, Assisting a Client with Controlled Coughing and Deep Breathing.)
- 12.** Have the client return demonstrate splinting and coughing (see Figure 4-23-5).
- 13.** Wash the incentive spirometer mouthpiece under running water and store in a clean container. Disposable mouthpieces should be changed every 24 hours.
- 14.** Teach the client leg and foot exercises (see Figure 4-23-6).
- Have the client, with heels on bed, push the toes of both feet toward the foot of the bed until the calf muscles tighten, then relax feet. Pull the toes toward the chin, until calf muscles tighten; then relax feet (see Figure 4-23-6A and B).
 - With heels on bed, lift and circle each ankle, first to the right and then to the left; repeat three times, relax.
 - Flex and extend each knee alternately, sliding foot up along the bed; relax (see Figure 4-23-6C).
- 15.** Have the client return demonstrate the leg and foot exercises.
- 16.** Explain how to turn in bed and get out of bed.
- 17.** Instruct the client who has a left-sided abdominal or chest incision to turn to the right side of bed and sit up as follows:
- Flex the knees.
 - With the right hand, splint the incision with hand or small pillow.
 - Turn toward right side by pushing with the left foot and grasping the shoulder of the
- Loosens mucous plugs and moves secretions to the main bronchus.
 - Elevates the diaphragm and expels air in a more forceful cough; supports the abdominal muscles and reduces pain while coughing, if the client has an abdominal incision.
 - Removes secretions from the main bronchus.
 - Preparation for sputum disposal.
- 12.** Fosters learning.
- 13.** Reduces the transmission of microorganisms.
- 14.** To improve venous blood return from the legs.
- Causes contraction and relaxation of the calf muscles.
 - Causes contraction and relaxation of the quadriceps muscles.
 - Causes contraction and relaxation of the quadriceps muscles.
- 15.** Fosters learning of how to improve venous blood return.
- 16.** Elicits client cooperation.
- 17.** Fosters learning how to turn and get out of bed without putting pressure on the incision line.



Figure 4-23-6 Leg exercises improve venous blood return.



Figure 4-23-7 Using the hand to splint the incision site when sitting up in bed will reduce pain and pressure at the incision site.

nurse or partial side rail of the bed with the left hand.

- Raise up to a sitting position on the side of the bed by using the left arm and hand to push down against the mattress or side rail.

18. Reverse instructions (use left side instead of right) for the client with a right-sided incision according to Action 17 (see Figure 4-23-7).

19. Instruct clients with orthopedic surgery (e.g., hip surgery) how to use a trapeze bar.

20. Wash hands.

18. Same as Rationale 17.

19. Facilitates movement in bed without putting pressure on a leg or hip joint.

20. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

A student nurse is assigned to ambulate Mrs. Ross, who had abdominal surgery yesterday. The student enters the room and explains to Mrs. Ross that she needs to get up and walk today. Mrs. Ross is horrified. She explains that there must be some mistake because she just had major surgery and couldn't possibly get out of bed yet. The student explains the need for exercise to prevent respiratory complications and to promote peristalsis. Mrs. Ross clearly did not expect to exercise postoperatively. She refuses to attempt even coughing and deep breathing until a "real" nurse has explained the

▼ REAL WORLD ANECDOTES *continued*

reasons for early postoperative activity and reassured her that this was per doctor's orders. This is a good reminder to the nurse and the student nurse that preoperative teaching regarding postoperative exercises is an important element in a client's surgical recovery.

Scenario 2

Margaret's postoperative recovery went well, partially because her children brought in several "toys" to help her do her postoperative exercises. Her favorite was a foam ball tied by a string to her bedside. She could squeeze the ball, or toss it at anyone or anything that annoyed her, then retrieve it unassisted.

> EVALUATION

- The client is able to successfully demonstrate postoperative exercises, deep breathing, coughing, pillow splinting, turning and proper body alignment, leg and foot exercises, and out-of-bed transfers.
- The client is able to successfully demonstrate proper use of the incentive spirometer.

> DOCUMENTATION

Nurses' Notes

- Document teaching the client postoperative exercises.
- Note the client's level of understanding and cooperation with the teaching.

Preoperative Checklist

- Initial the check-off area for documentation of preoperative teaching.

> CRITICAL THINKING SKILL

Introduction

Understand the client's perspective when assessing for noncompliance.

Possible Scenario

Mr. Hays had gallbladder surgery yesterday. This morning the nurse is encouraging Mr. Hays to cough, take deep breaths, and use his incentive spirometer. Prior to surgery Mr. Hays had demonstrated an understanding of these skills and had been able to perform them well. However, this morning he is breathing shallowly and coughing poorly. The nurse encourages him to try harder, but he explains that it hurts too much.

Possible Outcome

The nurse knows that if Mr. Hays is not able to improve his respiratory volumes and move the mucous secretions out of his lungs, he is at risk of pneumonia and postoperative complications that could prolong his hospital stay and further endanger his health.

Prevention

The nurse gives Mr. Hays his pain medication prior to his exercises so he is able to perform the tasks with less pain. If Mr. Hays was on PCA, the nurse could either have manually bolused the medication or had Mr. Hays initiate a dose of medication in anticipation of the exercises.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients are generally at higher risk of pulmonary complications, and their pulmonary toilet often must be more aggressive.



Pediatric Variations:

- Children are often very frightened of pain. They should be given pain medication prior to asking them to perform painful procedures. Other ways of encouraging deep breathing are with play activities such as blowing bubbles, mobiles, or paper windmills, or blowing a paper sailboat across a basin of water.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- *Teach the client's caregivers how to do and supervise these exercises so they can help and encourage the client.*



Long-Term Care Variations:

- *Long-term clients often have impaired mobility prior to surgery. The nurse should be more diligent about exercises to prevent circulatory stasis in these clients.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse is not being aggressive enough with postoperative exercises because of client pain.

Ask Yourself:

How do I prevent this error?

Prevention:

Be prepared to be placed in the supportive “bad guy” role of gently but firmly helping clients to do therapies that hurt. When clients are in pain, it is difficult for them to evaluate the long-term complications of their behavior. The nurse must be able to insist that clients do what is healthy even if they complain. Allow clients as much control as possible over the timing and pace of the therapy.

> NURSING TIPS

- The best time to teach postoperative exercises is before surgery. Remember to assess the client's motivation to learn and ability to pay attention.
- Encourage the client to use a pillow or other splinting method to ease the discomfort of coughing, turning, and deep breathing.
- Keep the incentive spirometer close to the client to encourage its use.

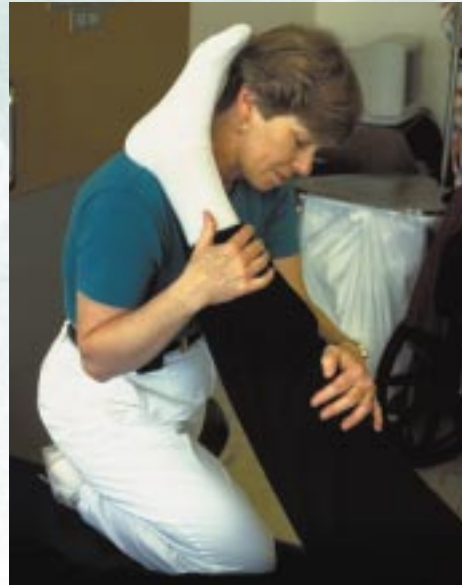
SKILL 4-24

Administering Passive Range of Motion (ROM) Exercises

Curt Campbell and Bethaney Campbell, RN, MN, OCN

KEY TERMS

Abduction	Extension
Active/assisted range of motion (A/AROM)	External rotation
Adduction	Flexion
Contracture	Internal rotation
	Passive range of motion (PROM)



> OVERVIEW OF THE SKILL

Passive range of motion (ROM or PROM) exercises seek to maintain or improve the current level of functional mobility of a client's extremities. The nurse provides, assists with, and teaches the client functional movements in all available planes and direc-

tions of involved joints. ROM exercises prevent contractures and shortening of muscles and tendons, increase circulation to extremities, decrease vascular complications of immobility, and facilitate comfort for the client.

> ASSESSMENT

1. Be aware of the client's medical diagnosis. Understand the expected functional limits of a client with this diagnosis.
2. Familiarize yourself with the client's current range of motion. Note any joint pain, stiffness, or inflammation that might limit the client's motion. Understanding the client's current ROM will help you assess the functional limits of movement of each joint.
3. Assess client consciousness and cognitive function. Client should be encouraged to participate in ROM as actively as possible.

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility, related to unhealed fracture
- 6.1.1.3 Risk for Activity Intolerance

> PLANNING

Expected Outcomes:

1. Client will maintain or improve current functional mobility in all involved joints and extremities.

2. Client will regain or improve strength and/or voluntary movement in involved joints and extremities.
3. Client will avoid complications of immobility, including decubitus ulcers, contractures, decreased peristalsis, constipation, fecal impaction, orthostatic hypotension, pulmonary embolism, and thrombophlebitis.



Estimated time to complete the skill:

Up to 5–7 minutes per extremity, depending on client's current mobility

Equipment Needed:

No special equipment is needed, except gloves when contact with body fluids is possible.

> CLIENT EDUCATION NEEDED:

1. Explain who you are and the purpose of ROM exercises.
2. Explain that ROM should not be painful and that any increase in pain or other symptoms should be reported immediately.
3. Discuss anticipated benefits of ROM exercises.
4. Use verbal cues to encourage the client to participate as actively as possible.
5. Verbally identify to the client each joint and movement to be exercised in turn.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands, wear gloves if contact with body fluids is possible. 2. Explain procedure to client, including estimated duration. 3. Provide for privacy, including exposing only the extremity to be exercised. 4. Adjust bed to comfortable height for performing ROM. 5. Lower bed rail only on the side you are working. 6. Describe the passive ROM exercises you are performing, or verbally cue client to perform ROM exercises with your assistance. Include all applicable exercises. (Refer to Table 4-24-1, pp. 480–484.) 7. Start at the client's head and perform ROM exercises down each side of the body. 8. Repeat each ROM exercise as the client tolerates, to a maximum of 5 times. Perform each motion in a slow, firm manner. Encourage full joint movement, but do not go beyond the point of pain, resistance, or fatigue. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Decreases anxiety, encourages compliance and participation. 3. Decreases embarrassment. 4. Prevents muscle strain and discomfort for nurse. 5. Prevents falls. 6. Exercises all joint areas. 7. Provides a systematic method to ensure that all body parts are exercised. 8. Provides exercise to the client's tolerance or to a level that will maintain the joint function. |
|--|--|

9. Head

Perform these movements with the client in a sitting position, if possible.

- Rotation: Turn the head from side to side.
- Flexion and extension: Tilt the head toward the chest and then tilt slightly upward.
- Lateral flexion: Tilt the head on each side so as to almost touch the ear to the shoulder.

10. Neck

Perform these movements with the client in a sitting position, if possible.

- Rotation: Rotate the neck in a semicircle while supporting the head.

11. Trunk

Perform these movements with the client in a sitting position, if possible.

- Flexion and extension: Bend the trunk forward, straighten the trunk, and then extend slightly backward.
- Rotation: Turn the shoulders forward and return to normal position.
- Lateral flexion: Tip trunk to the left side, straighten trunk, tip to the right side.

12. Arm

- Flexion and extension: Extend the arm in a straight position upward toward the head, then downward along the side.
- Adduction and abduction: Extend the arm in a straight position toward the midline (adduction) and away from the midline (abduction).

13. Shoulder

- Internal and external rotation: Bend the elbow at a 90° angle with the upper arm parallel to the shoulder; rotate the shoulder by moving the lower arm upward and downward.

14. Elbow

- Flexion and extension: Supporting the arm, flex and extend the elbow.
- Pronation and supination: Flex elbow, move the hand in palm-up and palm-down position.

9.

To optimize the performance of the movements.

- To preserve muscle tone and joint flexibility.

10.

To optimize the performance of the movements.

- To preserve muscle tone and joint flexibility.

11.

To optimize the performance of the movements.

- To preserve muscle tone and joint flexibility.

12.

- To preserve muscle tone and joint flexibility.

13.

- To preserve muscle tone and joint flexibility.

14.

- To preserve muscle tone and joint flexibility.

15. Wrist

- Flexion and extension: Supporting the wrist, flex and extend the wrist (see Figure 4-24-2).
- Adduction and abduction: Supporting the lower arm, turn wrist right to left, left to right, then rotate the wrist in a circular motion.



Figure 4-24-2 Flex and extend the wrist.

16. Hand

- Flexion and extension: Supporting the wrist, flex and extend the fingers (see Figure 4-24-3).
- Adduction and abduction: Supporting the wrist, spread fingers apart and then bring them close together.
- Opposition: Supporting the wrist, touch each finger with the tip of the thumb.
- Thumb rotation: Supporting the wrist, rotate the thumb in a circular manner.

17. Hip and leg

Perform these movements with the client in a supine position, if possible.

- Flexion and extension: Supporting the lower leg, flex the leg toward the chest and then extend the leg.
- Internal and external rotation: Supporting the lower leg, angle the foot inward and outward.
- Adduction and abduction: Slide the leg away from the client's midline and then back to the midline (see Figure 4-24-4).

15.

- To preserve muscle tone and joint flexibility.



Figure 4-24-3 Flex and extend the fingers.

16.

- To preserve muscle tone and joint flexibility.

17.

To optimize the performance of the movements.

- To preserve muscle tone and joint flexibility.



Figure 4-24-4 Slide the leg away from the client's midline, then return.



Figure 4-24-5 Flex and extend the knee.

18. Knee

- Flexion and extension: Supporting the lower leg, flex and extend the knee (see Figure 4-24-5).

19. Ankle

- Flexion and extension: Supporting the lower leg, flex and extend the ankle.

20. Foot

- Adduction and abduction: Supporting the ankle, spread the toes apart and then bring them close together.
- Flexion and extension: Supporting the ankle, extend the toes upward and then flex the toes downward.

21. Observe client's joints and face for signs of exertion, pain, or fatigue during movement.

22. Replace covers and position client in proper body alignment.

23. Place side rails in original position.

24. Place call light within reach.

25. Wash hands.

18.

- To preserve muscle tone and joint flexibility.

19.

- To preserve muscle tone and joint flexibility.

20.

- To preserve muscle tone and joint flexibility.

21. Alerts nurse to discontinue exercise.

22. Promotes comfort.

23. Prevents falls.

24. Facilitates communication.

25. Reduces the transmission of microorganisms.

Table 4-24-1 Joint Range of Motion

JOINT MOVEMENT	RANGE	MUSCLE GROUP(S)
1. Temporomandibular Joint (TMJ) (Synovial Joint)		
a. Open mouth.	1–2.5 in.	
b. Close mouth.	Complete closure	Masseter, temporalis
c. <i>Protrusion</i> : Push out lower jaw.	0.5 in.	Pterygoideus lateralis
d. <i>Retrusion</i> : Tuck in lower jaw.	0.5 in.	
e. <i>Lateral motion</i> : Slide jaw from side to side.	0.5 in.	Pterygoideus lateralis, pterygoideus medialis
2. Cervical Spine (Pivot Joint)		
a. <i>Flexion</i> : Rest chin on chest.	45° each side	Sternocleidomastoid
b. <i>Extension</i> : Return head to midline.	45°	Trapezius
c. <i>Hyperextension</i> : Tilt head back.	10°	Trapezius
d. <i>Lateral flexion</i> : Move head to touch ear to shoulder.	40° each side	Sternocleidomastoid
e. <i>Rotation</i> : Turn head to look to side.	90° each side	Sternocleidomastoid, trapezius
3. Shoulder (Ball-and-Socket Joint)		
a. <i>Flexion</i> : Raise straight arm forward to a position above the head.	180°	Pectoralis major, coracobrachialis, deltoid, biceps brachii
b. <i>Extension</i> : Return straight arm forward and down to side of body.	180°	Latissimus dorsi, deltoid, triceps brachii, teres major
c. <i>Hyperextension</i> : Move straight arm behind body.	50°	Latissimus dorsi, deltoid, teres major

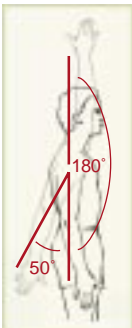
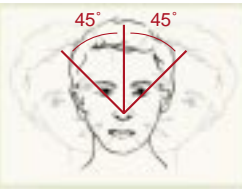
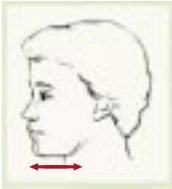
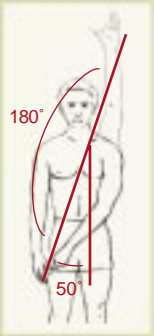






Table 4-24-1 Joint Range of Motion *continued*

JOINT MOVEMENT	RANGE	MUSCLE GROUP(S)	
d. <i>Abduction</i> : Move straight arm laterally from side to a position above the head, palm facing away from head.	180°	Deltoid, supraspinatus	
e. <i>Adduction</i> : Move straight arm downward laterally and across front of body as far as possible.	230°	Pectoralis major, teres major	
f. <i>Circumduction</i> : Move straight arm in a full circle.	360°	Deltoid, coracobrachialis, latissimus dorsi, teres major	
g. <i>External rotation</i> : Bent arm lateral, parallel to floor, palm down, rotate shoulder so fingers point up.	90°	Infraspinatus, teres minor, deltoid	
h. <i>Internal rotation</i> : Bent arm lateral, parallel to floor, rotate shoulder so fingers point down.	90°	Subscapularis, pectoralis major, latissimus dorsi, teres major	
4. Elbow (Hinge Joint)			
a. <i>Flexion</i> : Bend elbow, move lower arm toward shoulder, palm facing shoulder.	150°	Biceps brachii, brachialis, brachioradialis	
b. <i>Extension</i> : Straighten lower arm forward and downward.	150°	Triceps brachii	
c. <i>Rotation for supination</i> : Elbow bent, turn hand and forearm so palm is facing upward.	70°–90°	Biceps brachii, supinator	
d. <i>Rotation for pronation</i> : Elbow bent, turn hand and forearm so palm is facing downward.	70°–90°	Pronator teres, pronator quadratus	

continues

Table 4-24-1 Joint Range of Motion *continued*

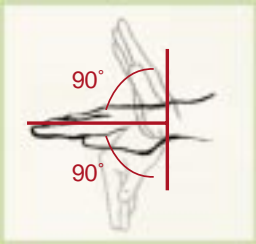



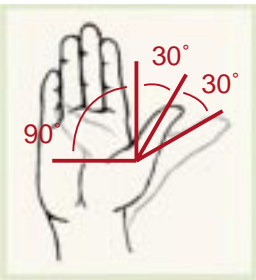

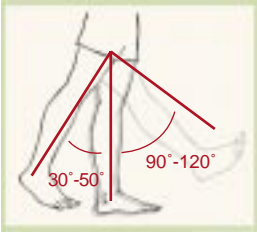
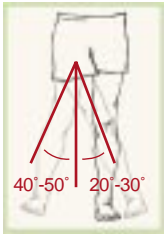

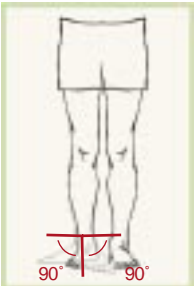
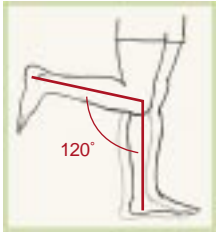



JOINT MOVEMENT	RANGE	MUSCLE GROUP(S)	
5. Wrist (Condyloid Joint)			
a. <i>Flexion</i> : Bend wrist so fingers move toward inner aspect of forearm.	80°–90°	Flexor carpi radialis, flexor carpi ulnaris	
b. <i>Extension</i> : Straighten hand to same plane as arm.	80°–90°	Extensor carpi radialis longus, extensor carpi radialis brevis, extensor carpi ulnaris	
c. <i>Hyperextension</i> : Bend wrist so fingers move back as far as possible.	80°–90°	Extensor carpi radialis longus, extensor carpi radialis brevis, extensor carpi ulnaris	
d. <i>Radial flexion: abduction</i> —Bend wrist laterally toward thumb.	Up to 20°	Extensor carpi radialis longus, extensor carpi radialis brevis, flexor carpi radialis	
e. <i>Ulnar flexion: adduction</i> —Bend wrist laterally away from thumb.	30°–50°	Extensor carpi ulnaris, flexor carpi ulnaris	
6. Hand and Fingers (Condyloid and Hinge Joints)			
a. <i>Flexion</i> : Make a fist.	90°	Interosseus dorsales manus, flexor digitorum superficialis	
b. <i>Extension</i> : Straighten fingers.	90°	Extensor indicis, extensor digiti minimi	
c. <i>Hyperextension</i> : Bend fingers back as far as possible.	30°–50°	Extensor indicis, extensor digiti minimi	
d. <i>Abduction</i> : Spread fingers apart.	25°	Interosseus dorsales manus	
e. <i>Adduction</i> : Bring fingers together.	25°	Interosseus palmares	
7. Thumb (Saddle Joint)			
a. <i>Flexion</i> : Move thumb across palmar surface of hand.	90°	Flexor pollicis brevis, opponens pollicis	
b. <i>Extension</i> : Move thumb away from hand.	90°	Extensor pollicis brevis, extensor pollicis longus	
c. <i>Abduction</i> : Move thumb laterally.	30°	Abductor pollicis brevis, abductor pollicis longus	
d. <i>Adduction</i> : Move thumb back to hand.	30°	Adductor pollicis transversus, adductor pollicis obliquus	

Table 4-24-1 Joint Range of Motion *continued*

JOINT MOVEMENT	RANGE	MUSCLE GROUP(S)	
e. <i>Opposition</i> : Touch thumb to tip of each finger of same hand.	Touching	Opponens pollicis, flexor pollicis brevis	
8. Hip (Ball-and-Socket Joint)			
a. <i>Flexion</i> : Move straight leg forward and upward.	90°–120°	Psoas major, iliacus, iliopsoas	
b. <i>Extension</i> : Move leg back beside the other leg.	90°–120°	Gluteus maximus, adductor magnus, semitendinosus, semimembranosus	
c. <i>Hyperextension</i> : Move leg behind body.	30°–50°	Gluteus maximus, semitendinosus, semimembranosus	
d. <i>Abduction</i> : Move leg laterally from midline.	40°–50°	Gluteus medius, gluteus minimus	
e. <i>Adduction</i> : Move leg back past midline.	20°–30° past midline	Adductor magnus, adductor brevis, adductor longus	
f. <i>Circumduction</i> : Move leg backward in a circle.	360°	Psoas major, gluteus maximus, gluteus medius, adductor magnus	
g. <i>Internal rotation</i> : Turn foot and leg inward, pointing toes toward other leg.	90°	Gluteus minimus, gluteus medius, tensor fasciae latae	
h. <i>External rotation</i> : Turn foot and leg outward, pointing toes away from other leg.	90°	Obturator externus, obturator internus, quadratus femoris	

continues

Table 4-24-1 Joint Range of Motion *continued*

JOINT MOVEMENT	RANGE	MUSCLE GROUP(S)	
9. Knee (Hinge Joint)			
a. <i>Flexion</i> : Bend knee to bring heel back toward thigh.	120°–130°	Biceps femoris, semitendinosus, semimembranosus	
b. <i>Extension</i> : Straighten each leg, place foot beside other foot.	120°–130°	Rectus femoris, vastus lateralis, vastus medialis, vastus intermedius	
10. Ankle (Hinge Joint)			
a. <i>Plantar flexion</i> : Point toes downward.	45°–50°	Gastrocnemius, soleus	
b. <i>Dorsiflexion</i> : Point toes upward.	20°	Peroneus, tertius, tibialis anterior	
11. Foot (Gliding Joint)			
a. <i>Eversion</i> : Turn sole of foot laterally.	5°	Peroneus longus, peroneus brevis	
b. <i>Inversion</i> : Turn sole of foot medially.	5°	Tibialis posterior, tibialis anterior	
12. Toes (Condyloid)			
a. <i>Flexion</i> : Curve toes downward.	35°–60°	Flexor hallucis brevis, lumbricales pedis, flexor digitorum brevis	
b. <i>Extension</i> : Straighten toes.	35°–60°	Extensor digitorum longus, extensor digitorum brevis, extensor hallucis longus	
c. <i>Abduction</i> : Spread toes apart.	Up to 15°	Interosseus dorsales pedis, abductor hallucis	
d. <i>Adduction</i> : Bring toes together.	Up to 15°	Adductor hallucis, interosseus plantares	

**▼ REAL WORLD ANECDOTES****Scenario 1**

Mrs. Takashima had fractured her right humerus near the shoulder when she fell from a ladder. Her physician had done an open reduction and internal fixation of the humerus and now Mrs. Takashima was being taught passive and active range of motion of the right arm. When Mrs. Takashima returned for her third appointment, the nurse noted that Mrs. Takashima's range of motion had decreased. Mrs. Takashima insisted that she had been performing the range of motion exercises regularly and she

▼ REAL WORLD ANECDOTES *continued*

didn't understand why she wasn't getting better. Upon closer examination the nurse noted an unusual lump at the fracture site. When the nurse performed passive range of motion on Mrs. Takashima's arm, the nurse noted that the lump changed in size and shape. Fearing that the fracture was no longer reduced, the nurse immobilized Mrs. Takashima's arm and notified the physician. X-rays revealed that the fracture had indeed dislocated and a second surgery was required for fixation of the fracture.

Scenario 2

Mr. Rewolinski, a postpolio syndrome client, was ventilator dependent and received active/assisted ROM 6 days a week. Functional shoulder rotation movement was normal and strong, but all other upper extremity movements were weak, especially shoulder flexion. The nurse could have easily accepted Mr. Rewolinski's inability to raise his arms and simply perform passive ROM. This would have maintained the client's shoulder mobility. For Mr. Rewolinski to have any reasonable hope of performing self-care, however, the nurse needed to continually encourage Mr. Rewolinski to participate in his exercises, assisting in the full range of motion but encouraging the client to expand his functional ROM. At the time of this printing, Mr. Rewolinski continues to slowly regain his strength and mobility.

Scenario 3

Mrs. Evangelista suffered subarachnoid trauma around her brain stem. Passive ROM was ordered to minimize the complications of the resulting paralysis and extended bedrest. Though Mrs. Evangelista was largely unresponsive when ROM began, it later became obvious that she was awake and conscious of her surroundings at that time. Therefore, it is extremely important to communicate verbally with all clients, especially those who are unresponsive. Since suffering her trauma, Mrs. Evangelista has made substantial improvements. She is able to track and participate in conversations; assist in transfers into and out of a wheelchair; and perform limited self-care, including eating by herself. Mrs. Evangelista has communicated with the staff how appreciative she is to those who talked to her when she could not respond.

> EVALUATION

- Client has maintained or improved current functional mobility in all involved joints and extremities.
- Client has regained or improved strength and/or voluntary movement in involved joints and extremities.
- Client has avoided complications of immobility, including decubitus ulcers, contractures, decreased peristalsis, constipation, fecal impaction, orthostatic hypotension, pulmonary embolism, and thrombophlebitis.

> DOCUMENTATION

Nurses' Notes

- Document the performance of ROM exercises. Includes the joints and extremities on which ROM was performed, the types and degrees of limitation observed, the extent of the client's active involvement in exercises, any reports of pain or discomfort and any observations of intolerance to exercise.
- Record any unusual findings.

> CRITICAL THINKING SKILL

Introduction

Nurses must be able to evaluate the true functional limit of a client's ROM.

Possible Scenario

A client with a closed head injury or another type of upper motor neuron damage often exhibits spastic paralysis. ROM is here indicated to reduce muscle spasticity and lengthen contractures. Because the client's muscles are working against the nurse, it is much more difficult to assess true functional limits as compared to a client with flaccid paralysis.

Possible Outcome

If ROM is attempted quickly with a client exhibiting spastic paralysis, the nurse could easily conclude that the client's functional limits were narrow and discontinue movement as soon as any resistance was felt. Very little motion would be accomplished and comparatively little therapeutic benefit would be achieved.

Prevention

Care must be taken to exercise slowly through all repetitions and encourage movement to functional limits as muscles relax. As long as one repetition accomplishes a longer arc of movement than the previous, even by a

few degrees, the nurse may conclude that functional limits have not been reached. The nurse must take care, however, to monitor not only the joint being exercised but also the face of the client for signs of pain or fatigue.

▼ VARIATIONS



Geriatric Variations:

- *The ultimate goal of ROM exercise is client independence, so encourage as much participation as possible.*
- *Arrange for ROM to be performed at the same time each day, at the client's convenience.*
- *Various chronic conditions (COPD, hypertension, and so on) require extra caution and careful observation for fatigue, pain, and respiratory difficulty.*



Pediatric Variations:

- *For a child of appropriate age, demonstrate each movement to be performed either on yourself, a doll, or some other nonthreatening surrogate.*



Home Care Variations:

- *Instruct family members and caregivers to perform ROM between scheduled visits. Lower extremity ROM is best performed on a flat, raised surface, while upper extremity ROM can be executed in a seated position.*



Long-Term Care Variations:

- *Various chronic conditions (COPD, hypertension, and so on) require extra caution and careful observation of the client for fatigue, pain, and respiratory difficulty.*
- *The ultimate goal of ROM exercise is client independence, so encourage as much participation as possible.*
- *Arrange for ROM to be performed at the same time each day, at the client's convenience.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Exercises place the client in pain or discomfort.

Ask Yourself:

How do I prevent this error?

Prevention:

Watch the client's face as well as the joint being moved. Observe changes in expression when nearing the limits of movement. If the client does indicate feeling pain or discomfort, discontinue exercise immediately and assess client for pain management.

Possible Error:

ROM exercises were administered incorrectly because orders were written for only specific joints or planes.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Do not assume ROM exercises will be ordered for both upper and lower extremities. Be sure to read orders each shift. If ROM exercises are administered incorrectly, admit the error to the client and perform any omitted ROM exercises correctly.

Possible Error:

The nurse ignores a nonresponsive client.

Ask Yourself:

How do I prevent this error?

Prevention:

Do not assume that nonresponsive means unaware.

Ask Yourself:

How do I respond to this error?

Response:

Talk each client through every exercise.

> NURSING TIPS

- Perform all needed ROM exercises on one extremity, then move to the other side of the client, and perform ROM on the other extremity.
- If a joint or plane of motion is especially tight, hold the joint close to the end range for up to 30 seconds to stretch the area, then move the joint again through the ROM.

SKILL 4-25

Postmortem Care

Nancy Unger, RN, MN, MPH

KEY TERMS

Autopsy
Death
Death certificate
Grief

Morgue
Organ donation
Postmortem care



> OVERVIEW OF THE SKILL

Postmortem care involves the physical caring for the body after death, respecting as much as possible the wishes of the deceased and family. In some institutions the physician or qualified practitioner is

responsible for notifying the next of kin and obtaining permission for an autopsy and organ donation. In others, nurses notify the family.

> ASSESSMENT

1. Verify that respiration and heart activity have ceased before initiating postmortem care. Verify that the physician has pronounced the death. As a client nears death, respiratory and cardiac systems become more difficult to assess. A client may develop stridor from pooled secretions or exhibit Cheyne-Stokes breathing with long periods of apnea. The heart rate eventually slows and usually becomes quite irregular. Peripheral pulses will become weaker, thready, and difficult to palpate. Documentation of the death will include when the heartbeat and respiration ceased.
2. Assess the family's response to the news of the client's death. Providing emotional support to the family during the acute grieving stage is essential.

3. If not already known or required, ask the family's preference for an autopsy. **Usually asking the family's permission for an autopsy is the physician's or qualified practitioner's responsibility, but that can vary at institutions.**
4. Follow hospital policy regarding seeking permission from the family for organ donation if not already known. **Some organs must be harvested within hours of the death in order to be transplanted.**

> DIAGNOSIS

- 9.2.1.1 Dysfunctional Grieving
- 8.1.1 Knowledge Deficit related to family, friends regarding postmortem care and procedures

> PLANNING

Expected Outcomes:

1. Next of kin will be informed of the client's death in a timely manner and offered the option to visit the deceased if desired prior to postmortem care.
2. The client will be bathed and prepared for the morgue according to hospital policies.
3. The client's body alignment will be maintained during family visitation.
4. The family will experience no undue emotional shock or trauma from resuscitation debris left around the bedside, blood or secretions staining the sheets, or needles or tubes protruding from the body.

Equipment Needed:

- Clean client gown and bed linens
- Basin, soap, and other bathing supplies
- Morgue pack, which may include shroud, tags for labeling body

- Equipment to remove tubes if indicated (i.e., a syringe to remove the Foley catheter, a suture removal kit, and so on)
- Morgue cart, or stretcher



Estimated time to complete the skill:
Depends on the length of the family visit. Preparing the body for the morgue will take approximately 20–30 minutes.

> CLIENT EDUCATION NEEDED:

1. The family should be informed when the body will be sent to the mortuary.
2. The family needs to be aware of hospital or institution resources such as a chaplain or priest, or facilities such as chapels.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Close the drapes and/or door. Allow the family to stay in the room if desired (see Figure 4-25-2).

Figure 4-25-2 The morgue cart and morgue pack are used to prepare the body and transport it to the morgue.

2. Notify the physician in charge when death has occurred. Have physician and/or other qualified person pronounce the client's death.
3. Notify the nursing supervisor, admitting department, and any other departments that need to know of the client's death.
4. Wash hands and apply gloves and other protective equipment (see Figure 4-25-3).

RATIONALE

1. Privacy is maintained.



2. The physician is responsible for pronouncing the client's death, completing the death certificate, notifying the next of kin, and obtaining permission for an autopsy and/or organ donation. The physician may assign some of these duties to another person.
3. Informing the proper personnel is essential to be sure that policy is followed.
4. Hand washing reduces the transmission of microorganisms. Wearing gloves and other

continues



Figure 4-25-3 Apply gloves prior to preparing the body.



Figure 4-25-4 Allow family and friends time to view the deceased.

5. Bathe the body, removing all tubes (or leave tubes in place for autopsy according to the institution's policy). Put a gown on the client if the family will view the body. Also, clean the immediate environment as indicated.
 6. Follow the institution's policy about removing or inserting dentures, dental plates, artificial eyes, limbs and hair, and removing contact lenses.
 7. Gently close the client's eyes, if open. Do not use tape.
 8. Allow family and friends of the deceased time to view the deceased, if desired. Be available to answer questions and provide support. Be sensitive to different cultural beliefs surrounding the deceased immediately after death (see Figure 4-25-4).
 9. Inventory the client's belongings if this has not already been done.
 10. Send all the client's belongings, jewelry, and personal effects home with the family if possible. Document the name of the person who received the items. If the family is not available, follow the institution's policy regarding disposition of belongings.
 11. Place identifying tags on the deceased according to the institution's policy.
 12. Wrap the body in a sheet or shroud (see Figures 4-25-5, 4-25-6, and 4-25-7).
 13. Transfer the body to the stretcher or morgue cart (see Figures 4-25-8 and 4-25-9).
- protective equipment protects the nurse from exposure to body fluids.
5. Showing consideration for the family and friends of the deceased includes cleaning of the body and environment prior to viewing.
 6. Hospital policy will determine the appropriate disposition of these items.
 7. Tape may mark the face.
 8. Family and friends of the deceased may want to view the body alone for varying lengths of time. If the family was not present at the time of death, they may have questions about the immediate steps leading up to the death. If at all possible, allow for cultural variations.
 9. Inventory of the client's belongings is preliminary to their disposition.
 10. Sending belongings home with the family prevents their loss during transport or in the morgue.
 11. The policy will determine how the body should be identified.
 12. Follow policy to ensure that the body is properly prepared for the morgue.
 13. Ensures safe transport of client.



Figure 4-25-5 Roll the body to one side and open the shroud. Roll the body back on top of the open shroud.



Figure 4-25-6 Wrap the body in the shroud.



Figure 4-25-7 Secure the shroud around the body.



Figure 4-25-8 Transfer the body to the morgue cart. Obtain assistance with heavy lifting.



Figure 4-25-9 Replace the cover on the morgue cart prior to moving it.

14. Arrange for transportation to the morgue.
15. Leave the morgue cart in the room until ready to transport.
16. Document in the progress notes the time the pulse and respiration ceased; the time the physician was notified; the time the family was notified; absence or presence of the family; and disposition of jewelry, personal effects, and the body.
17. Wash hands.
14. Ensures proper disposition of the body.
15. Ensures client privacy.
16. Accurate documentation of disposition is essential if there are questions asked regarding the whereabouts of belongings and so on.
17. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Clarissa Stubb's death was expected and she had been receiving terminal care for several days. Her family, who had recently decided on a "no code" status because of the irreversibility of her illness, had been visiting Mrs. Stubb every day. Usually, one or more members were with the client at all times, even at night. The family decided to meet together for dinner one evening because there were a number of personal issues to discuss as a group, on the assumption that the client was stable enough to be left alone for a few hours.

Shortly after the family left the unit, Mrs. Stubb died. Unfortunately, the family had not left the phone number or name of the restaurant so the physician was unable to notify them of the death. When the family returned to the ward several hours later, they were informed that Mrs. Stubb had died. Several members of the family began blaming themselves for leaving the client alone during her last moments of life. Other members of the family blamed the nursing staff for not properly informing them of the imminent death so that they could have decided to stay.

The nurse allowed the family to talk about their concerns before gently stating that the point of death is not predictable. The family had many questions about the immediate events leading up to the death, including whether their absence had hastened the death. By not taking the family's comments personally, the nurse was able to calmly and sensitively listen to their questions before focusing the discussion on whether the family wanted to spend some time with Mrs. Stubb and say good-bye. The family did want to visit with the deceased. The nurse allowed them privacy with the body but made himself available to answer any questions. By the time the family left the unit, they were visibly less angry and thanked the nurse for caring for their family member.

> EVALUATION

- Ensure that the client's body is prepared for the morgue appropriately by following the institution's policy.
- Check the inventory of the client's belongings against the disposition of belongings prior to transporting the client to the morgue to be sure that all personal effects are accounted for.

> DOCUMENTATION

Nurses' Notes

- Document the client's condition immediately prior to and at the time of death. Include the time of and situation surrounding client's death, including the cessation of pulse and respirations.
- Note the date and time the physician or qualified provider was notified.
- Document if and when the family was notified. Record which family members were notified of the client's demise.
- Record whether the family visited. Include the family's reaction and any special requests the family may have.
- Note the disposition of the client's belongings, including jewelry, personal effects, and so on.
- Indicate that postmortem care was completed. Include which tubes were discontinued or left in

place. Note any special postmortem preparations or instructions.

- Document notification of the mortuary or transport to the morgue.

> CRITICAL THINKING SKILL

Introduction

An elderly Chinese American client died after a long illness at the hospital. Many of his family were present during the death and requested that the body be wrapped in a special cloth brought from home.

Possible Scenario

After the death of the client, the family approached the nurse and requested that they be allowed to bathe the body. The nurse agreed and granted privacy to the family. Upon the nurse's return to the room, she discovered the body had been wrapped in a special cloth, which the family requested be transported with the client to the morgue. The nurse checked with the nursing supervisor and the morgue to be sure that the family wishes would be honored. After careful documentation of her actions, including the family's request and approval from the morgue, the nurse sent the body shrouded in the special cloth to the morgue.

Possible Outcome

By honoring the family's request, the nurse was sensitive to the client's desires even during postmortem care. If the nurse had refused to allow the family to bathe and prepare the body in accordance with their beliefs, she would have negatively interfered with the grieving process.

Prevention

Exercising culturally sensitive nursing care allowed the nurse to facilitate a grieving process rather than create an obstacle.

▼ VARIATIONS



Geriatric Variations:

- *If the death has been expected and/or the client is old or debilitated, family and friends may feel a mixture of sadness, happiness, and relief upon learning of the death. Such feelings may be distressing to them. They may be remorseful that they are not feeling overwhelming grief.*



Pediatric Variations:

- *Parents may feel tremendous guilt if the death was accidental or unexpected. If applicable, remind the parents of the good care and love they gave to the child.*



Home Care Variations:

- *Assist the family in making funeral arrangements and contacting relatives.*
- *Plan prior to the death who to call and how the body will be removed from the house. Discuss with the family if they wish to be present when the body is being removed.*



Long-Term Care Variations:

- *Consider the needs of other residents of a long-term care facility. Often friends and family are deceased, live far away, and do not visit often. Fellow residents become "family" to each other. When a fellow resident dies, consider the needs of other residents to grieve and to view the body. Remember that the death may remind them of their own mortality, especially if they are in a similar situation.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client's family reports a missing ring. The nurse remembers that a family member took the valuable ring home, but it was not documented.

Ask Yourself:

How do I prevent this error?

Prevention:

Document disposal of all client property, the client's chart, and the personal property records used at the institution, including property taken by the family.

> NURSING TIPS

- Allow uninterrupted time to talk with the family about the client's death.
- If death is imminent, check to see if the client is an organ donor before the death occurs. Refer to institutional policies regarding how families are to be approached.
- Careful documentation of the client's belongings, including disposition, will provide answers if there are questions about belongings.
- If appropriate, the nurse may want to call the family after the death to address any unanswered questions and provide some closure.
- Be sure the nursing unit has current contact information for the next of kin of clients admitted.
- If the family desires to be with the body immediately, and you do not have time to clean the body and the environment, you can wash the client's hands, and cover the client with a clean sheet, leaving the hands on the outside. Remove debris in the room, or cover with clean sheets.

Medication Administration

- Skill 5-1** Administering Oral, Sublingual, and Buccal Medications
- Skill 5-2** Administering Eye and Ear Medications
- Skill 5-3** Administering Skin/Topical Medications
- Skill 5-4** Administering Nasal Medications
- Skill 5-5** Administering Rectal Medications
- Skill 5-6** Administering Vaginal Medications
- Skill 5-7** Administering Nebulized Medications
- Skill 5-8** Administering an Intradermal Injection

- Skill 5-9** Administering a Subcutaneous Injection
- Skill 5-10** Administering an Intramuscular Injection
- Skill 5-11** Administering Medication via Z-Track Injection
- Skill 5-12** Withdrawing Medication from a Vial
- Skill 5-13** Withdrawing Medication from an Ampoule
- Skill 5-14** Mixing Medications from Two Vials into One Syringe
- Skill 5-15** Preparing an IV Solution
- Skill 5-16** Adding Medications to an IV Solution
- Skill 5-17** Administering Medications via Secondary Administration Sets (Piggyback)
- Skill 5-18** Administering Medications via IV Bolus or IV Push
- Skill 5-19** Administering Medications via Volume-Control Sets
- Skill 5-20** Administering Medication via a Cartridge System
- Skill 5-21** Administering Patient-Controlled Analgesia (PCA)
- Skill 5-22** Administering Epidural Analgesia
- Skill 5-23** Managing Controlled Substances

SKILL 5-1

Administering Oral, Sublingual, and Buccal Medications

Kathryn Lilleby, RN

KEY TERMS

Buccal	Mortar
Capsule	Oral
Enteric coated	Pestle
Liquid	Powder
Medication	Prescription
administration	Sublingual
record (MAR)	Tablet



> OVERVIEW OF THE SKILL

The easiest method of administering a medication is usually by mouth. Clients may be taught to administer the medication by themselves at home or a nurse can prepare the medications and dispense them to clients. Oral medications are contraindicated for clients with gastrointestinal alterations or using nasogastric tube or gastrostomy tube. Clients with an inability to swallow due to neuromuscular disorder, esophageal stricture, or lesion of the mouth or those who are unresponsive or comatose are also ineligible to receive oral administration of medication.

Nurses need to know the action, normal dosage, side effects, and nursing implications for each drug they administer. In some settings, medications for several clients may be prepared at one time in the medication room or medication cart by carefully identifying each client's doses (see Figure 5-1-2).



Figure 5-1-2 In some settings, medications for several patients are prepared at the medication cart at one time.

> ASSESSMENT

1. Review the action, purpose, normal dosage and route, common side effects, time of onset and peak action, and nursing implications of each drug so their response to the medication may be monitored.
2. Assess the client's condition to be sure the order of the physician or qualified practitioner is appropriate as the client's condition may have changed since the order was written.

3. Assess the client's ability to swallow food and fluid **since they may be unable to swallow a pill and an alternate route for medication may be needed.**
4. Assess for any contraindications for administering an oral medication such as nausea and vomiting, gastric suction, or gastric surgery resulting in decreased peristalsis **since alterations in gastrointestinal function may interfere with drug absorption and excretion.**
5. Assess the client's medical record for a history of allergies to food or medications so these medications can be avoided.
6. Assess the client's knowledge about the use of medications so client teaching can be tailored to their needs. This may also assess their compliance for taking the drugs at home or reveal drug dependence or abuse.
7. Assess the client's age as **pediatric or geriatric clients may have special needs according to their ability to swallow a pill.**
8. Assess the client's need for fluids **since swallowing a pill is usually easier with fluid and promotes fluid intake. However, fluid restrictions may be necessary to observe.**
9. Assess the client's ability to sit or turn to the side. **The client must be able to swallow the pill without aspiration.**

> DIAGNOSIS

- 5.2.1.1 Noncompliance, related to the client's medication regimen
- 6.5.1.1 Impaired Swallowing
- 8.1.1 Knowledge Deficit, related to the client's medication regimen

> PLANNING

Expected Outcomes:

1. The client will swallow the prescribed medication.
2. The client will be able to explain the purpose and schedule for taking the medication.
3. The client will have no gastrointestinal discomfort or alterations in function.
4. The client will show the desired response to the medication such as pain relief, regular heart rate, or stable blood pressure.

Equipment Needed (see Figure 5-1-2):

- Physician's or qualified practitioner's order for the medication

- Medication administration record (MAR)
- Medication cart or dispensing computer
- Medication tray
- Disposable medication cups
- Glass of water, juice, or other liquid
- Drinking straw
- Mortar and pestle, if needed
- Paper towels



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Provide written information regarding each medication as requested.
2. Clients should be taught the basic guidelines for drug safety:
 - Keep each drug in its original, labeled container.
 - Discard any outdated medication through approved methods.
 - Always finish a prescribed drug unless instructed.
 - Never save a drug for future use or give it to another person.
 - Keep drugs out of reach of children.
 - Refrigerate medications that require it.
 - Read labels carefully and follow all instructions.
3. Instruct clients on which foods, medications, or other elements, such as alcohol or sunlight, are to be avoided while taking this medication.
4. Teach client how to store the medication at home such as in the refrigerator or in a clean, dry place.
5. Clients need to be cautioned on which drugs can cause gastric irritation and need to be taken with food.
6. Remind client that medications taken sublingually should not be swallowed or they will have little effect since gastric juices will destroy them.
7. Caution clients taking medications intended for buccal administration to allow them to dissolve against the mucous membrane of the cheek and swallow the saliva.
8. Instruct clients to allow lozenges to dissolve and not to chew or swallow them whole since the drug acts slowly through oral absorption and not through gastric mucosa.
9. Clients with drug allergies should wear an identification bracelet listing the drugs to which they have an allergy.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands and put on clean gloves.
2. Arrange the medication tray and cups in the medication room or on the medication cart outside the client's room.
3. Unlock the medication cart or log on to the computer.
4. Prepare the medication for one client at a time following the five rights. Select the correct drug from the medication drawer according to the MAR (see Figure 5-1-3). Calculate the drug dosage if needed.



Figure 5-1-3 Prepare oral medications following the five rights—right client, time, medication, dose, and route.

RATIONALE

1. Reduces the number of microorganisms.
2. Organizing medications and equipment saves time and reduces the possibility of error.
3. Medications need to be safeguarded.
4. The five rights are right patient, right time, right medication, right dose, and right route. Comparing the MAR with the label reduces error. Double checking reduces error in calculation.



Figure 5-1-4 Scored tablets may be broken, if necessary.

5. To prepare a tablet or capsule: Pour the required number of tablets or capsules into the bottle cap and transfer the medication to a medication cup without touching them.
 - Scored tablets may be broken, if necessary, using gloved hands or with a pilliating device (see Figure 5-1-4).
 - A unit-dose tablet should be placed directly into the medicine cup without opening it.
 - For clients with difficulty swallowing, some tablets may be crushed into a powder using a mortar and pestle or by being placed between two paper medication cups and ground with a blunt object, then mixed in a small amount of applesauce or custard.
5. Avoids wasting expensive medications and avoids contamination of medication.
 - Tablets that are not scored are not meant to be broken. The medication's effectiveness would be diminished if the tablet were broken or crushed.
 - The wrapper maintains cleanliness and identification until it is administered.
 - A large tablet is usually easier to swallow if it is ground and mixed with soft food.

Be aware that time-released or specially coated medications must not be crushed. Check with the pharmacy if you are uncertain (see Figure 5-1-5).

Figure 5-1-5 Some medications may be crushed and mixed with a soft food, such as applesauce, for clients with difficulty swallowing.



- To prepare a liquid medication: Remove the bottle cap from the container and place cap upside down on the cart. Hold the bottle with the label up and the medication cup at eye level while pouring (see Figure 5-1-6). Fill the cup to the desired level using the surface or base of the meniscus as the scale, not the edge of the liquid on the cup. Wipe lip of bottle with paper towel.



Figure 5-1-6 Measure oral medications at eye level.

- Placing the bottle cap upside down on the cart prevents contamination of the inside of the container. Holding the bottle with the label up keeps spilled liquid from obliterating the label. Holding the medication cup at eye level ensures an accurate dose. Wiping the lip of the bottle prevents the bottle cap from sticking.



Figure 5-1-7 Controlled substance laws require records of each narcotic dose dispensed.

- To prepare a narcotic, obtain the key to the narcotic drawer and check the narcotic record for the drug count when signing out the dose (see Figure 5-1-7).
- Check expiration date on all medications.
 - Double-check the MAR with the prepared drugs.
 - Return stock medications to their shelf or drawer.
 - Place MARs with the client's medications.
 - Do not leave drugs unattended.
- Controlled substance laws require records of each dose dispensed.
- Expired medications may lose their effectiveness.
 - Reduces risk of error.
 - Ensures safety of stock medications.
 - Ensures identification of medications.
 - Drugs are safeguarded by nurse.

continues

9. Administer medications to client: Observe the correct time to give the medication.
 - Identify the client by reading the client's name bracelet, repeating his name, and/or asking him to state his name (see Figure 5-1-8).
 - Check the drug packaging if it is present to ensure the medication type and dosage.
 - Assess the client's condition and the form of the medication.
 - Perform any assessment required for specific medications such as a pulse or blood pressure.
 - Explain the purpose of the drug and ask if the client has any questions.
 - Assist the client to a sitting or lateral position.
 - Allow client to hold the tablet or medication cup.
 - Give a glass of water or other liquid, and straw if needed, to help the client swallow the medication (see Figure 5-1-9).
 - For *sublingual* medications, instruct client to place medication under the tongue and allow it to dissolve completely.
 - For *buccal* administration of drugs, instruct the client to place the medication in the mouth against the cheek until it dissolves completely.
 - For oral medications given through a *nasogastric tube*, crush tablets or open capsules and dissolve powder with 20–30 ml of warm water in a cup. Be sure medication will still be properly absorbed if crushed and dissolved. Check placement of the feeding tube or nasogastric tube before instilling anything but air into the tube.
 - Remain with the client until each medication has been swallowed or dissolved.
 - Assist the client into a comfortable position.
 10. Dispose of soiled supplies and wash hands.
 11. Record the time and route of administration on the MAR and return it to the client's file.
9. Ensures the therapeutic effect of the drug when given within 30 minutes of the prescribed time. (*Right time.*)
 - Identification bracelets made at the time of admission are the most reliable source of identification even if the client is unable to state his name. (*Right client.*)
 - Prevents giving the wrong medication or wrong dose. (*Right medication, right dose.*)
 - Allows you to assess the route of the medication and if this route is appropriate. (*Right route.*)
 - Determines whether the medication should be given at that time or not.
 - Improves compliance with drug therapy.
 - Prevents aspiration during swallowing.
 - Client becomes familiar with medications.
 - Promotes client comfort in swallowing and can improve fluid intake.
 - Drug is absorbed through the mucous membranes into the blood vessels. If swallowed, the drug may be destroyed by gastric juices or detoxified in the liver too quickly so that its intended effects will not occur.
 - Promotes local activity on mucous membranes.
 - Allows medication administration via NG or feeding tube. Ensures that the medication is absorbed and utilized correctly.
 - Nurse is responsible for ensuring that the client receives the dose and does not save it or discard it.
 - Maintains client's comfort.
 10. Reduces transmission of organisms.
 11. Prevents administration error.



Figure 5-1-8 Identify the client by reading the client's name bracelet and asking his name before administering medication.



Figure 5-1-9 Allow the client to hold the tablet, and give water or juice to help him swallow the medication.

12. Return the cart to the medicine room; restock the supplies as needed. Clean the work area.

12. Assists other staff in completing duties efficiently.



▼ REAL WORLD ANECDOTES

Fred was a 91-year-old resident of a long-term care facility who was having increasing difficulty swallowing following a series of small strokes. His favorite breakfast consisted of a bowl of bran buds with milk and two glasses of prune juice. The tablets his physician ordered for him were large, so the nurse crushed them by putting them between two paper medication cups and crushing them with a pestle. This made it easy to remove the top cup and add a teaspoon of applesauce to the powder just before she approached Fred to give him his medications. She gave him the cup and he spooned the medication-containing applesauce into his mouth and washed it down with his prune juice.

> EVALUATION

- Evaluate the client's response to the drug within 30 minutes of administration or sooner if an allergic reaction is anticipated.
- Ask client or caregiver to discuss the purpose, action, dosage schedule, and side effects of the drug.

> DOCUMENTATION

Medication Administration Record

- Date and time each drug was administered including initials and signature
- If drug is withheld, circle the time the drug was scheduled on the MAR

Nurses' Notes

- Date, time, and reason a drug was withheld
- Response to drug administered

> CRITICAL THINKING SKILL

Introduction

Oral medications are manufactured under aseptic conditions. They should be administered under the same conditions. The nurse does not touch the medications with her fingers during the preparation of the medications.

Possible Scenario

The nurse prepares the medications for a client. When she hands the medication cup containing two tablets and one capsule to the client, one of the tablets falls to the floor.

Possible Outcome

The nurse administers the tablet and capsule to the client. Then she picks up and discards the contaminated

tablet and goes back to the medication cart to obtain another tablet following the same procedure as before. Returning to the client, she administers the remaining tablet.

Prevention

The client's ability to handle the medication cup needs to be assessed. The nurse may assist the client to a comfortable position in order to take their prescribed dose.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may be more at risk for fluid overload; if so, any fluid intake restrictions should be considered when giving oral medications.*
- *Older clients may have increased difficulty swallowing and therefore be at greater risk of aspiration.*
- *Older clients should be encouraged to take one tablet at a time and not rush.*
- *Elderly clients may have dry mouth due to loss of elasticity in oral mucosa or reduction in parotid gland secretion.*
- *Difficulty swallowing may be due to delayed esophageal clearance.*
- *Physiologic changes with aging may include reduction in gastric acidity and stomach peristalsis and reduced colon motility, which may slow drug absorption and excretion.*



Pediatric Variations:

- *Liquid oral medications are the preferred route of administration for children.*
- *Solid preparations such as tablets and capsules are not recommended for children less than 5 years old.*
- *An oral syringe (without needle), plastic cup, and teaspoon for dispensing liquid medication are helpful in administering medications to pediatric clients.*
- *Offering carbonated beverages poured over finely crushed ice after giving medications to a client may reduce nausea in both children and adults.*
- *Use small amounts of flavorings when mixing with medications.*



Home Care Variations:

- *Clients need to be compliant in order to successfully self-administer their medications.*
- *Clients may benefit from a special medication container with compartments for times of the day and days of the week to assist them in remembering and complying with the medication schedule.*



Long-Term Care Variations:

- *Maintain medication cart with a mortar and pestle, spoons, and a supply of applesauce.*
- *Keep a record on each client's MAR of how they need their medications given.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The teenager with pain after arthroscopic knee surgery holds on to his pain pill so he can take several doses at one time.

Ask Yourself:

How do I prevent this error?

Prevention:

Careful assessment of the client may reveal a drug abuse problem.

▼ COMMON ERRORS—ASK YOURSELF *continued*

Ask Yourself:

How do I respond to this error?

Response:

When a client requests a repeat dose of pain medication sooner than the medication is ordered, the nurse may question the client's level of pain. The nurse may also ask the client about previous use of pain medication. If a pain tablet is found in the client's possession, the nurse should remain with the client until she is sure he has taken it. She can then record that it was taken so that the next dose can be administered according to the orders.

Possible Error:

The client takes a tablet but becomes nauseated and vomits it 10 minutes later.

Ask Yourself:

How do I prevent this error?

Prevention:

The client should be assessed for nausea before administering the medication. If the client complains of nausea, give an antiemetic first, wait for a positive response, and then administer the medication ordered. If the nausea is mild, giving the medication with a saltine cracker may help reduce the nausea so the medication can be taken.

Ask Yourself:

How do I respond to this error?

Response:

Clean up the emesis and make the client comfortable. Allow the client to relax and overcome the nausea or give an antiemetic drug as ordered. When the nausea has subsided, administer the medication as ordered or, if ordered, give the medication parenterally.

> NURSING TIPS

- Remember that checking a medication five times reduces the risk of a medication error:
 - When checking the medication name with the order
 - When calculating or verifying the dose
 - When determining the ordered route of the medication
 - When checking the name of the client the medication is ordered for with the client's identification bracelet
 - When checking the frequency and times the medication is ordered
- Obtain the key to the narcotics drawer if you are anticipating the client's need for a controlled medication.
- Keep a calculator on the medication cart for use in dosage calculations. If in doubt about a medication calculation, have a second nurse perform the calculations as well.
- Maintain a pillating device, a mortar, and pestle and a supply of gloves on the medication cart for use in breaking scored tablets.
- Cold carbonated water may help clients swallow and pass the tablet through the esophagus.
- Powdered medications such as Metamucil should be mixed with liquid immediately before administration or it will become thick or even solid, making swallowing impossible.
- Effervescent powders and tablets should be given immediately after dissolving since this improves its taste and is therapeutic.
- If the client is alert, call the client by name or ask his name prior to giving the medication to ensure the right client gets the medication.
- Enteric-coated pills should not be crushed since the purpose of the coating is to delay absorption, thus preventing gastric irritation.
- Tablets for buccal or sublingual administration should not be crushed.
- Offering a nonfat snack with medications that can be taken with food will reduce gastric distress.

SKILL 5-2

Administering Eye and Ear Medications

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, Albany, NY: Delmar Publishers.)

KEY TERMS

OD
Ophthalmic
OS

Otic
OU
Pinna



> OVERVIEW OF THE SKILL

Medications can be administered by various routes. The route of administration depends on many factors: client condition, type of medication, area to be medicated, and desired effect of the medication. An accurate understanding of the anatomy and physiology of the area being medicated is essential to the safe and effective administration of the medications.

Eye Medications

Eye medications refer to drops, ointment, and disks. These drugs are used for diagnostic and therapeutic purposes—to lubricate the eye or socket for a prosthetic eye and to prevent or treat eye conditions such as glaucoma (elevated pressure within the eye) and infection. Diagnostically, eyedrops can be used to anesthetize the eye, dilate the pupil, and stain the cornea to identify abrasions and scars.

The nurse should review the abbreviations used in medication orders to ensure that the medication is instilled in the correct eye. Cross-contamination is a potential problem with eyedrops. The nurse should

adhere to the following safety measures to prevent cross-contamination:

- Each client should have his or her own bottle of eyedrops.
- Discard any solution remaining in the dropper after instillation.
- Discard the dropper if the tip is accidentally contaminated, as by touching the bottle or any part of the client's eye.

Ear Medications

Solutions ordered to treat the ear are often referred to as otic (pertaining to the ear) drops or irrigation. Eardrops may be instilled to soften ear wax, to produce anesthesia, to treat infection or inflammation, or to facilitate removal of a foreign body, such as an insect. External auditory canal irrigations are usually performed for cleaning purposes and less frequently for applying heat and antiseptic solutions.

Before instilling a solution into the ear, the nurse should inspect the ear for signs of drainage, an indication of a perforated tympanic membrane. Eardrops

are usually contraindicated when the tympanic membrane is perforated. If the tympanic membrane is damaged, all procedures must be performed using sterile aseptic technique; otherwise, medical asepsis is used when instilling medication into the ear.

> ASSESSMENT

1. Assess the five rights: the right patient, the right medication, the right route, the right dose, and the right time. **Prevents errors in medication administration.**
2. Assess the condition of the client's eyes and/or ears. Are there any contraindications to administering this medication present? Is there drainage from the ear indicating a possible tympanic rupture? If so, the medication administration must be done using sterile technique. **Reassessing the client prior to every medication dose prevents possibly injuring the client.**
3. Assess the medication order. Is the medication for only one eye/ear or both? With eye medications be sure to understand the abbreviations used for right eye (OD), left eye (OS), and both eyes (OU). **Prevents errors in medication administration.**

> DIAGNOSIS

- | | |
|-------|---|
| 1.6.1 | Risk for Injury |
| 8.1.1 | Knowledge Deficit, related to medication regime |
| 7.2 | Sensory/Perceptual Alterations due to the effects of eye or ear medications |

> PLANNING

Expected Outcomes:

1. The right client will receive the right dose of the right medication via the right route at the right time.
2. The client will encounter the minimum of discomfort during the medication administration procedure.
3. The client will receive the maximum benefit from the medication.

Equipment Needed (see Figure 5-2-2):

Eye Medication

- Medication administration record (MAR)
- Eye medication

Certain conditions have contraindications for specific drugs; for example, hydrocortisone eardrops are contraindicated in clients with a fungal infection or a viral infection such as herpes.

- Tissue or cotton ball
- Nonsterile gloves (if needed)

Ear Medication

- Medication administration record (MAR)
- Medication
- Cotton-tipped applicator
- Tissue



Estimated time to complete the skill:
5 minutes

> CLIENT EDUCATION NEEDED:

1. Educate the client regarding the reason for this medication, including the importance of taking the right dose at the right time.
2. Instruct the client in ways to prevent contamination and cross-contamination, especially when using eye drops.
3. Teach the client to gently press the tear duct closed while administering eye drops to prevent loss of the medication and possible systemic complications.



Figure 5-2-2 Many over-the-counter and prescription drops and ointments are dispensed directly into the eye.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Eye Medication

- | | |
|---|---|
| 1. Check with the client and the chart for any known allergies or medical conditions that would contraindicate use of the drug. | 1. Prevents occurrence of adverse reactions. |
| 2. Gather the necessary equipment. | 2. Promotes efficiency. |
| 3. Follow the five rights of drug administration. | 3. Promotes safety. |
| 4. Take the medication to the client's room and place on a clean surface. | 4. Decreases risk of contamination of bottle cap. |
| 5. Check client's identification armband. | 5. Accurately identifies client. |
| 6. Explain the procedure to the client; inquire if the client wants to instill medication. If so, assess the client's ability to do so. | 6. Reduces client's anxiety and enhances collaboration; some clients are used to instilling their own medication. |
| 7. Wash hands, don nonsterile gloves if needed. | 7. Decreases contact with bodily fluids. |
| 8. Place client in a supine position with the head slightly hyperextended. | 8. Minimizes drainage of medication through the tear duct. |

Instilling Eyedrops

- | | |
|--|---|
| 9. Remove cap from eye bottle and place cap on its side. | 9. Prevents contamination of the bottle cap. |
| 10. Squeeze the prescribed amount of medication into the eyedropper. | 10. Ensures correct dose. |
| 11. Place a tissue below the lower lid. | 11. Absorbs the medication that flows from the eye. |
| 12. With dominant hand, hold eyedropper $\frac{1}{2}$ – $\frac{3}{4}$ inch above the eyeball; rest hand on client's forehead to stabilize. | 12. Reduces risk of dropper touching eye structure, and prevents injury to the eye. |
| 13. Place hand on cheekbone and expose lower conjunctival sac by pulling down on cheek. | 13. Stabilizes hand and prevents systemic absorption of eye medication. |
| 14. Instruct the client to look up and drop prescribed number of drops into center of conjunctival sac (see Figure 5-2-3). | 14. Reduces stimulation of the blink reflex; prevents injury to the cornea. |
| 15. Instruct client to gently close eyes and move eyes. Briefly place fingers on either side of the | 15. Distributes solution over conjunctival surface and anterior eyeball. |



Figure 5-2-3 Instruct the client to look up. Administer prescribed number of drops into the center of the conjunctival sac.

client's nose to close the tear ducts and prevent the medication from draining out of the eye (see Figure 5-2-4).

16. Remove gloves; wash hands.
17. Record on the MAR the route, site (which eye), and time administered.

Eye Ointment Application

18. Repeat Actions 1–8.
19. Lower lid:
 - With nondominant hand, gently separate client's eyelids with thumb and finger and grasp lower lid near margin immediately below the lashes; exert pressure downward over the bony prominence of the cheek.
 - Instruct the client to look up.
 - Apply eye ointment along inside edge of the entire lower eyelid, from inner to outer canthus.
20. Upper lid:
 - Instruct client to look down.
 - With nondominant hand, gently grasp client's lashes near center of upper lid with thumb and index finger, and draw lid up and away from eyeball.
 - Squeeze ointment along upper lid starting at inner canthus.

21. Repeat Actions 16 and 17.



Figure 5-2-4 Placing the fingers on the sides of the client's nose closes the tear ducts and prevents the medication from draining out of the eye.

16. Reduces the transmission of microorganisms.
17. Provides documentation that the medication was given.
18. See Rationales 1–8.
19.
 - Provides access to the lower lid.
 - Reduces stimulation of the blink reflex and keeps cornea out of way of medication.
 - Ensures drug is applied to entire lid.
20.
 - Keeps cornea out of way of medication.
 - Ensures medication applied to entire length of lid.

21. See Rationales 16 and 17.

Medication Disk

- | | |
|--|--|
| <p>22. Repeat Actions 1–8.</p> <p>23. Open sterile package and press dominant, sterile gloved finger against the oval disk so that it lies lengthwise across fingertip.</p> <p>24. Instruct the client to look up.</p> <p>25. With nondominant hand, gently pull the client's lower eyelid down and place the disk horizontally in the conjunctival sac.</p> <ul style="list-style-type: none"> • Then pull the lower eyelid out, up, and over the disk. • Instruct the client to blink several times. • If disk is still visible, repeat steps. • Once the disk is in place, instruct the client to gently press the fingers against the closed lids; do not rub eyes or move the disk across the cornea. • If the disk falls out, rinse it under cool water and reinsert. <p>26. If the disk is prescribed for both eyes (OU), repeat Actions 23–25.</p> <p>27. Repeat Actions 15–17.</p> | <p>22. See Rationales 1–8.</p> <p>23. Promotes sticking of disk to fingertip.</p> <p>24. Reduces stimulation of the blink reflex and keeps cornea out of way of medication.</p> <p>25. Allows the disk to automatically adhere to the eye.</p> <ul style="list-style-type: none"> • To secure the disk in the conjunctival sac. • To allow the disk to settle into place. • To ensure correct placement of the disk. • To secure disk placement. To prevent corneal scratches. • Preserves medication. This is not a sterile procedure. <p>26. Ensures both eyes are treated at the same time.</p> <p>27. See Rationales 15–17.</p> |
|--|--|

Removing an Eye Medication Disk

- | | |
|--|---|
| <p>28. Repeat Actions 3 and 5–8.</p> <p>29. Remove the disk:</p> <ul style="list-style-type: none"> • With nondominant hand, invert the lower eyelid and identify the disk. • If the disk is located in the upper eye, instruct the client to close the eye, and place your finger on the closed eyelid. Apply gentle, long, circular strokes; instruct client to open the eye. Disk should be located in corner of eye. With your fingertip, slide the disk to the lower lid, then proceed. • With dominant hand, use the forefinger to slide the disk onto the lid and out of the client's eye. <p>30. Remove gloves; wash hands.</p> <p>31. Record on the MAR the removal of the disk.</p> | <p>28. See Rationales 3 and 5–8.</p> <p>29.</p> <ul style="list-style-type: none"> • Exposes the disk for removal. • Safely moves the disk to the lower conjunctival sac. • Safely removes the disk without scratching the cornea. <p>30. Reduces transmission of microorganisms.</p> <p>31. Provides documentation that the disk was removed.</p> |
|--|---|

ACTION

RATIONALE

Ear Medication

1. Check with client and chart for any known allergies.
2. Check the MAR against the physician's or qualified provider's written orders.
3. Wash your hands.
4. Calculate the dose (see Figure 5-2-5).



Figure 5-2-5 Calculate the correct dose and draw medication into the ear dropper.

5. Use the identification armband to properly identify the client (see Figure 5-2-6).
6. Explain the procedure to the client.
7. Place the client in a side-lying position with the affected ear facing up.
8. Straighten the ear canal by pulling the pinna down and back for children less than 3 years of age or upward and outward in adults and older children.
9. Instill the drops into the ear canal by holding the dropper at least $\frac{1}{2}$ inch above the ear canal (see Figure 5-2-7).
10. Ask the client to maintain the position for 2–3 minutes.
11. Place a cotton ball on the outermost part of the canal.

1. Prevents the occurrence of hypersensitivity reactions.
2. Ensures accuracy in identification of the medication.
3. Reduces the transfer of microorganisms.
4. Ensures the administration of the correct dose.



Figure 5-2-6 Check the client's identification band before administering medication.

5. Ensures correct client.
6. Enhances cooperation.
7. Facilitates the administration of the medication.
8. Opens the canal and facilitates introduction of the medication.
9. Prevents injury to the ear canal.
10. Allows for distribution of the medication.
11. Prevents the medication from escaping when the client changes to a sitting or standing position.

continues

Ear Medication *continued*

Figure 5-2-7 Slowly instill the drops, holding the dropper at least ½ inch above the ear canal.

- | | |
|---|---|
| <p>12. Wash hands.</p> <p>13. Document the drug, number of drops, time administered, and ear medicated.</p> | <p>12. Reduces the transmission of microorganisms.</p> <p>13. Documenting the actions of the nurse will reduce the number of medication errors.</p> |
|---|---|



▼ REAL WORLD ANECDOTES

Nurse Woodard has volunteered to work as a summer camp nurse for a week. Shortly after the arrival of this week's campers, Darla, a 9-year-old girl presents to the infirmary complaining of an earache in her left ear. On examination the nurse finds no inflammation or drainage in the outer ear or the ear canal. During the exam Darla talks to the nurse about her mother being away on her honeymoon this week. The nurse notes that when she is discussing her feelings Darla's ear pain seems to disappear. After examining Darla's eardrum with the otoscope to be sure it is intact, the nurse gently instills some warm sterile saline into Darla's ear and inserts a cotton ball to hold the saline in. She tells Darla to be sure and come back later in the day for another check of her ear. Nurse Woodard continues to check Darla's ear and ear canal twice a day for the remainder of the week. There is no evidence of inflammation or drainage and Darla reports pain relief following the instillation of the warm saline. During Darla's visits Nurse Woodard encourages Darla to discuss her feelings about her mother's marriage and the changes that will be occurring after she returns home.

> EVALUATION

- The right client received the right dose of the right medication via the right route at the right time.
- The procedure was performed with the minimum of trauma and/or discomfort to the client.
- The client received the maximum benefit from the medication.
- All of the prescribed medication went into the eye or ear and none was spilled.

> DOCUMENTATION

Medication Administration Record (MAR)

- Record the date, time, location, and dosage of medication administered.
- If an ordered medication was not given, note this, usually by circling the time of the missed medication.

Nurses' Notes

- If an ordered medication was not given, record the reason.
- If an as-needed medication was given, note the reason for giving the medication and the client's response.

> CRITICAL THINKING SKILL

Introduction

Always assess for potential interactions between a medication and a client.

Possible Scenario

Mrs. Wagner has been receiving cortisone eye drops for several weeks to treat an inflammation of her eyes. She presents to her physician's office today complain-

ing of irritability, weight gain, and facial puffiness. While taking her initial vital signs you recognize that these symptoms are characteristic of systemic cortisone usage.

Possible Outcome

If Mrs. Wagner has other medical problems, systemic cortisone may be seriously contraindicated. If the cortisone is effecting Mrs. Wagner systemically, she may need to be weaned off the eye drops carefully

rather than simply stopping them to prevent systemic withdrawal.

Prevention

To prevent systemic contamination by a local eyedrop, be sure to gently compress the tear duct at the inner corner of the eye. This helps to keep the medication in the eye rather than running through the tear duct and down the back of the throat.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may be treated with eyedrops for glaucoma or cataracts. These conditions make it difficult to read the small print on eyedrop bottles. Be sure to mark the bottles in an easily identifiable manner so the client will be sure to get the right medication at the right time in the correct eye.*
- *Small bottles may be hard to hold if the elderly client has reduced fine motor skills, trembling, or reduced sensation in his or her hands. The nurse can help the client devise ways of stabilizing the bottle by bracing the other fingers of the hand on the face (for eyedrops) or the side of the head (for eardrops). The nurse can demonstrate how to make an eyedrop or eardrop bottle easier to hold by wrapping it with a cloth to increase its diameter.*



Pediatric Variations:

- *Children tend to rub their eyes and noses when tired. A child with an eye infection, such as pink-eye, can easily cross-contaminate from one eye to another. Parents need to be taught the importance of keeping the child's hands away from the eyes as well as keeping the child's hands and eyes clean.*



Home Care Variations:

- *Clients who use eyedrops routinely at home can become careless about identifying the right medication for the right time and the right use. Help the client mark the eyedrop bottles so they are clearly identifiable.*
- *Contact wearers have been known to confuse eyedrop bottles with liquid glue or nail adhesive bottles. Be sure the client is aware of the similarity and teach the client to carefully identify anything before they put it in their eyes.*
- *Make sure there is adequate lighting in the home care setting. A client who is having trouble with vision may have difficulty seeing medication in the dropper or reading the medication labels. Good lighting makes it easier to read and see without eyestrain.*



Long-Term Care Variations:

- *Long-term care clients who are self-medicating may be reluctant to dispose of outdated or contaminated eyedrops/eardrops. Explain the importance of not using contaminated or outdated medications.*
- *The risk of contamination of an eyedrop or eardrop bottle rises if that bottle is used repeatedly, especially if proper technique is not followed. Make sure that proper technique is taught and reinforced for caregivers and clients in the long-term care setting.*

▼COMMON ERRORS—ASK YOURSELF

Possible Error:

Mr. Adams is scheduled to receive antibiotic ointment in both eyes. At this time he only has an infection in his right eye but his physician is concerned that treating only one eye will lead to a back-and-forth cross-contamination. As you instill the antibiotic ointment, you have difficulty in separating the ointment ribbon from the tube nozzle. In order to end the ribbon, you gently nudge the nozzle against the inside of Mr. Adams's lower eyelid. The tip of the antibiotic ointment tube is now contaminated.

Ask Yourself:

How do I prevent this error?

Prevention:

In this case the nurse should medicate the noninfected eye first if she is using the same tube of ointment for both eyes. The safer and cleaner method would be to use two tubes of the same ointment and designate one for the clean left eye and one for the contaminated right eye. Cross-contamination when only one eye or ear is infected is a common error that can be prevented with careful attention to aseptic technique. If the tip of the medication dropper touches the client or anything else, it is contaminated and must be cleaned or discarded immediately. Gently pull, twist, or rotate the tube away from the eye to end the ribbon, rather than touch the tip of the tube to the eyelid.

> NURSING TIPS

- Insert medication disks at bedtime because they usually cause blurring of the eyes on insertion.
- Apply pressure to the inner canthus when instilling eyedrops that have potential systemic effects such as atropine, Timoptic, or hydrocortisone to prevent the drug from flowing into the tear duct and being absorbed systemically.
- Remember that the client always has the right to refuse any and all treatment, including medications.
- Unused medication in the medication dropper should be discarded rather than returned to the medication bottle. This avoids contaminating the medication remaining in the bottle.
- Clean any drainage or old medication from the eye or ear prior to administering the medication.
- Warm eardrops to room temperature unless this is specifically contraindicated. Cold medication against the eardrum can cause pain and dizziness.
- Have the client gently close the eye and move the eyeball back and forth under the lid to disperse the medication. If the client squeezes the eye shut, the medication will be squeezed out.
- If an ointment was instilled, have the patient hold the eye gently closed for 1 minute to allow the ointment to melt. If the client squeezes the eye shut, the ointment may be squeezed out.
- When instilling eardrops, the client should remain on his or her side for 2–3 minutes to allow the medication maximal contact with the ear canal.

SKILL 5-3

Administering Skin/ Topical Medications

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Creams

Lotions

Ointments

Patches

Percutaneous
absorption

Powders

Topical medications

Transdermal patch



> OVERVIEW OF THE SKILL

Topical medications are directly applied to the skin or mucous membranes. These type of medications are used for their local effect or to produce systemic effects by absorption from percutaneous routes. Topical medications include creams, ointments, and lotions. Topical medications applied to the skin are com-

monly used to relieve itching, prevent local infections, moisten the skin, or for vasodilatation. Most topical medications are used for local effects; however, certain medications can be absorbed percutaneous to provide systemic effects, such as topical nitroglycerin, nicotine patches, or certain estrogen products.

> ASSESSMENT

1. Assess the area where treatment will be applied to establish a baseline condition of the skin for future comparison.
2. If drug is being used for systemic effect, assess for area free of scars, moles, or other skin aberrations to facilitate selection of a site with no barriers to absorption.

> DIAGNOSIS

1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Good skin integrity
2. Relief of itching, irritation, or pain
3. Improved circulation

Equipment Needed (see Figure 5-3-2):

- Correct medication
- Correct applicator (cotton balls, sterile gauze pad, tongue blades, or cotton applicator)
- Gloves (sterile if broken skin integrity)
- Basin with warm water
- Mild soap (if appropriate and not contraindicated due to skin condition or interaction with medication)
- Wash cloth and towel
- Gauze dressing, tape as indicated
- Disposable waterproof pad
- Chart or medication sheet for medication verification



Estimated time to complete the skill:
**5–15 minutes depending on if
dressing change needed**



Figure 5-3-2 Creams, lotions, ointments, and patches are all used to dispense topical medications.

> CLIENT EDUCATION NEEDED:

1. Instruct the client regarding the reason for the topical medication.
2. Explain the need to allow for absorption without disturbing area of application.
3. Teach the client what possible adverse effects can occur and to report any symptoms.
4. Explain to the client the need to wear gloves if self-administering systemically absorbed topical medications to avoid overmedicating.
5. Note the danger of inhaling topical aerosolized medications or powders.
6. Instruct the client to apply only the ordered amount of medication to avoid over or undermedication.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Obtain order for medication with physician or qualified practitioner. | 2. Prevents inappropriate medication administration. An order is needed for any medication. |
| 3. Ascertain client's allergic status. | 3. Avoids allergic reactions. Nurses are responsible for medication errors including reactions. Charts may not always be current regarding allergies or an oversight might have occurred. |
| 4. If unfamiliar with medication, read label and read insert or seek appropriate information. | 4. Prevents inappropriate medication administration and errors. Medications should never be administered without knowledge of the medication. |
| 5. Select medication and verify medication with orders (first medication verification). | 5. Prevents medication errors. |
| 6. Check expiration date. | 6. Outdated medications may not be effective. |
| 7. Read medication label again before leaving medication room or cart as available in facilities (second medication verification). | 7. Avoids medication errors. |
| 8. Take medication to client's room and introduce self. In some facilities topical medication used for skin irritations are kept in the client's room and therefore verification may be done at the bedside. | 8. Helps establish rapport with client and identifies credentials of person administering medications. If medications are kept in client's room, still must verify appropriate medication with right client. |

9. Ask the client if he or she has had the medication before and its effect and ascertain if the client has any drug allergies or untoward reactions.
10. Explain the purpose of the medication.
11. Read the label for the third time (third medication verification) and check the client's identification band.
12. Position the client appropriately for administration of medication. Keep client draped for privacy.
13. Put on gloves. If dressing is over area to be treated, remove, discard, and change gloves (see Skill 9-6, Changing Dressings around Therapeutic Puncture Sites).
14. If an open wound, clean area to be treated with mild soap (if no allergies or reactions to soap) and water. If skin is irritated, use only warm water. If administering a systemically absorbed topical medication, clean the skin surface thoroughly and pat skin dry, leaving no residues of soap. Do not rub vigorously as absorption can be altered (see Figure 5-3-3).
9. Provides another verification for the medication. If the client has had adverse effects to medication, revalidate.
10. Helps inform the client and assist the client in taking some responsibility for his or her care. Provides the client with involvement in learning more about their condition.
11. Avoids medication errors.
12. Keeps the client in a comfortable position for medication administration. Protects privacy.
13. Decreases contact with microorganisms.
14. Soap can irritate an open wound. If skin is already irritated, soap may cause more irritation. Systemically absorbed medication can be effected by residue on the skin or rubbing, which causes vasodilatation.

Figure 5-3-3 Cleanse the skin prior to applying topical medication.



15. Assess the client's skin condition, making notation of circulation, drainage color, temperature, or any altered skin integrity.
16. Change gloves.
17. Apply medication according to label. If lotion or ointment, apply a thin layer and smooth into skin as indicated.
15. Information can be compared with future assessment and effect of medication.
16. Prevents spread of microorganisms and avoids absorption of medication by caregivers. (This is especially important in systemically absorbed medication.)
17. Medication dosages have been studied and are recommended according to certain standards.

18. If an aerosol spray is used, shake the container and administer according to direction. Spray evenly over affected area and avoid spraying close to client's or caregiver's face.
19. If gels or pastes are used, applicators may be needed. Apply evenly. If applying over an area with hair growth, follow direction of hair.
20. If powders are used, dust lightly and avoid inhalation by client and caregiver.
21. If nitroglycerin ointment or paste are used, follow instructions and orders carefully to administer correct dosage.
 - Remove the old ointment strip and clean the old site thoroughly. New ointment will be applied in different area.
 - Cleanse the new site with the appropriate cleaner.
 - Squeeze the dose out onto the enclosed medication measuring strip (see Figure 5-3-4). Nitroglycerin paste dosages are measured in inches and applied to the paper measuring strip before being applied to the client.
 - Flatten the roll of nitroglycerin so the ointment will be spread over a wider area when applied to the client.
 - Apply the measuring paper, ointment side down, to a nonhair portion of the client's body.
 - Tape the paper in place.
18. Aerosol may need to be mixed to be effective. Avoid inhalation since may have adverse effects on the mucous membranes and lungs.
19. Apply evenly to affected areas. Excess gel or paste will be wasted because absorption can only occur at skin level. The client will experience less discomfort if hair growth pattern is followed.
20. Excess powder will be wasted because absorption can only occur at skin level. Inhalation can cause untoward effects on the lungs and mucous membranes.
21. Nitroglycerin is systemically absorbed and accurate dosing is essential. If thick lines of ointment are applied, the dose will be different; therefore, the manufacturer's suggestions must be followed carefully for safe use of this drug.
 - If areas of ointment from previous doses are not removed, the client will be receiving more than one dose at a time.
 - Ensures proper absorption of the medication.
 - Use care not to over or undermedicate by squeezing out a line of ointment that is too thick or too thin.
 - The wider area of contact and thinner coating of ointment increases absorption.
 - Using a nonhairy area increases the absorption of the medication.
 - Keeps the medication in place.



Figure 5-3-4 Squeeze the correct dose out onto the enclosed medication measuring strip.

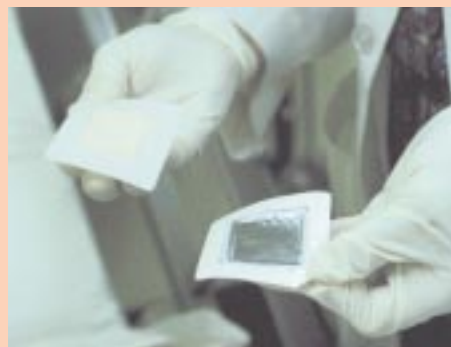


Figure 5-3-5 When applying a transdermal patch, remove the protective covering and apply the patch.

- 22.** If a transdermal patch is used, follow the manufacturer's directions and apply the patch to a smooth, cleaned skin surface.
- Remove the old patch and wash the site of the old patch.
 - Wash and prepare the skin at a new site.
 - Remove the protective covering over the transdermal portion of the patch and apply the new patch (see Figure 5-3-5).
- 23.** Remove gloves; wash hands.
- 24.** Document the medication given, the site it was applied to, and the client's response to the medication.
- 22.** Patches offer a more reliable means of controlling dosage; however, patches are generally more expensive than ointments.
- Prevents overdose.
 - Allows for maximal medication absorption.
 - Removing the protective covering allows the medication to be absorbed.
- 23.** Reduces the transmission of microorganisms.
- 24.** Proper documentation is essential for client care.



▼ REAL WORLD ANECDOTES

Mrs. Hayes brought her 7-month-old son, Darren, to the walk-in clinic. While the nurse did her intake evaluation, Mrs. Hayes noted that Darren had been in a week earlier because of diaper rash. Mrs. Hayes had brought Darren back because his rash was worse despite regular use of the cream ordered a week earlier. Upon examination, the nurse noted that Darren's diaper area was quite red and seemed to be painful for Darren. While examining the redness, the nurse noticed that it seemed to have abrupt edges right at the edge of Darren's diaper. When asked about it, Mrs. Hayes noted that it had not been that way one week earlier. Upon closer questioning, the nurse realized that the abrupt edges of the redness represented the limit of Mrs. Hayes's application of the cream. The nurse suspected that the worsening diaper rash actually represented an allergic reaction to the prescription cream. The nurse explained what symptoms to look for with topical allergies and Mrs. Hayes was advised to stop using the cream and to leave Darren's buttocks open to air as much as possible. Within a week both Darren's diaper rash and his topical redness were gone.

> EVALUATION

- The client's skin integrity was maintained.
- The client experienced relief of itching, irritation, or pain if this was the intent of the medication.
- The client experienced the maximum effect from the topical medication.

> DOCUMENTATION

Medication Administration Record

- Record the date, time, and site of application of the topical medication.

Nurses' Notes

- Document any changes in the client's skin integrity, coloration, or sensation.
- If medication was for irritation, itching, or rash, document any improvement or change.
- Note any unusual findings or client complaints.

> CRITICAL THINKING SKILL

Introduction

A little medication can go a long way.

Possible Scenario

Mr. Carr, a 62-year-old male, was receiving 1 inch of nitroglycerin ointment every 4 hours. The nurse caring for Mr. Carr was distracted while measuring the ointment for Mr. Carr. She inadvertently applied 2 inches of ointment to the measuring paper instead of one. When she removed the old dose of ointment, she wiped the area with a paper towel and reapplied the ointment to the same spot.

Possible Outcome

An hour later the nurse returned to help Mr. Carr walk in the hallway. He complained of a pounding headache. When he tried to stand, he was overcome by dizziness and had to sit back down right away.

When the nurse took his vital signs, his blood pressure was low. The nurse realized that these were all signs of a high dose of nitroglycerin ointment. She removed the nitroglycerin ointment and washed the site with soap and water. She had Mr. Carr remain sitting and she monitored his condition until his blood pressure had improved and Mr. Carr felt able to return to bed.

Prevention

Topical preparations can have serious systemic effects. Be sure to use the right amount of medication. It is even more important to pay attention when dispensing a medication that is difficult to measure, such as nitroglycerin paste. Carefully follow the manufacturer's recommendations for applying any ointment. Do not guess about a dosage; do not give it until you are sure it is right.

▼ VARIATIONS



Geriatric Variations:

- *Since elderly clients have thin skin, they may be more sensitive to topical medications.*
- *When using systemically absorbed topical medications, locate an area of skin with minimal wrinkles for administration.*



Pediatric Variations:

- *Children may move about causing topical medication to be wiped off.*



Home Care Variations:

- *Continuous use of systemically absorbed topical ointments may require a systematic tracking system to ensure the medication is administered at different sites.*
- *Teaching proper use of topical medications is essential.*



Long-Term Care Variations:

- *Caregivers should be aware of the adverse signs and symptoms associated with the topical medication the client is receiving and how to respond to them.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Overapplication of ointments is both costly and wasteful.

Ask Yourself:

How do I prevent this error?

Prevention:

Apply medications carefully and according to directions.

Possible Error:

When topical medications are kept in the client's room, error can occur.

Ask Yourself:

How do I prevent this error?

Prevention:

Keep medications in secure or designated areas only.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Overapplication of systemically absorbed topical medication can lead to adverse effects.

Ask Yourself:

How do I prevent this error?

Prevention:

Apply medications carefully and according to directions. Keep appropriate records of medications administered.

> NURSING TIPS

- Gloves should be worn to avoid absorption of medications by the health worker. If soothing lotions are used gloves should be worn if the skin is not intact.

SKILL 5-4

Administering Nasal Medications

Gaylene Bouska Altman, RN, PhD

KEY TERMS

**Aerosol
Humidifiers
Inhalers
Nasal medications**

**Nebulizer
Nose drops
Pump sprays
Turbo-inhalers**



> OVERVIEW OF THE SKILL

Nasal medications may be administered by drops or sprays. Sprays may be packaged as pump sprays, sprays in aerosolized containers (pressurized containers, sometimes called nasal nebulizers), or powdered turbo inhalers. Prescribed medications are generally available in pump sprays or aerosolized sprays, whereby sprays and nasal drops are available in over-the-counter medications. Since the advent of environmental controls on fluorocarbons, some aerosolized medications (which use fluorocarbons in pressurized dispensers) are being replaced by pump sprays. Nasal medications may be used to achieve local effects on the nasal mucosa, indirect effects on the sinuses, or a systemic effect. Examples of medications that have systemic effects and are available in nasal sprays are insulin, agents for suppression of nicotine use, and agents for the treatment of migraine headaches. The four groups of sinuses (frontal, ethmoid, sphenoid, and maxillary) communicate with

the nasal fossae and are lined with mucous membranes similar to those that line the nose. Even though it is unlikely that nasal medications penetrate the sinuses, positioning may aid in decreasing inflammation and congestion in the mucous membranes adjacent to the sinuses, thereby indirectly decreasing pressure in the sinuses. To medicate the mucous membranes adjacent to the frontal sinuses, the client will assume a supine position with the head turned to the affected side to be treated (Parkinson position). To medicate the mucous membranes adjacent to the ethmoid sinuses, the client will lie supine with his or her head leaning back over the side of the bed with the client's head supported by the nurse's hand to avoid muscle strain on the client's neck (Proetz position). Although the nose is not considered a clean or sterile cavity, because of its connection with the sinuses, the nurse should employ medical asepsis when performing nasal instillation.

> ASSESSMENT

1. Assess the client's nasal congestion and nasal obstruction to determine if the medicine can be inhaled to reach the nasal mucosa and to determine the effectiveness of the medication.
2. Assess the color, quantity, and odor of the client's discharge and the color and moistness of the nasal mucosa to check for signs and symptoms of infection, to discern tissue damage, and to establish a baseline for future assessments.
3. Assess the client's pain and/or discomfort level in the areas of sinuses as this is another symptom of infection. May determine if the client can use the inhaler or drops.
4. Assess the client for systemic conditions that may be adversely affected by nasal medications (see manufacturer's information). Clients with cardio-

vascular conditions and hypertension may need to use caution with medications containing sympathomimetic ingredients.

> DIAGNOSIS

- 1.6.2.1.1 Altered Oral Mucous Membrane
5.2.1 Ineffective Management of Therapeutic Regimen—Individual

> PLANNING

Expected Outcomes:

1. The client will be free of nasal congestion.
2. The client will be free of nasal discharge and odor.
3. The client will breathe freely through the nasal passages.
4. The client will be free of sinus pain and nasal pain.
5. The client's nasal passages will be moist and pink.

Equipment Needed:

- Medication in spray, drops, or aerosolized form (see Figure 5-4-2)
- Gloves
- Tissue as needed
- Dropper as needed



Estimated time to complete the skill:
5 minutes to administer medication. Assess the patient 15–30 minutes after treatment.

> CLIENT EDUCATION NEEDED:

1. Teach client the purpose of the medication.
2. Explain the need for certain positioning with administration of medication and the need to retain positioning for a few minutes.

3. Help client understand the need for compliance with the prescribed regimen.
4. Explain the purpose of closing one nostril while administering the medication to the other nostril.
5. Discuss the effects of the overuse of nasal decongestants.
6. Teach the client to clear the nostril before treatment and to administer the medication during inhalation.
7. Describe possible adverse side effects, such as increased temperature, increased sinus headache, nasal mucosa that remain inflamed and tender, increased nasal discharge, or a change in color of nasal discharge, and teach the client to report these to his provider.
8. Some clients may feel nauseated or even vomit after unpleasant side effects of nasal medication, such as with nose drops or sprays that drip into the oral pharynx.
9. The client understands the purpose of closing one nostril while administering the medication to the other nostril.



Figure 5-4-2 Nasal medication spray. Wear gloves when administering nasal medication to a client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands. Wear a mask if the client is coughing or sneezing.
2. Explain the purpose of the medication and the desired position (see Figure 5-4-3).

RATIONALE

1. Reduces transmission of microorganisms. Respiratory-related microorganisms are easily transferred by the hands and air droplets.
2. The client will be more compliant with medication if he or she understands the purpose

continues



Figure 5-4-3 Explain the purpose of the medication to the client.



Figure 5-4-4 Ask the client to inhale while the spray is administered into the nostril.

3. Explain to the clients the sensation of the local effects of the medications, such as burning, tingling, and effect on taste buds. If drops are used, explain to the clients that a sensation of medications may be felt in the posterior oral pharynx.
 4. If a nasal inhaler is prescribed, explain the manufacturer's directions and how inhalers work. Follow the five rights of drug administration (check identification and orders at five different stages of administration).
 5. Have the client assume a comfortable position. If inhalers are to be used, this will generally be an upright position. If drops are to be instilled, the client should assume the appropriate position as mentioned above to medicate specific sinuses that need treatment. Before the instillation of drops or the use of an inhaler, ask the client to blow his or her nose and clear the nostrils of discharge as much as possible. Squeeze nose drops into dropper.
 6. Have the client exhale and close one nostril.
- and proper use of medication. Proper positioning is necessary with nose drops so the drops will reach the area of treatment by gravity with the client assuming a dependent position.
3. Some nasal medications cause undesirable tastes. If this occurs, the physician or qualified practitioner may order other medications or encourage mouthwashes after treatment. Warning of postnasal sensations of the medication will prepare the client. Some clients may feel a quick sensation of choking. This can be frightening if the client has not been alerted to this consequence.
 4. Clients will be more compliant if they understand the use of the inhalers and that a fine cold mist will be released into the nasal passage via a pressurized container. Nasal medications that are prescribed must be considered to have the same safety precautions of administration as any medication.
 5. Nose drops are effective only if they reach the areas to be medicated. The client should be as comfortable as possible; otherwise he or she may not stay in desired position an adequate time. If the client is in a position with the neck hyperextended, a pillow or support by the nurse's hand under the neck may be necessary. Medications can only be effective if they are in contact with the mucous membranes. If large amounts of discharge are present, medications cannot be effective.
 6. Since the client will be asked to inhale with the use of nasal medications exhalation will first be necessary.

7. Ask the client to inhale while the spray is pumped or sprayed into the first nostril (see Figure 5-4-4). If nose drops are used, insert nasal dropper only about $\frac{3}{8}$ inch into the nostril, keeping the tip of the dropper away from the sides of the nostril. Insert the prescribed dosage of medication into the nostril. Discard any unused medication in dropper.
8. Ask the client to blot excess drainage from the nostril; however, do not have the client blow his or her nose.
9. Repeat the procedure on the other nostril.
10. Help the client resume a comfortable position. If nose drops are used, the client should stay in the appropriate position as indicated by manufacturer's suggestions, generally 5 minutes. Ask the client to breathe through the nose after the decongestion administration. It may be necessary to occlude one nostril at a time and breathe deeply.
11. Remove all soiled supplies and dispose according to universal precautions. Wash hands carefully.
12. Evaluate the effect of the medication in 15–20 minutes.
13. Wash hands.
7. Nasal medications are more effective if instilled during inhalation since they will be carried and distributed farther into the nasal passages. Droppers should be kept away from the nostril to avoid inserting bacteria into the medication bottle. Discard excess medication for the same reason.
8. Blowing the nose will remove medication and therefore should not be done. However, excess medication should be removed from dripping out of the nostrils onto the facial areas in order to avoid discomfort.
9. Most often both nostrils contain congestion and therefore need to be treated.
10. Nose drops need positions that by gravity will allow medications to reach areas of desired treatment.
11. Proper disposal decreases the chance of transmission of microorganisms. Respiratory diseases are especially easily transmitted.
12. It is necessary to note if the medication is effective without adverse side effects; otherwise, other medications may be considered. If the client experiences bothersome or unpleasant symptoms, such as a bad taste, other medications may be considered. Clients generally will not comply with medications that have too many unpleasant side effects.
13. Reduces transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Sharon was taking aerosolized medication for her migraine headaches. She complained that it did not work as well as the injections she had been using previously; it dripped out of her nose and it left a bad taste in her mouth. The nurse reviewing the medication administration procedure with Sharon realized that Sharon was not taking the time to allow the medication to be absorbed through the mucous membranes near her sinuses. The nurse suggested to Sharon that she position her head to allow the medication to contact the mucous membranes for better systemic absorption. The nurse recommended mouthwash or crackers for the bad taste left by the medication.

> EVALUATION

- The client is free of nasal congestion.
- The client is free of nasal discharge and odor.
- The client breathes freely through the nasal passages.
- The client is free of sinus pain and nasal pain.
- The client's nasal passages are moist and pink.
- The client is free of adverse side effects secondary to the nasal medication.

> DOCUMENTATION

Medication Administration Record

- Indicate the time and date the medication was given, the amount (number of drops may be necessary), and the nostril medicated.

Nurses' Notes

- Document the results of the treatment.
- Document any adverse or unpleasant side effects.

> CRITICAL THINKING SKILL

Introduction

Nose drops can enter the oral pharynx causing coughing, choking, and possibly vomiting.

Possible Scenario

Three-year-old Tommy was prescribed nose drops for a persistent nasal discharge. The nurse gives Tommy his

first dose, showing his mother how the procedure is done. Tommy wiggles and cries during the procedure and then starts to cough and choke. The nose drops have dripped into his oral pharynx causing a choking sensation. Tommy continues to cough and choke, crying and becoming increasingly agitated. After much difficulty, Tommy's mother calms him, but the mere sight of the nose drop bottle starts him crying and struggling again.

Possible Outcome

Tommy will continue to fight whenever his mother attempts to give him the nose drops. If forced, Tommy may aspirate and develop pneumonia. Before long, Tommy's mother will give up trying to give him the nose drops and Tommy will not receive any medication for his nasal discharge.

Prevention

When instilling any nasal medications, be prepared to position clients so as to avoid aspiration. Alert clients that medication may enter the oral pharynx and give a sensation that may cause them to cough. Sometimes swallowing before taking the medication, using mouthwash after the medication, or at least preparing the client for this sensation may avert the client from choking or vomiting. Some forms of medication are not appropriate for some age groups. Children, who are less likely to be cooperative, need a medication that will be pleasant or at least nonthreatening to use.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not be able to tolerate positions with the head dependent for long periods of time; therefore, pump sprays may be more useful.*
- *Aerosolized containers may be too difficult for elderly clients to apply appropriate pressure to be effective.*



Pediatric Variations:

- *Small children may not be cooperative and may need to be restrained. Sometimes the use of a reward system may be beneficial.*
- *Position infants using a football hold and slightly hyperextend the neck.*



Home Care Variations:

- *If nasal congestion persists, clients may have chronic sinus infections that require the adjunct of humidifiers or different medications.*
- *Saline nose sprays or drops may be effective for simple nasal congestion or as adjunct therapy and can be made by dissolving 1 teaspoon of salt in 1 pint of warm water.*
- *Saline solutions should not be kept over 24 hours because bacterial growth will occur. Clients should assess temperature and report long-lasting sinus headaches.*

▼ VARIATIONS *continued*



Long-Term Care Variations:

- Tolerance can develop with some nasal decongestants and, therefore, cannot be used on a routine basis.
- Other categories of drugs may be needed.
- Clients with persistent nasal congestion should seek medical attention and be evaluated for allergies, chronic sinus problems, or other health problems.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client does not effectively blow his nose, and medication cannot penetrate the nasal mucosa.

Ask Yourself:

How do I prevent this error?

Prevention:

Carefully explain to the client how to effectively clear the nasal passages by blowing the nose. Explain the importance of clearing the nasal passages before using the medication.

Possible Error:

The client does not use proper head positioning or allow enough time for the medication to be absorbed through the mucous membranes.

Ask Yourself:

How do I prevent this error?

Prevention:

Teach the client the appropriate head position for the ordered medication. Explain the importance of positioning and of allowing time for the medication to be absorbed.

- Clients should not use over-the-counter nose sprays for more than 4–5 days. If sprays contain sympathomimetic drugs, a rebound vasodilatation may occur or nasal congestion symptoms may worsen.
- Clients with a history of hypertension or cardiovascular disease should not instill nasal medications that contain vasoconstrictors. If sympathomimetic drugs are absorbed, elevated blood pressure may result.
- If the nasal route of administration is used for medications with systemic effects, evaluate the patency of nasal passage before administration of the medication.
- Certain nasal medications may cause an unpleasant taste. Using a mouthwash after administration of the medications may aid in compliance with the prescribed regimen.
- Some clients may feel nauseated or even vomit after use of nasal medication, such as with nose drops or sprays that drip into the oral pharynx.

> NURSING TIPS

- Explain medication and needed positions before administering medication. Allow the client time to find a comfortable position if asked to assume a Proetz or Parkinson position.
- Ask the client to review risks of overuse of decongestants and methods of administration.
- Ask the client to demonstrate use of nasal medication (see Figure 5-4-5).



Figure 5-4-5 If the client will be self-administering the medication, have the client demonstrate how to administer the medication.

SKILL 5-5

Administering Rectal Medications

Chandra VanPaepegthem, RN

KEY TERMS

Contraindications
Lubrication
Medication

Rectum
Sims' position
Suppository



> OVERVIEW OF THE SKILL

The administration of rectal medications is an important responsibility for nurses in numerous health care settings. Rectal suppositories include medications that produce both local and systemic effects. Suppositories that produce a local effect include laxatives, which promote defecation. Medications to help relieve nausea, fever, or bladder spasms can also be administered via rectal suppository but produce a systemic effect.

As with all medications, nurses must understand the drug's action in order to assess the positive outcome or harmful side effects. To ensure safe and accurate medication administration, the nurse should always follow the five rights: the right drug, the right dose, the right client, the right route, and the right time.

> ASSESSMENT

1. Review the physician's or qualified practitioner's order and identify the medication to be delivered, verifying dosage, route, time, and correct client. **This ensures safe and correct administration of medications.**
2. Assess the client's need and appropriateness for rectal medication administration, reviewing the client's history for contraindications. **A history of rectal surgery or bleeding may contraindicate use of a suppository.**
3. Consider any adjustments that may need to be taken in delivery of medications due to the age of the client. **This allows the nurse to deliver the medication in a correct manner if the client is an infant, child, or adult.**
4. Observe the client for the desired therapeutic effects or any adverse reactions, documenting this

response appropriately **to determine the effectiveness of the treatment.**

5. Assess the client's knowledge and understanding of the procedure. **Explaining the procedure not only will allay fear and anxiety but also will promote understanding and cooperation. If physically able, the client may wish to self-administer the medication.**

> DIAGNOSIS

- 1.3.1.1 Constipation secondary to decreased physical activity or medication side effects
- 3.2.2.1 Risk for Caregiver Role Strain; embarrassment administering the medication in this form
- 3.1.1 Impaired Social Interaction; potential for embarrassment by receiving medication in this form

> PLANNING**Expected Outcomes:**

1. The medication will be delivered appropriately and safely following the five rights of medication administration.
2. The desired outcome will be verbalized by the client and documented appropriately by the nurse.
3. The treatment will be completed as quickly and efficiently as possible to decrease discomfort and anxiety.
4. Client will state relief of complaint after medication administration.

Equipment Needed (see Figure 5-5-2):

- Medication (suppository or medicated enema)
- Water-soluble lubricant
- Gloves
- Tissue or washcloth
- Bedpan if client physically immobile
- Medication administration record



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the type of medication, including purpose, onset of action, and any side effects.
2. Explain the procedure in detail, including client position, any sensations such as coolness from the lubricant, or any discomfort. A thorough explanation may empower the client to self-administer medications.
3. Teach the client to take slow, deep breaths not only to help allay anxiety but also to relax the anal sphincter.



Figure 5-5-2 Protective pad, gloves, lubricant, and rectal medication

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Assess the client's need for the medication.
2. Check physician's or qualified practitioner's written order.
3. Check the medication administration record against the medication order, verifying correct client, medication, dose, route, and time.
4. Check for any drug allergies.
5. Review the client's history for any previous surgeries or bleeding.
6. Gather the equipment needed for the procedure before entering the client's room.

RATIONALE

1. Allows nurse to determine effectiveness of the medication.
2. Ensures safe and accurate administration of medication.
3. Ensures accuracy and decreases chance of medication error.
4. Decreases risk of allergic reaction.
5. Contraindications for rectal administration may be discovered.
6. Prevents numerous trips to gather supplies and helps the procedure flow smoothly.

continues

7. Assess the client's readiness to receive the medication. Encourage visitors to leave until the procedure is completed and close door or curtain.
8. Wash hands.
9. Apply disposable gloves (see Figure 5-5-3).



Figure 5-5-3 Apply gloves prior to administering rectal medications.

7. Promotes privacy and maintains self-image.
8. Reduces transmission of microorganisms.
9. Prevents contact with fecal material.



Figure 5-5-4 Lubricate the enema tip if it is not prelubricated.

10. Ask the client name and check identification band.
 11. Assist client into correct position; side-lying Sims' position, preferably the left side with upper leg drawn up toward chest.
 12. Visually assess the client's external anus.
 13. Remove suppository from wrapper and lubricate rounded end along with insertion finger. If a medicated enema is used, lubricate the enema tip if it is not prelubricated (see Figure 5-5-4).
 14. Tell client they will experience a cool sensation and pressure during administration. Encourage slow deep breaths.
 15. Retract buttocks with nondominant hand, visualizing the anus (see Figure 5-5-5). Using the dominant index finger, slowly and gently insert the suppository through the anus, past the internal sphincter, and against the rectal
10. Ensures correct client.
 11. The descending colon is on the left side; this is a more anatomically correct position. This position exposes the anus to identify placement.
 12. Determines presence of any active bleeding.
 13. Lubrication decreases friction and decreases discomfort.
 14. Prepares the client for administration. Relaxes the rectal sphincter.
 15. Slow insertion minimizes pain. Correct placement ensures adequate absorption and less chance for expulsion of medication.

wall. Depth of insertion will differ if client is a child or infant. If instilling a medicated enema, gently insert the enema tip past the internal sphincter and instill the contents by slowly squeezing (see Figure 5-5-6).



Figure 5-5-5 Retract the buttock and visualize the anus.



Figure 5-5-6 Gently insert the enema tip and instill the contents by slowly squeezing the bottle.

- | | |
|--|---|
| <p>16. Remove finger or enema tip and wipe client's anal area with a washcloth or tissue.</p> <p>17. Discard gloves.</p> <p>18. Wash hands.</p> <p>19. Discuss with client a 10-minute time frame to remain in bed or on side.</p> <p>20. Place call light in client's reach if administering suppository containing laxative to assist once client has sensation to defecate.</p> <p>21. Record administration of medication.</p> <p>22. Document effectiveness or any side effects of treatment on nursing flow sheet or progress note if applicable.</p> | <p>16. Removes lubricant externally. Promotes cleanliness and comfort.</p> <p>17. Reduces transfer of microorganisms.</p> <p>18. Reduces transfer of microorganisms.</p> <p>19. Keeps suppository or medicated fluid in place for better absorption.</p> <p>20. Gives client control over situation and nurse response once sensation to defecate occurs.</p> <p>21. Provides documentation of administration of medication.</p> <p>22. Communicates with other caregivers the effectiveness of treatment.</p> |
|--|---|



▼ REAL WORLD ANECDOTES

Mrs. Upton is a 57-year-old woman who had surgery two days ago. She has not been tolerating any oral intake and is requiring maintenance intravenous fluids to keep her hydrated. You are called to her room because her IV is infiltrated and other nurses have been unable to restart it. Mrs. Upton is also complaining of severe nausea. To provide immediate relief of the nausea until IV access is achieved, you administer a Compazine suppository. After about 15 minutes, Mrs. Upton feels less nauseated and is relaxed enough to cooperate with the IV restart.

> EVALUATION

- The medication was delivered appropriately and safely following the five rights of medication administration.
- The desired outcome was verbalized by the client and documented appropriately by the nurse.
- The treatment was completed as quickly and efficiently as possible to decrease discomfort and anxiety.
- Client stated relief of complaint after medication administration.

> DOCUMENTATION

Medication Administration Record

- Name of medication
- Dosage
- Route of administration
- Time administered
- Initials and signature of nurse administering medication

Nurses' Notes

- Time and type of client complaint
- Medication administered
- Outcome of treatment (client response)
- Physician or qualified practitioner notified, if needed
- Nurse's signature

> CRITICAL THINKING SKILL

Introduction

Numerous systemic and local reacting medications can be given rectally when clients cannot take oral or IV medications.

Possible Scenario

Mr. Woodall is complaining of nausea and begins complaining of feeling hot and chilling. You take his temperature and note that it is 39.2°C. Blood cultures, a chest x-ray, and a urine sample are collected. Mr. Woodall's practitioner orders acetaminophen to reduce Mr. Woodall's fever. Mr. Woodall takes the acetaminophen but within minutes vomits. The intact acetaminophen tablets are noted to be in the emesis.

Possible Outcome

Without a method to retain and assimilate the acetaminophen, Mr. Woodall's fever will not be treated and he will continue to be uncomfortable.

Prevention

Many oral medications are also available in suppository form. If a client is complaining of nausea, it is prudent to consider and request an alternative administration method as well as the oral route. An acetaminophen suppository would have treated Mr. Woodall's fever without the discomfort accompanying nausea and vomiting.

▼ VARIATIONS



Geriatric Variations:

- *Absorption may vary in older adults.*
- *Elderly are more prone to constipation due to such factors as insufficient fluid intake, insufficient dietary fiber and bulk, decreased activity or sedentary lifestyle, or side effects of medications.*
- *Older clients may be physically unable to self-administer the medications and require assistance.*
- *Fecal impaction may occur more often, interfering with suppository placement.*
- *If suppository is a laxative, provide bedpan or bedside commode if client is immobile or at risk to not make it to the bathroom on time.*



Pediatric Variations:

- *Consider the age of the client when explaining the procedure. Provide simple and brief explanations and answer questions honestly, facilitating open communication.*
- *Never leave the medication unsupervised near the client.*
- *After the medication has been inserted into the rectum, press the buttocks together for several minutes to prevent expulsion.*
- *Provide extra assurance of privacy for adolescent clients during the procedure.*

▼ VARIATIONS *continued*



Home Care Variations:

- Teach client or family members the procedure of administration. If the rectal suppository is ordered on an as-needed basis, teach the caregivers how to determine whether the medication is needed.
- Make sure rectal suppositories are stored correctly in the home setting, refrigerated if needed, and discarded when they have expired.



Long-Term Care Variations:

- Review medications given over extended periods of time to determine any long-term side effects that might occur.
- Review with primary caregivers how to assess and document these side effects.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse is unable to visualize the external anus clearly enough to safely place the suppository.

Ask Yourself:

How do I prevent this error?

Prevention:

Pressing the hard suppository into the wrong area can cause trauma to the anus and surrounding tissue. Be sure you can see where you are placing the suppository before inserting it. This may require extra help to position the client or you may need to clean the rectal area before inserting the suppository.

Possible Error:

The nurse inserts the suppository into stool in the rectum rather than placing it against the rectal wall.

Ask Yourself:

How do I prevent this error?

Prevention:

Slide the suppository along the rectal wall as you are passing it through the anal sphincter. This will keep it in contact with the rectal mucosa, increasing the absorption of the medication.

> NURSING TIPS

- Adjust the height of the bed to decrease back strain during insertion.
- Communication helps decrease anxiety and promotes cooperation.
- Observe the client's nonverbal and verbal cues during the procedure.
- Provide for privacy: Close the door, pull the curtains, and ask visitors to leave until the procedure is complete.

SKILL 5-6

Administering Vaginal Medications

Gaylene Bouska Altman, RN, PhD, and
Carla A. Bouska Lee, PhD, ARNP C, FAAN

KEY TERMS

Douche
Instillations
Suppositories
Vagina

Vaginal creams
Vaginal foam
Vaginal jellies
Vaginal medications



> OVERVIEW OF THE SKILL

Vaginal medications come in the form of creams, suppositories, foams, jellies, or irrigations (commonly known as douches). Vaginal medications are generally used to treat infections, irritations, or pruritis requiring topical treatment. These medications may be prescribed by a physician or nurse practitioner or many vaginal medications can be purchased over the counter (OTC). Irrigations or douches can be used to soothe, cleanse, change vaginal acidity/alkalinity, or disinfect the vagina; however, if used excessively, they can cause vaginal irritation. Most often, creams, foams, or jellies are administered with an applicator or inserter. Suppositories are individually foil wrapped oval-shaped

solids that require refrigeration. Once the suppository is inserted by an applicator or directly with a finger (gloved hand), body temperature causes the suppository to melt and the medication to be distributed. Clients often prefer to administer their own vaginal medications. Once a vaginal medication is administered, a perineal pad may be placed to collect excess drainage and discharge. Pericare and personal hygiene (see Skill 4-9, Perineal and Genital Care) are essential since many vaginal infections cause foul-smelling discharge and irritation. Assess the client's level of pain, pruritis, burning, or general discomfort to establish a baseline for future assessment.

> ASSESSMENT

1. Assess the client's comfort level. Evaluate the level of burning, irritation, pruritis, pain, and smell to establish a baseline for assessment of treatment.
2. Assess the client's knowledge of the purpose of the medication and treatment. Enables client to understand and monitor effects of medication.
3. If the client prefers to self-administer the medication, assess the client's ability to self-administer the medication, such as ability to manipulate the

applicator or insert a suppository the appropriate distance. Clients may prefer to self-administer vaginal medications for privacy but if medication is not properly inserted it will not be effective.

> DIAGNOSIS

- 1.6.2.1 Impaired Tissue Integrity
- 3.3 Altered Sexuality Patterns

> PLANNING

Expected Outcomes:

1. Client will experience an absence of vaginal infection, pruritus, burning, or irritation.
2. Client will experience an absence of foul-smelling, curdlike, or blood-tinged discharge.
3. Client will understand the importance of continued treatment until infection is absent.
4. Client will understand the importance of personal hygiene in combination with medication.
5. Client will understand the need to properly clean and store equipment.

Equipment Needed (see Figure 5-6-2):

- Vaginal medication: cream, foam, jelly, or suppository



Figure 5-6-2 Vaginal medication and applicator

- Applicator (if needed)
- Water-soluble lubricating jelly (for suppository)
- Nonsterile gloves
- Perineal pad
- Paper towel, toilet tissue, or tissue paper
- Washcloth and warm water (optional)



Estimated time to complete the skill:

5 minutes

15–20 minutes if vaginal irrigation

> CLIENT EDUCATION NEEDED:

1. Instruct client of need to be in proper position and stay in position.
2. Instruct client to report adverse reactions, such as burning and increased irritation.
3. Instruct client to advise nurse if signs and symptoms improve.
4. Instruct the client how to self-administer (if appropriate) the medication.
5. Explain the need for careful personal hygiene and pericare.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Verify orders. | <ol style="list-style-type: none"> 1. Prevents medication errors. |
| <ol style="list-style-type: none"> 2. Ascertain if the client has ever had vaginal medications before and understands the procedure. | <ol style="list-style-type: none"> 2. Enables understanding and compliance. |
| <ol style="list-style-type: none"> 3. Ask the client to void. | <ol style="list-style-type: none"> 3. Provides for client comfort during the procedure. |
| <ol style="list-style-type: none"> 4. Wash hands. | <ol style="list-style-type: none"> 4. Reduces transmission of microorganisms. |
| <ol style="list-style-type: none"> 5. Arrange equipment at client's bedside. | <ol style="list-style-type: none"> 5. Promotes organization. |
| <ol style="list-style-type: none"> 6. Provide complete privacy by closing door and curtains. | <ol style="list-style-type: none"> 6. This procedure can be embarrassing, and this protects the client's privacy. |
| <ol style="list-style-type: none"> 7. Assist the client into a dorsal-recumbent or Sim's position (see Figure 5-6-3). | <ol style="list-style-type: none"> 7. Allows positioning for administration and for medication to remain in vagina. |
| <ol style="list-style-type: none"> 8. Drape the client as appropriate, such as over the client's abdomen and lower extremities. | <ol style="list-style-type: none"> 8. Provides privacy. |

continues



Figure 5-6-3 This client is placed in a Sim's position for administering vaginal medications.



Figure 5-6-4 Place the suppository in the applicator.

9. Position lighting to illuminate vaginal orifice.
 10. Assess the perineal area for redness, inflammation, discharge, or foul odor.
 11. If using an applicator, fill with medication. If using a suppository, remove the suppository from the foil and position in the applicator (applicator is optional) (see Figure 5-6-4). An applicator may be used for suppositories or a gloved finger may be used. The foil is discarded. Apply water-soluble lubricant to suppository or applicator (optional for applicator).
 12. For suppository, with nondominant hand, retract the labia (see Figure 5-6-5).
9. Assists in visualization of vagina and proper administration of medication.
 10. Provides baseline data.
 11. The medication is prepared for insertion. Lubricant provides comfort and ease of insertion.
 12. Allows visualization of the vaginal orifice and eases insertion of medication.



Figure 5-6-5 Retract the labia with the nondominant hand.



Figure 5-6-6 Slide the applicator 2–3 inches into the vagina.

13. With dominant hand, insert the applicator 2–3 inches into the vagina, sliding the applicator posteriorly (see Figure 5-6-6). Push the plunger to administer the medication (see Figure 5-6-7). With a suppository, insert the tapered end first with the index finger or applicator along the posterior wall of the vagina (approximately 3 inches).
 14. Withdraw the applicator and place on a towel.
13. Medication must be inserted completely to provide coverage of the entire vagina. When medication is deposited at the posterior end of the vagina, gravity will allow medication to move toward the orifice.
 14. Reduces the transmission of microorganisms.

Figure 5-6-7 Push the plunger to administer the medication.



15. If administering a douche or irrigation:
 - Warm solution to slightly above body temperature (105°–110°F). Check using the back of the hand or the wrist.
 - Position the client in a semirecumbent position on a bedpan, on a toilet seat, or in a tub.
 - Apply lubricant to the irrigation nozzle and insert approximately 3 inches into the vagina.
 - Hang the irrigant container approximately 2 feet above the client's vaginal area.
 - Open the clamp and allow a small amount of solution to flow into the vagina.
 - Move the nozzle and rotate around the entire vaginal area. If the labia are inflamed, allow the solution to flow over the labia as well. If the client is on the toilet seat, alternate between closing off the labia and allowing solution to be expelled.
16. Wipe and clean the client's perineal area, including the labia, from the front to the back with toilet tissue. Some clients may prefer that the perineal area is also cleaned with a washcloth and warm water.
17. Apply a perineal pad.
18. Wash the applicator (if reusable) with soap and warm water and store in appropriate container in client's room.
19. Remove gloves and wash hands.
20. Instruct the client to remain flat for at least 30 minutes.
21. Raise side rails and place the call light in reach.
15.
 - Avoids burning the client. The mucous membranes of the vagina are sensitive.
 - Provides comfort during procedure and allows for appropriate drainage of irrigation solution.
 - Provides comfort.
 - Height is necessary for drainage by gravity. If the container is too high, the flow will be too forceful and uncomfortable.
 - Allows the client to evaluate the temperature.
 - Rotation allows for irrigation throughout vagina. Closing off labia allows medication to stay in and flush total vagina.
16. Provides comfort for client and avoids spread of infective agents to perineal area.
17. Protects client from discomfort of drainage and spread of infection or irritation to perineal area.
18. Applicator can only be used for individual clients; however, some applicators and inducers are reusable and must be appropriately cleaned and stored to prevent reinsertion of infective agents.
19. Reduces the transmission of microorganisms.
20. Allows maximum contact between the medication and the vaginal mucous membranes.
21. Provides for client comfort and safety.



▼ REAL WORLD ANECDOTES

Mrs. Lopez is an elderly woman who presented to the clinic with complaints of foul-smelling discharge and vaginal irritation one week earlier. She returns complaining that the medication the doctor prescribed hasn't helped at all. She speaks very little English and has brought her granddaughter along to translate. While questioning Mrs. Lopez about her medication, the nurse realizes that Mrs. Lopez had been unable to read the use directions and had been too embarrassed to ask anyone to translate them for her. Mrs. Lopez had been taking the suppositories orally, not realizing that they were intended for vaginal insertion. The nurse carefully explained where the medication was to be applied and how to use the applicator. Mrs. Lopez was initially embarrassed to be discussing this with her granddaughter present, but the nurse's matter-of-fact demeanor put her at ease. By the time Mrs. Lopez left the clinic, the nurse was confident that Mrs. Lopez would be able to correctly apply her medication and was on the way to recovery.

> EVALUATION

- Client experiences an absence of vaginal infection, pruritus, burning, or irritation.
- Client experiences an absence of foul-smelling, curdlike, or blood-tinged discharge.
- Client understands the importance of continued treatment until infection is absent.
- Client understands the importance of personal hygiene in combination with medication.
- Client understands the need to properly clean and store equipment.

> DOCUMENTATION

Nurses' Notes

- Document the procedure performed and the results.
- Note any unusual findings or client complaints.
- Document client's response to treatment.
- Document client's signs and symptoms associated with vaginal condition.

Medication Administration Record

- Record the date and time the medication/treatment was administered.

> CRITICAL THINKING SKILL

Introduction

Client education is an important part of nursing care.

Possible Scenario

Mrs. Davies frequently presented to the clinic with complaints of vaginal irritation and tenderness. De-

spite a number of medication regimes, she continued to suffer with these problems. Mrs. Davies' complaints had become so common that her doctor had started simply calling in prescriptions when she notified the office of another episode of vaginal irritation and tenderness, hoping to save her the cost of an office visit.

Possible Outcome

Mrs. Davies continues to have vaginal irritation and tenderness. The constant mess of the medication as well as the vaginal tenderness she experiences has impacted her relationship with her husband. The next time she calls the office complaining of vaginal irritation and tenderness the office nurse takes the time to sit and talk to Mrs. Davies. One of the questions the office nurse asks regards douches. The office nurse had noticed in Mrs. Davies chart that she had previously reported using vinegar douches. When the nurse asks Mrs. Davies if she uses premixed douches from the store or if she mixes her own, Mrs. Davies notes that she mixes her own. The nurse then asks about the ratio of vinegar to water Mrs. Davies uses. Mrs. Davies seems surprised and replies that she uses plain white vinegar as a douche liquid. She had read that vinegar douches tighten the vagina and improve the sexual experience. She had not noted that the article called for a vinegar/water mix and advised not douching too frequently. In an effort to improve relations with her husband, Mrs. Davies had increased the frequency of the vinegar douches, increasing her irritation and tenderness. The mystery was solved with some insightful nursing communication.

Prevention

Do not assume that clients have the advantage of information you have. Many clients do not understand the workings of the human body and many harbor ideas that seem odd to a nurse educated in anatomy and physiology. Do not ask yes/no questions when gathering client information. Ask questions that require the client to explain, and then listen carefully,

without preconceived notions. If the nurse had assumed that “vinegar douche” meant the same thing to her and to Mrs. Davies, the client might have suffered until her relationship ended, only to then discover that her irritation improved. Especially in this area, where many people are reluctant to discuss concerns or to ask questions, good communication and client teaching are essential.

▼ VARIATIONS



Geriatric Variations:

- *The labia may be more difficult to hold apart in elderly clients.*
- *Elderly clients may be more sensitive to temperature variations of irrigation fluids.*
- *Assess the client's previous use of vaginal irrigations since some elderly clients may use douches frequently.*



Pediatric Variations:

- *Vaginal medications can be very embarrassing for children. The staff need to be extremely sensitive to the child's privacy.*
- *Inappropriate touching can be an issue with children. Have a trusted female family member or a second staff member present when giving vaginal medications to children.*



Home Care Variations:

- *Assess the home environment to see if there is a place where equipment can be properly cleaned and stored.*
- *Instruct the client or the client's caregiver how to administer the medication, if necessary.*



Long-Term Care Variations:

- *The client's ability to assume a Sims' or recumbent position may be limited. Alternative positioning or medication administration may be necessary.*
- *Most vaginal medications were not designed to be used over long periods. Regular reevaluation of the need for a vaginal medication should be performed.*

▼ COMMON ERRORS—ASK YOURSELF

Common Error:

The nurse does not insert the medication deeply enough into the vagina.

Ask Yourself:

How do I prevent this error?

Prevention:

Visualize the vaginal opening before trying to insert the applicator. Be sure to insert the medication 2–3 inches into the vagina.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Common Error:**

The client did not remain in the recumbent position long enough to allow the medication to effectively contact the vaginal mucosa.

Ask Yourself:

How do I prevent this error?

Prevention:

Educate the client regarding the need to lie flat for 30 minutes to allow the medication time to work. Explain that this is as important a step as proper insertion of the medication.

> NURSING TIPS

- Insert medication 2–3 inches.
- Clean client carefully after inserting medication to avoid perineal irritation.
- Patient can have allergic reactions to vaginal medication or to latex gloves used by the nurse. Assess for reactions. If redness persists, it may be an allergic reaction instead of the infectious process.

SKILL 5-7

Administering Nebulized Medications

Eleonor U. de la Pena, BS, CMA

KEY TERMS

Air compressor	Nebulizer
Anaphylactic shock	Rales
Asthma	Saline
Beta 2 agonist	Urticaria
Bronchodilator	Wheezes
Metered-dose inhaler (MDI)	



> OVERVIEW OF THE SKILL

A nebulizer is a device that is used to aerosolize medications into a mist for delivery directly into the lungs. Medication that is inhaled in the form of small droplets is absorbed immediately into the mucosa and bloodstream and is available to the body within minutes. This method of medication delivery is one of the fastest, noninvasive methods of medication delivery. A large number of medications could be delivered by inhalation, but currently this delivery method is used primarily for medications designed to ease respiratory distress symptoms such as those seen with asthma.

This skill deals with two types of nebulizers: the single-dose nebulizer, which is driven by an air compressor, wall air, or wall oxygen; and the portable metered-dose inhaler. Both nebulizers have advantages and disadvantages. The single-dose, compressor-driven nebulizer delivers smaller droplets, allowing faster, more complete assimilation of the medication.

The single-dose nebulizer can be filled with any type of medication that is ordered and it can be used by clients who cannot coordinate the use of the metered dose inhaler. The primary drawback of the single-dose nebulizer is its lack of portability. The nebulizer itself is portable, but to function it must be connected to a compressor. The nebulizer must also be loaded with medication for each use, delaying the client's relief.

The metered-dose inhaler has the benefit of being small and portable. It can be carried in the client's pocket. Because the meter dispenses measured doses of the preloaded medication, no special training is needed to prime the inhaler. The primary drawback of a metered-dose inhaler is the need to coordinate dispensing the dose and inhalation. Very small children, clients with coordination impairment, and clients with cognitive difficulties may not be able to use the metered-dose inhaler.

> ASSESSMENT

1. Assess the client's respiratory status. Note if the client is using accessory muscles for respiration or if there is flaring of the nares. Auscultate the client's chest for wheezes and rales. **Respiratory distress is the primary reason to administer nebulized medications.**
2. Evaluate the history of this episode of the client's distress. Take a complete history from the client or

a reliable informant about the symptoms and length of time the client has had them. Respiratory distress can have many causes. Asthma, bronchitis, a foreign object in the airways, and chronic obstructive pulmonary disease can all cause respiratory distress. **Assessing the client's current symptoms provides more accurate diagnosis and care. The client's history of asthma does not mean that this episode of distress is asthma.**

3. Assess the client's ability to use the nebulizer or metered-dose inhaler. Determine the client's ability to understand and follow the directions, the client's ability to hold and manipulate the equipment, and the client's ability to coordinate the release of the medication with inhalation. **This will determine the type of equipment used for the client. Very young children may need a mask instead of a mouthpiece on the nebulizer. The elderly may need specialized dispensers for their metered-dose inhalers.**
4. Assess the medication(s) currently ordered by the physician or qualified practitioner: action, purpose, common side effects, time of onset, and peak of action. **This permits the nurse to anticipate what to observe from the client.**
5. Assess the medications the client is currently taking, including over-the-counter drugs. **Some medications can interact. Beta blockers (propranolol, atenolol, and betalol) can antagonize the beta agonists and can cause or increase asthma symptoms.**
6. Assess the client's knowledge regarding the medications and the use of the nebulizer or metered-dose inhaler. **This allows the nurse to determine the need for client education to promote compliance.**

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.3 Ineffective Breathing Pattern
- 1.6.1.1 Risk for Suffocation
- 8.1.1 Knowledge Deficit, related to the proper use of the nebulizer or metered-dose inhaler



Figure 5-7-2A Hand-held nebulizer and gloves

- 9.3.1 Anxiety
- 9.3.2 Fear

> PLANNING

Expected Outcome:

1. The client will experience improved gas exchange.
2. The client's breathing pattern will become effective.
3. The client will demonstrate understanding of the need for the medication and the use of the nebulizer or metered-dose inhaler.
4. The client will not experience any adverse effects secondary to medication interactions.
5. The client's anxiety level will decrease following treatment.

Equipment Needed (see Figure 5-7-2 A & B):

Hand-Held Nebulizer

- Medication administration record
- Nebulizer set (cup, tubing, cap, T-shaped tube, mouthpiece, or mask) or prepackaged nebulizer and applicator
- Medication(s)
- Saline
- Air compressor, wall air, or wall oxygen

Metered-Dose Inhaler

- Metered-dose inhaler
- Aerochamber, if appropriate



Estimated time to complete the skill:
5–8 minutes



Figure 5-7-2B Nebulizer cup, tubing, cap, T-shaped tube, medication, and mouthpiece

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of the procedure.
2. Teach the client how to use the nebulizer properly, holding it upright to prevent spillage of medication, sealing the mouth around the mouthpiece, and breathing in slowly and deeply through the mouth. Observe the client for about 1 minute during the nebulization treatment to ensure that proper technique is being followed.
3. Describe how long the treatment should take.
4. Teach the client the importance of measuring medication to be nebulized properly. Have the client demonstrate the instructions given.
5. Explain the medication(s) the client will be using for the nebulization. This includes the purpose, time of onset, peak of action, and common side effects.
6. Teach the client how to use an aerochamber if unable to coordinate the inhalation in a metered-dose inhaler.
7. Explain how long the task will last and the expected outcome.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE****Hand-Held Nebulizer**

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Assess client's ability to use the nebulizer. 2. Check the medication administration record against the physician's or qualified practitioner's orders. 3. Check for drug allergies and hypersensitivity. 4. Wash your hands before setting up the nebulizer. 5. Set up the medication(s) for one client at a time. 6. Look at the medication at eye level if using droppers to dispense the solution into the nebulizer. 7. Pour the entire amount of the drug(s) into the nebulizer cup carefully. <ul style="list-style-type: none"> • Avoid touching the drug while pouring into the nebulizer cup. 8. Cover the cup with the cap and fasten. 9. Fasten the T-piece to the top of the cap. 10. Fasten a short length of tubing to one end of the T-piece. 11. Fasten the mouthpiece or mask to the other end of the T-piece. <ul style="list-style-type: none"> • Avoid touching the nebulizer mouthpiece or the interior part of the mask. | <ol style="list-style-type: none"> 1. Assures client compliance. 2. Ensures accuracy in the administration of medication. (Right drug) 3. Decreases the risk of allergic reaction such as hives, urticaria, or anaphylactic shock. 4. Reduces the transmission of microorganisms. 5. Ensures that the client receives the right medication(s). (Right drug) 6. Increases accuracy. (Right dose) 7. Determines the correct amount of medicine and assures accurate dosage. (Right dose) <ul style="list-style-type: none"> • Reduces the transmission of microorganisms. 8. Prevents spillage of the medication. 9. Provides a connector for the mouthpiece. 10. Provides dead space to prevent room air from entering the system and medicated aerosol from escaping. 11. Provides a portal for the client to inhale the aerosolized medication. <ul style="list-style-type: none"> • Reduces the transmission of microorganisms. |
|--|--|

continues

Hand-Held Nebulizer *continued*

- | | |
|---|---|
| <p>12. Identify the client prior to administration of medication(s).</p> <p>13. Identify the medication(s) to the client and clearly explain the therapeutic purpose(s) of the medication.</p> <p>14. Advise the client to sit in an upright position.</p> <p>15. Attach tubing to the bottom of the nebulizer cup and attach the other end to the air compressor or wall air.</p> <ul style="list-style-type: none">• Before turning it on, adjust the wall oxygen valve to 6 liters/min (or less per physician's or qualified practitioner's orders).• Leave the air on for about 6–7 minutes until the medications get used up. <p>16. Instruct the client to breathe in and out slowly and deeply through the mouthpiece/mask.</p> <ul style="list-style-type: none">• The client's lips should be sealed tightly around the mouthpiece. <p>17. Remain with the client long enough to observe the proper inhalation-exhalation technique.</p> <p>18. Wash your hands with soap and water.</p> <p>19. Record the medications administered along with the date, time, and dosages on the chart.</p> <p>20. When the nebulizer cup is empty:</p> <ul style="list-style-type: none">• Turn off the compressor or wall air.• Detach the tubing from the compressor and the nebulizer cup.• If the nebulizer is disposable, dispose of the nebulizer in the appropriate container.• If the nebulizer is to be reused for this client, carefully wash, rinse, and dry the nebulizer components. <p>21. Assess the client immediately following the treatment for results or adverse effects from the treatment.</p> <p>22. Reassess the client 5–10 minutes following the treatment.</p> <p>23. Wash your hands.</p> | <p>12. Assures the right client gets the medication. (Right client)</p> <p>13. Promotes client's cooperation and awareness of the medication's effects.</p> <p>14. Promotes better expansion of the lungs.</p> <p>15. Provides a conduit for the compressed air.</p> <ul style="list-style-type: none">• Drives the medication into a mist or wet aerosol form.• Allows the client to receive the entire dose of medication. <p>16. Promotes better deposition and efficacy of the medication in the airways.</p> <p>17. Ensures the correct use of the nebulizer to get the full effects from the medications administered.</p> <p>18. Reduces the transmission of microorganisms.</p> <p>19. Provides documentation of administration of drugs.</p> <p>20.</p> <ul style="list-style-type: none">• Stops the aerosolization.• Prepares components for cleaning or disposal.• Prevents the transmission of microorganisms.• Prevents the transmission of microorganisms. <p>21. Allows the nurse to determine the effectiveness of the treatment.</p> <p>22. Some effects may be delayed.</p> <p>23. Reduces the transmission of microorganisms.</p> |
|---|---|



Figure 5-7-3 Metered-dose nebulizer and medications



Figure 5-7-4 Preparation of a metered-dose nebulizer and medication.

Metered-Dose Nebulizer (see Figure 5-7-3)

24. Assess the client for ability to use the metered-dose nebulizer.
25. Check the medication administration record against the physician's or qualified practitioner's orders.
26. Check for drug allergies and hypersensitivity.
27. Wash your hands before administering medication.
28. Shake the prepackaged nebulizer.
29. Place the nebulizer into the applicator (see Figure 5-7-4).
30. Place the aerochamber onto the nebulizer if needed.
31. Have the client place the mouthpiece in his mouth.
32. Have the client press down on the prepackaged dispenser as the client simultaneously inhales.
33. If there is an aerochamber attached to the nebulizer, have the client inhale slowly and deeply.
34. Observe the client for several minutes to assess for possible adverse effects from the medication.
35. Wash your hands.
36. Record the medication administration and your observations.
24. Assures client compliance.
25. Ensures accuracy in the administration of medication.
26. Decreases the risk of allergic reaction, such as hives, urticaria, or anaphylactic shock.
27. Decreases risk of the transmission of microorganisms.
28. Thoroughly mixes the medication.
29. Allows for proper administration of the medication.
30. The aerochamber provides dead space for the medicated mist while the client inhales.
31. Delivers medication to the lungs through the proper route.
32. Allows delivery of the medication to the lungs.
33. Allows proper delivery of the medication.
34. Nebulized medication is delivered into the blood stream almost immediately and reactions can occur right away.
35. Prevents the transmission of microorganisms.
36. Provides a record of care and ensures continuity of care.



▼ REAL WORLD ANECDOTES

An ambulatory 15-year-old male arrived at the clinic for his regular 4-month check-up. He does not remember the names of the two regular metered-dose inhalers prescribed for his asthma. He uses the medications irregularly. He can only recall the colors of the containers; one is teal green and the other is pink. He uses the “yellow one” as a rescue medication at least once a day. His pulmonary lung function test results showed mild to moderate obstruction in his airways. The physician decided to give him bronchotherapy via a nebulizer. The client did not want to listen to the instructions of the nurse because he apparently knew how to do it and had done it a couple of times before. The nurse left, assuming that the client knew the correct way of using the nebulizer. The client decided to lie on his side on the exam table while reading a sports magazine. Lung function tests were repeated 10 minutes after the treatment was over. Because the nebulizer was not used correctly, the client’s results did not show significant improvement as expected. The nurse should have instructed or reviewed with the client how to inhale slowly and deeply through the mouthpiece even if he had “done it before.” This assures good client compliance.

> EVALUATION

- The client experienced improved gas exchange.
- The client’s breathing pattern became effective.
- The client demonstrates understanding of the need for the medication and the use of the nebulizer or metered-dose inhaler.
- The client did not experience any adverse effects secondary to medication interactions.
- The client’s anxiety level decreased following treatment.

> DOCUMENTATION

Medication Administration Record

- Name of medication(s)
- Dosage
- Route
- Site
- Time of administration
- Initials of the nurse who administered the medication(s)
- Signature of the nurse identifying the initials

Nurses’ Notes

- Client’s assessment parameters
- Name of medication, dosage, route, and time of administration
- Amount of oxygen delivered per minute from wall oxygen or air compressor machine
- Signature and initials of the nurse
- Client’s response

> CRITICAL THINKING SKILL

Introduction

Be aware of client limitations.

Possible Scenario

A 75-year-old female was evaluated for asthma. Pulmonary function tests showed moderate to severe airway obstruction. The client was given two nebulization treatments of albuterol 0.5 cc and Atrovent 2.5 cc with 6 liters/min of oxygen. The client became stabilized and was prescribed metered-dose inhalers to be used at home. The client was told to come back for a 2-week follow-up visit.

Possible Outcome

Two nights later, the client had to go to the emergency room. She told the physician that her asthma inhalers did not seem to help her. When questioned regarding her use of the inhalers, she seemed to understand how to dispense the dose while inhaling. When asked to demonstrate her use of the inhalers however, it was clear that she was unable to coordinate dispensing the dose and inhalation.

Prevention

Although the client understood the instructions, she lacked the physical dexterity to carry them out. The nurse should not only explain how to perform the skill but require a return demonstration. Clients may voice understanding without actually being able to perform the skill.

▼ VARIATIONS



Geriatric Variations:

- Some older clients may have arthritis or some disabling condition that may make it difficult for them to set up a nebulizer or manipulate a metered-dose inhaler. There are aids designed for clients with manual dexterity difficulties that can make these tasks easier.
- Older clients have trouble seeing the lines on the medicine dropper. Use of unit-dose inhalers or premixed solutions will make it easier and assures accuracy for the right amount of medicines to be given.
- Older clients may have hand tremors, so it may be hard for them to keep the nebulizer mouthpiece in place. Provide the client with a mask so the nebulizer does not have to be held during treatment.



Pediatric Variations:

- Infants and toddlers will not be able to hold the nebulizer mouthpiece properly. Use of appropriately-sized mask can be used for this age group.
- Young children might get upset or cry when they see the mist coming out of the nebulizer cup. Continue giving the nebulizer treatment because crying can actually increase the chance of medication being deposited in the airways/lungs.
- Metered-dose inhalers are often prescribed for asthmatic children. Be sure to reinforce the correct usage and dosage frequently. Children may become dependent on their inhalers and use them more often than prescribed.



Home Care Variations:

- Clients who will be in nebulization treatment at home are advised to purchase or rent an air compressor machine. A multiuse nebulizer can be recommended, but it is exclusively for a single client use only. The nebulizer set should be changed every 6 months depending on its use.
- Client should be advised to clean and disinfect the nebulizer. Dishwasher-safe nebulizers are available, and rinsing off with soap and water and letting all parts air dry on a clean cloth or paper towel are advised after each use. Store in a clean Ziploc bag if nebulizer is totally dry. Disinfecting with diluted bleach (1:100) is recommended at least once a day. Soaking the nebulizer with one part vinegar and three parts distilled or sterile water will remove the clog in the nebulizer cup after using it several times. The tubing does not need to be washed, but it can be cleaned from the outside by alcohol or wet towel with bleach and then air dried.



Long-Term Care Variations:

- Clients on long-term nebulizer treatment are advised to purchase two kinds of nebulizer machines. One is portable and the other is the regular air compressor machine. The portable nebulizer will allow the client to have nebulization treatments wherever he goes. Charged or regular batteries or a cigarette lighter adapter can power it.
- Some clients, especially the elderly, usually get a regular supply of unit or premixed dose medications from the pharmacy or health care agencies so that they will not fail to have nebulizer treatments. The respiratory therapist visits from the health care agencies can provide free monitoring of client compliance.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Nebulizer medication and saline solution is beyond the maximum 5-ml capacity of the cup.

Ask Yourself:

How do I prevent overmedication?

Prevention:

Use caution in handling medications. Look at the medicine dropper at eye level and pour the entire amount into the cup carefully without spilling. Discard the medication, obtain the replacement, repeat the preparation, and administer the correct medication.

Possible Error:

The client exhales while using the metered-dose inhaler.

Ask Yourself:

How do I prevent this error?

Prevention:

Have the client demonstrate the use of the metered-dose inhaler. If the client is unable to adequately coordinate inhaling while dispensing the metered dose, provide the client with an aerochamber to provide a holding chamber for the medication while the client breathes in and out normally.

> NURSING TIPS:

- Evaluate the client's need for medication delivery. Some clients, such as young clients (usually less than 5 years old), clients with coordination problems, and clients with severe or acute asthma, will benefit more from using a nebulizer. Some clients, such as school aged children, active adults, and clients with exercise-induced asthma, will benefit more from the ease and portability of a metered-dose inhaler.
- Be aware of the client's ability to use the nebulizer device. Young children and clients with acute or severe exacerbation may not be able to use the mouthpiece for the nebulizer. A mask may provide better delivery of the medication(s).
- Measure the medication accurately by looking at the medicine dropper at eye level, and pour the exact amount of medication needed into the cup.
- Familiarize yourself with all the asthma medications in order to be aware of any outcomes the client may have from treatment. Some medications that the client might be taking can interact with each other. Beta blockers (Propranolol, Atenolol, and Betalol) can antagonize the beta agonists, increasing asthma symptoms. The nurse needs to be familiar with the medications in order to anticipate possible reactions.
- Be aware of the advantages and disadvantages of using the nebulizer or the metered-dose inhaler. The particle size of medication used via a nebulizer, which is in a mist form, is smaller compared to using metered-dose inhalers. Therefore, the medication gets deposited into the receptor sites quicker and the effects are faster. It takes about 6–7 minutes to finish up a nebulizer treatment of 2.5–3 ml solution, whereas it only takes about a minute to use 1–2 puffs of a metered-dose inhaler.

SKILL 5-8

Administering an Intradermal Injection

Kathryn Lilleby, RN

KEY TERMS

Allergy testing
Bleb
Dermis

Intradermal
Tuberculin syringe



> OVERVIEW OF THE SKILL

An intradermal injection is a method used to administer medications just below the skin. Potent medications that should be absorbed slowly are given intradermally due to the less richly supplied blood vessels of this layer. However, the client may respond rapidly and should be monitored for allergic reactions.

The most common reason for an intradermal injection is skin testing such as tuberculin screening or allergy testing. Only small amounts (0.01–0.10 ml) of fluid are given intradermally.

The most common sites for injections are forearms and upper back. The site should be lightly pigmented, free of lesions, and hairless. Since these areas are easily accessible, the nurse can monitor the reaction.

A syringe, consisting of the barrel with plunger and tip of syringe where a needle can be attached, is used. The needle's hub screws into the tip of the syringe and its hollow shaft ends at a beveled point. A tuberculin or small hypodermic syringe is used with a short ($\frac{1}{4}$ – $\frac{1}{2}$ inch), fine (26–27) gauge needle.

> ASSESSMENT

1. Review physician's or qualified practitioner's order so that the drug is administered safely and correctly.
2. Review information regarding the expected reaction to the allergen in order to anticipate the type of reaction a client may have.
3. Assess for the indications for intradermal injection including the client's allergy history so the nurse will not administer a substance to which the client is known to be sensitive.
4. Check the expiration date of the medication vial since the drug loses its potency over time.
5. Assess client's knowledge regarding the medication to be received so that client education may be tailored according to their need.

6. Assess the client's response to discussion about an injection since some clients may express anticipatory anxiety, which may increase pain.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to the procedure
- 9.3.1 Anxiety

> PLANNING

Expected Outcomes:

1. The client will experience only minimal pain or burning at the injection site.

2. The client will experience no allergic reaction or other side effects from the injection.
3. The client will be able to explain the significance of the presence or absence of a skin reaction.
4. The client will keep follow-up appointments within the recommended time frame to have responses to the medication evaluated.

Equipment needed (see Figure 5-8-2):

- Tuberculin syringe, 1 ml
- Needle (25–27 gauge, $\frac{1}{4}$ – $\frac{5}{8}$ inch)
- Antiseptic or alcohol swabs
- Medication ampoule or vial
- Medication card or medication administration record
- Disposable gloves



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for administering the medication intradermally.
2. Reassure client that the injection will look and feel like a mosquito bite.
3. The client should be told to report any bleeding, itching, pain, or other skin reactions.



Figure 5-8-2 Syringes come in many sizes. Select the 1-ml tuberculin syringe for intradermal injections.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands and put on clean gloves.
2. In the inpatient setting, close door or curtains around bed and keep gown or sheet draped over body. In the outpatient setting, close door to exam or treatment room. Identify client.
3. Select injection site.
 - Inspect skin for bruises, inflammation, edema, masses, tenderness, and sites of previous injections.
 - Forearm site should be 3–4 fingerwidths below antecubital space and one hand-width above wrists on inner aspect of forearm.
4. Select $\frac{1}{4}$ - to $\frac{5}{8}$ -inch 25- to 27-gauge needle (see Figure 5-8-3).
5. Assist client into a comfortable position. Forearm site: Relax the arm with elbow and fore-

RATIONALE

1. Reduces the transmission of microorganisms.
2. Provides privacy. Assures medication is given to right client.
3. Injection site should be free of lesions. Repeated daily injections should be rotated. Assures a clear site for interpreting results.
4. Ensures that needle will be injected into the intradermis.
5. Relaxation minimizes discomfort. Distraction reduces anxiety.



Figure 5-8-3 Select a ¼-inch to ⅝-inch 25- to 27-gauge needle for the injection.



Figure 5-8-4 Note a small bleb, like a mosquito bite, forming under the skin surface as the medication is injected.

arm extended on a flat surface. Distract client by talking about an interesting subject.

6. Use antiseptic swab in a circular motion to clean skin at site.
 7. While holding the swab between fingers of nondominant hand, pull cap from needle.
 8. Administer injection:
 - With nondominant hand, stretch skin over site with forefinger and thumb.
 - Insert needle slowly at a 5- to 15-degree angle, bevel up, until resistance is felt; then advance to no more than ⅛ inch below the skin. The needle tip should be seen through the skin.
 - Do not aspirate. Slowly inject the medication. Resistance will be felt.
 - Note a small bleb, like a mosquito bite, forming under the skin surface (see Figure 5-8-4).
 9. Withdraw the needle while applying gentle pressure with the antiseptic swab.
 10. Do not massage the site.
 11. Assist the client to a comfortable position.
 12. Discard the uncapped needle and syringe in a safe receptacle.
 13. Remove gloves and wash hands.
6. Circular motion and mechanical action of swab remove secretions containing microorganisms.
 7. Swab remains accessible during procedure. Prevents contamination of needle.
 8.
 - Needle penetrates tight skin easier than loose skin.
 - Ensures needle tip is in the dermis.
 - Dermal layer is tight and does not expand easily when fluid is injected.
 - Indicates the medication was deposited in the dermis.
 9. Supporting tissue around injection site minimizes discomfort.
 10. Prevents medication from being dispersed into the tissue and altering test results.
 11. Promotes comfort.
 12. Decreases risk of needle stick.
 13. Reduces transmission of organisms.



▼ REAL WORLD ANECDOTES

Sharon, a teen-ager, suddenly developed sneezing, watery eyes, and sinus congestion. Her mother thought it was allergies and took her to a doctor. Skin testing was ordered after a history and physical examination. The nurse talked with Sharon about the intradermal injections before bringing the vials and syringes into the room. It seemed that Sharon was concerned about the marks the injections might make on her skin as well as the pain. So the nurse explained that the injections would be on her forearms. She discussed ways to cover the sites, such as wearing a long-sleeved blouse, until the redness disappeared. When the nurse explained that the injection would be similar to a mosquito bite, Sharon relaxed and allowed the nurse to prepare the injection.

> EVALUATION

- The client experienced only minimal pain or burning at the injection site.
- The client experienced no allergic reaction or other side effects from the injection.
- The client was able to explain the significance of the presence or absence of a skin reaction.
- The client kept all follow-up appointments within the recommended time frame to have responses to the medication evaluated.

> DOCUMENTATION

Medication Administration Record

- Date, time, dose, route, site of medication, and signature or initials.

Nurses' Notes

- Date and time of skin reaction.
- Date and time of any systemic side effects of the medication. Report to physician.

> CRITICAL THINKING SKILL

Introduction

Potent medications are used in skin testing so the dermis is used since the drug is absorbed slowly in this area of fewer blood vessels.

Possible Scenario

A bleb does not appear after an intradermal injection and a small amount of blood oozes from the site after the needle is removed.

Possible Outcome

The client test results are invalid because the drug has entered the circulation or the client experiences an anaphylactic reaction due to an IV dose of the potent drug.

Prevention

When inserting the needle into the dermis, be sure the needle meets resistance, an indication that the needle is in the dermis. When injecting, if no resistance is felt, pull the needle out, clean another site, and start again with a new syringe.

▼ VARIATIONS



Geriatric Variations:

- Aging skin may be fragile. Use extra caution and guide the needle into position slowly. Apply gentle pressure when withdrawing the needle.



Pediatric Variations:

- Distracting a child so he does not see the syringe and needle may help relieve anxiety.
- Lightly tap the skin before inserting the needle. This may decrease pain by focusing the child's attention on the touch rather than the needle. Be sure not to contaminate the clean site.

▼ VARIATIONS *continued*

- Elicit the child's cooperation to sit still and enlist the parent's or caregiver's help to assist the child to remain still. Discuss a reward, such as a play opportunity after the injection, to elicit cooperation.
- Draw a rabbit, cat, or flower around the site instead of just a circle.



Home Care Variations:

- Clients may call the nurse to report skin reactions at various time points following the injection.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The needle is inserted too deep and no bleb forms during the injection.

Ask Yourself:

How do I prevent this error?

Prevention:

Check placement of needle by visual inspection of the needle tip below the skin and observing the bleb formation.

Ask Yourself:

How do I respond to this error?

Response:

Remove the needle and perform the injection at another site.

Possible Error:

A tuberculosis test was ordered for a client but the wrong vial was used and an allergy test was given instead.

Ask Yourself:

How do I prevent this error?

Prevention:

Read the label of the vial or ampoule carefully and compare it with the physician's or qualified practitioner's order.

Ask Yourself:

How do I respond to this error?

Response:

Report the error to the physician or qualified practitioner. Observe for a skin reaction. Administer the correct test in the other arm. Mark both arms and read the reaction of each site.

> NURSING TIPS

- A flat surface with a towel or cushion will provide a comfortable place for the client to rest their arm.
- Remember to inject the needle with the bevel up so the medication is not injected into the subcutaneous tissue.
- Remember when documenting the site of the injection to indicate left or right arm, as markings often wash off.
- Mark sites with skin marking pen, if appropriate. Avoids confusion when evaluating results.

SKILL 5-9

Administering a Subcutaneous Injection

Kathryn Lilleby, RN

KEY TERMS

Cachectic	Nonviscous
Connective tissue	S.C.
Dermis	S.Q.
Intramuscular	Subcutaneous
Isotonic	



> OVERVIEW OF THE SKILL

A subcutaneous injection is a method used to administer medications into the loose connective tissues just below the dermis of the skin. Medications that do not need to be absorbed as quickly as those given intramuscularly are given subcutaneously due to the less richly supplied blood vessels in the subcutaneous tissue. However, the client may respond more rapidly to a subcutaneous injection than oral medication and should be monitored for potential side effects, allergic reactions, the risk of infection, or bleeding.

Only small (0.5- to 1-ml) doses of isotonic, non-irritating, nonviscous, and water-soluble medications should be given subcutaneously, such as insulin, tetanus toxoid, allergy medications, epinephrine, and vitamin B₁₂. If larger volumes of medications remain

in these sensitive tissues, a sterile abscess could form, causing a hard, painful lump.

The most common sites for subcutaneous injections are the vascular areas around the outer aspect of the upper arms, the abdomen, and the anterior aspect of the thighs. Since these areas are easily accessible, the client may learn how to self-administer medications. Rotation of sites of injections should be observed so that no site is used more often than every 6–7 weeks.

For a subcutaneous injection, a 2- to 3-ml syringe or a 1-ml syringe is recommended. U-100 insulin syringes in 30-, 50-, and 100-unit sizes are used for subcutaneous insulin injections. The most commonly used needle for a subcutaneous injection is a $\frac{5}{8}$ -inch 25-gauge needle. Adjustments need to be made for pediatric, obese, or cachectic clients.

> ASSESSMENT

1. Review physician's or qualified practitioner's order so that the drug is administered safely and correctly.
2. Review information regarding the drug ordered such as action, purpose, time of onset and peak action, normal dosage, common side effects, and nursing implications to anticipate the drug's effects and anticipate a reaction.
3. Assess client for factors that may influence an injection such as circulatory shock or reduced local tissue perfusion since reduced tissue perfusion will interfere with the absorption and distribution of the drug.
4. Assess for previous subcutaneous injections in order to rotate sites and avoid repeating a dose in the same site.
5. Assess for the indications for subcutaneous injection since an injection is preferred for clients who are confused or unconscious, are unable to swallow a tablet, or have a gastrointestinal disturbance including the use of nasogastric suction.

6. Assess the client’s age since older clients or pediatric clients have special needs based on their physiologic status.
7. Assess client’s knowledge regarding the medication to be received so that client education may be tailored according to their need.
8. Assess the client’s response to discussion about an injection since some clients may express anticipatory anxiety, which may increase pain.

- Medication record
- Disposable gloves



Estimated time to complete the skill:
5–10 minutes

> **DIAGNOSIS**

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 9.3.1 Anxiety, related to the injection
- 8.1.1 Knowledge Deficit, related to the injection

> **PLANNING**

Expected Outcomes:

1. The client will experience only minimal pain or burning at the injection site.
2. The client will experience no allergic reaction or other side effects from the injection.
3. The client will be able to explain the action, side effects, dosage and schedule of the medication, and rationale for rotation of sites.

Equipment Needed (see Figure 5-9-2):

- Syringe appropriate for the medication being given
- Needle (25–27 gauge, $\frac{3}{8}$ – $\frac{5}{8}$ inch)
- Antiseptic or alcohol swabs
- Medication ampoule or vial

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for administering the medication subcutaneously rather than orally.
2. The client should be told what to expect when receiving a subcutaneous injection.
3. The client should be told to report any bleeding, itching, pain, or other side effects as a result of the injection.
4. Clients and caregivers can be taught to administer subcutaneous injections.
5. The client should be provided with written, illustrated instructions on administration of a subcutaneous injection.



Figure 5-9-2 100-unit insulin syringes are used to administer insulin subcutaneously.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and put on clean gloves.
2. Close door or curtains around bed and keep gown or sheet draped over body. Identify client.
3. Select injection site.
 - Inspect skin for bruises, inflammation, edema, masses, tenderness, and sites of previous injections.
 - Use anatomic landmarks (see Figure 5-9-3).

1. Reduces the number of microorganisms.
2. Provides privacy. Assures medication is given to right client.
3. Injection site should be free of lesions.
 - Repeated daily injections should be rotated.
 - Avoids injury to underlying nerves, bone, or blood vessels.

continues



Figure 5-9-3 Select injection site. Inspect for bruises, tenderness, swelling, or other skin conditions prior to administering the injection.

4. Select needle size:
 - Measure skinfold by grasping skin between thumb and forefinger.
 - Be sure needle is one-half the length of the skinfold from top to bottom.
 5. Assist client into a comfortable position:
 - Relax the arm, leg, or abdomen.
 - Distract client by talking about an interesting subject or explaining what you are doing step by step.
 6. Use antiseptic swab to clean skin at site.
 7. While holding swab between fingers of non-dominant hand, pull cap from needle.
 8. Administer injection:
 - Hold syringe between thumb and forefinger of dominant hand like a dart.
 - Pinch skin with nondominant hand (see Figure 5-9-4).
 - Inject needle quickly and firmly (like a dart) at a 45- to 90-degree angle (see Figure 5-9-5).
 - Release the skin.
 - Grasp the lower end of the syringe with nondominant hand and position dominant hand to the end of the plunger. Do not move the syringe.
 - Pull back on the plunger to ascertain that the needle is not in a vein. If no blood appears, slowly inject the medication. (Aspiration is contraindicated with some medications; check with the pharmacy if you are unclear.)
 9. Quickly withdraw the needle while applying pressure with the antiseptic swab. Do not push
4. Ensures that needle will be injected into subcutaneous tissue.
 5. Relaxation minimizes discomfort. Distraction reduces anxiety.
 6. Circular motion and mechanical action of swab remove microorganisms.
 7. Swab remains accessible during procedure. Prevents contamination of needle.
 8.
 - Quick, smooth injection is easier with proper position of syringe.
 - Needle penetrates tight skin easier than loose skin. Pinching skin elevates subcutaneous tissue.
 - Quick, firm injection minimizes discomfort.
 - Injection requires smooth manipulation of syringe parts. Movement of syringe may cause discomfort.
 - Aspiration of blood indicates intravenous placement of needle so procedure may have to be abandoned.
 9. Supporting tissue around injection site minimizes discomfort.



Figure 5-9-4 Pinch the skin with the nondominant hand.



Figure 5-9-5 When injecting at a 90° angle, hold the syringe like a dart and pierce the skin quickly and firmly.

down on the needle with the swab while withdrawing it, as this will cause more pain.

- | | |
|--|---|
| <p>10. Gently massage the site. Some medications should not be massaged. Ask the pharmacy if you are unclear.</p> <p>11. Assist the client to a comfortable position.</p> <p>12. Discard the uncapped needle and syringe in a disposable needle receptacle.</p> <p>13. Remove gloves and wash hands.</p> | <p>10. Stimulates circulation and improves drug distribution and absorption.</p> <p>11. Promotes comfort.</p> <p>12. Decreases risk of needle stick.</p> <p>13. Reduces transmission of microorganisms.</p> |
|--|---|



▼ REAL WORLD ANECDOTES

Dorothy was receiving chemotherapy for treatment of her breast cancer. After the first cycle of adriamycin, cyclophosphamide, and 5-fluorouracil (5FU), her neutrophil count dropped to less than 500. She was admitted to the hospital for treatment of a presumed infection after she reported a fever of 38.5°C to her physician. In addition to IV antibiotics, Dorothy's doctor ordered subcutaneous injections of granulocyte colony-stimulating factor (G-CSF), a hematopoietic growth factor to stimulate her bone marrow to produce more neutrophils. Since she weighed over 90 kg, the daily dose was more than 2 ml, an amount of fluid too large to inject subcutaneously. So the nurse divided the dose into two syringes and gave the dose in two separate sites in Dorothy's abdomen one day and rotated the sites to each upper thigh the next day. This also enabled the nurse to teach Dorothy how to give herself the injections once she left the hospital or when she needed the medication after her next cycle of chemotherapy.

> EVALUATION

- Ask the client if they feel any pain, burning, numbness, or tingling at the injection site.
- Assess the client's response to the medication 30 minutes later.
- Ask the client to discuss the purpose, action, schedule, and side effects of the medication.

> DOCUMENTATION

Medication Administration Record

- Document the date, time, dose, route, site of injection, and signature or initials.

Nurses' Notes

- Document date and time of response to the medication.
- Document date and time of any side effects of the medication.

> CRITICAL THINKING SKILL

Introduction

A subcutaneous injection is intended for the tissue below the skin, not a vein. It is important to check the needle position before injecting the medication.

Possible Scenario

A thin client with prominent superficial veins requires a subcutaneous injection so the nurse assesses the client for the best site. When the client states that she prefers

the upper arm, the nurse honors her request and inserts the needle. When she aspirates to check for position of the needle, blood appears in the syringe.

Possible Outcome

The nurse removes the needle and syringe and applies pressure to the injection site. Then she discards the needle, medication, and syringe and prepares a new dose of the medication in another syringe. She assesses the abdomen and successfully injects the medication into subcutaneous tissue and not a vein.

Prevention

The nurse should have assessed the upper arm for the presence of veins close to the surface and instructed the client about the rationale for using the abdomen to avoid injecting medication into a vein.

▼ VARIATIONS



Geriatric Variations:

- Older clients have less subcutaneous tissue and the skin is less elastic.
- Clients may have an increased need for daily subcutaneous injections such as insulin or heparin.



Pediatric Variations:

- Distracting a child so he does not see the syringe and needle may help relieve anxiety.
- Lightly tapping the skin before inserting the needle may decrease pain by focusing the child's attention on the touch rather than the needle. Make sure not to tap the clean area, so it does not become contaminated.
- Demonstrate the injection procedure on a doll or teddy bear using a syringe without a needle.
- A parent or another caregiver may be needed to help hold the child for a safe procedure.



Home Care Variations:

- A safe method of disposing of needles and syringes should be maintained, especially if children or animals are present.



Long-Term Care Variations:

- Clients who receive subcutaneous injections over long-term periods should be taught to rotate injection sites to prevent the buildup of scar tissue and poor absorption at any one site.
- Periodically reassess the client's injection technique. Over the long term, clients can become careless with technique. Be sure the client continues to use the proper technique.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The needle hits a bone when the nurse inserts it.

Ask Yourself:

How do I prevent this error?

Prevention:

The client should be assessed for a suitable needle length and gauge according to their weight and skinfold measurement.

Ask Yourself:

How do I respond to this error?

Response:

Remove the needle. Reassess the client and choose an appropriate needle. Change needles and reinsert.

Possible Error:

After inserting the needle, the client jerks and the syringe moves in the nurse's hand, causing pain to the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Tell the client when you are going to insert the needle and keep a hand on the syringe at all times.

Ask Yourself:

How do I respond to this error?

Response:

Reassure the client. Hold the syringe firmly. Support the tissue around the needle with the alcohol swab.

> NURSING TIPS

- A simple rule to follow: If 2 inches of tissue can be grasped, the needle should be inserted at a 90-degree angle. If 1 inch of tissue can be grasped, the needle should be inserted at a 45-degree angle.
- Do not push a needle through the skin; insert it quickly and smoothly.
- Divert the client's attention by engaging in conversation.
- Use an alcohol swab to stabilize the skin around the needle while removing it to reduce pulling of the tissue.
- Keep an anatomic chart with the medication record to document the sites used.

SKILL 5-10

Administering an Intramuscular Injection

Kathryn Lilleby, RN

KEY TERMS

Aspirate
Deltoid
Dorsogluteal

Intramuscular
Vastus lateralis
Ventrogluteal



> OVERVIEW OF THE SKILL

An intramuscular injection is a method used to administer medications into the deep muscle tissue. Medications will be absorbed quickly due to the richly supplied blood vessels in the muscle. Most aqueous medications are absorbed in 10–30 minutes. Average-sized adults can tolerate up to 3 ml of medication injected into a large muscle because muscle is less sensitive to irritating and viscous drugs than subcutaneous tissue.

The most common sites for intramuscular injections are the vastus lateralis, the ventrogluteal, the dorsogluteal, and the deltoid muscles. The *vastus lateralis* muscle is located on the anterior lateral aspect of the thigh. This easily accessible site is the preferred site for clients of all ages since it has no major blood vessels or nerves nearby. The *ventrogluteal* muscle is also safe for all clients since it is located deep and away from major blood vessels and nerves. The *dorsolateral* muscle is the traditional site for an intramuscular injection in the upper outer quadrant of the buttock; however, there is greater risk of damage to the sciatic nerve, major blood vessels, and the greater trochanter bone. It should not be used in children less than 5 years of age since this muscle is not developed. The *deltoid* muscle is found on the upper arm about 1 to 2 inches below the acromium process. Major

nerves and blood vessels are beneath this site and only small volumes of medication should be injected.

There are many different types and sizes of syringes. For intramuscular injections, the basic syringe, consisting of a barrel with plunger and tip of syringe where a needle can be attached, can be used. The needle's hub screws into the tip of the syringe and the needle's hollow shaft ends at a beveled point. Prefilled syringes that consist of a prefilled barrel and needle assembly placed in a reusable plunger are often used (see Figure 5-10-2). For an intramuscular injection, a 2- to 3-ml syringe is recommended with a 1¼- to 1½-inch, 19- to 23-gauge needle. Adjustments need to be made for pediatric, obese, or cachectic clients.



Figure 5-10-2 A prefilled syringe consists of a prefilled barrel and needle assembly placed in a reusable plunger.

> ASSESSMENT

1. Review physician's or qualified practitioner's order so that the drug is administered safely and correctly.
2. Review information regarding the drug ordered such as action, purpose, time of onset and peak action, normal dosage, common side effects, and nursing implications to anticipate the drug's effects and anticipate a reaction.
3. Assess client for factors that may influence an injection, such as circulatory shock, reduced local tissue perfusion, or muscle atrophy since reduced tissue perfusion will interfere with the absorption and distribution of the drug.
4. Assess for previous intramuscular injections in order to rotate sites and avoid repeating a dose in the same site.
5. Assess for the indications for intramuscular injection since an injection is preferred for clients who require the fast action of the medication, are confused or unconscious, are unable to swallow a tablet, or have a gastrointestinal disturbance including the use of nasogastric suction.
6. Assess the client's age since older clients or pediatric clients have special needs based on their physiologic status.
7. Assess client's knowledge regarding the medication to be received so that client education may be tailored according to their need.
8. Assess the client's response to discussion about an injection since some clients may express anticipatory anxiety that may increase pain.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
1.6.2.1.2.1 Impaired Skin Integrity



Figure 5-10-3 There are many types of prefilled syringe plungers in use today.

- 9.3.1 Anxiety, related to the injection
8.1.1 Knowledge Deficit, related to the injection

> PLANNING

Expected Outcomes:

1. The client will experience only minimal pain or burning at the injection site.
2. The client will experience no allergic reaction or other side effects from the injection.
3. The client will be able to explain the action, side effects, dosage, and schedule of the medication.

Equipment Needed (see Figures 5-10-3 and 5-10-4):

- Syringe (1–3 ml)
- Needle (19–23 gauge, 1¼–1½ inches)
- Antiseptic or alcohol swabs
- Medication ampoule or vial
- Medication record
- Disposable gloves



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for administering the medication intramuscularly rather than orally.
2. The client should be told what to expect when receiving an intramuscular injection.
3. The client should be told to report any bleeding, itching, pain, or other side effects as a result of the injection.
4. If the client has allergies, be sure they wear a bracelet stating what they are allergic to.



Figure 5-10-4 Prefilled barrel and needle cartridges

5. Clients who require regular injections need to record how they rotate the sites.
6. Clients and caregivers should be instructed to observe injection sites for complications and side effects of medications.
7. Clients and caregivers can be taught to administer intramuscular injections.
8. Provide written, illustrated instructions on administration of an intramuscular injection.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Wash hands and put on clean gloves. 2. Close door or curtains around bed and keep gown or sheet draped over body. Identify client. 3. Select injection site. <ul style="list-style-type: none"> • Inspect skin for bruises, inflammation, edema, masses, tenderness, and sites of previous injections. • Use anatomic landmarks. 4. Select needle size: Assess size and weight of client and site to be used. 5. Assist client into a comfortable position: <ul style="list-style-type: none"> • For vastus lateralis, lie flat or supine with knee slightly flexed. • For ventrogluteal, lie on side or back with knee and hip slightly flexed. • For dorsogluteal, lie prone with feet turned inward or on side with upper knee and hip flexed and placed in front of lower leg. • For deltoid, stand with arm relaxed at side or sit with lower arm relaxed on lap or lie flat with lower arm relaxed across abdomen (see Figure 5-10-5). • Distract client by talking about an interesting subject. 6. Use antiseptic swab to clean skin at site. 7. While holding swab between fingers of non-dominant hand, pull cap from needle. 8. Administer injection: <ul style="list-style-type: none"> • Hold syringe between thumb and forefinger of dominant hand like a dart. | <ol style="list-style-type: none"> 1. Reduces the number of microorganisms. 2. Provides privacy. Assures medication is given to the right client. 3. Injection site should be free of lesions. <ul style="list-style-type: none"> • Repeated daily injections should be rotated. • Avoids injury to underlying nerves, bone, or blood vessels. 4. Ensures that needle will be injected into the muscle. 5. Relaxation minimizes discomfort. Distraction reduces anxiety. 6. Circular motion and mechanical action of swab remove secretions containing microorganisms. 7. Swab remains accessible during procedure. Prevents contamination of needle. 8. <ul style="list-style-type: none"> • Quick, smooth injection is easier with proper position of syringe. |
|--|---|



Figure 5-10-5 Have the client stand or sit with arm relaxed at side.



Figure 5-10-6 Inject needle quickly and firmly at a 90° angle.

- Spread skin tightly, or pinch a generous section of tissue firmly—for cachectic patients.
 - Inject needle quickly and firmly (like a dart) at a 90-degree angle (see Figure 5-10-6).
 - Release the skin.
 - Grasp the lower end of the syringe with nondominant hand and position dominant hand to the end of the plunger. Do not move the syringe.
 - Pull back on the plunger to ascertain if needle is in a vein. If no blood appears, slowly inject the medication.
9. Quickly withdraw the needle while applying pressure with the antiseptic swab.
 10. Gently massage the site.
 11. Assist the client to a comfortable position.
 12. Discard the uncapped needle and syringe in a safe receptacle.
 13. Remove gloves and wash hands.
- Needle penetrates tight skin easier than loose skin.
 - Quick, firm injection minimizes discomfort.
 - Injection requires smooth manipulation of syringe parts. Movement of syringe may cause discomfort.
 - Aspiration of blood indicates intravenous placement of needle so procedure may have to be abandoned.
9. Supporting tissue around injection site minimizes discomfort.
 10. Stimulates circulation and improves drug distribution and absorption.
 11. Promotes comfort.
 12. Decreases risk of needle stick.
 13. Reduces transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Mr. Germeau was to receive an IM injection of Demerol. The nurse carefully located the landmarks on Mr. Germeau's ventrogluteal site. She held her nondominant hand on Mr. Germeau's hip to mark the site as she inserted the needle, dart-like, into the muscle. Unfortunately, she darted the needle through the skin between her fingers as she darted the needle into Mr. Germeau's hip. While maintaining a straight face, the nurse injected the Demerol and withdrew the needle from his hip and her hand. Making sure Mr. Germeau was safe, the nurse proceeded to the sink to wash her hands and stem the bleeding from her nondominant hand. Once she had stopped the bleeding, she made sure Mr. Germeau was comfortable and proceeded to the nurses' station where she cleaned and dressed the injury and filled out an incident report.

> EVALUATION

- Ask the client if they feel any pain, burning, numbness, or tingling at the injection site.
- Assess the client's response to the medication 10–30 minutes later.
- Ask the client to discuss the purpose, action, schedule, and side effects of the medication.

> DOCUMENTATION

Medication Administration Record

- Name of medication
- Dosage
- Route of administration
- Location of injection
- Time administered
- Initials and signature of nurse administering medication

Nurses' Notes

- Time and type of client complaint
- Medication administered
- Outcome of treatment (patient response)
- Nurse's signature

> CRITICAL THINKING SKILL

Introduction

The deltoid muscle is easily accessible although not well developed in some adults and older clients. It may be difficult to avoid the nerves and blood vessels underlying the muscle.

Possible Scenario

A young woman injured in a car accident has a fractured pelvis and is in a knee-to-chest body cast. She has recovered from her acute injuries and no longer needs an IV but she still requires IM injections of pain medication.

Possible Outcome

The only available muscle for an IM injection is the deltoid, so the nurse assesses her muscle and finds it is not well developed. She knows that pain medications are available in different concentrations. She draws up the dose of medication equal to 1.5 ml and injects it into the deltoid muscle.

Prevention

The only site for an IM injection was assessed and a suitable amount of medication was administered.

▼ VARIATIONS



Geriatric Variations:

- Older clients who have had a cerebrovascular accident may have muscle atrophy.
- Elderly clients may require shorter and smaller gauged needles due to muscle atrophy.
- Older clients should receive no more than 2 ml of medication.



Pediatric Variations:

- No more than 1 ml of medication should be injected into the muscle of a small child. Small infants should not be given more than 0.5 ml IM.
- A tuberculin syringe and a 1/2- to 1-inch, 25- to 27-gauge needle are more appropriate for infants who require small doses of medications.
- Distracting a child so he does not see the syringe and needle may help relieve anxiety.
- Lightly tapping the skin before inserting the needle may decrease pain by focusing the child's attention on the touch rather than the needle.
- Parents can comfort their child after an injection.
- Band-Aids with cartoon pictures help soothe a child after an injection.
- Assistance may be required to help the child hold still.



Home Care Variations:

- Clients need an approved method of discarding needles and syringes when giving injections at home.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *If the client requires routine doses of IM medication, be sure to rotate the sites to prevent tissue damage and poor absorption of the medication.*
- *Reassess the client's need for ongoing IM medications regularly. It may be more appropriate to deliver the medication via a different route.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

When the elderly, obese client turned on her side for an IM injection into her dorsogluteal muscle, the nurse could not identify the landmarks for the site.

Ask Yourself:

How do I prevent this error?

Prevention:

Use the vastus lateralis muscle since it is accessible, safe, and easy to assess for correct injection site.

Ask Yourself:

How do I respond to this error?

Response:

Ask the client to turn onto her back and flex her knee slightly. Reassure her that an injection in her leg will be no more painful than in her buttock.

Possible Error:

The nurse felt the needle tip hit a bone when she gave an intramuscular injection in the dorsolateral muscle.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the client for size and weight in order to select the most appropriate site. Be sure the needle length is also suitable for the client's weight.

Ask Yourself:

How do I respond to this error?

Response:

Pull back on the needle, then pull back on the plunger, to see if the needle is in a vein. If not, inject the medication.

> NURSING TIPS

- Avoid giving an injection into atrophied muscles since they absorb medication poorly.
- Do not push a needle through the skin; insert it quickly and smoothly.
- Divert the client's attention by engaging in conversation.
- Use an alcohol swab to stabilize the skin around the needle while removing it to reduce pulling of the tissue.
- Keep an anatomic chart with the medication record to document the sites used.

SKILL 5-11

Administering Medication via Z-Track Injection

Kimberly Sue Kahn, RN, MSN, FNP-C, CS, AOCN

KEY TERMS

**Anterior gluteal
Deltoid
Dorsogluteal
Intramuscular
injection**

**Quadriceps
Traction
Ventrogluteal
Z-track**



> OVERVIEW OF THE SKILL

Originally the Z-track method of intramuscular injections was used as a special procedure for only certain medications. Medications such as iron dextran and hydralazine hydrochloride can be irritating to the tissues and stain the skin. Using the Z-track

method prevents potentially irritating medications from being tracked up through the tissues by interrupting the injection tract. This method can help reduce pain even with nonstaining or irritating substances.

> ASSESSMENT

1. Assess the client's understanding of the proposed injection. Allows the nurse to provide education and support as needs are identified.
2. Verify the physician's or qualified practitioner's order. Assures appropriate medication, route, dose, side effects, time of onset and peak action, and nursing implications. This allows the nurse to anticipate effects of the drug and to observe the client's response.
3. Consider the appropriateness of the therapy. If the medication is a narcotic, how has the client responded to intramuscular narcotics in the past? Knowing what dose and medication have been effective in the past for this client will enable the nurse to be a better client advocate.
4. Replace any missing or faded identification bracelets. Identification bracelets provide positive client information.

5. Check the client's drug allergy history since an allergic reaction could occur.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 9.3.1 Anxiety, related to the injection
- 8.1.1 Knowledge Deficit, related to the injection

> PLANNING

Expected Outcomes:

1. The correct client will receive the correct medication.
2. The client will not experience pain or skin staining secondary to the medication.
3. The client will obtain the expected benefit from the medication.

Equipment Needed (see Figure 5-11-2A, B, C):

- Syringe with larger-bore needle for drawing up the medication
- Needle to place on syringe for client injection
- Alcohol swab
- Medication
- Medication administration record (MAR)



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct on appropriate positioning to maximize their comfort during the procedure.
2. Explain the purpose of the injection and probable side effects and duration.



Figure 5-11-2A Various sizes of syringes. Select the appropriate syringe for the amount of medication being administered.



Figure 5-11-2B Select the correct gauge and length of needle for the size of the client and the type of medication being administered.



Figure 5-11-2C Medication ampoules

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Assess the client for knowledge of planned injection. | <ol style="list-style-type: none"> 2. Decreases client anxiety. |
| <ol style="list-style-type: none"> 3. Check the MAR against the physician’s or qualified practitioner’s order. | <ol style="list-style-type: none"> 3. Ensures accuracy in the administration of the medication. |
| <ol style="list-style-type: none"> 4. Check for drug allergies. | <ol style="list-style-type: none"> 4. Decreases risk of allergic reactions such as hives, urticaria, or anaphylactic shock. |
| <ol style="list-style-type: none"> 5. Prepare the medication for only one client at a time. | <ol style="list-style-type: none"> 5. Ensures that the right client receives the right medication. |

continues

6. Select the correct medication and double check against the MAR.
7. Calculate the medication dose, if necessary.
8. With the syringe at eye level, draw up the medication with a large-bore needle. Remove the large-bore needle and replace it with a needle of the appropriate size and length for the client (see Figure 5-11-3).



Figure 5-11-3 Replace the large-bore needle with a needle of appropriate size and length for the client.

6. Increases accuracy and decreases potential errors.
7. Determines the correct amount of medication to be given.
8. Syringe at eye level increases precision. Changing the needle will prevent introducing any potentially irritating medication into the client.



Figure 5-11-4 Add 0.1–0.2 ml of air to the medication in the syringe.

9. Add 0.1–0.2 ml of air to the dose in the syringe. The air will push the medication out of the needle when the last of the medication has been injected (see Figure 5-11-4).
10. Identify client. Locate the appropriate injection site (see Figure 5-11-5).
 - Quadriceps: For children under 3 years of age
 - Dorsogluteal: for adults while lying prone with the feet internally rotated
 - Ventrogluteal: Desirable site for all ages
 - Deltoid: Use only for small volumes of fluid

9. The injected medication is followed by air to clear the medication from the needle.
10. Assures medication is given to the right client. Selecting the most appropriate injection site for an IM shot is a critical factor. A large healthy muscle should always be used. If client is receiving multiple injections, the injection site should be rotated. Rotating the injection site avoids overuse and muscle irritation.

Figure 5-11-5 Locate the appropriate injection site for the Z-track injection.



11. Wash your hands using an antibacterial soap.
12. Clean the injection site thoroughly and allow to dry.
13. Using your nondominant hand, pull the skin and subcutaneous tissue to the side or downward about an inch.
14. Using sterile technique, remove the needle guard using your nondominant hand.
15. While maintaining traction on the skin, using your dominant hand, dart the needle into the skin at a 90-degree angle.
16. Aspirate for a minimum of 5 seconds. Observe for a blood return.
17. If no blood return present, slowly (at a rate of 1 ml/10 seconds) inject the medication.
18. If injecting iron dextran or other irritating substance, allow the needle to stay in place for 10 seconds after the medication is injected.
19. While still maintaining traction on the skin with the nondominant hand, smoothly remove the needle and allow the skin to slide over the now-interrupted injection track.
20. Do not rub or wipe the skin after removal of the needle.
21. Dispose of needle in a nonpenetrable container.
22. Wash hands.
11. Decreases the potential of equipment and client contamination.
12. The mechanical action of cleaning along with the alcohol at the injection site helps reduce microflora and decreases the potential of introducing pathogens into the client's tissue. Alcohol can cause skin irritation and burning if the skin is not allowed to dry prior to injection.
13. Pulling the tissue to the side or downward prior to the injection will break the injection track after removing the needle, not allowing the medication to track back up to the surface of the skin. Also, by pulling the tissue tight, the skin becomes firm and facilitates entry of the needle.
14. Ensures the needle is not contaminated with microorganisms.
15. Darting the needle is more comfortable for the patient. A 90-degree angle will ensure the needle reaches muscle tissue and is not trapped in the subcutaneous or adipose tissue.
16. Blood from small vessels can take up to 5 seconds to appear in the syringe.
17. Allows the medication to diffuse, causing less stretch on the muscle fibers, and thus is better tolerated by the client.
18. Allows the medication to diffuse before the needle is removed, which decreases the chance that any medication will be tracked back up through the skin.
19. Holding traction on the tissue prevents any irritation caused by the needle being removed. Allowing the tissue to slide over the track seals the track, not allowing any medication to penetrate the skin surface.
20. This can cause seepage of the medication back to the surface and cause irritation.
21. Avoids needle sticks to colleagues.
22. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Mr. Arango had just returned postoperative from a lumbar laminectomy. He was supine in bed and complaining of severe back pain. Dr. Bowden ordered 100 mg of meperidine IM now. Nurse Kennedy knew that 100 mg of meperidine comes in a prefilled syringe of 2 cc. She also knew that she should not inject this large volume into the client's deltoid. The anterior gluteal site was ideal. This way Mr. Arango would not have to roll over and the anterior gluteal was the ideal site for this large volume of meperidine. To increase client comfort, she gave the injection by Z-track.

> EVALUATION

- The correct client received the correct medication.
- The client did not experience pain or skin staining secondary to the medication.
- The client obtained the expected benefit from the medication.

> DOCUMENTATION

Medication Administration Record

- Document the date, time, medication, and dose.
- Record the injection site used.

Nurses' Notes

- Document the efficacy of the medication.
- Note any unusual findings.

> CRITICAL THINKING SKILL

Introduction

Dr. Smith orders a dose of an experimental medication for Mr. Kane. The medication comes with a pack-

age insert stating that the medication can be irritating to the skin; in addition it had been known to cause staining.

Possible Scenario

The nurse consults the pharmacist in regard to this medication to find out more information. The pharmacist suggests that this medication has been known to cause irritation and discoloration and she should be very careful with its administration.

Possible Outcome

The nurse gives the medication in the anterior gluteal site with a 1½-inch needle, Z-track method. The client tolerates the procedure well and suffers no irritation or skin staining.

Prevention

Be familiar with any medication you are giving. The Z-track method is usually the preferred method.

▼ VARIATIONS



Geriatric Variations:

- The ventrogluteal site is a preferred site for clients who are elderly and may have muscle wasting. It avoids the risk of injuring the sciatic nerve and is less painful.



Pediatric Variations:

- Adjust the needle size to the size of the child. Inspect and palpate the site prior to injection. The goal is to deliver the medication deep within a large muscle mass and to seal the medication into the muscle using the Z-track technique.
- The vastus lateralis site is usually used for children and infants.
- The dorsogluteal site should not be used for a child under 3 years of age.



Home Care Variations:

- Assess that the caregiver knows all the possible sites for Z-track administration and that they feel comfortable rotating sites to decrease the impact of repeated injections at any one site.
- The vastus lateralis site is the most accessible for self-injections using the Z-track method.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- Set up a schedule for rotating sites to decrease the impact of repeated injections at any one site.
- Avoid injections into any site that shows bruising, swelling, or tenderness. Let it heal.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not using the correct length of needle.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the site carefully, including the size and weight of the person. Visualize where the medication needs to go prior to selecting the needle.

Possible Error:

Letting go of the subcutaneous tissue before the needle is completely removed.

Ask Yourself:

How do I prevent this error?

Prevention:

Watch carefully, and remember to hold the skin in the correct position until after the needle is out. Do not be in a hurry.

Possible Error:

Not palpating the landmarks prior to injection.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember not to get overconfident, especially when repeating injections on the same client. Palpating landmarks prior to injection is a “must do” for every injection, every time.

Possible Error:

Attempting to give too large a volume in one shot.

Ask Yourself:

How do I prevent this error?

Prevention:

If the volume to be administered is at or exceeds the recommended amount, either divide the amount into two injections or select a different dosage strength.

> NURSING TIPS

- Practice the ventral gluteal site and become comfortable with it.
- Use the Z-track method routinely.
- Palpate your landmarks. Do not just visualize them.
- At times the medication itself causes pain for the client. Giving the medication slowly will decrease the client’s discomfort.

SKILL 5-12

Withdrawing Medication from a Vial

Kimberly Sue Kahn, RN, MSN, FNP-C, CS, AOCN

KEY TERMS

Calibrations
Expiration date
Multidose

Negative pressure
Turbulence
Vial



> OVERVIEW OF THE SKILL

Vials are often used to package multidose or single-dose parenteral medication. A vial is a small glass bottle with a rubber seal at the top. Glass vials come with a protective plastic or metal cap that prevents the rubber from being punctured prior to use. The rubber top must be cleaned with 70% alcohol with every usage of the medication. In order to aspirate the med-

ication from the vial, an equal amount of air must be injected into the vial before attempting to withdraw any medication. In order to draw the medication out of the vial, the entire vial should be turned upside down. The syringe should be held at eye level to ensure an accurate amount of medication is drawn into the syringe.

> ASSESSMENT

1. Assess the expiration date on the vial to be sure it is current to avoid administering outdated medications.
2. Assess the contents of the medication vial you are about to use for the correct medication in the correct dosage strength to avoid medication error.
3. Assess the contents of the vial for color, consistency, and debris to avoid administering contaminated medication.
4. Assess the integrity of the vial and the stopper on the vial to avoid using a vial that may be contaminated.
5. Assess the integrity of the syringe and needle that will be used to withdraw the medication

to avoid using equipment that may be contaminated.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.1 Risk for Injury

> PLANNING

Expected Outcomes:

1. The correct medication will be drawn from the vial using sterile technique.
2. The correct dose will be drawn from the vial.
3. The remaining contents of multiuse vials will not be contaminated.

- The date will be marked on the vial after opening using an ink pen.

Equipment Needed (see Figure 5-12-2):

- Medication vial
- Syringe with needle
- Alcohol sponge pad
- Gloves (optional)
- Clean work space
- Medication administration record (MAR)



Estimated time to complete the skill:
2–5 minutes

> CLIENT EDUCATION NEEDED:

- If the client or caregiver will be drawing up medications from a vial, educate the client regarding the correct technique.



Figure 5-12-2 Syringe, needle, vial of medication, and alcohol wipe are used to withdraw medication from a vial.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands. Apply gloves (optional).
2. Select the appropriate vial (see Figure 5-12-3).

Figure 5-12-3 Carefully select the medication ordered.

3. Verify physician's or qualified practitioner's orders.
4. Check expiration date.
5. Determine the route of medication delivery and select the appropriate size syringe and needle.
6. While holding the syringe at eye level, withdraw the plunger to the desired volume of medication.
7. Clean the rubber top of the vial with a 70% alcohol pad. Use a circular motion starting at the center and working out.
8. Using sterile technique, uncap the needle (see Figure 5-12-4).

RATIONALE

1. Decreases the transmission of microorganisms.
2. Prevents medication errors.



3. Prevents medication errors.
4. Avoids giving expired medication, which may have altered potency.
5. The route of medication delivery is essential to knowing what size syringe and needle will be needed.
6. Holding the syringe at eye level makes it easier to read the syringe calibrations and increases accuracy.
7. Ensures that the center of the rubber top is the cleanest area for needle entry. Reduces potential contamination with microorganisms.
8. Prevents spread of microorganisms.

continues



Figure 5-12-4 Using sterile technique, uncap the needle.

9. Lay the needle cap on a clean surface.
10. Placing the needle in the center of the vial, inject the air slowly. Do not cause turbulence.
11. Invert the vial and slowly; using gentle negative pressure, withdraw the medication. Keep the needle tip in the liquid.
12. With the syringe at eye level determine that the appropriate dose has been reached by volume (see Figure 5-12-5).



Figure 5-12-5 Invert the vial and slowly withdraw the medication until the appropriate dosage has been reached.

13. Slowly withdraw the needle from the vial. Follow the institution's policy regarding recapping needles (see Figure 5-12-6).
14. Using ink, mark the current date and time and initials on the vial.
15. Label the syringe with drug, dose, date, and time.
16. Wash hands.

9. Prevents spread of microorganisms.
10. Adding air prevents the buildup of negative pressure in the vial. Injecting quickly may cause turbulence, which can result in air bubbles forming within the vial, which could affect the accuracy of the volume of liquid being withdrawn.
11. Decreases the number of air bubbles that tend to form with unsteady, fast, jerky motions. Keeping the needle tip in the liquid prevents drawing in air.
12. Ensures client receives the ordered dose of medication.



Figure 5-12-6 Follow the institutional policy regarding recapping needles.

13. Avoids splatter of medication and potential contamination of near-by supplies. Keeps the needle sterile.
14. Prevents using a medication that has been opened too long per hospital protocol.
15. Prevents medication errors.
16. Decreases the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Dr. Saari ordered Mrs. Srsen's central line flushed every 12 hours with 10 cc of normal saline, followed by 3 cc of 100 U/ml heparin. Nurse Eubanks draws up the correct amount of normal saline in one syringe and heparin in another syringe and places them on her medication cart while she answers the phone. When she returns, one syringe is missing, and her notes have been moved. Concerned about the disappearance of the medication, nurse Eubanks asks fellow staff members if they took the filled syringe. She discovers that a very busy float nurse had left two filled syringes on a different medication cart. In her hurry and disorientation on the unit, the float nurse had returned to the wrong cart and grabbed the wrong syringe. Luckily, the float nurse checked the "five rights" again prior to administering the medication. By double-checking she avoided delivering the wrong medication to the client.

> EVALUATION

- The vial was current and the rubber seal intact.
- The correct amount of medication was given.
- The needle did not become contaminated or damaged.

> DOCUMENTATION

Medication Administration Record

- Name of the medication
- Dosage drawn up
- Date and time the medication was drawn up

Controlled Substances Record Book (If the medication drawn up is a controlled substance)

- Name of the medication
- Dosage drawn up
- Date and time the medication was drawn up
- Any controlled substance that was wasted
- Name of nurse drawing up the controlled substance

Controlled substances must be documented at the time they are removed from the locked cabinet. Documentation on the MAR is done after the medication is administered.

> CRITICAL THINKING SKILL

Introduction

Carefully examine the label of your desired medication. Several drug manufacturers use very similar labels for

very different medications. During a busy shift, errors can happen if the nurse doesn't pay particular attention to the medication label.

Possible Scenario

While drawing up normal saline to flush a heparin lock, the nurse reaches into the medication cupboard and into the box marked normal saline. She withdraws a vial. The vial is the same size and shape as the multidose normal saline vials and, distracted, she does not carefully check the label as she is drawing up the medication.

Possible Outcome

The multidose lidocaine is kept on the same shelf in the medication cupboard. The lidocaine vial is the same shape and size as the normal saline vial. The primary difference between the two vials is the color of the type on the label. If the label is not carefully checked, the client is at risk of receiving a potentially toxic dose of lidocaine rather than a therapeutic dose of saline.

Prevention

Be aware of the medication packaging. If two different types of medication are packaged very similarly, don't store them close to each other, as this invites confusion. Always check the label on the medication you are preparing to administer. Two different vials of insulin can look the same and yet have very different effects on the client.

▼ VARIATIONS



Geriatric Variations:

- If an older adult is drawing up medication from a vial, assess that his vision is adequate to read the syringe calibrations and the vial label.
- Assess that the client has the flexibility in his hands to manipulate the syringe and hold the vial.

▼ VARIATIONS *continued*



Pediatric Variations:

- *Keep this and all medications out of the reach of children, especially on an unattended medication cart.*
- *If the setting requires drawing up the medication at the bedside, do not leave capped needles within reach of a child.*
- *Make sure all sharps go completely in the sharp container and that a small hand cannot reach into the opening.*



Home Care Variations:

- *Correct disposal of used vials and needles in the home health setting is extremely important to avoid needlestick injury or cuts from broken glass. Sharps boxes are often not available in the home setting. An empty labeled bleach container can make a useful and safe sharp object container. Encourage clients to return their filled bleach containers to a medical facility instead of dispensing in the trash.*
- *Periodically reassess the client's or caregiver's technique when withdrawing medication from a vial to evaluate for any lapses in technique.*
- *Teach the client or caregiver to question any vial of medication that looks different (color, amount, consistency, label) than normal.*



Long-Term Care Variations:

- *Multiuse vials should be checked regularly for expiration, labeling with date they were opened, and any changes in appearance of the medication.*
- *Multiuse vials are more prone to contamination than single-use vials. Take care not to contaminate the contents of a vial. If there is any doubt, throw it out.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The medication in the vial is not good.

Ask Yourself:

How do I prevent this error?

Prevention:

Question any medication that appears contaminated, discolored, or has a precipitate. Do not administer it.

Possible Error:

The vial has been opened too long.

Ask Yourself:

How do I prevent this error?

Prevention:

Question any multidose vial where the prior-use information is smeared or unreadable. Do not administer it.

Possible Error:

Vials often look very similar. If similar vials are stored side by side and things get hectic or you are tired, you could possibly grab the wrong one.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Store similar vials apart. Label them clearly. Train yourself to always check and double-check, so checking becomes automatic.

> NURSING TIPS

- Double-check the vial for the appropriate medication. Be certain that a medication error does not happen.
 - Verify that the generic name on the vial is the same trade medication that is desired. Many new medications are coming on the market, many with similar names. Always verify that the medication you are about to use is the medication desired.
- Take the extra time to look it up or call the pharmacy if you are unsure.
- If performing a drug calculation, have a colleague verify your calculation. Even nurses with years of experience have a colleague verify their calculation to ensure client safety.
 - If this is the first usage of the vial, use an ink pen to record the date the vial was opened.

SKILL 5-13

Withdrawing Medication from an Ampoule

Kimberly Sue Kahn, RN, MSN, FNP-C, CS, AOCN

KEY TERMS

Ampoule
Ampule
Filter needle

Microdroplets
Surface tension



> OVERVIEW OF THE SKILL

Ampoules (also spelled ampule) are containers that hold a single dose of medication. The ampoules are made of clear glass and have a distinctive shape with a constricted neck. The head of the ampoule is broken off at the neck, and the medication is withdrawn with a needle and syringe.

The neck of the ampoule is often colored and usually scored. This scoring allows the neck to be broken off easily from the body to obtain the medication. The nurse places a sterile piece of gauze around the

neck of the ampoule and breaks the neck in an outward motion. The gauze protects the nurse's fingers from the glass.

Medication can become trapped in the uppermost portion of the ampoule. Before opening the ampoule, nurses frequently need to flick the upper portion of the ampoule with their fingernail to drop the medication from the upper segment down into the body of the ampoule. This step may need to be repeated several times.

> ASSESSMENT

1. Identify the correct ampoule, including medication, dosage strength, dosage volume, dosage route, and expiration date to avoid medication errors.
2. Assess the syringe, filter needle, and injection needle for expiration date and package intactness to evaluate the suitability of the equipment.
3. Assess the fluid in the ampoule for cloudiness, particulate matter, or color changes to evaluate for usability of the medication.
4. Identify the medication's intended action, purpose, normal dosage range, time of action, common side effects, and nursing implications to avoid medication errors.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The correct medication ampoule will be selected.
2. The medication will be drawn into an appropriate syringe.
3. Microorganisms will not be introduced into the sterile system.
4. Foreign objects will not be introduced into the sterile system.

Equipment Needed (see Figure 5-13-2):

- Medication ampoule
- Sterile gauze pad or alcohol pad
- Syringe with filter needle
- Replacement needle
- Clean work space
- Medication administration record (MAR)



Estimated time to complete the skill:
2–5 minutes

> CLIENT EDUCATION NEEDED:

1. When teaching a client to withdraw medication from an ampoule, show him how to hold the ampoule away from the cut edges to prevent a hand laceration.

2. Clients or caregivers might find it easier to place the medication on a countertop and insert the needle downward into the liquid.



Figure 5-13-2 Syringes, needles, alcohol wipes, and medication ampoules are used to withdraw medication from an ampoule.

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Wash hands.
2. Select appropriate ampoule (see Figure 5-13-3).



Figure 5-13-3 Medication ampoules

3. Select syringe with filter needle (see Figure 5-13-4).
4. Obtain a sterile gauze pad.
5. Select and set aside the appropriate length of needle for planned injection.

RATIONALE

1. Decreases the transmission of microorganisms.
2. Ensures client receives correct medication.



Figure 5-13-4 Select a syringe and a filter needle.

3. Filter needle entraps any glass fragments.
4. Using a gauze pad prevents the nurse from being cut on the jagged edge of the broken ampoule.
5. Accurate needle length ensures the medication is administered where it is intended.

continues

6. Clear a work space.
7. Observe ampoule for location of the medication.
8. If the medication is trapped in the top, flick the neck of the ampoule repeatedly with your fingernail while holding the ampoule upright (see Figure 5-13-5).
6. Prevents contamination of microdroplets that may spill when the ampoule is broken.
7. The medication frequently becomes trapped in the top of the ampoule.
8. Flicking the neck and top of the ampoule moves the medication into the body of the ampoule.



Figure 5-13-5 Flick the neck of the upright ampoule to dislodge medication from the top of the vial.

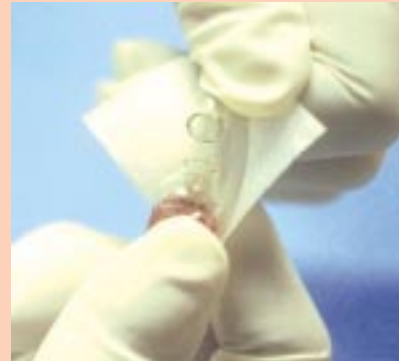


Figure 5-13-6 Wrap gauze or alcohol pad around the neck to protect fingers. Snap off the top in a quick outward motion.

9. Wrap the sterile gauze pad around the neck and snap off the top in an outward motion (see Figure 5-13-6).
9. The gauze prevents the nurse from being cut by the jagged edge of the broken ampoule. The outward motion provides added safety for the nurse.
10. Invert ampoule and place the needle into the liquid. Gently withdraw medication into the syringe (see Figure 5-13-7).
10. Inverting the ampoule allows all of the medication to be withdrawn into the syringe. Surface tension will hold the medication in the ampoule until the negative pressure of the syringe barrel draws it into the syringe.



Figure 5-13-7 Invert ampoule and gently draw the liquid into the syringe.



Figure 5-13-8 Remove the filter needle and replace with the injection needle.

11. Alternately, place the ampoule on the counter, hold and tilt slightly with the nondominant hand. Insert the needle below the level of liquid and gently draw liquid into the syringe, tilting the ampoule as needed to access all the liquid.
12. Remove the filter needle and replace with the injection needle (see Figure 5-13-8).
13. Dispose of filter needle and glass ampoule (including lid) in appropriate container (see Figure 5-13-9).
11. While it is more difficult to read the syringe calibrations, it is easier to hold the ampoule steady. Choose the method most comfortable for you.
12. The filter needle is designed to trap glass particles and must not be used for client injections.
13. Needles or sharp glass objects must always be disposed of in puncture- and leak-proof containers in order to provide safety for clients and health care workers.



Figure 5-13-9 Dispose of the filter needle, ampoule, and ampoule top in an appropriate container.

14. Label the syringe with drug, dose, date, and time.
15. Wash hands.
14. Prevents medication errors from taking place.
15. Decreases the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Scenario 1

Kim followed the appropriate technique of wrapping the neck of an ampoule with a sterile 2 × 2 prior to breaking. Due to the force needed to break the ampoule, she inadvertently allowed the broken neck of the ampoule to jerk back and cut her finger. The necks of the ampoules are not always of uniform thickness. In order to break them, a different amount of force is used for some rather than others. Kim did some experimentation after this injury and found that wrapping an unopened alcohol sponge around the gauze helped protect her fingers from injury.

Scenario 2

A client proudly showed his home-made sharps container (a converted olive-oil can) to the visiting nurse. It was puncture proof, leak proof, and well labeled. Unfortunately, the jagged edges of the opening he had cut had sharper edges than many of the sharps inside! The nurse helped with some redesign, and the sharps container worked well after that.

> EVALUATION

- The correct medication ampoule was selected.
- The medication was drawn into an appropriate syringe.
- Microorganisms were not introduced into the sterile system.
- Foreign objects were not introduced into the sterile system.

> DOCUMENTATION

Medication Administration Record

- Name of the medication
- Dosage drawn up
- Date and time the medication was drawn up

Controlled Substances Record Book (If the medication drawn up is a controlled substance)

- Name of the medication
 - Dosage drawn up
 - Date and time the medication was drawn up
 - Any controlled substance that was wasted
 - Name of nurse drawing up the controlled substance
- Controlled substances must be documented at the time they are removed from the locked cabinet. Documentation on the MAR is done after the medication is administered.

> CRITICAL THINKING SKILL

Introduction

Always double-check the amount of medication drawn up with the expected dosage. Don't assume that a single-dose ampoule contains the exact amount needed for the dose.

Possible Scenario

Mrs. Ruden's pain medication order was for morphine sulfate 10 mg IM. Her nurse removed a 10-mg ampoule of morphine from the controlled substances cupboard, opened it, and drew up the medication. The nurse was busy documenting the use of the controlled substance and didn't pay attention to the amount of fluid she had drawn up in the syringe.

Possible Outcome

If the ampoule was slightly overfilled, Mrs. Ruden would receive more morphine than had been ordered. Depending on her condition, this could have results ranging from negligible to serious. If some of the medication had been trapped in the top of the ampoule and discarded, Mrs. Ruden would receive less pain medication than ordered. Potentially, Mrs. Ruden would not receive effective pain relief, causing unnecessary suffering for the client.

Prevention

Ampoules usually contain one dose of medication. Manufacturers sometimes overfill ampoules by a small amount to compensate for medication caught in the top of the ampoule. If medication is caught in the top of the ampoule, the dose drawn up may be too small. Don't assume that the amount of fluid in a single-dose ampoule is the correct dose. Always double-check the amount of fluid against the label on the ampoule.

Always double-check your math. There are three main ways to calculate dosages: ratio proportion, formula, and dimensional analysis. Study and use the method that feels most comfortable to you. Never feel embarrassed to have a second party verify your results. Ideally state the dosage calculation problem and do not tell the answer until you can compare it. This will be an added safety measure in avoiding math problems.

▼ VARIATIONS



Geriatric Variations:

- *If an older adult is drawing up medication from an ampoule, assess that his vision is adequate to see the contents of the ampoule and to check for glass. Check that he can clearly read the syringe calibrations and the medication label.*



Pediatric Variations:

- *Keep this and all medications out of the reach of children.*
- *If the setting requires drawing up the medication at the bedside, do not leave the empty ampoule within the reach of a child.*
- *Make sure all sharps go completely into the sharps container and that a small hand cannot reach into the opening.*

▼ VARIATIONS *continued*



Home Care Variations:

- *Correct disposal of a used ampoule in the home health setting is extremely important as it has sharp and jagged edges and may cut someone. A glass jar or metal container with a small mouth may be used. Make sure there is a lid that fits. Label the container clearly, and place where it is accessible to the caregiver. Empty the container regularly.*
- *Change the needle prior to injection if you suspect any contamination has occurred or if there is irritating medication on the outside of the needle.*



Long-Term Care Variations:

- *Change the needle prior to injection if you suspect any contamination has occurred or if there is irritating medication on the outside of the needle.*
- *Empty sharps containers regularly.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The top of the ampoule cannot be broken off the body of the ampoule.

Ask Yourself:

How do I respond to this error?

Response:

Discard in the appropriate container and begin again with a new ampoule.

Possible Error:

When the ampoule is broken, some medication is spilled.

Ask Yourself:

How do I respond to this error?

Response:

Make sure the medication left in the ampoule has not been contaminated in any way. Lifting the syringe to eye level, determine if you still have the prescribed amount of medication. If not, you will need to open an additional ampoule.

Possible Error:

The nurse uses a freshly opened alcohol swab to protect her fingers. Some of the alcohol runs into the ampoule, contaminating the medication.

Ask Yourself:

How do I prevent this error?

Prevention:

Use only unopened alcohol wipes or a gauze pad to protect fingers.

> NURSING TIPS

- An alcohol swab package wrapped around the sterile gauze adds extra protection for the nurse.
- Handle the top and bottom after separated with extreme caution as one can be easily cut.
- Dispose of the parts in a sharps-proof container.
- Always move the ampoule away from your face prior to breaking the neck to prevent glass from flying back at you.

SKILL 5-14

Mixing Medications from Two Vials into One Syringe

Eva Gallagher, RN, BSN

KEY TERMS

Contamination
Milliliters
Mixing

Negative pressure
Vacuum
Vials



> OVERVIEW OF THE SKILL

When giving ordered subcutaneous or intramuscular medication to a client, it sometimes becomes necessary to mix medications in one syringe from two separate vials. In doing so, it is often important that the medications are removed from the vials in a specific order. Learning which medications must be mixed in

a specific order is necessary to avoid contamination of the vials. It also is important for the nurse drawing up the medications to be familiar with this skill to ensure the correct dose of medication is given to the client and that vials are not contaminated with other medications.

> ASSESSMENT

1. Identify the medications ordered. **Prevents medication errors.**
2. Consider whether the order of drawing up medications makes a difference. **This will vary based on the type of medications to be mixed.**
3. Assess client's knowledge regarding drawing medications up from two vials if the client will be performing this skill at home **to determine need for drug education and to assist in identifying client's compliance with drug therapy at home.**

> DIAGNOSIS

- 1.6.1 Risk for Injury, secondary to medication error
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The ordered medications will be drawn up safely using sterile technique.

2. The correct dose of medications will be drawn from the vial.
3. The remaining contents of multiuse vials will not be contaminated.
4. The client will be instructed, if needed, on preparing an injection that requires mixing medications from two vials.

Equipment Needed (see Figure 5-14-2):

- Medication administration record (MAR)
- Medication vials
- Syringe
- Alcohol wipes



Estimated time to complete the skill:
5–15 minutes

> CLIENT EDUCATION NEEDED:

1. If the client or caregiver will be performing this skill, explain the order of drawing up medications and the reason this order is important.

2. Have the client or caregiver perform a return demonstration after showing him how to draw up medication.
3. Make sure the client or caregiver knows who to call with questions.
4. Reinforce verbal teaching with written instructions.



Figure 5-14-2 Syringe with needle, vials, and alcohol wipes are used to draw two medications into one syringe.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check MAR against the physician’s or qualified practitioner’s written orders.
2. Check for drug allergies.
3. Wash your hands.
4. Gather the equipment needed. Prepare the medication for one client at a time.
5. Check need for one medication to be drawn up before the other.
6. Determine the total medication volume (in milliliters) you will have in the syringe when you have finished drawing both medications into the syringe.
7. Swab the top of each vial with alcohol (see Figure 5-14-3).

1. Ensures accuracy in the administration of the medication.
2. Decreases risk of allergic reaction such as hives, urticaria, or anaphylactic shock.
3. Decreases transmission of microorganisms.
4. Promotes organization. Ensures that the right client receives the right medications.
5. Determines the order in which medications will be drawn up.
6. Determines how much of the second medication will need to be drawn into the syringe.
7. Decreases the transmission of microorganisms.



Figure 5-14-3 Swab the top of each vial with alcohol.

8. Draw air into the syringe equal to the amount of medication to be drawn up from the second vial (see Figure 5-14-4). Inject air into the

8. Avoids creating a vacuum in the second vial. When you draw medication from the second vial, you will not be able to inject air at that

continues



Figure 5-14-4 Draw air into the syringe equal to the amount of medication to be drawn up from the second vial.

second vial and remove the syringe and needle from the vial (see Figure 5-14-5).

9. Draw air into the syringe equal to the amount of medication to be drawn up from the first vial. Inject air into the first vial. Keep the needle and syringe in the vial (see Figure 5-14-6).



Figure 5-14-6 Inject air into the first vial.

10. Pulling back on the plunger, withdraw the correct amount (in milliliters) of medication from the first vial (see Figure 5-14-7).

11. Remove the syringe from the first vial and insert it into the second vial. Withdraw medication from the second vial to the volume (in milliliters) total of both medications summed together (see Figures 5-14-8 and 5-14-9).



Figure 5-14-5 Inject the air into the second vial.

time, because your syringe will already contain medication from the first vial. If you inject air, you will also risk injecting medication and contaminating the second vial.

9. Avoids creating a vacuum in the first vial.



Figure 5-14-7 Withdraw the correct amount of medication from the first vial.

10. Draws up the first medication.

11. Draws up the second medication. Drawing up medication equal to the total of both medications ensures the correct amount of second medication is withdrawn.



Figure 5-14-8 Withdraw medication from the second vial to the volume of both medications summed together.



Figure 5-14-9 Double-check the syringe to make sure it contains medication equal to the total volume of both medications summed together.

12. Either leave the needle in the second vial until just prior to injecting the medication or follow the institution's policy regarding recapping needles.

13. Wash hands.

12. Prevents needlestick injuries.

13. Reduces the transmission of microorganisms.



▼ REAL WORLD ANECDOTES

Jane is a diabetic woman who goes to the pharmacy to pick up her regular insulin and NPH as well as a new supply of syringes. Upon returning home, she gets out her medications to draw them both up in one syringe, as she is used to, to give herself her 12:00 dose. She realizes that the syringes look different, and she is unable to read the numbers. She is confused about how to mix the two medications in the new syringes. She calls the pharmacy to tell them that she has the wrong syringes, and the pharmacist tells her that they have switched brands of syringes, and even though they look different, these are the syringes she is to use. She waits until her daughter gets home to help her draw up her medication. Her daughter helps her label the new syringes with tape to mark the numbers clearly.

> EVALUATION

- The ordered medications were drawn up safely using sterile technique.
- The correct doses of medications were drawn from the vials.
- The remaining contents of multiuse vials were not contaminated.
- The client was instructed, if needed, on preparing an injection that requires mixing medications from two vials.

> DOCUMENTATION

Medication Administration Record

- Name of the medications
- Dosages drawn up
- Date and time the medications were drawn up

Controlled Substances Record Book (If either or both of the medications drawn up are controlled substances)

- Name of the medication
- Dosage drawn up

- Date and time the medication was drawn up
- Any controlled substance that was wasted
- Name of nurse drawing up the controlled substance

Controlled substances must be documented at the time they are removed from the locked cabinet. Documentation on the MAR is done after the medication is administered.

> CRITICAL THINKING SKILL

Introduction

For diabetic clients who need insulin injections, it is important for that person to be comfortable drawing up and administering these medications. Careful teaching must occur to ensure that the diabetic client is comfortable with this skill.

Possible Scenario

Jim is a newly diagnosed diabetic client who must learn how to administer regular insulin and NPH when he goes home tomorrow. The nurse shows Jim how to draw up the medication out of the regular vial and then the NPH vial. She stresses the importance of doing this in the correct order so that the regular insulin is not contaminated with the cloudy NPH. She also shows him how to inject air into the vials before drawing the medication up and how to withdraw the milliliters of regular insulin, then withdraw the mil-

liliters of both medications combined. For example, Jim needs to take 5 ml of NPH and 7 ml of regular insulin. After injecting air into each vial, Jim should first withdraw 7 ml of regular insulin, and then, using the same syringe, he should withdraw NPH insulin to the 12-ml line.

Possible Outcome

Jim goes home the next morning. While trying to draw up his first dose of insulin at home, he realizes that he is unsure how to draw it up correctly. He calls the hospital asking if someone can give him directions. By the time he finally gets connected to the diabetic teaching nurse, he is angry and desperately in need of his insulin. After talking Jim through drawing up this dose of insulin, the diabetic teaching nurse arranges for a home care nurse to visit Jim and do some additional teaching.

Prevention

It is important to watch the client perform this skill one or two times to make sure the client understands the instructions. It is also important to give written information, if available, to reinforce the teaching that was done. Follow-up visits to the client's home may be in order as well. This is a skill that does not come easily and clients who are already stressed regarding their disease may have a difficult time assimilating information they receive in the hospital.

▼ VARIATIONS



Geriatric Variations:

- *Vision must be clear enough to assure that the correct dose of medication is drawn up.*
- *Manual dexterity must also be checked because of the difficulty drawing up medications.*
- *Write down instructions in a step-by-step format in large print to help clients with vision or short-term memory difficulties self-administer the medication.*
- *Follow up teaching immediately to verify the client can perform the skill. Follow up in 1 to 2 weeks to verify client has retained the skill correctly.*



Pediatric Variations:

- *Determine with the doctor, parent, and hospital policy at what age a child or adolescent may begin to participate in the preparation and administration of their own medications.*
- *Check manual dexterity and motor skills.*
- *Determine areas where the child can participate, such as observation, play-therapy, and hands-on activities, with supervision.*
- *Allow the child to participate in the process as much as possible.*

▼ VARIATIONS *continued*



Home Care Variations:

- *Care must be taken in this setting to assure the client is comfortable with the skill and that all needed supplies are available.*
- *Make sure medication vials are clearly labeled and the client or caregiver can read the labels.*
- *Check that the medication is being stored in a safe place at the proper temperature.*
- *Assess the client or caregiver to determine that they understand the basics of medication safety. Can they locate the expiration date on the vials, for example. Remind them to question, and not to administer, medications that have been improperly stored, look discolored, or do not look like their usual medication.*
- *In the home care setting, it is more difficult to replace medications if an error has contaminated a vial. The client, nurse, or caregiver needs to know the exact procedure for quickly replacing a medication during the day or after hours should the need arise. This will reduce the anxiety associated with mixing medications from two vials as well as reduce the temptation to overlook a possible contamination or mixing medication error.*
- *Make sure lighting is adequate to see the calibration numbers on the syringe.*



Long-Term Care Variations:

- *A client who self-administers the same medication over time may need a “refresher” course on how to correctly maintain his or her technique. This will reduce the temptation to adopt “short-cuts,” such as not adequately cleaning the vial stopper. It may reduce the risk of damage to skin integrity, infection, or medication errors due to poor technique.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The medication vial becomes contaminated

Ask Yourself:

How do I prevent this error?

Prevention:

Always use an alcohol swab to clean the top of the vials before injecting the syringe. Assist any client with sensory or motor deficits when drawing up medications.

Ask Yourself:

How do I respond to this error?

Response:

Discard, obtain replacement, repeat preparation, and administer the medication.

Possible Error:

No air was injected into the vial before drawing up medication.

Ask Yourself:

How do I prevent this error?

Prevention:

Follow the same set of steps listed in the Implementation section of this chapter.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I respond to this error?

Response:

If previous users have not injected air and the negative pressure inside the vial is too high to withdraw medication, clean the top of the vial with an alcohol swab and insert a sterile needle into the stopper. The needle provides a sterile opening to allow the passage of air. This procedure should be done in a clean area to prevent the introduction of airborne bacteria into the vial.

> NURSING TIPS

- Become familiar with types of medications commonly ordered at your facility and which ones can be mixed together in one syringe.
- Find out the maximum number of milliliters that can be injected SQ and IM in one syringe at your facility.
- Think through the steps of drawing up two medications into one vial before you begin this procedure.
- Teach client this skill using the same equipment he or she will be using at home.

SKILL 5-15

Preparing an IV Solution

Kathryn Lilleby, RN

KEY TERMS

D₁₀W

D₅W

**Electrolyte
imbalance**

IV solution

**Lactated Ringer's
solution**

**Normal saline
solution**



> OVERVIEW OF THE SKILL

An intravenous solution is a method of replacing fluid lost, or correcting an electrolyte imbalance. Clients who are acutely ill, are NPO after surgery, or have severe burns are examples of those who require IV therapy.

The solution in an IV bag is ordered by the physician or qualified practitioner according to the client's

needs and is changed at least every 24 hours, or per the institutions policy, to decrease the risk of infection. Tubing is used to connect the solution in the IV bag with the client's IV catheter or needle.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the IV solution to be infused and rate of flow to ensure accurate administration.
2. Review information regarding the solution and nursing implications in order to administer the solution safely.
3. Check all additives in the solution and other medications so that there will be no incompatibilities of additives with the solution.
4. Assess the client's understanding of the purpose of the IV infusion so that client teaching can be tailored to his or her needs.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The appropriate fluids at the ordered dosages will be available for IV infusion.
2. The IV infusion will be sterile, without precipitate or contamination.
3. The caregiver preparing the IV solution will not be injured or endangered.

Equipment Needed (see Figure 5-15-2):

- IV solution in a bag or bottle
- Medication administration record (MAR)
- IV flow sheet
- IV tubing, if needed



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. If the client or caregiver will be administering IV fluids at home, provide clear, step-by-step instructions regarding the procedure.

2. Explain to the client or caregiver the need to store the solution in a clean, dry area.



Figure 5-15-2 Many types of prepackaged IV solutions are available.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Check physician's or qualified practitioner's order for the IV solution. 2. Wash hands. Apply gloves if required by institutional policy. 3. Prepare new bag by removing protective cover from bag or bottle. 4. Inspect the bag or bottle for leaks, tears, or cracks. Inspect the fluid for clarity, particulate matter, and color. Check expiration date. 5. Prepare a label for the IV bag or bottle: <ul style="list-style-type: none"> • On the label, note date, time, and your initials. • Attach the label to the bag or bottle. Keep in mind the bag or bottle will be inverted when it is hanging. Make sure the label can be read when the IV is hanging. 6. Store the prepared IV solution in the area assigned by the institution. 7. Remove gloves and dispose of gloves with all used materials. 8. Wash hands. 9. Document the preparation of the IV solution. | <ol style="list-style-type: none"> 1. Ensures accurate administration of the solution. 2. Reduces the transmission of microorganisms. 3. Allows for access to the solution container. 4. Prevents infusing contaminated or outdated solution. 5. <ul style="list-style-type: none"> • Communicates when the bag was opened. • Labeling the bag or bottle upside-down makes identification easier when the bottle is hanging. 6. Keeps the prepared solution readily available for when it is needed. 7. Reduces the transmission of microorganisms. 8. Reduces the transmission of microorganisms. 9. Provides a record to ensure continuity of care. |
|---|---|

Hanging the Prepared IV

10. Wash hands.
11. Obtain the IV solution for the client as ordered. Check the label on the IV bag to see that it matches the order.
12. Inspect the bag or bottle for leaks, tears, or cracks and inspect the fluid for clarity, particulate matter, and color.
13. Check client's identification bracelet.
14. Prepare an IV time tape for the IV bag or bottle:
 - On the time tape, note the rate at which the solution is to infuse.
 - Mark the approximate infusion intervals.
 - Attach the time tape to the bag or bottle. Keep in mind the bag or bottle will be inverted when it is hanging. Make sure the time tape can be read when the IV is hanging.
15. Make sure the clamp on the tubing is closed. Grasp the port of the IV bag with your non-dominant hand, remove the plastic tab covering the port (see Figure 5-15-3), and insert the full length of the spike into the bag's port (see Figure 5-15-4).
10. Reduces the transmission of microorganisms.
11. Ensures the ordered medication is administered.
12. Prevents infusing contaminated solution.
13. Ensures IV solution is given to the correct patient.
14.
 - Communicates how long before the next IV should be hung.
 - Gives a rough estimate of the accuracy of the infusion rate.
 - Placing the time tape on the bag or bottle upside-down makes identification easier when the bottle is hanging.
15. Promotes rapid flow of solution through new tubing without air bubbles.



Figure 5-15-3 Open the IV plastic bag and pull down the plastic tab covering the port with one hand while pinching the port with the other hand.



Figure 5-15-4 Remove the cap from the spike and spike the IV port.

16. Compress drip chamber to fill halfway.
17. Loosen protective cap from the needle or end of the IV tubing, open roller clamp, and flush tubing with solution (see Figure 5-15-5 A and B).
16. Filling chamber halfway allows the chamber to provide a clear measurement of drip rate when the IV is flowing.
17. Removes air from tubing.

Hanging the Prepared IV *continued*



Figure 5-15-5 A, B Priming the IV tubing. Open the roller clamp on the tubing to allow the fluid to enter the tube and expel the air.

- | | |
|--|--|
| <p>18. Close roller clamp and replace cap protector.</p> <p>19. When ready to initiate infusion, remove the cap protector from the tubing. Attach the IV tubing to venipuncture catheter (see Skill 8-2, Starting an IV).</p> <p>20. Open clamp and regulate flow or, if applicable, attach tubing to infusion device or rate controller if used. Turn on pump and set flow rate (see Skill 8-5, Setting the IV Flow Rate).</p> <p>21. Wash hands.</p> | <p>18. Prevents fluid from leaking and maintains sterility of needle.</p> <p>19. Initiates infusion.</p> <p>20. Allows flow rate to be regulated.</p> <p>21. Reduces the transmission of microorganisms.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

While preparing an IV solution for her client, Tamekia grabbed a bottle of D₅W to mix the medication into. As she was drawing up the ordered additive, she glanced at the bottle of D₅W and noticed something unusual about it. On closer inspection, Tamekia noticed what appeared to be crystals in the bottom of the IV bottle. Tamekia disposed of the bottle and checked the rest of the stock of IV D₅W bottles. When she found several other bottles that were contaminated, she notified her supervisor and the old bottles were replaced with a new lot.

> EVALUATION

- The appropriate fluids at the ordered dosages were available for IV infusion.
- The IV infusion was sterile, without precipitate or contamination.
- The caregiver preparing the IV solution was not injured or endangered.

> DOCUMENTATION

Parenteral Flow Sheet

- Date and time IV solution was prepared

> CRITICAL THINKING SKILL

Introduction

Some IV solutions are commercially made or prepared by the pharmacist but others may require the nurse to prepare them. Reading the labels carefully will ensure that the correct solution is infused into the client.

Possible Scenario

On a busy evening shift the nurse walked quickly into the medication room to grab a bag of IV solution for her client. The protective plastic cover obscured the la-

bel printed on the bag with its contents. She wanted 5% dextrose in water but she mistakenly took 10% dextrose in water from the shelf.

Possible Outcome

As the nurse spiked the bag and hung it from the IV pole, she watched the fluid fill the tubing. Then she noticed the 10% dextrose in water on the bag. She had not connected the tubing with the IV solution to the client yet, so she took the bag down, discarded the bag and tubing, and went to obtain the correct IV solution and new tubing to start over again.

Prevention

The nurse should remember the five rights of drug administration: the right drug, the right dose, the right client, the right route, and the right time.

▼ VARIATIONS



Geriatric Variations:

- Older clients may be at higher risk of fluid overload. IV solutions containing sodium may increase fluid retention in older clients.



Pediatric Variations:

- Small children require smaller volumes of fluid.
- Special effort needs to be taken to keep an IV site clean, dry, and intact in very young clients.



Home Care Variations:

- Be sure the client or caregiver has a clean, dry area to store IV solutions.



Long-Term Care Variations:

- Regularly reassess the solution a client is receiving based on the client's current fluid and electrolyte status.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The IV solution appears cloudy when the nurse takes it from the shelf.

Ask Yourself:

How do I prevent this error?

Prevention:

The nurse should check the expiration date on the bag or bottle to make sure it is not out of date. She should also check for any cracks or leaks in the bottle or bag.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I respond to this error?

Response:

Do not use the IV solution. Return it to the pharmacy or stock room with information about what the problem is. Obtain a fresh bag and proceed to prepare the IV solution.

> NURSING TIPS

- Anticipate the need for the next bag of IV solution to avoid the risk of an IV clotting due to the solution running out.
- Keep in mind the client's laboratory results and need for fluid to be sure the correct solution is given.
- Hold the bottle or bag up against both a light and dark solid background to check for discoloration.

SKILL 5-16

Adding Medications to an IV Solution

Kathryn Lilleby, RN

KEY TERMS

Injection port
IV bag
IV bottle

IV solution
Potassium chloride



> OVERVIEW OF THE SKILL

The intravenous route carries the highest risk for a client since the response to the drug and solution are immediate. Great care and precise calculations are required when preparing a medication to add to an IV solution. The drug is diluted and mixed into a larger volume (50–1000 ml) of compatible solution and then infused into the primary or secondary IV line. Medications such as vitamins or potassium chloride are commonly added to IV solutions.

Mixing the drugs into large volumes of fluids is safe and easy. While institutional policies vary, the

nurse, pharmacist, or pharmacist technician can add the medication into a compatible solution of either normal saline, 5% dextrose in water, or lactated Ringer's solution.

It is important to note that some medications, such as potassium, can be irritating to the lining of blood vessels. Other medications injected into a traumatized vein can infiltrate tissue to such an extent that affected tissue could slough, become abscessed, or become necrotic.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the client, medication, dosage, and time and route of administration to ensure accurate administration.
2. Review information regarding the drug, including action, purpose, side effects, normal dose, peak onset, and nursing implications, in order to administer the drug safely.
3. Determine the additives in the solution of an existing IV line to determine if the medication is compatible with the solution. If the medications are not compatible, a new IV site will be needed, unless the existing site is a double- or triple-lumen catheter.
4. Assess the patency of the IV to ensure that the medication will enter the vein and not the surrounding tissue.
5. Assess the skin at the IV site so that the medication will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
6. Check the client's drug allergy history since an allergic reaction could occur rapidly and be fatal.
7. Assess the client's understanding of the purpose of the medication so that client teaching can be tailored to his needs.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The appropriate fluids and medications at the ordered dosages will be mixed for IV infusion.
2. The IV infusion will not be contaminated during the procedure.
3. The caregiver mixing the IV will not be injured or endangered.



Figure 5-16-2 Medications may be ordered to be added to IV solutions for administration.

4. The medication will be infused without injury or trauma to the client.

Equipment Needed (see Figure 5-16-2):

- Prescribed medication in vial or ampoule
- Prescribed diluent for medication
- Sterile syringe of appropriate size (5–20 ml)
- Sterile needle (1–1½ inches, 19–21 gauge)
- Sterile IV bag (500–100 ml)
- Antiseptic swab
- Label for IV bag
- Medication administration record



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the medication.
2. The client should be taught the rationale for IV administration of the medication.
3. The client should be taught to report any side effects he experiences immediately.
4. Clients with an allergy history should be instructed to wear a bracelet listing their allergies.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Check physician's or qualified practitioner's order for the IV solution and additives ordered.
2. Determine whether the ordered additives are compatible with the IV solution and with each other.
3. Wash hands. Apply gloves if required by institutional policy.
4. Using the appropriate technique, draw up any additives ordered by the physician or qualified practitioner (see Figure 5-16-3).

Adding Medication to a New Solution

5. Prepare new bag by removing protective cover from bag or bottle.

RATIONALE

1. Ensures accurate administration of the solution and additives.
2. Multiple additives increase the possibility of incompatibility. Some medications can only be mixed in saline.
3. Reduces the transmission of microorganisms.
4. Ordered additives may come in vials, ampoules, or bags.
5. Allows for access to the injection port.



Figure 5-16-3 Draw the medication into the syringe.



Figure 5-16-4 Inject the medication into the bag.

6. Inspect the bag or bottle for leaks, tears, or cracks. Inspect the fluid for clarity, particulate matter, and color. Check expiration date.
7. Add medication to IV solution:
 - For plastic IV bag, locate port with rubber stopper.
 - For IV bottle, locate the X, circle, or triangle indicating the IV injection site.
 - Wipe off port or site with antiseptic swab.
 - Insert needle into center of port or site.
 - Inject medication into bag (see Figure 5-16-4).
 - Remove needle from bag.
8. Mix medication into IV solution by gently turning the bag from end to end.
9. Label the bag:
 - Write the name and dose of medication. Write date, time, and nurse's initials.
 - Apply to bag upside-down.
10. Store the prepared IV solution in the area assigned by the institution.

Adding Medication to an Existing Solution

11. Identify client using armband and calling name.
12. Explain the purpose of the medication and how it will be given.
13. Clamp the IV tubing and remove bag from IV pole.
14. Add medication to IV solution:
 - For plastic IV bag, locate port with rubber stopper.

6. Prevents infusing contaminated or outdated solution.
7.
 - Avoids use of port of the IV tubing or the air vent.
 - Ensures the medication enters the bottle.
 - Reduces transmission of microorganisms.
 - Facilitates adding medication to bag.
 - Facilitates adding medication to bag.
 - Injection ports are self-sealing.
8. Ensures even distribution of medication throughout the solution.
9.
 - Informs nurses and doctors regarding medications added to the solution.
 - Allows easy visualization when bag is hanging.
10. Keeps the prepared solution readily available for when it is needed.

11. Ensures correct client received the medication.
12. Information reduces anxiety.
13. Prevents medication from being infused rapidly.
14.
 - Avoids use of port of the IV tubing or the air vent.

Adding Medication to an Existing Solution *continued*

- For IV bottle, locate the X, circle, or triangle indicating the IV injection site.
 - Wipe off port or site with antiseptic swab.
 - Insert needle into center of port or site.
 - Inject medication into bag.
 - Remove needle from bag.
- Ensures the medication enters the bottle.
 - Reduces transmission of microorganisms.
 - Facilitates adding medication to bag.
 - Facilitates adding medication to bag.
 - Injection ports are self-sealing.
15. Mix medication into IV solution by gently turning the bag from end to end.
 16. Apply a new label:
 - Write the name and dose of medication. Write date, time, and nurse's initials.
 - Apply to bag upside-down.
 17. Unclamp the tubing and regulate the flow.
 18. Remove gloves and dispose of all used materials appropriately.
 19. Wash hands.
 20. Document the preparation of the IV solution.
15. Ensures even distribution of medication throughout the solution.
 16.
 - Informs nurses and doctors regarding medications added to the solution.
 - Allows easy visualization when bag is hanging.
 17. Prevents rapid infusion of the medication.
 18. Reduces transmission of organisms.
 19. Reduces transmission of organisms.
 20. Provides a record to ensure continuity of care.



▼ REAL WORLD ANECDOTES

Barbara had a low serum potassium for several days following her surgery. The physician ordered KCl given IV piggyback several times, but her serum potassium levels remained slightly low. The physician ordered additional KCl added to her IV of D₅1/2NS to achieve a normal KCl. The continuous potassium infusion corrected her KCl deficiency and her KCl was changed to an oral form of potassium.

> EVALUATION

- The appropriate fluids and medications at the ordered dosages were mixed for IV infusion.
- The IV infusion was not contaminated during the procedure.
- The caregiver mixing the IV was not injured or endangered.
- The medication was infused without injury or trauma to the client.

> DOCUMENTATION

Medication Administration Record

- Document the name, dosage, time, and date of medication added to the IV solution.

Intravenous Flow Sheet

- Note the date, time, solution, volume, medications added.

Nurses' Notes

- Record the client's response to the medication and condition of the IV site.
- Document any serious side effects. These should also be reported to the physician or qualified practitioner immediately.

> CRITICAL THINKING SKILL

Introduction

A minimum amount of solution is necessary in which to dilute certain medications.

Possible Scenario

The physician ordered 40 mEq of KCl to be added to an existing IV solution of D₅NS already containing 40 mEq KCl. The nurse noted that there was only 120 ml of the solution left in the bag and that it was infusing at 100 ml/hr. Should she add the dose of potassium the physician prescribed?

Possible Outcome

The nurse realized that the amount of potassium that would infuse per hour at that concentration could be potentially dangerous. She notified the physician, who changed the IV order to a safe concentration.

Prevention

The nurse needs to know the action of medications that are added to IV solutions in order to give them safely.

▼ VARIATIONS**Geriatric Variations:**

- *Elderly clients may react more slowly to IV medications due to impaired circulation.*
- *Elderly clients may have more fragile veins and skin, which will be very sensitive to irritating additives.*
- *Older adults may have decreased renal and liver function, which can affect how IV additives and medications affect them.*

**Pediatric Variations:**

- *Giving a medication to a child through an established IV may be less traumatic than an IM or subcutaneous injection.*
- *Special effort needs to be taken to keep an IV site clean, dry, and intact in very young clients.*
- *Remember that there is even less room for fluid and electrolyte and fluid volume administration errors in infants and children. Double check all orders to make sure the additives and the infusion amounts are appropriate for the age of the child.*

**Home Care Variations:**

- *Medications should be added to IV solutions by the pharmacist before dispensing them for home use.*
- *Make sure the caregiver can clearly read and understand the labels on the IV bag and any additive labels.*
- *Assess that the client or caregiver can determine if an additive has been added to an IV bag.*

**Long-Term Care Variations:**

- *Clients receiving IV additives over the long-term need to be assessed regularly for continued need of those additives. For example, if the client is receiving a potassium supplement, regular laboratory tests should be performed to track the client's blood potassium level.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

The medication needle is inserted into the air vent and fluid leaks through the vent.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to visually assess the injection port or site before inserting the needle. Make sure you can tell the difference between the air vent and the injection port.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I respond to this error?

Response:

Clamp the IV tubing to the client. Turn the bag upright to allow the fluid to return to the bag. Assess for contamination of the medication, the IV fluid, or the needle. Replace contaminated items if needed.

> NURSING TIPS

- Prepare medication and label in the medication room before approaching the client.
- Some IV solutions should be prepared by the pharmacist under the laminar air flow hood to ensure a sterile solution.
- Check with the pharmacist or drug text regarding drug compatibility.
- Be aware of the minimum dilution requirements for medications. If there is a question regarding the adequacy of the amount of fluid in an existing IV bag, prepare a new one and replace the old one.

SKILL 5-17

Administering Medications via Secondary Administration Sets (Piggyback)

Kathryn Lilleby, RN

KEY TERMS

Abscessed
Backflow valve
Injection port
IV piggyback

Necrotic
Precipitate
Primary IV line
Y-port



> OVERVIEW OF THE SKILL

A medication is given intravenously when a rapid response to a drug is required or when several medications need to be given IV on a regular schedule. This is best accomplished by using an existing IV to be the basic infusion and adding medications by “piggyback” when they are ordered. It also carries the highest risk of side effects due to the immediate response of the medication and the inability to correct a medication administration error.

The drug is diluted and mixed with a small volume (50–100 ml) of compatible solution and then joined to the primary IV line for infusion. The bag is connected to the upper Y-port of the primary infusion line and hung higher than the primary IV bag, thus the name piggyback. The piggyback infusion

works because of the backflow valve. When the piggyback infusion starts flowing, the valve stops the flow of the primary infusion. After the piggyback infusion is complete and the solution within the tubing falls below the level of the primary infusion drip chamber, the valve opens and the primary infusion flows.

It is important to note that some medications can be irritating to the lining of blood vessels. Other medications, when injected into a vein that is beginning to infiltrate, will injure the tissue to such an extent that tissue could slough, become abscessed, or become necrotic. No IV medication should be administered through IV sites that are suspected to be inflamed or infiltrated.

> ASSESSMENT

1. Check the physician’s or qualified practitioner’s order or the medication administration record (MAR) for the medication, dosage, and time and route of administration to ensure accurate administration.
2. Review information regarding the drug, including action, purpose, side effects, normal dose, peak onset, and nursing implications, in order to administer the drug safely.
3. Determine additives in the solution of an existing IV line so that the medication will be compatible with the solution.
4. Assess the placement of the IV catheter in the vein to ensure that the medication will enter the vein and not the surrounding tissue.

5. Assess the skin at the IV site so that the medication will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
6. Check the client's drug allergy history since an allergic reaction could occur rapidly and be fatal.
7. Assess the client's understanding of the purpose of the medication so that client teaching can be tailored to his needs.
8. Assess the compatibility of the piggyback IV medication with the primary IV solution to avoid an adverse reaction such as the formation of precipitate in the IV tubing.

- Antiseptic swab
- Adhesive tape
- IV pole
- Medication administration record



Estimated time to complete the skill:
5–10 minutes to set up the IV piggyback

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.1 Risk for Injury
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to the medication

> PLANNING

Expected Outcomes:

1. The drug is infused into the vein without complications.
2. The IV site remains free of swelling and inflammation.
3. The client will be able to discuss the purpose of the drug.

Equipment Needed:

- Disposable gloves
- Medication prepared in a labeled infusion bag
- Short microdrip or macrodrip tubing set for piggyback (needleless system preferred); see Figure 5-17-2
- Sterile needles, 21 or 23 gauge, if needleless system not available

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the medication.
2. The client should be taught the rationale for IV administration of the medication.
3. The client should be taught to report any side effects he experiences immediately.
4. The client should be reassured that the administration of an IV medication into an existing IV line may be uncomfortable but not painful.
5. The client with an allergy history should be instructed to wear a bracelet listing her allergies.



Figure 5-17-2 IV tubing set for piggyback administration

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Check physician's or qualified practitioner's order.
2. Wash hands. *Gloves are not necessary if you are adding fluids to an existing infusion line.*
3. Check client's identification bracelet.

RATIONALE

1. Ensures accurate administration of medication.
2. Reduces the transmission of microorganisms.
3. Ensures medication is given to the correct client.

4. Explain procedure and reason drug is being given.
5. Prepare medication bag:
 - Close clamp on tubing of infusion set.
 - Spike medication bag with infusion tubing (see Figure 5-17-3).
 - Open clamp (see Figure 5-17-4).
 - Allow tubing to be filled with solution to evacuate air from tubing (see Figure 5-17-5).



Figure 5-17-3 Spike the medication bag with the infusion tubing.

4. Information decreases anxiety.
5.
 - Prevents leakage of solution.
 - Provides a method of infusing the medication into the system.
 - Allows the solution to fill the tubing.
 - Prevents air embolus.



Figure 5-17-4 Open the clamp on the IV tubing.



Figure 5-17-5 Allow the tubing to fill with solution.



Figure 5-17-6 Hang the piggyback bag higher than the primary IV bag.

6. Hang piggyback medication bag above level of primary IV bag. One way to do this is to lower the primary bag using an extender (found in the piggyback tubing package (see Figure 5-17-6).

6. Relationship between height of the bags affects the flow rate to the client.

7. Connect piggyback tubing to primary tubing at Y-port:
 - For needleless system, remove cap on port and connect tubing (see Figure 5-17-7 and 5-17-8)
 - If a needle is used, clean port with antiseptic swab and insert small-gauge needle into center of port.
 - Secure tubing with adhesive tape.



Figure 5-17-7 Remove the cap on the needleless system port.

7. Ensures medication in piggyback bag is infused.
 - A needleless system is preferred to prevent accidental needle sticks.
 - A small-gauge needle does less damage to the rubber stopper on the port.
 - Prevents accidental removal of tubing.



Figure 5-17-8 Connect the needleless system tubing.

8. Administer the medication:
 - Check the prescribed length of time for the infusion.
 - Regulate the flow rate of the piggyback by adjusting the regulator clamp (see Figure 5-17-9).
 - Observe whether backflow valve on piggyback has stopped flow of primary infusion during drug administration (see Figure 5-17-10).



Figure 5-17-9 Regulate the flow rate of the piggyback by adjusting the regulator clamp.

8.
 - Each medication has a recommended rate for IV piggyback administration.
 - Medication infuses through primary line.
 - Prevents backup of medication into primary infusion line.



Figure 5-17-10 Double-check that the primary infusion has stopped flowing.

- | | |
|--|---|
| <p>9. Check primary infusion line when medication is finished:</p> <ul style="list-style-type: none"> • Regulate primary infusion rate. • Leave secondary bag and tubing in place for next drug administration. <p>10. Dispose of all used materials and place needles in needle disposal container.</p> <p>11. Wash hands.</p> | <p>9.</p> <ul style="list-style-type: none"> • Reestablishes primary infusion. • Reduces risk for entry of microorganisms by repeated changes of tubing. <p>10. Reduces transmission of microorganisms.</p> <p>11. Reduces transmission of microorganisms.</p> |
|--|---|



▼ REAL WORLD ANECDOTES

Steven was hospitalized for meningitis. He received a continuous infusion of IV fluids to treat dehydration and fever as well as scheduled infusions of IV antibiotics. Steven was receiving ampicillin every 4 hours via IV piggyback and amphotericin every 12 hours via IV piggyback. Steven's nurse was preparing to infuse his 4 PM dose of ampicillin. She checked the MAR, and reached into the medication refrigerator for Steven's piggyback bag of ampicillin. Intent on getting to her meal break, she only glanced at the label long enough to verify that the bag was labeled for Steven. The medication name looked similar to ampicillin and she hurried to Steven's room to hang the medication. As she was preparing to spike the new piggyback she took a longer look at the label. Realizing that it said amphotericin, not ampicillin, she returned to the medication room with the piggyback and retrieved the bag of ampicillin, being careful this time to confirm that this was the correct medication for the correct client at the correct time.

> EVALUATION

- The drug was infused into the vein without complications.
- The IV site remained free of swelling and inflammation.
- The client was able to discuss the purpose of the drug.

> DOCUMENTATION

Medication Administration Record

- Document the date, time, dose, and route of medication.

Intravenous Flow Sheet

- Document the date, time, and volume of fluid infused IV piggyback.

Nurses' Notes

- Document the client's response to the medication.
- Record any serious side effects and report them to the physician or qualified practitioner immediately.

Intake and Output Record

- Note the amount of fluid infused.

> CRITICAL THINKING SKILL

Introduction

The piggyback bag should be hung higher than the primary bag so the backflow valve will operate correctly.

Possible Scenario

A client has an IV of D₅W infusing at 75 ml/hr. The physician orders an antibiotic to be given via IV piggyback every 6 hours. The nurse connects the piggyback tubing into the primary IV line but does not hang it high enough, causing blood to back up 1 inch into the primary IV line.

Possible Outcome

If left in the tubing, the blood could clot and occlude the primary IV line, requiring a new IV start and unnecessary trauma for the client. In this case the nurse checked on the client within 5 minutes and noticed the blood in the primary tubing. She raised the piggyback bag of medication, watched to be sure the piggyback fluid was infusing, and verified that the blood infused into the client's vein.

Prevention

The IV piggyback bag must be hung higher than the primary IV fluid. If it is not, the piggyback medication could flow into the primary IV fluid or the primary IV fluid could flow into the piggyback bag. In either sce-

nario the client would not be receiving any IV fluid and the IV site would be in danger of occluding. Take the time to be sure the piggyback is infusing correctly before proceeding on to other duties.

▼ VARIATIONS



Geriatric Variations:

- *The veins of elderly clients may be more fragile and sensitive to irritating solutions.*



Pediatric Variations:

- *Giving a medication to a child through an established IV may be less traumatic than an IM or subcutaneous injection.*
- *Special precautions need to be taken to maintain an intact IV in very young clients.*
- *Adaptation to promote optimum mobility for a child while piggyback medication is infusing will increase the child's compliance with the procedure.*



Home Care Variations:

- *Medications can be given by IV piggyback at home after teaching caregiver and client how to perform the procedure.*



Long-Term Care Variations:

- *Clients who are receiving IV medication over the long term generally have central lines in place to prevent repeated trauma to their peripheral veins. The procedure for administering a piggyback medication through a central line is the same.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The IV piggyback tubing was not primed with fluid before it was connected to the primary IV line so air enters the primary tubing.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to visually assess the IV tubing for the presence of fluid before connecting it to the primary IV line.

Ask Yourself:

How do I respond to this error?

Response:

Stop the infusion. Assess the amount and location of the air. If it is close to the IV piggyback line, clamp the primary line, lower the piggyback bag, and allow gravity to fill the tubing up to the drip chamber. If the air is closer to the client, use a new, empty syringe, insert it at the nearest port, and aspirate the air.

> NURSING TIPS

- The IV piggyback sets have specific instructions about the tubing and setup.
- An extra hanger may be used to lower the primary IV bag on the IV pole to assure that the piggyback bag is higher than the primary IV bag.
- An alternative method of priming the IV tubing in the piggyback line is to connect it to the primary line, unclamp, then lower the piggyback bag and tubing below the level of the primary IV bag. This will allow solution from the main IV to backflow into the piggyback tubing. When the solution has flowed to fill half the drip chamber in the piggyback tubing, raise the piggyback and hang in place. Make sure to keep the piggyback bag upright during this process.
- Medication can never be piggybacked into a blood transfusion.

SKILL 5-18

Administering Medications via IV Bolus or IV Push

Kathryn Lilleby, RN

KEY TERMS

Aspirate

Heparin lock

Injection port

IV bolus

IV push

Saline flush

Three-way stopcock



> OVERVIEW OF THE SKILL

An intravenous bolus is the administration of a medication directly into a vein through the injection port of an existing IV line or through a previously placed IV catheter with a heparin lock. The method of administering the bolus dose of medication is called IV push. The nurse must follow institutional as well as pharmacologic guidelines regarding which medication may be given IV push.

An IV bolus is used when a rapid response to a drug is required such as a cardiac emergency. It

also carries the highest risk of side effects due to the immediate response of the medication and the inability to correct a medication administration error.

Some medications can be irritating to the lining of blood vessels. Other medications, when injected into a vein that is beginning to infiltrate, will injure the tissue to such an extent that tissue could slough, become abscessed, or become necrotic.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the medication, dosage, time, and route of administration to ensure accurate administration.
2. Review information regarding the drug, including action, purpose, side effects, normal dose, peak onset, and nursing implications, in order to administer the drug safely.
3. Determine the additives in the solution of an existing IV line so that the medication will be compatible with the solution.
4. Assess the placement of the IV needle to ensure that the medication will enter the vein and not the surrounding tissue.
5. Assess the skin at the IV site so that the medication will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
6. Check the client's drug allergy history since an allergic reaction could occur rapidly and be fatal.
7. Assess the client's understanding of the purpose of the medication so that client teaching can be tailored to his needs.
8. Assess the medication to be given to determine how much time is needed to administer the medication safely.

> **DIAGNOSIS**

- 1.2.1.1 Risk for Infection
- 1.6.1 Risk for Injury
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to the medication

> **PLANNING**

Expected Outcomes:

1. The drug will be infused into the vein without complications.
2. The IV site will remain free of swelling and inflammation.
3. The client will be able to discuss the purpose of the drug.
4. Any adverse reactions to the drug will be identified and treated.

Equipment Needed (see Figure 5-18-2):

- Disposable gloves
- Medication in vial or ampoule
- Syringe, 3–5 ml
- Sterile needles, 21 and 25 gauge
- Antiseptic swab
- Syringe with heparin flush solution. Label syringe.
- Two syringes with saline flush solution. Label syringe.
- Watch with second hand



Estimated time to complete the skill:
5–10 minutes

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for the medication.
2. The client should be taught the rationale for IV administration of the medication.
3. The client should be taught to report any side effects he experiences immediately.
4. The client should be reassured that the administration of an IV medication into an existing IV line or heparin lock may be uncomfortable but not painful.
5. Clients with an allergy history should be provided with a bracelet listing their allergies.



Figure 5-18-2 Povidone-iodine, alcohol swabs are used to clean the injection site. Syringes are used to inject the medication. Heparinized saline is used to flush the injection port before and after medication is administered.

IMPLEMENTATION—ACTION/RATIONALE

ACTION	RATIONALE
1. Check physician’s or qualified practitioner’s order to give drug.	1. Ensures accurate administration of medication.
2. Wash hands and put on clean gloves.	2. Reduces the transmission of microorganisms.
3. Using the appropriate technique, draw the medication up into a syringe.	3. Prepares the medication bolus while preserving its sterility.
4. Check client’s identification bracelet.	4. Ensures medication is given to the correct client.
5. Explain procedure and reason drug is being given.	5. Information decreases anxiety.

continues

6. To inject medication using an injection port on an existing primary IV:

- Select an injection port close to the IV insertion site.
- Check for a blood return by pinching the tubing above the injection port and pulling back on the plunger of the syringe.
- Administer the medication by continuing to pinch the tubing and slowly injecting the medication over the prescribed time period (see Figure 5-18-3).
- After the medication bolus is infused, clear the tubing of medication by releasing the pinched tubing and allowing the infusion rate of the IV to resume. (If the medication is not compatible with the IV solution, a saline flush may be needed.) Check with the pharmacy if you are unclear.

Figure 5-18-3 Pinch the tubing and slowly inject the medication over the prescribed time period.

7. To inject medication using a heparin lock:

- Clean the heparin lock with antiseptic solution and insert a saline syringe with a 25-gauge needle into the center of the diaphragm.
- Check for blood return by pulling back gently on the plunger of the syringe then flush the lock with saline.
- Remove the saline syringe.
- Clean the injection port again with an antiseptic swab.
- Insert the syringe with the medication into the injection port and slowly inject the medication over the prescribed time.
- Remove the medication syringe.
- Clean the injection port with an antiseptic swab.
- Insert another syringe with saline into the injection port and slowly flush.
- Insert syringe of heparinized saline into the injection port and slowly flush. This step may vary depending on the policies at your institution.

6.

- Selecting the closest insertion site decreases the amount of medication in the IV line if an immediate reaction occurs.
- Ensures the IV is patent so that medication will enter the blood circulation and not the surrounding tissues.
- Each medication has a recommended rate for IV push administration. Some medications can lead to death if given too rapidly.
- Ensures that the entire dose of medication has been infused. Maintains the patency of the infusion catheter.



7.

- Prevents the introduction of microorganisms into the client's circulatory system. Using a small-gauge needle causes less damage to the rubber diaphragm.
- Ensures the IV is patent so that medication will enter the blood circulation and not the surrounding tissues.
- Allows access for the medication syringe.
- Prevents the introduction of microorganisms into the client's circulatory system.
- Each medication has a recommended rate for IV push administration. Some medications can lead to death if given too rapidly.
- Allows access for the saline syringe.
- Prevents the introduction of microorganisms into the client's circulatory system.
- Ensures that the entire dose of medication has been infused. Maintains the patency of the infusion catheter.
- Heparinized saline prevents occlusion of the catheter.

- | | |
|--|--|
| <p>8. To bolus medication using a three-way stopcock:</p> <ul style="list-style-type: none"> • Turn off the stopcock to the port that will be used. • For a stopcock without an injection port, remove the stopcock cap and attach the needleless syringe to the uncapped port. • For a stopcock with an injection port, clean the port with an antiseptic swab and insert a small-gauge needle into the center of the port. • If the stopcock is attached to a catheter that is used intermittently, attach a syringe of saline rather than the syringe containing medication. • Open the stopcock so the fluid flow will progress from the syringe to the client. • Check for blood return by gently pulling back on the plunger of the syringe. • If flushing with saline, turn off the stopcock, remove the syringe, clean the cap, if present, insert the syringe filled with medication, and turn on the stopcock to the injection port. • Slowly inject the medication over the prescribed time period. • Turn off the stopcock to the injection port. • Reinitiate the flow of IV fluid, if applicable. • Flush the tubing or catheter with saline and heparinized solution using the preceding technique, if there is no continuous IV flow. <p>9. Remove the needle from the port or diaphragm and swab the port with an antiseptic swab.</p> <p>10. Remove gloves and dispose in the appropriate container.</p> <p>11. Wash hands.</p> | <p>8.</p> <ul style="list-style-type: none"> • Prevents the accidental infusion of air into the intravenous system. • Provides access to the infusion system. • Prevents the introduction of microorganisms into the client's circulatory system. Using a small-gauge needle causes less damage to the rubber diaphragm. • Flushing with saline clears the existing fluid out of the catheter and tubing, decreasing the possibility of medication interactions. • Allows access to the client's circulatory system. • Ensures the IV is patent so that medication will enter the blood circulation and not the surrounding tissues. • Prevents the introduction of microorganisms and the accidental introduction of air into the client's circulatory system. • Each medication has a recommended rate for IV push administration. Some medications can be lethal if given too rapidly. • Prevents the accidental introduction of air into the system. • Maintains the patency of the infusion catheter. • Flushing with saline clears the medication out of the catheter and heparinized solution prevents occlusion by clot. <p>9. Prevents transmission of microorganisms.</p> <p>10. Reduces transmission of microorganisms.</p> <p>11. Reduces transmission of microorganisms.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

Ralph was in the cardiac telemetry unit 4 days after experiencing a myocardial infarction. His IV infusion had been discontinued and a heparin lock placed. That evening, the nurse noticed several premature ventricular beats on the cardiac monitor. When the arrhythmia persisted, she notified the physician, who ordered lidocaine to be given IV push immediately. The nurse prepared one syringe with saline and one with the lidocaine, flushed the heparin lock with saline, then gave the lidocaine. An IV solution with tubing was prepared and attached to the heparin lock for other emergency drugs to be given if needed.

> EVALUATION

- The drug was infused into the vein without complications.
- The IV site remained free of swelling and inflammation.
- The client was able to discuss the purpose of the drug.
- Any adverse reactions to the drug were identified and treated.

> DOCUMENTATION

Medication Administration Record

- Document the date, time, name, dose, and route of medication.

Nurses' Notes

- Record the client's response to the medication.
- Record any serious side effects and report them to the physician or qualified practitioner immediately.

> CRITICAL THINKING SKILL

Introduction

Some medications are not compatible with a dextrose in water IV solution. They may form a precipitate that occludes the tubing or IV catheter.

Possible Scenario

A client has an IV of D₅W infusing at 75 ml/hr. The physician orders dilantin to be given IV since the client is unable to take oral medications. The nurse uses the port closest to the client to inject the dilantin, but after the first few seconds of starting the IV push, she notices a white precipitate forming in the tubing.

Possible Outcome

The nurse immediately stops pushing the dilantin and stops the IV infusion. Since the precipitate did not reach the IV catheter, she quickly obtains new tubing and replaces the contaminated tubing using sterile technique. After flushing the tubing with D₅W, she attaches the new tubing to the IV catheter. She draws up a new dose of dilantin and starts the IV bolus dose again, this time flushing the line with normal saline before and after the dilantin.

Prevention

The nurse must always check the compatibility of a medication with the IV solution before giving it IV push.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may react to an IV bolus more slowly due to circulatory deficits.*
- *The veins of elderly clients may be more fragile and sensitive to irritating solutions.*



Pediatric Variations:

- *Giving a medication to a child through an established IV may be less painful and traumatic than an IM or subcutaneous injection.*
- *Special precautions need to be taken to maintain an IV intact in very young clients.*
- *A child may react strongly to the feelings of pressure or coolness when IV medication is injected. Carefully observe the child and the site to determine if the reaction is related to anxiety or actual problems with the IV site.*
- *Explain the procedure carefully to the child. Make sure that they do not think there is another "needle" going to be inserted into their skin.*



Home Care Variations:

- *Clients may be taught how to flush an intravenous line to maintain patency, but IV push medications should be administered only by a nurse.*



Long-Term Care Variations:

- *Long-term IV push medications should be reevaluated periodically for effectiveness of the medication.*
- *Most clients receiving long-term, IV push medications have a central line in place rather than a peripheral IV line.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Medication pushed slowly through a heparin lock causes swelling around the needle.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to assess the IV for patency before administering the IV medication.

Ask Yourself:

How do I respond to this error?

Response:

Stop pushing the IV medication. Using another syringe, pull back to check for a blood return. If there is none, remove the needle and heparin lock and start an IV in another site. When you are sure the needle is in the vein, administer a new dose of the medication.

> NURSING TIPS

- Sometimes no blood will return from a heparin lock even though it is patent.
- Be sure the IV site is visible and free of tape or dressing while injecting the medication.
- A patent vein should allow a free flow of medication during an IV push.

SKILL 5-19

Administering Medications via Volume-Control Sets

Eva Gallagher, RN, BSN

KEY TERMS

Additive set

Buretrol

Infusion set

Intermittent infusion

Volume-controlled

set

VoluTrol



> OVERVIEW OF THE SKILL

Volume-control sets are often referred to by the brand name such as Soluset, VoluTrol, or Buretrol. They allow the nurse or caregiver to dilute medication in a small to moderate quantity of IV fluid in a calibrated chamber. The drip rate is then adjusted using

the roller clamp or a dial-a-flow to deliver a set volume over a set time. This makes it easier for the nurse to accurately regulate and manage the intermittent infusion of IV medications.

> ASSESSMENT

1. Identify the drug(s) ordered: action, purpose, normal dosage and route, common side effects, time of onset and peak action, possible interactions with IV solution, and nursing implications. This allows the nurse to anticipate effects of the drug and to observe client's response.
2. Check allergies and replace any missing or faded identification bracelets. Identification bracelets provide positive client identification.
3. Assess client's knowledge regarding medications to determine need for drug education and to assist in identifying client's compliance with drug therapy at home.
4. Assess client's IV access to determine need for a new IV site or access to existing site.

> DIAGNOSIS

- 1.4.1.2.1 Fluid Volume Excess
- 1.2.1.1 Risk for Infection
- 1.6.1 Risk for Injury

> PLANNING

Expected Outcomes:

1. Correct dose of medication will be administered to client over correct time period.
2. Client will be instructed, if needed, on use of intermittent infusion or additive set.
3. The client will not suffer any adverse effects from the medication administration method.

Equipment Needed (see Figure 5-19-2):

- Primary IV set
- Volume-control infusion set
- Medication administration record (MAR)
- Medication
- Syringe (may be needed)
- Alcohol pads

2. Make sure client knows where to call with questions.
3. Reinforce verbal teaching with written instructions.



Estimated time to complete the skill:
5–15 minutes



Figure 5-19-2 Volume-control infusion set

> CLIENT EDUCATION NEEDED:

1. If client is going to be administering medication at home using volume control sets, have client do a return demonstration setting up the set independently.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.	1. Reduces the transmission of microorganisms.
2. Check MAR against the physician’s or qualified practitioner’s written orders.	2. Ensures accuracy in the administration of the medication.
3. Check for drug allergies.	3. Decreases risk of allergic reaction such as hives, urticaria, or anaphylactic shock.
4. Prepare the medication for one client at a time.	4. Ensures that the right client receives the right medication.
5. Decide what type of infusion set is needed. If a volume control infusion set is your choice, assemble equipment.	5. Select the infusion device which will offer the best control and regulation for the type and delivery schedule of medication you are administering.
6. If you are unfamiliar with the brand of equipment where you are working, seek assistance before you need to use it to deliver medication to a client.	6. Reduces the chance of medication errors. Reduces the chance of anxiety or stress for the client.
7. Close clamps and open air vent on chamber (see Figure 5-19-3). Connect the primary IV bag to the volume-control set. Then connect the IV tubing to the volume-control set.	7. Opening the air vent prevents the buildup of negative pressure in the volume-control set, allowing the solution to flow out of the chamber.

continues



Figure 5-19-3 Close the clamps and open the air vent on the chamber.



Figure 5-19-4 Open the upper clamp and let the IV solution partially fill the chamber.

8. Open the upper clamp and let the IV solution partially fill the chamber. Close the clamp (see Figure 5-19-4).
 9. Open the lower clamp and allow the solution to flow down to fill the tubing.
 10. Prepare the medication for delivery. Draw up the medication into a syringe.
 11. Check the client's armband before administering the medications.
 12. Identify the drug for the client and its therapeutic purpose.
 13. Clean the injection port with alcohol.
 14. Inject the medication into the chamber and gently mix (see Figure 5-19-5).
8. Fills the chamber so medication may be diluted.
 9. Primes the tubing to prevent air from entering the vein.
 10. Allows for a smooth and accurate medication administration procedure.
 11. Ensures right client.
 12. Encourages client cooperation and increases client awareness of what to expect from the medication.
 13. Reduces the transmission of microorganisms.
 14. Adds medication to chamber for dilution.



Figure 5-19-5 Inject the medication into the chamber.



Figure 5-19-6 Open the upper clamp and add the additional IV solution to bring the volume of medication and diluent to the prescribed amount.

- | | |
|---|---|
| <p>15. Open upper clamp and add additional IV solution to bring the volume of medication and diluent to the prescribed amount (see Figure 5-19-6). Close clamp.</p> <p>16. Adjust the flow rate, or set the dial-a-flow, to infuse the medication over the prescribed rate.</p> <p>17. Label the chamber with medication information, date, time, and initials.</p> <p>18. Observe the client for side effects or adverse reactions.</p> <p>19. When the volume in the chamber has infused, close the air vent and reset the flow rate to the prescribed IV infusion rate.</p> <p>20. Wash hands.</p> | <p>15. Allows infusion of desired dosage strength in desired amount of diluent.</p> <p>16. Allows infusion of desired medication in desired amount of time.</p> <p>17. Reduces the chance of medication error.</p> <p>18. Assesses for potential problems related to the medications administered.</p> <p>19. Allows resumption of IV therapy.</p> <p>20. Decreases transmission of microorganisms.</p> |
|---|---|



▼ REAL WORLD ANECDOTES

The nurse brought the syringe filled with medication to be administered through the additive set into the client's room. She injected the medication into the Buretrol and left the room. When she returned to the room 20 minutes later, the Buretrol was still full. The nurse realized that she had forgotten to open the clamp on the Buretrol, which would allow it to empty and administer all of the medication to the client. The nurse was reminded to always check the clamps.

> EVALUATION

- The correct dose of medication was administered to the client over the correct time period.
- The client was instructed, if needed, on the use of the intermittent infusion or additive set.
- The client did not suffer any adverse effects from the medication administration method.

> DOCUMENTATION

Medication Administration Record

- Record the name and dosage of the medication.
- Record the date and time the medication was administered.

Nurses' Notes

- Note the client's response to the medication.

Controlled Substances Record Book (If the medication is a controlled substance)

- Record the name and dosage of the medication.
- Record the date and time the medication was removed from the locked cabinet.
- Document any controlled substance that was wasted.
- Note the name of the nurse administering the controlled substance.

Controlled substances must be documented at the time they are removed from the locked cabinet. Documentation on the MAR is done after the medication is administered.

> CRITICAL THINKING SKILL

Introduction

Volume-control sets are helpful for administering IV medications over a period of time. The medication

can be mixed with a certain volume of the primary IV fluid and then infused.

Possible Scenario

The nurse checks the MAR and notices that Bill is scheduled to receive potassium as well as a corticosteroid at noon today. She decides to put them both in the Buretrol at the same time and infuse them.

Possible Outcome

If the medications are incompatible, the effectiveness may be altered. A precipitate may also be formed causing the IV line to clog and become nonfunctioning. Precipitate could potentially be infused into the client.

Prevention

Always check the compatibility of drugs before mixing them together. When in doubt, infuse the two medications separately.

▼ VARIATIONS



Geriatric Variations:

- *The elderly may be susceptible to fluid overload. Be aware of the amount of diluent you are infusing.*



Pediatric Variations:

- *Only use microdrip IV tubing and an infusion pump for small children.*
- *Do not use too much diluent when infusing IV medications in small children. They are very susceptible to fluid overload.*



Home Care Variations:

- *Clients may try to reuse equipment more often than is safe. Teach the client the importance of regularly changing the infusion set.*



Long-Term Care Variations:

- *Periodically reassess the client's need for IV medication. Long-term IV access leaves the client susceptible to infection and thrombi.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

After the medication in an additive set is infused, not adjusting the rate of the primary infusion back to the original set rate.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check back within 20–30 minutes after setting up the medication infusion to see if the medication infusion is complete or on schedule and to adjust the rate as needed.

Ask Yourself:

How do I respond to this error?

Response:

Note the amount of fluid that was infused. Consider adjusting the rate of the primary infusion to make up for the incorrect amount of fluid that was infused. Follow institutional policy regarding adjusting an IV rate.

> NURSING TIPS

- Become familiar with types of volume-control sets used at the facility you work at.
- Think through the steps and review written instructions if unsure about how to assemble volume-control sets.
- If teaching the client this skill, use the same equipment he or she will be using at home.
- Learn the difference between the air vent and the injection port (see Figure 5-19-7).



Figure 5-19-7 Learn the difference between the air vent and the injection port.

SKILL 5-20

Administering Medication via a Cartridge System

Eva Gallagher, RN, BSN

KEY TERMS

Bolus
Cartridge
Epidural

Program
Pump



> OVERVIEW OF THE SKILL

Cartridge systems were designed to make IV or subcutaneous infusion of medications more portable for the client. Cartridge systems are widely used in various settings, including hospitals, outpatient infusion areas, clinics, long-term care settings, and home care. There are a number of different cartridge systems currently being used across the United States. They are compact.

Many allow the client to put the entire cartridge system in their pocket or over their shoulder in order to move freely about. Cartridge systems can infuse a continuous rate of medication and can also be programmed to deliver a bolus of medication as needed. They are simple enough to program that the client or family member can often be instructed on how to operate them.

> ASSESSMENT

1. Identify the drug ordered: action, purpose, normal dosage and route, common side effects, time of onset and peak action, and nursing implications. This allows the nurse to anticipate effects of the drug and to observe client's response.
2. Check allergies and replace any missing or faded identification bracelets. Identification bracelets provide positive client identification.
3. Assess client's knowledge regarding medications to determine need for drug education and to assist in identifying client's compliance with drug therapy at home.

4. Assess IV or SQ access to determine if new site is needed.
5. Assess rate of infusion to be run to determine if the volume to be infused and the infusion rate is feasible using a cartridge system.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 5.2.4 Effective Management of Therapeutic Regimen: Individual
- 6.1.1.3 Risk for Activity Intolerance
- 8.1.1 Knowledge Deficit, related to the use of the cartridge system

> **PLANNING**

Expected Outcomes:

1. Correct dose of medication will be administered to the client in a set time period.
2. Client will demonstrate knowledge regarding the use of the cartridge system and, if appropriate, how to program system.
3. Client will not suffer any adverse effects secondary to the use of the cartridge system.

Equipment Needed (see Figure 5-20-2):

- Cartridge system
- Medication
- Tubing
- Alcohol pads
- Medication administration record (MAR)



Estimated time to complete the skill:
5–15 minutes

> **CLIENT EDUCATION NEEDED:**

1. If client is going to be administering medication at home using an infusion set, have client do a return demonstration setting up the infusion set independently.
2. Make sure client knows who to call with questions.
3. Reinforce verbal teaching with written instructions.
4. Explain the expected actions of the medication, including purpose it is being administered and common side effects.



Figure 5-20-2 Cartridge system

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Check MAR against the physician’s or qualified practitioner’s written orders. Determine with the physician if a cartridge system is appropriate for this medication and this client. 3. Check for drug allergies. 4. Prepare the medication for one client at a time. <ul style="list-style-type: none"> • Decide if a cartridge infusion replacement set is needed. • Assemble needed equipment (check battery of cartridge system). • Ensure air is completely expelled from tubing. 5. Check the client’s identification bracelet before administering the medications (if appropriate). 6. Review the drug information with the client, including side effects, and therapeutic purpose. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Ensures accuracy in the administration of the medication. 3. Decreases risk of allergic reaction such as hives, urticaria, or anaphylactic shock. 4. Ensures that the right client receives the right medication. 5. Ensures right client. 6. Encourages client cooperation and increases client awareness of what to expect from the medication. |
|---|--|

continues

- | | |
|--|---|
| <p>7. Administer the medication using the cartridge set through central, peripheral, epidural, or subcutaneous catheter site as ordered.</p> <p>8. Observe the client for side effects or adverse reactions.</p> <p>9. Wash hands.</p> | <p>7. Cartridge sets can be used with many types of IV access.</p> <p>8. Assesses for potential problems related to the medications administered.</p> <p>9. Decreases transmission of microorganisms.</p> |
|--|---|



▼ REAL WORLD ANECDOTES

Scenario 1

Mary is an insulin-dependent diabetic. Recently her endocrinologist recommended that Mary start using an insulin pump. She received instructions from the diabetic teaching nurse and started to use the pump routinely. She had no problem with the pump until one day when she noticed that her blood sugar level kept rising despite several boluses from the pump. Worried, Mary called the diabetic teaching nurse. The nurse recommended that Mary check the placement of the subcutaneous needle and the tubing to be sure they were intact. After careful inspection, Mary realized that the insulin syringe was not properly seated in the pump. After repositioning the syringe, Mary was able to successfully inject a bolus of insulin and control her blood sugar level.

Scenario 2

Sally has been on pain medication using a cartridge system since surgery this morning. She is quite uncomfortable but has not used the bolus button to give herself a bolus of the pain medication because she is afraid she will give herself too much. Sally mentions this to the nurse and the nurse explains that the cartridge system is set up to give Sally a specific dose for a bolus, so she cannot get too much medication. The important thing is for her to have good pain control.

> EVALUATION

- Correct dose of medication was administered to the client in a set time period.
- Client demonstrates knowledge regarding the use of the cartridge system and, if appropriate, how to program the system.
- Client does not suffer any adverse effects secondary to the use of the cartridge system.

> DOCUMENTATION

Medication Administration Record

- Document the name, dosage, and route of the medication.
- Note the site of medication administration, if appropriate.

Nurses' Notes

- Record client's response to medication and any adverse effects noted.
- Note client teaching performed.

Controlled Substance Record

- If the client is receiving a controlled substance, record the amount removed from the locked cabinet and any controlled substance wasted.

> CRITICAL THINKING SKILL

Introduction

Medications in cartridge systems can be mixed at different strengths. For instance, morphine can be mixed to infuse 5 mg/ml of morphine or 10 mg/ml of mor-

phine. For this reason, when changing the cartridge, it is important to verify the strength of the medication being infused.

Possible Scenario

Jim has been receiving morphine through a cartridge set for the last week. His pain has been increasing, so his dose of morphine was increased over the last 2 days. The medication in the cartridge ran out so the nurse replaced it. Because of Jim's increased morphine use, the pharmacy decided to make the morphine cartridge a different strength. The nurse did not realize that the morphine cartridge that was sent up was a different concentration and was twice as strong as the previous medication cartridge. She programmed the cartridge set at the same rate that was previously used.

Possible Outcome

Jim became very sleepy and somewhat disoriented. His respiratory rate dropped to 7 breaths/min. The nurse discovered her error, turned off the morphine infusion, and called Jim's doctor. In an hour, Jim was wide awake and once again oriented. The morphine infusion was restarted at the correct rate.

Prevention

Always check the concentration of new medication cartridges before setting up the infusion. Check the dose of the infusion against both the MAR and the doctor's original order. Have another nurse double check the infusion rate if needed. Sometimes the pharmacy will change the label of a medication to look different on cartridges of different concentrations.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may be more sensitive to some medications. Carefully assess the client's reaction to the cartridge medication and report your findings to the client's physician or qualified practitioner.*



Pediatric Variations:

- *Be sure the cartridge system is either out of a small child's reach or locked to prevent the child from accidentally interfering with the cartridge system's function.*



Home Care Variations:

- *Arthritic clients or clients with impaired coordination may require a cartridge system that is easy to load and unload.*
- *Teach the client how to determine if the battery is low in the cartridge system.*



Long-Term Care Variations:

- *Periodically reassess the effectiveness of the medication being delivered by the cartridge system.*
- *Regularly monitor the condition of the cartridge system, including the battery strength.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The cartridge set is programmed for the incorrect medication administration rate.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check the MAR and physician's or qualified practitioner's orders for the correct dose of medication. Make sure that the concentration of medication in the cassette is the same as the concentration in the previous cassette.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I respond to this error?

Response:

Turn medication cartridge set down or off. Assess client for medication side effects. Attempt to figure out how error occurred. Report the error.

Possible Error:

Medication is leaking from tubing connection between the cartridge set and client's IV access.

Ask Yourself:

How do I prevent this error?

Prevention:

Always double-check that connections are secure.

Ask Yourself:

How do I respond to this error?

Response:

Secure connections. Assess amount of medication that was leaked and need to replace medication. Document any leakage to explain any discrepancies between the amount in the cartridge and the amount the client used.

> NURSING TIPS

- Always check the connections in the tubing to make sure they are secure.
- Always check the concentration of the medication to ensure the right dose is being delivered to the client.
- Become familiar with types of infusion sets used at the facility you work at.
- Think through the steps and review written instructions if unsure about how to assemble infusion set.

SKILL 5-21

Administering Patient-Controlled Analgesia (PCA)

Hsiu-Ying Huang, RN, PhD

KEY TERMS

Analgesics	Opioid
Basal infusion rate	Pain
Bolus dose	PCA
Lock-out interval	Respiratory depression
Maximum dose limit	



> OVERVIEW OF THE SKILL

Patient-controlled analgesia (PCA) is a method to relieve pain through self-administration of analgesics (usually opioids, e.g., morphine) by a client using a programmable pump connected to a subcutaneous, intravenous, or epidural catheter. It is commonly used for controlling postoperative pain or cancer pain in hospital and home. By pressing a button of the PCA pump, the client can bolus administer the prescribed analgesic as demanded. Clients need to operate the PCA as instructed. The use of PCA is contraindicated for sedated and confused clients.

Nurses should obtain an order with clear indication of the analgesic used, route of administration,

bolus dose (amount of analgesic received when pressing the button), lock-out interval (the time period that pressing the button more than once results in only one dose of analgesic received), and maximum dose limit (the maximum amount of analgesic can be received within a certain period of time, e.g., 1 hour); loading dose (first bolus dose) and basal infusion rate (continuous infusion rate) should be prescribed if applicable. To administer PCA, nurses should maintain a patent catheter line as route, install the analgesic solution into the PCA chamber, and program the PCA pump according to the prescribed parameters.

> ASSESSMENT

1. Assess client consciousness level and cognitive function to determine if the client has the ability to correctly operate the PCA pump.
2. Identify the PCA ordered: the analgesic, action, purpose, common side effects, route, loading dose, bolus dose, lock-out interval, maximum dose, and basal rate. Nurses should prepare the analgesics and program the PCA pump as prescribed and observe client responses to the pain therapy.
3. Assess client pain: Initial assessment should include the location, intensity, characteristics, and pattern of the pain as well as factors increasing and decreasing the pain; ongoing assessment includes the degree of pain intensity and pain relief, amount of analgesic administered, and times of button being pressed. Evaluates the appropriateness of the pain therapy and titration of the pain medication.
4. Measure patient blood pressure and respiratory rate if opioid is prescribed. Low blood pressure or respiratory depression may occur if using opioid. Reducing the dose, changing the drug, or administering naloxone (opioid antagonist) may be necessary.

> DIAGNOSIS

- 9.1.1 Pain
- 8.1.1 Knowledge Deficit, related to PCA and opioid use
- 9.3.1 Anxiety

> PLANNING

Expected Outcomes:

1. Client reports lessening or absence of pain.
2. Client can correctly press the PCA button to self-administer analgesic.
3. Client experiences no unwanted change in consciousness level, blood pressure, and breathing pattern.
4. Client experiences no uncontrollable side effects.

Equipment Needed (see Figure 5-21-2):

- A patent and indwelling subcutaneous, intravenous, or epidural line installed as the prescribed route of administration; see other skills about inserting an IV or SC catheter and assisting with epidural catheter placement.
- A PCA pump with manufacturer's instruction guide for operation: PCA pumps usually consist of a programmable infusion pump with syringe inside, a button linked to a timing unit that is activated by the client when demanded, and a tube that can be connected to an indwelling catheter (i.e., IV line).
- Properly prepared pain medication as ordered by the physician or qualified practitioner
- Label for drug identification and time tape
- Adhesive tape
- Disposable gloves
- Naloxone solution (0.4 mg in 10 ml of saline) if giving opioid agonists (i.e., morphine)



Estimated time to complete the skill:

10–15 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of PCA and the goal for pain therapy.
2. Teach how to report their pain (i.e., using a 0–10 scale to indicate how much pain experienced and how much pain relief felt).
3. Coach when and how to press the PCA button to administer bolus dose of analgesic. Remind them that they cannot overdose because of the lock-out interval.
4. Explain action and potential side effects of the pain medication.
5. Remind well-meaning family members or visitors not to push the PCA button for the client.
6. Explain the actions and side effects of the narcotic being used to both the client and family members.



Figure 5-21-2 PCA pump

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash your hands.
2. Assess the client's comfort level: pain location, intensity, characteristics, pattern, and factors that increase or decrease the pain.
3. Assess the client's consciousness level and ability to understand the instruction.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Identifies pain problem, purpose of pain therapy, and other adjuvant therapies. Establishes baseline to measure improvement.
3. PCA is contraindicated for sedated and confused clients.

4. Check the PCA order for drug, concentration, route, basal infusion rate, bolus dose, lock-out interval, maximum dose, and any loading dose.
5. Check the PCA medication label against physician's or qualified practitioner's order, and follow the five rights principle. PCA medication usually has been placed in the PCA syringe at the pharmacy.
6. Read the manufacturer's instruction guide before assembling and programming the PCA pump.
7. Place the filled PCA syringe into the chamber in the PCA pump and detect any leaking or damage to the system (see Figures 5-21-3, 5-21-4, and 5-21-5).
4. Opioid administration requires a physician's or qualified practitioner's order. Dosing parameters are necessary for programming a PCA pump.
5. Minimizes medication error and harm to client.
6. Different manufacturers or models may require different operation. Follow the manufacturer's instruction to ensure proper operation of the pump.
7. Assemble PCA pump and inspect damage of the system to avoid medication error and harm to client.



Figure 5-21-3 Remove the empty PCA syringe.



Figure 5-21-4 Place new PCA syringe into the chamber in the PCA pump.



Figure 5-21-5 Check for any leaking or damage to the system, and close the door to the chamber.

8. Program the pump according to the prescribed parameters, usually including basal infusion rate (mg/hr), bolus dose (mg), lock-out interval (min), and maximum dose limit (mg/hr) (see Figure 5-21-6).
8. Avoids overmedication and ensures accuracy of the medication given.



Figure 5-21-6 Program the pump.

- | | |
|--|--|
| <p>9. Wear gloves.</p> <p>10. Inspect the existing infusion line and puncture site for any inflammatory sign and check any occlusion or leakage of the infusion line. See IV catheterization or assisting epidural catheter placement if client needs an infusion line.</p> <p>11. Prime the PCA pump tubing. Connect the PCA pump tubing with the infusion line using aseptic technique and secure the connection with adhesive tape.</p> <p>12. Give the client the control button and instruct how and when to press the button.</p> <p>13. Record the procedure, including starting time, type of medication used, route, dosage, lock-out interval, and maximum dose limit.</p> <p>14. Wash your hands.</p> | <p>9. Sterile technique reduces transmission of microorganisms.</p> <p>10. Avoids skin breakdown and infection for safely administering medication. Infusion line must be patent to deliver medication to vessels.</p> <p>11. Reduces risk of infection and leakage. Prevents air embolism.</p> <p>12. Client teaching ensures appropriate use of PCA.</p> <p>13. Prevents document errors by timely recording.</p> <p>14. Reduces the transmission of microorganisms.</p> |
|--|--|



▼ REAL WORLD ANECDOTES

Mr. Franco, a 70-kg adult, received abdominal surgery. He complained of severe pain associated with position change. His wife was with him and asked the physician to give the client pain medication. The physician then prescribed PCA with IV infusion of morphine, starting with a loading dose of 10 mg, basal infusion rate of 0 mg, and bolus of 2 mg if demanded, lock-out interval of 15 minutes, with maximum dose of 20 mg in 3 hours. The nurse started the PCA and instructed the client how to use the PCA. Two hours after initiating the PCA, the nurse found Mr. Franco was quite drowsy and could not answer the nurse's questions. The nurse found Mrs. Franco was looking at a watch and then pressing the PCA button. Mrs. Franco admitted that she has pressed the button every 15 minutes to help relieve her husband's pain when she felt he might be in pain. The nurse immediately checked the vital signs of Mr. Franco and monitored any sign of overmedication. The nurse then communicated with Mrs. Franco for the purpose of PCA and the actions of morphine. The nurse was reminded to include family members in teaching and to emphasize the control of administration by the client to avoid overmedication. This incident served as a reminder to the nurse that even with the lock-out feature of the PCA, a client could be overmedicated for pain.

> EVALUATION

- Assess the degree of pain intensity and pain relief.
- Assess the consciousness level, blood pressure, and pattern of breathing.
- Check the presence and degree of nausea, vomiting, urinary retention, and constipation if opioid is administered.
- Assess the insertion site for inflammatory or infection sign.

> DOCUMENTATION

Medication Administration Record

- Record the route, drug name, concentration and volume prepared, dosage, loading dose, basal rate, lock-out interval, maximal hourly dose, and total dose of the PCA.

Nurses' Notes

- Record the pain location, intensity, characteristics, and pattern for initial assessment.
- Record the consciousness level, blood pressure, respiratory rate, and change in respiratory depth.
- Record any side effects associated with the drug use.

> CRITICAL THINKING SKILL**Introduction**

Nurses must be able to evaluate the effectiveness of PCA by assessment of the pain intensity and pain relief.

Possible Scenario

A client posthysterectomy was given PCA morphine for controlling pain. The client was lying stiff on her bed and breathing shallowly. The nurse asked how she was doing. She indicated that she was OK but could not rest. Assessing the client's pain intensity using a 0–10 scale, the nurse found that her pain was 5 now

and most of the time but could be 9 when she moved. The pain relief was about 2–3 using a 0–10 scale. The nurse checked the PCA and discovered that she pressed the PCA button every 1–2 minutes. The nurse then reported to the physician. The physician changed the prescription to add continuous infusion of morphine and escalate the PCA bolus dose of morphine.

Possible Outcome

If the nurse did not assess the client's pain and detect insufficiency of morphine dose, the client would continuously suffer from pain. Restlessness and immobilization may occur due to pain, which may impede recovery.

Prevention

The nurse prevented undermedication by assessing the client's pain intensity, pain relief, and medication used.

▼ VARIATIONS**Geriatric Variations:**

- *The elderly may present with cognitive impairment or confusion, which is contraindicated with the use of PCA.*
- *In addition, the dosing should be carefully monitored and titrated in elderly with decreased kidney or liver function.*

**Pediatric Variations:**

- *Children need to be mature enough to understand the relationship between pain, pushing the button, and pain relief in order to operate the system.*
- *Most children over the age of 7 understand this concept, and some younger children can learn to use PCA safely.*

**Home Care Variations:**

- *PCAs are commonly used in home care setting.*
- *Family members need to be reminded not to press the button for the client if the client does not ask for it to avoid overmedication.*
- *Make sure the client will have access to the button at all times in the home setting and that a way to summon help is at hand if the button falls or is moved out of reach.*

**Long-Term Care Variations:**

- *PCAs are usually used for a short period of time.*
- *Long-term use may be seen in clients with cancer or chronic pain, especially those who had breakthrough or incidence pain.*
- *Encourage the client to become an active participant in pain control.*
- *The client may be exploring other options to support for pain control, such as acupuncture, imagery, massage, or over-the-counter remedies.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Opioid was not delivered because the infusion line was occluded or leaked.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess patency of the infusion line and detect any leakage. Secure the line to avoid kinking.

Ask Yourself:

How do I respond to this error?

Response:

Change the infusion line.

Possible Error:

Client was over- or undermedicated because of a mistake in PCA programming.

Ask Yourself:

How do I prevent this error?

Prevention:

Check each parameter programmed against the physician's or qualified practitioner's order. Have another nurse to double check the programming.

Ask Yourself:

How do I respond to this error?

Response:

Assess the client's condition such as pain, consciousness level, and vital signs. Intervene immediately if adverse effects occur. Correct or stop the infusion. Notify the physician for further intervention.

> NURSING TIPS

- Read manufacturer's instruction guide before assembling and programming the PCA pump.
- Identify the actions of the prescribed medication and necessary parameters to be programmed.
- Periodically assess pain intensity, pain relief, and side effects.
- Remember that if the medication is discontinued, any narcotic left in the pump must be wasted. Another nurse must witness the wasting procedure and the amount, reason, time, and date of the wasting must be documented.

SKILL 5-22

Administering Epidural Analgesia

Robi Thomas, MS, RN, AOCN

KEY TERMS

Analgesia
Catheter
Epidural

Opiates
Pain



> OVERVIEW OF THE SKILL

Epidural catheters have long been used for administration of opioid analgesics for chronic intractable pain and for chemotherapy. In recent years they have become a popular and widely accepted vehicle for the management of acute postoperative pain.

Epidural opioid use is beneficial to the client because pain is controlled with lower dosages of the drugs, thus producing fewer side effects. The blood-brain barrier prevents the opiates from crossing into

the brain; thus pain relief results from drug levels in the spinal cord.

The catheter is usually placed by the anesthesiologist into the epidural space. If the catheter is intended for long-term use, it is tunneled subcutaneously, exiting on the side of the body or on the abdomen. Epidural catheters intended for short-term use may not be sutured in place and will exit from the insertion site on the back.

> ASSESSMENT

1. The client should be assessed for relief from pain. The level of pain should be assessed, using a 0–10 scale, with 0 being pain free and 10 being excruciating pain. The type of pain and location of pain should also be assessed. **This will help establish a baseline to gauge the effectiveness of the pain medication.**
2. The catheter site should be assessed for erythema, purulent drainage, edema, and tenderness. **Denotes signs and symptoms of infection.**
3. Temporarily placed catheters should be assessed to ensure that they are intact and have not been dislodged.

4. Assess vital signs prior to infusing medication through the catheter to **establish a baseline for later assessment of the effects of the medication.**

> DIAGNOSIS

- 8.1.1 Knowledge Deficit, related to epidural analgesia
- 9.1.1 Pain
- 1.2.1.1 Risk for Infection, related to epidural catheter placement
- 1.6.1 Risk for Injury

> PLANNING**Expected Outcomes:**

1. Client's pain will be relieved.
2. Client's mobility will be improved due to relief from pain.
3. Catheter and tubing will be taped securely in place.
4. There will be no signs or symptoms of infection.
5. The client will be able to void without difficulty.

Equipment Needed (see Figure 5-22-2):

- Sterile gloves
- Prediluted, preservative-free medication
- Labels for the injection port and tubing
- Infusion pump for medication administered by continuous infusion
- IV tubing that doesn't have Y-ports if medication is administered by continuous infusion
- Tape
- Povidone-iodine swabs
- Syringe, 10–12 cc, if administering medication by bolus injection
- Filter needle
- Needle, 20 gauge 1 inch, or needleless system



Estimated time to complete the skill:
5–15 minutes

> CLIENT EDUCATION NEEDED:

1. Describe the epidural catheter to the client prior to placement. Showing the client a picture of the catheter or letting the client talk to another client who has had an epidural catheter may relieve fears for the client.
2. Teach the client how to assess pain on a scale of 0–10.
3. Teach the client that pain relief will be obtained within 30–60 minutes after the injection.
4. Teach the client the side effects of the opiates and reassure the client that the side effects can be treated.



Figure 5-22-2 Infusion pump and infusion tubing are used to administer medication by continuous infusion.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

1. Wash hands.
2. Verify medication with order.
3. Gather equipment needed and verify client.
4. Set up sterile field.

1. Reduces the transmission of microorganisms.
2. Decreases risk of medication error.
3. Ensures all equipment needed is available and saves time. Verifying correct client decreases risk of medication error.
4. Minimizes risk of infection by using sterile technique.

For Bolus Injection

5. For bolus injection: draw up prediluted, preservative-free narcotic solution through filter needle in 10-cc syringe (see Figure 5-22-3).

5. Preservatives are toxic to neural tissue. Filter needles remove any microscopic glass particles.



Figure 5-22-3 For bolus injection, draw up prediluted, preservative-free narcotic solution through filter needle in 10-cc syringe.



Figure 5-22-4 For continuous infusion, attach preservative-free opioid to the infusion pump tubing and prime tubing.

6. Change from filter needle to regular 20-gauge needle or needleless system if in use.
7. Clean injection cap with povidone-iodine.
8. Insert needle into injection cap and aspirate.
9. If 0.5 cc or less clear fluid returns, inject drug slowly.
10. Remove needle from the injection cap and dispose of properly.

For Continuous Infusion

11. For continuous infusion, attach preservative-free opioid to infusion pump tubing and prime tubing (see Figure 5-22-4).
12. Attach the proximal end of the tubing to the pump and the distal end to the catheter (see Figure 5-22-5). Luer-lock all connections. Tape a tension loop of tubing to client's body. Start pump.
13. Ensure pump is infusing at desired rate.

6. Prepares medication to be injected.
7. NEVER use alcohol, since it is toxic to neural tissue. Povidone-iodine cleans injection cap and minimizes introduction of microorganisms during needle insertion. Allow povidone-iodine to dry for 2–3 minutes to maximize effectiveness.
8. Aspiration of clear fluid of 0.5 cc or less is indicative of epidural catheter placement. If more than 0.5 cc cerebrospinal fluid or blood is obtained, notify physician or qualified practitioner since catheter may be in subarachnoid space or in a blood vessel.
9. Slowly injecting medication minimizes client discomfort by lowering the pressure exerted.
10. Prevents accidental needle sticks and complies with biosafety guidelines for disposal of contaminated material.

11. Air bubbles should be eliminated to prevent air embolus.
12. Luer-locking connections minimize the risk of accidental leakage from separation of catheter and tubing. This also minimizes risk of infection. Taping tension loop minimizes risk of dislodging catheter by pulling on tubing.
13. Ensures client is receiving correct dose.

For Continuous Infusion *continued*

Figure 5-22-5 Attach the proximal end of the tubing to the pump.

- | | |
|---|--|
| <p>14. Label tubing as epidural catheter tubing and with name of drug, date, and time.</p> <p>15. Dispose of gloves and wash hands.</p> <p>16. Document in client's chart.</p> | <p>14. Protects against inadvertent use of line for other reasons.</p> <p>15. Reduces transmission of microorganisms.</p> <p>16. Records dose, route, and time drug was administered.</p> |
|---|--|



▼ REAL WORLD ANECDOTES

Maria Rodriguez was status post an exploratory laparoscopy and total abdominal hysterectomy. Her anesthesiologist placed an epidural catheter with morphine infusing for control of the pain. The nurse caring for Ms. Rodriguez assessed her pain level, and according to the client, the pain score was 2 on a scale of 0–10. Upon assessment, the exit site of the epidural catheter was clean, with no tenderness noted. The catheter was securely taped in place. Ms. Rodriguez had a Foley catheter that was draining clear yellow urine. Her vital signs were stable, and her only complaint was of mild nausea. The nurse administered 10 mg of prochlorperazine as ordered, with relief of nausea obtained. Four hours later, Ms. Rodriguez was sitting in a chair at the bedside.

> EVALUATION

- Client's pain was relieved.
- Client's mobility was improved due to relief from pain.
- Catheter and tubing were taped securely in place.
- There are no signs or symptoms of infection.
- The client is able to void without difficulty.

> DOCUMENTATION

Medication Administration Record

- Record the type of drug, dose, time, and route (either by bolus injection or continuous infusion).

Nurses' Notes

- Record the effectiveness of the medication in relieving the client's pain.
- Note the status of the epidural catheter site.
- Document any client teaching performed.
- Record the client's vital signs and neurologic status.

Intake and Output Record

- Note the amount of fluid infused from the previous cassette or the current bolus.

Controlled Substance Record

- Record the type of drug, dose, and time.
- Note any controlled substance that is wasted.

> CRITICAL THINKING SKILL

Introduction

A client has a tunneled epidural catheter for continuous infusion morphine to treat intractable cancer pain. The client has had the catheter for a month and has not had any complications. She is being admitted to the hospital for a temperature of 102°F.

Possible Scenario

Upon initial assessment, the nurse caring for the client notes that the client flinches when the nurse lightly touches her back along the spinal cord. The nurse also notes some erythema and edema at the lower lumbar spine. She notifies the physician, who orders intravenous antibiotics, blood cultures, and a consult to the anesthesiologist who placed the epidural catheter.

Possible Outcome

Twenty-four hours after initiation of antibiotics, the client became afebrile. The site of the epidural catheter was still tender but less erythematous and the edema disappeared. The client was kept on intravenous antibiotics for an additional 24 hours, but when cultures were negative and the client remained afebrile, she was changed to oral antibiotics and discharged to home. However, a visiting nurse was ordered to follow up at home and reinforce teaching on how to care for the epidural catheter to the client and her husband.

Prevention

Maintaining good technique in caring for the epidural catheter as well as carefully monitoring for signs and symptoms of infection can decrease the risk of infection. However, when immunocompromised clients have any indwelling foreign object, they are automatically at an increased risk for infection.

▼ VARIATIONS



Geriatric Variations:

- *The elderly are more sensitive to side effects of medication and may need to be titrated carefully to relieve pain yet minimize side effects of the opiates.*
- *They may become easily confused, so it is important that the catheter is well secured and tubing Luer-locked, to minimize displacement if the client becomes restless or confused.*
- *It is important to assess other medications the elderly client is taking to ensure that there is no synergism of side effects from the multiple medications the client may be taking.*



Pediatric Variations:

- *Children have the same needs for pain relief as adults do, yet research has shown that children are chronically undermedicated.*
- *Children can safely use epidural analgesia, but it is important that the catheter is well secured and tubing Luer-locked, to minimize displacement if child becomes restless.*
- *Check the catheter frequently in an active child to make sure tubing connections are secure.*



Home Care Variations:

- *Temporary epidural catheters should remain in place for only 7 days to decrease the risk of infection. If the client is to be discharged with an epidural catheter in place, a permanent catheter may be required to decrease risk of infection and dislodgement.*



Long-Term Care Variations:

- *Epidural catheters placed in clients in long-term care facilities should be permanent catheters.*
- *The employees at the long-term care facility need information on how to care for the client as well as what signs and symptoms to look for that will alert for catheter malfunction as well as infection.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Injecting the wrong medication into the catheter.

Ask Yourself:

How do I prevent this error?

Prevention:

Often clients coming out of surgery have a multitude of intravenous lines. It is imperative that intravenous tubing used for the epidural catheter be clearly marked so that medications other than the preservative-free opioids are not injected.

Possible Error:

Misinterpreting rest and undermedicating the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Many times health care professionals do not administer the necessary amount of opiates due to fear of overmedicating the client. A client who has been in chronic pain may sleep for an extended period of time when opioid analgesia is initiated, not because of oversedation, but because the client is pain free and is able to rest.

> NURSING TIPS

- A client receiving intravenous opiates will need to have them titrated down once epidural opiates are initiated. The intravenous to epidural morphine equivalent is 10:1. However, each individual is different and must be closely observed to ensure that pain is controlled but the client is not oversedated.
- All medication should be clearly marked as preservative free if it is to be used epidurally.
- It is advisable to keep a patent IV in place for 24 hours after the epidural catheter has been initiated for easy access of IV medications needed to treat side effects of the medication used in the epidural catheter.
- A client with an epidural catheter should not be using heparin.
- Observe for side effects of opioid, including nausea/vomiting, urinary retention, constipation, headache, increased sedation, and, in rare cases, respiratory depression.
- Observe for paresthesias and/or change of level of consciousness, suggesting displacement of epidural catheter.
- An in-line filter may be required depending on institutional policy.

SKILL 5-23

Managing Controlled Substances

Karrin Johnson, RN

KEY TERMS

Controlled substance	Schedule I
Drug Enforcement Agency (DEA)	Schedule II
Narcotics	Schedule III
Potential for abuse	Schedule IV
	Schedule V



> OVERVIEW OF THE SKILL

A controlled substance is defined as chemicals or drugs designated by the Drug Enforcement Agency (DEA) as having a potential for abuse by humans. They are identified by a capital “C” and Roman numerals (IV) on the label. Potential for abuse is thought to exist if the chemical is being used in amounts sufficient to create a hazard to the individual or community, there is diversion of the chemical from legitimate uses, or the chemical is being used without licensed medical advice. Evidence of actual abuse of a substance is indicative that a drug has a potential for abuse.

Controlled substances are categorized according to their abuse potential. There are five categories known as schedules:

- Schedule I substances have no acceptable medical use in the United States. This category includes heroin, LSD, and mescaline.
- Schedule II substances have a high potential for psychological or physical dependency, but have legitimate medical uses. This category includes narcotic, stimulant, and depressant drugs such as morphine, codeine, and percodan.
- Schedule III substances have a lesser potential for abuse than Schedule II substances. This category includes some preparations containing narcotics and barbiturates. Because of the widespread abuse of anabolic steroids many states now consider them to be a Schedule III substance.
- Schedule IV substances have a lesser potential for abuse than Schedule III substances. This category includes phenobarbital, chloral hydrate, and Valium.
- Schedule V substances have a lesser potential for abuse than Schedule IV substances. This category includes preparations containing small amounts of narcotics such as antitussive medication and antidiarrheal medication.

Controlled substances must be stored, accounted for, and distributed according to strict legal guidelines. All substances must be accounted for in the record and the record must match the actual substance on hand exactly. Controlled substances must be kept in a double-locked safe that is either attached to a wall or weighs over 2,000 lbs. Nothing else can be locked in the same safe including

paperwork and nonscheduled substances. The keys to the safe must be in the possession of a licensed person at all times and must remain in the facility at all times.

When controlled substances are routinely stored and administered by the registered nurse, it is the nurse's responsibility to safeguard the keys and record all controlled substances received, given, and wasted, as well as monitoring the current inven-

tory. Because these medications have a high potential for abuse, the responsible nurse should monitor all personnel who come in contact with the narcotics safe. Nurses are not immune from substance abuse leading to workplace theft. Suspicions regarding potential theft of controlled substances or impaired staff members must be dealt with according to institutional policy.

> ASSESSMENT

1. Assess the security of the controlled substance storage safe to remain within legal guidelines and to ensure the safety of the substances.
2. Assess the contents of the safe for any evidence of tampering with substance containers to detect possible theft.
3. Assess the controlled substance record for integrity regarding records of substances given to clients and substances wasted to detect possible diversion of substances.
4. Assess the method used for the storage and safeguarding of the safe keys to remain within legal guidelines and ensure the safety of the substances.
5. Assess the method used for signing out controlled substances that are to be administered to clients to detect possible diversion of substances.
6. Assess the method used for wasting unused controlled substances to detect possible diversion of substances.
7. Assess the method used to document controlled substances received from and returned to the pharmacy to detect possible diversion of substances.

> DIAGNOSIS

- 3.2.2.2 Risk for Caregiver Role Strain
- 8.1.1 Knowledge Deficit, related to management of controlled substances

> PLANNING

Expected Outcomes:

1. The controlled substances will be stored in a legal, safe, and secure manner.
2. The controlled substance packaging will be intact without evidence of tampering.

3. The controlled substance record will be accurate and agree with the actual contents of the safe.
4. The keys to the controlled substance safe will be maintained in a secure place and manner.
5. Controlled substances removed from the safe will be recorded and dispensed in a safe and legal manner.
6. Unused portions of controlled substances will be disposed of in a safe and legal manner.
7. Controlled substances will be received from and returned to the pharmacy using a secure and legal method.

Equipment Needed:

- Controlled substance safe
- Controlled substance count sheet
- Keys
- Client's medical admission record (MAR)
- Sharps box
- Sink
- Pen



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Educate the client regarding the potential for abuse and addiction inherent in a controlled substance.
2. Reinforce the need to take the controlled substance as ordered. If the substance is not working effectively, notify the caregiver rather than take an extra dose of medication.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Dispensing a Controlled Substance to a Client

1. Wash hands.
2. Obtain the client's MAR to determine the type and dosage of the controlled substance.
3. Obtain the keys to the controlled substance safe.
4. Making sure that the area is secure, open both locks on the controlled substance safe (see Figure 5-23-2).



Figure 5-23-2 Make sure the area is secure, then open the outer lock.

5. Remove the ordered controlled substance and check the medication and dosage against the client's MAR (see Figure 5-23-3).
6. Remove the ordered dosage from the safe and relock the safe.
7. On the controlled substance sign-out record, note the date, time, client, drug, and dosage. Sign the record.
8. Secure the controlled substance safe keys.
9. Dispense the controlled substance using the appropriate method according to the form of the substance.

1. Reduces the transmission of microorganisms.
2. Verifies the order for the controlled substance.
3. Provides access to the controlled substance safe.
4. Promotes a secure area to prevent pilferage while the safe is open.



Figure 5-23-3 Check the medication and dosage against the client's MAR.

5. Ensures the right medication and dosage for the right client.
6. Secures the remaining controlled substances.
7. Provides a legal record of the disposition of the controlled substance.
8. Prevents pilferage from the safe.
9. Ensures the appropriate method of medication administration—IM, oral, SQ, etc.

continues

Disposing of Unused Portions of Controlled Substances

10. Obtain the assistance of a second registered nurse.
11. With the second nurse as a witness, safely dispose of the unused controlled substance. If it is a liquid, pour it down the sink. Pills may be crushed and disposed of in the biohazard container or the powder may be flushed down the sink.
12. On the controlled substance record, note the amount of substance wasted, the method of disposal, the date, and the time. Sign the proper area and have the witnessing nurse sign also.
13. Dispose of any needles or biohazardous substances in the appropriate containers.
14. Wash hands.
10. Provides a legal witness to the disposal of the controlled substance.
11. Disposes of the controlled substance in an irrevocable manner.
12. Provides a legal record of the disposition of the entire amount of the controlled substance.
13. Follows standard precautions.
14. Reduces the transmission of microorganisms.

Inventorying Controlled Substances

15. Obtain the assistance of a registered nurse from the next or previous shift.
16. Obtain the keys to the controlled substance safe.
17. One nurse physically counts the amount of each type and dosage of controlled substance in the safe, informing the second nurse of each total (see Figure 5-23-4).
15. Provides a legal witness for the procedure.
16. Provides access to the controlled substance safe. This is a good time to collect all sets of keys for the safe.
17. Physically verifies the presence of each medication. This is the time to examine the various medication containers to assess for possible tampering.



Figure 5-23-4 One nurse counts the amount of each type and dosage of controlled substance in the safe.



Figure 5-23-5 The second nurse records the counted totals in the controlled substance record.

18. The second nurse records the counted totals in the appropriate space in the controlled substance record (see Figure 5-23-5).
18. Checks the physical total against the written totals. These amounts must tally exactly. This is a good time to examine the controlled sub-

- stance record for excessive use of controlled substances, suspicious waste documentation, or other suspicious documentation.
19. Any discrepancies must be accounted for and accompanied by the signature of the responsible nurse before the administering nurses can be dismissed.
 20. All sets of keys must be accounted for and collected before the administering nurses can be dismissed.
 21. Relock the controlled substance safe and secure the keys.
 19. By law all controlled substances, dispensed or in the safe, must be accounted for before the dispensing nurse can leave.
 20. By law all sets of keys to the controlled substance safe must remain on the institution premises to prevent tampering or copying.
 21. Secures the controlled substances and limits access to the controlled substances.



▼ REAL WORLD ANECDOTES

While working her shift in labor and delivery, Mary has a set of keys to the controlled substance safe. She uses the keys several times throughout the shift and appropriately signs out the substances she gives. As the time for change of shift approaches Mary notes that there are no clients in the labor and delivery area. She has an appointment soon and asks Vera, the other RN in labor and delivery, to count the controlled substances while she changes out of her scrubs. Vera agrees and counts the controlled substances with the oncoming shift. As Vera hands over her set of keys the oncoming nurse asks about the second set of keys. Realizing that Mary must still have the second set, Vera hurries to the changing room. Unfortunately, Mary is already gone and so is the dirty laundry. Vera and the oncoming nurses have to contact the laundry and everyone has to go through dirty scrubs in search of the keys to the controlled substance safe.

> EVALUATION

- The controlled substances are stored in a legal, safe, and secure manner.
- The controlled substance packaging is intact and shows no evidence of tampering.
- The controlled substance record is accurate and agrees with the actual contents of the safe.
- The keys to the controlled substance safe are maintained in a secure place and manner.
- Controlled substances removed from the safe have been recorded and dispensed in a safe and legal manner.
- Unused portions of controlled substances are disposed of in a safe and legal manner.
- Controlled substances are received from and returned to the pharmacy using a secure and legal method.

> DOCUMENTATION

Controlled Substance Record

- Document any change in the amount of controlled substances in the safe on the controlled substance record.
- Note the date, time, and disposition of the substance. This record must always agree with the physical contents of the safe.

Nurses' Notes

- Document dispensing a controlled substance and the reason it was given, e.g., pain, sedation, etc.
- Note the results of the medication and any unusual effects that might be attributed to the medication.
- Note if the client refuses the controlled substance. Indicate that the client refused the medication. If the medication was prepared, note that the substance was wasted.

Medical Administration Record (MAR)

- Record the amount and dosage.
- Record date and time the controlled substance was administered.
- Note if the client refuses the controlled substance. Indicate that the client refused the medication. If the medication was prepared, note that the substance was wasted.

> CRITICAL THINKING SKILL

Introduction

Theft of controlled substances occurs.

Possible Scenario

You are working nights in a small intensive care unit. The client beds and nurses desk are all in the same room so the lights are kept low to promote client comfort. The nurse you are working with seems to be very clumsy tonight and is dropping things. Several times she has dropped a prefilled syringe of morphine with the needle uncapped, contaminating the contents. You are quite busy with your clients and watch from the far side of the room while the nurse wastes the medication, signing the controlled substance record when you have time.

Possible Outcome

When you count the controlled substances at the change of shift you notice that 90 mg of morphine have been signed out by the other nurse. All but 5 mg have been marked as wasted. You are stunned by the amount of morphine that has been used. You certainly do not remember seeing the other nurse waste anything close to that amount during the night. Before you can leave you must check the client medication records to confirm the morphine that was given, as well as check the controlled substance safe and the record. You also open up the sharps box to determine the number, size, and dosage strength of the morphine syringes present to confirm that they were actually wasted.

Prevention

Do not assume that abuse of controlled substances cannot happen on your floor, unit, or wing. Just as in all walks of life, some nurses steal and some nurses are addicted to controlled substances. For your protection, as well as the protection of your clients, do not give these nurses a chance to break the law. Watch when a coworker asks you to cosign a wasted substance. Check for possible tampering with containers. If a coworker's behavior seems suspicious, follow up through the appropriate channels. This protects you, your clients, and allows your coworker to get needed help if indeed help is warranted.

▼ VARIATIONS



Geriatric Variations:

Not applicable



Pediatric Variations:

Not applicable



Home Care Variations:

- *If controlled substances are being dispensed in the client's home, the nurse must teach the client or the caregiver about the abuse and addiction potential of these substances.*
- *Teach the client or caregiver not to give extra doses if the medication does not seem to be working. Have them call the physician or qualified practitioner for advice. Extra doses can lead to psychological or physical addiction.*



Long-Term Care Variations:

- *In long-term care settings, do not become complacent about controlled substances that a client routinely takes. Follow all standard precautions.*
- *Do not leave a controlled substance at the client's bedside for the client to take later.*
- *Be sure to witness the client taking the medication.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Putting partial doses back in the safe or in the client's drawer for later use.

Ask Yourself:

How do I prevent this error?

Prevention:

Unused narcotics must be wasted, not saved. Never keep or reuse partial doses of controlled substances. If a prefilled syringe only comes in a 50 mg dose and the order is for 25 mg, waste the extra 25 mg prior to administering the medication. This helps prevent errors in dosage as well as preventing confusion and diversion of wasted controlled substances. You are accountable for the narcotics you use.

> NURSING TIPS

- Count all controlled substances with a nurse on the opposite shift.
- Check packaging for signs of tampering. Be sure the seals on the top and bottom of boxes are intact. Check unit dose packages to be sure the foil is intact. If the controlled substance is dispensed in a numbered roll of pills, check the other end of the roll to be sure numbers, 1, 2 and 3 are there.
- Report discrepancies immediately according to your agency policy.
- Be sure all sets of keys to the safe are accounted for at all times.
- Do not leave the keys to the safe in the drawer of the medication cart for convenience.
- If you aren't using a controlled substance regularly, return it to the pharmacy so you do not have to keep counting it.
- If someone tries to forcibly steal the controlled substances, give them the keys. No drug is worth your life.

Nutrition and Elimination

- Skill 6-1** Inserting and Maintaining a Nasogastric Tube
- Skill 6-2** Assessing Placement of a Large-Bore Feeding Tube
- Skill 6-3** Assessing Placement of a Small-Bore Feeding Tube
- Skill 6-4** Removing a Nasogastric Tube
- Skill 6-5** Feeding and Medicating Via a Gastrostomy Tube
- Skill 6-6** Maintaining Gastrointestinal Suction Devices

- Skill 6-7** Applying a Condom Catheter
- Skill 6-8** Inserting an Indwelling Catheter: Male
- Skill 6-9** Inserting an Indwelling Catheter: Female
- Skill 6-10** Routine Catheter Care
- Skill 6-11** Obtaining a Residual Urine Specimen from an Indwelling Catheter
- Skill 6-12** Irrigating a Urinary Catheter
- Skill 6-13** Irrigating the Bladder Using a Closed-System Catheter
- Skill 6-14** Removing an Indwelling Catheter
- Skill 6-15** Catheterizing a Noncontinent Urinary Diversion
- Skill 6-16** Maintaining a Continent Urinary Diversion
- Skill 6-17** Pouching a Noncontinent Urinary Diversion
- Skill 6-18** Administering Peritoneal Dialysis
- Skill 6-19** Administering an Enema
- Skill 6-20** Digital Removal of Fecal Impaction
- Skill 6-21** Inserting a Rectal Tube
- Skill 6-22** Irrigating and Cleaning a Stoma
- Skill 6-23** Changing a Bowel Diversion Ostomy Appliance: Pouching a Stoma

SKILL 6-1

Inserting and Maintaining a Nasogastric Tube

Hsin-Yi Tang, RN, MS, and Jung-Chen Chang, RN, MN

KEY TERMS

Decompression
Double lumen
Gastric content
Gastrointestinal surgery
Levin's tube

Nasogastric tube
Peptic ulcer
Salem sump tube
Single lumen
Tube feeding



> OVERVIEW OF THE SKILL

Nasogastric (NG) tubes are used for several purposes, including feeding for nutrition when the client is comatose, semiconscious, or unable to consume sufficient nutrition orally. Nasogastric suction tubes are used for decompression of gastric content after gastrointestinal surgery, and to obtain gastric specimens for diagnosis of peptic ulcer. Tubes are used for irrigation to clean and flush the stomach after oral ingestion of poisonous substances. Finally, NG tubes are used to document the presence of blood in the stomach, monitor the amount

of bleeding from the stomach, and identify the recurrence of bleeding in the stomach.

The two most commonly used NG tubes are the single lumen Levin's tube, and the double lumen Salem sump tube.

The gastrointestinal tract is considered to be a clean area rather than a sterile one. The procedure to place an NG tube is performed using clean technique unless it is performed in conjunction with gastrointestinal surgery.

> ASSESSMENT

1. Assess client's consciousness level to determine the ability of the client to cooperate during the procedure.
2. Check the client's chart for any previous medical history of nostril surgery or injury or unusual nostril bleeding. **Reduces risk of injury from the tube.**
3. Use a penlight to assess nostrils for a deviated septum. **Facilitates choice of nostril and size of tube.**
4. Ask the client to breathe through each nostril occluding the other with a finger. **Facilitates choice of nostril and decreases chance that tube will interfere with respirations.**

> DIAGNOSIS

- 1.1.2.2 Altered Nutrition: Less Than Body Requirement

- 6.5.1.1 Swallowing Impairment
1.6.1.4 Risk for Aspiration
1.3.1.2 Risk for Diarrhea
1.6.2.1.1 Altered Oral Mucous Membranes
1.4.1.2.2.1 Risk for Fluid Volume Deficit
9.1.1 Pain
1.6.2.1.2.1 Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Client's nutritional status will improve, as indicated by increased body weight, physical strength, and mental status.
2. Client's nutritional needs will be met with the assistance of tube feeding.

3. Client will maintain a patent airway, as evidenced by absence of coughing, no shortness of breath, and no aspiration.
4. Client will not have diarrhea due to nasogastric feeding.
5. Mouth mucous membranes will remain moist and intact.
6. Client will maintain a normal fluid volume, as evidenced by good skin texture, muscle tone, and blood volume.
7. Client's comfort level will increase.
8. Skin around the tube will remain intact, with no redness or blisters.

Equipment Needed:

- Nasogastric tube: adult, 14 to 18 French; child/infant, 5 to 10 French; single lumen (Levin's sump): feeding; double lumen (Salem sump tube): feeding, suction, irrigation (see Figure 6-1-2)
- Water-soluble lubricant
- Syringe with catheter tip or adapter, 20-50 ml
- Glass of tap water with straw, or ice
- Towel or tissue
- Emesis basin with ice chips
- Tongue blade
- pH chemstrip
- Stethoscope
- Disposable gloves (nonsterile), goggles, gown
- Hypoallergenic tape, rubber band, and safety pin
- Penlight or flashlight
- Disposable irrigation set (if needed)
- Wall mount or portable suction equipment (if needed)
- Administration set with pump or controller for feeding tube



Estimated time to complete the skill:
15–20 minutes

> CLIENT EDUCATION NEEDED:

1. Inform the client of the purpose of the NG tube.
2. Explain the procedure of insertion and any expected discomfort.
3. Establish and clarify a “hand signal” to indicate the need to temporarily stop the NG insertion.
4. Explain how the client can cooperate during tube insertion, especially by swallowing water when asked to do so.
5. Explain potential complications, such as diarrhea, mouth dryness, and nostril irritation.
6. Review the skills and procedures of maintaining tube.
7. Instruct to chew on ice chips to satisfy the basic need to eat (if there is no fluid intake restriction).
8. Encourage physical activity to enhance gastrointestinal mobility (if there is no activity restriction).
9. If a client with dentures is conscious, encourage to wear the dentures to maintain the normal shape of oral cavity.



Figure 6-1-2 Double-lumen nasogastric tube

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Review client's medical history.
2. Assess client's consciousness and ability to understand. Explain the procedure and develop a hand signal (see Figure 6-1-3).

1. To assess for any nostril surgery and abnormal bleeding.
2. Decreases anxiety and promotes cooperation.

continues



Figure 6-1-3 Explain the procedure; demonstrate head position and tube insertion.

3. Prepare the equipment, putting tissues, a cup of water, and an emesis basin nearby (see Figure 6-1-4).
4. Prepare the environment; raise the bed and place it in a high Fowler's position (45 to 60 degrees). Cover the chest with a towel.
5. Wash hands and then put on gloves.
6. Use a penlight to view the client's nostrils. Assess client's nostrils with penlight and have the client blow her nose one nostril at a time (see Figure 6-1-5).



Figure 6-1-5 Assess the client's nostrils before introducing the nasogastric tube.

7. Using the NG tube, measure the distance from the bridge of the nose to the earlobe and then to the xiphoid process of the sternum and mark this distance on the tube with a piece of tape (see Figure 6-1-6).
8. Lubricate first 4 inches of the tube with water-soluble lubricant.
9. Ask the client to slightly flex the neck backward.



Figure 6-1-4 Put an emesis basin, cup with straw, and tissues nearby.

3. Facilitates an efficient procedure.
4. Facilitates insertion and prevents back strain.
5. Practices clean technique.
6. Choosing the more patent nostril for insertion decreases discomfort and unnecessary trauma.



Figure 6-1-6 Measure the distance from nose to earlobe to the xiphoid process to determine how much tube will need to be inserted to reach the stomach.

7. Determines the approximate amount of tube needed to reach the stomach.
8. Facilitates passage into the naris.
9. Makes insertion easier.

10. Gently insert the tube into a naris (see Figure 6-1-7)



Figure 6-1-7 Gently insert the tube into the naris.

10. Promotes passage of tube with minimal trauma to mucosa.



Figure 6-1-8 Advance the tube slowly. The client swallows small sips of water to assist in pushing the tube past the oropharynx.

11. Ask the client to tip the head forward once the tube reaches the nasopharynx. If the client continues to gag, stop a moment.

11. Tipping the head forward facilitates passage of the tube into the esophagus instead of the trachea. Tube may stimulate gag reflex. Allows the client to rest, reduces anxiety, and prevents vomiting.

12. Advance the tube several inches at a time as the client swallows water or ice chips (see Figure 6-1-8).

12. Assists in pushing the tube past the oropharynx.

13. Withdraw the tube immediately if there are signs of respiratory distress.

13. Prevents trauma to bronchus or lung.

14. Advance the tube until the taped mark is reached (see Figure 6-1-9).

14. Enables the tube to reach the stomach.



Figure 6-1-9 Advance the tube until the taped mark is at the opening of the naris.

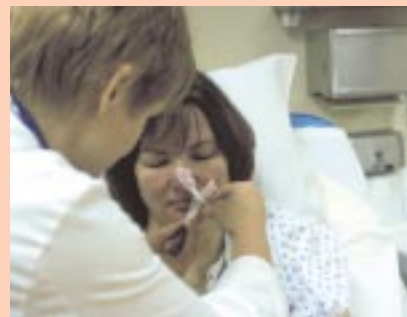


Figure 6-1-10 Secure the tube to the nose.

15. Split a 4-inch strip of tape lengthwise 2 inches. Secure the tube with the tape by placing the wide portion of the tape on the bridge of the nose and wrapping the split ends around the tube (see Figure 6-1-10). Tape to cheek as well if desired (see Figure 6-1-11).

15. Prevents tube displacement.



Figure 6-1-11 Tape the tube to the cheek as well, if desired, to provide extra support.



Figure 6-1-12 Auscultate over the epigastric area.

16. Check the placement of the tube:

- Attach the syringe to the end of the tube for injecting 10 cc of air and auscultate over the epigastric area (upper left quadrant); see Figure 6-1-12.
- Aspirate sample gastric content and measure with chemstrip pH (see Figure 6-1-13).
- Prepare the client for x-ray check-up, if prescribed.

- 16.** Ensures correct placement. (A pH below 4 indicates the tube is in the stomach; a pH range of 6–7 indicates intestinal sites.)



Figure 6-1-13 Aspirate a sample of gastric content to check for pH.



Figure 6-1-14 Connect the distal end of the tube to suction or drainage to complete the procedure.

- 17.** Connect the distal end of the tube to suction, draining bag, or adapter (see Figure 6-1-14).

- 17.** Establishes an appropriate pathway for intervention.

- 18.** Secure the tube with rubber band and safety pin to client's gown or bed sheet.

- 18.** Enhances the level of comfort and secures the tubing system.

- 19.** Remove gloves, dispose of contaminated materials in proper container, and wash hands.

- 19.** Implements the principles of infection control.

- 20.** Position client comfortably and place the call light in easy reach.

- 20.** Decreases client's anxiety and provides access to help if needed.

- 21.** Document procedure.

- 21.** Records implementation of intervention and promotes continuity of care.

Maintaining a Nasogastric Tube

- | | |
|---|---|
| <p>22. Wash hands and apply gloves.</p> <p>23. Follow the steps in Action 16 to check the proper tubing position before instilling anything per NG tube or at least every 8 hours.</p> <p>24. Assess for signs that the tube has become blocked, including epigastric pain and vomiting, and/or the inability to pass medications or feedings through the tube.</p> <p>25. Remember never to irrigate or rotate a tube that has been placed by the physician or qualified practitioner during gastric or esophageal surgery.</p> <p>26. Provide oral hygiene and assist client to clean nares daily.</p> <p>27. Remove gloves, dispose of contaminated materials in proper container, and wash hands.</p> | <p>22. Reduces the transmission of microorganisms.</p> <p>23. Prevents complications from dislocation of the tube.</p> <p>24. Prevents complications from the loss of beneficial effects from the tube.</p> <p>25. Rotation or irrigation may disturb incisions.</p> <p>26. Enhances client's comfort and the integrity of skin and nose mucosa.</p> <p>27. Reduces the transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- Client's nutritional status improves, as indicated by increased body weight, physical strength, and mental status.
- Client's nutritional needs are met with the assistance of tube feeding.
- Client maintains a patent airway, as evidenced by absence of coughing, no shortness of breath, and no aspiration.
- Client does not have diarrhea due to nasogastric feeding.
- Mouth mucous membranes remain moist and intact.
- Client maintains a normal fluid volume, as evidenced by good skin texture, muscle tone, and blood volume.
- Client's comfort level increases.

- Skin around the tube remains intact, with no redness or blisters.

> DOCUMENTATION

Nurses' Notes

- Document the type of NG tube inserted, the naris used, how the client tolerated the procedure, and the methods used to verify placement.
- Document care provided to the client to increase comfort of the NG insertion naris.
- Note any unusual findings.

Intake and Output Record

- Note the amount of fluid the client drank to aid insertion of the NG tube.
- Note the amount of gastric contents removed for testing.



▼ REAL WORLD ANECDOTES

Mr. Klotz had just been admitted to the hospital with severe abdominal distention. NG tube placement was ordered for abdominal decompression. Mr. Klotz was not to have any fluids by mouth but he could have ice chips. The nurse provided Mr. Klotz with ice chips and instructed him to suck on a few chips and swallow as she inserted the NG tube. The nurse inserted the NG tube into Mr. Klotz's right naris but was unable to advance the tube any further than an inch. After several

continues

▼ REAL WORLD ANECDOTES *continued*

attempts to advance the tube, the nurse tried Mr. Klotz's left naris. It required several gentle attempts and lots of lubricant to pass the tube into the nasopharynx, the nurse was finally able to advance the tube into Mr. Klotz's stomach. After Mr. Klotz had received some relief from his distention, he did mention to the nurse that he had broken his nose many years earlier.

> CRITICAL THINKING SKILL

Introduction

Nurses must be able to evaluate the effectiveness of NG tube insertion, maintenance, or removal.

Possible Scenario

The family of your home care client has been assisting in her care, including the care of her feeding tube. You have educated them on the tube and its placement. Although they state they secured the tube in a proper place and the end of the tube is currently positioned higher than the stomach, you observe the tube is filled with gastric content.

Possible Outcome

Client has a continuous risk for infection, electrolyte imbalance, and potential aspiration.

Prevention

Assess that the caregiver is properly securing the end of the tube at a level higher than the stomach. Assess the client's vital signs and respiratory pattern for infection, electrolyte imbalance, or aspiration. Reeducate the caregivers on assessing for correct tube placement, and review with them common situations where the tube might move.

▼ VARIATIONS



Geriatric Variations:

- For elderly clients who wear dentures, oral hygiene and denture care should not be overlooked simply because an NG tube is in place.



Pediatric Variations:

- Dispose of, or securely tape any small parts, such as plastic connectors or plugs, to prevent small children from accidentally aspirating or swallowing them.



Home Care Variations:

- Periodically assess the family member's ability to check the placement of the tube, check residual gastric contents, administer tube feedings, or connect the tube properly with suction.



Long-Term Care Variations:

- Teach family members or caregivers to assess client's nutritional status and assess for any sign of complications related to the NG tube.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse is unable to auscultate air bubbles but assumes the NG tube is in place anyway.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

If you are unable to verify NG tube position by auscultating air, use another method of verification. Attempt to aspirate gastric contents. Place the end of the NG tube in a glass of water and check for air bubbles that correspond to the client's exhalations. If you are unable to verify NG tube placement, do not instill anything through the tube. Notify the client's qualified practitioner. Send the client for an x-ray to verify placement if this is within institutional guidelines.

> NURSING TIPS

- Adjust the height of the bed to eliminate back strain.
- Prepare the split tape before putting on gloves.
- This can be an anxiety-provoking procedure. Good communication skills decrease anxiety and promote the client's cooperation.
- The size of the NG tube used depends on client size, client history of damage to the structure of the nose, and the purpose of the procedure.
- Tincture of Benzoin may be used to prep the skin. This acts as an adhesive as well as a skin prep.
- Carefully observe client's verbal and nonverbal responses during the entire procedure.
- When feasible, engage family members or caregivers to assist in NG tube insertion.
- Sump tubes should whistle continuously on low suction.

SKILL 6-2

Assessing Placement of a Large-Bore Feeding Tube

Kathy Lilleby, RN

KEY TERMS

Aspiration	Nasogastric tube
Large-bore feeding tube	PEG
Nasoduodenal tube	PEJ
	pH



> OVERVIEW OF THE SKILL

Clients who cannot take food or fluids orally may require the placement of a feeding tube for enteral nutrition. These clients may be unconscious, unable to respond to the thirst reflex, unable to swallow, or receiving a hyperosmotic enteral preparation. The large-bore nasogastric feeding tube requires a physician's or qualified practitioner's order to be placed. The tube can be a firm, polyvinyl large-bore tube or a soft, flexible polyurethane or silicone tube. After insertion, the placement should be checked by x-ray to determine that it is in the stomach or in the intestine as ordered and not in an airway. After the initial x-ray for placement, it is the nurse's responsibility to verify the tube's position before each intermittent feeding or medication or once a shift if the client is receiving continuous feedings.

There are several types of large-bore feeding tubes. A nasogastric tube is for short-term use; the major complication of its use is aspiration pneumonia. The nasoduodenal tube is also used short term. There is less risk of aspiration with this tube, since the tip is weighted and rests in the duodenum. But it is also more difficult to place, and some institutions require that a physician or qualified practitioner insert this type of tube. The gastrostomy tube (GT) is placed surgically by laparoscopy for long-term use. The more common percutaneous endoscopic gastrostomy (PEG) tube is placed at the bedside under local anesthesia and conscious sedation. A PEG tube is used for long-term feedings. The percutaneous endoscopic jejunostomy (PEJ) tube may also be placed at the bedside by the physician or qualified practitioner. It is more comfortable for the client and carries minimal risk of aspiration.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the type and size of feeding tube to ensure accurate placement of the correct tube.
2. Review the client's medical record for a history of prior tube use or displacement since recurring tube displacement may increase the risk of pulmonary placement.
3. Assess the client for signs and symptoms of inadvertent respiratory placement since coughing, choking, and cyanosis may indicate placement of the tube in an airway.
4. Assess the client for signs and symptoms that increase the client's risk of tube dislocation. Coughing, retching, and nasotracheal suctioning may cause the tube to become dislodged.

> **DIAGNOSIS**

- 1.1.2.1 Altered Nutrition: More Than Body Requirements
- 1.1.2.2 Altered Nutrition: Less Than Body Requirements
- 1.4.1.2.2 Risk for Fluid Volume Deficit
- 1.6.1.4 Risk for Aspiration
- 6.5.1.1 Impaired Swallowing

> **PLANNING**

Expected Outcomes:

1. The tube will remain in place and intact.
2. The tube feeding or medication will infuse into the client’s gastrointestinal (GI) tract.

3. The client will not experience any respiratory distress.
4. The client will not experience any pain.
5. The client will be able to describe the reason for checking the tube’s placement.

Equipment Needed (see Figure 6-2-2):

- Catheter tip syringe, 60 ml
- Stethoscope
- Gloves
- pH indicator strip
- Emesis basin
- Towel



Estimated time to complete the skill:
5 minutes



Figure 6-2-2 Stethoscope, syringe, and pH strips are used to assess placement of the tube.

> **CLIENT EDUCATION NEEDED:**

1. Tell the client the rationale for checking the placement of the feeding tube.
2. Ask the client to tell you if they are having respiratory difficulties.
3. Instruct the caregiver how to check the tube for correct placement before each feeding or medication.
4. Provide written and oral instructions about how to check for correct tube placement.
5. Tell the client and caregiver not to proceed with a feeding if there is any doubt about the tube’s proper placement.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check physician’s or qualified practitioner’s order for the feeding tube.
2. Wash hands (see Figure 6-2-3). Apply gloves.
3. Assess placement of the tube by auscultation:
 - Place stethoscope over left upper quadrant of the abdomen.
 - Quickly inject 10–20 ml air with the 60-ml syringe (see Figure 6-2-4).

1. Ensures accurate placement of the tube.
2. Reduces the transmission of microorganisms.
3. This method is less reliable than checking for gastric contents, but it is the simplest way to assess for placement of the feeding tubes.
 - Allows nurse to hear sound of air.

continues



Figure 6-2-3 Wash hands prior to beginning procedure.

- Assess for resistance.
- Listen for sound.

4. Measure pH of GI contents:

- Aspirate 10 cc of GI contents with 60-cc syringe (see Figure 6-2-5).
- If unable to aspirate, reposition client on side and try again.
- Measure pH of GI contents with pH indicator strip.



Figure 6-2-5 Aspirate 10 cc of gastric contents to check pH.

- 5.** Proceed with feeding and medication (see Figures 6-2-6 and 6-2-7). Continue to monitor the client for discomfort.
- 6.** Recheck tube placement following the tube feeding.
- Flush tube with 30 cc warm water after medication or tube feeding (see Figure 6-2-8).
 - Wait 1 hour before testing pH.



Figure 6-2-4 Inject 10-20 ml of air.

- If resistance is felt, tells nurse to attempt to aspirate GI contents.
- A whooshing or gurgling sound can be heard as air enters the stomach.

4. Gastric contents have pH of 1–4. Intestinal contents have pH of 6–7.

- Measure the pH of the gastric aspirate before instilling anything through the feeding tube.
- The tube opening may be lying against the gastric wall.
- To obtain accurate results.



Figure 6-2-6 After verifying placement of the tube, proceed with feeding.

- 5.** To provide the client with nutrition and treatment. Continuing to assess for signs of tube displacement ensures client safety.
- 6.** Continuing to assess for signs of tube displacement ensures client safety.
- Flushes out residual formula or medication.
 - Allows for digestion of the formula or assimilation of the medication.

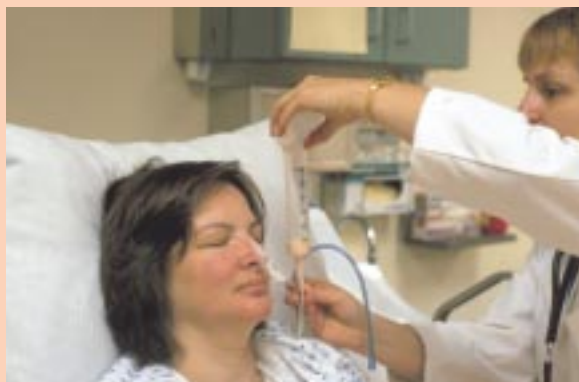


Figure 6-2-7 Proceed with administering medications.

- Flush tube with 30 cc air and auscultate for sound as in Action 3.
- Aspirate 10 cc of GI contents and check for pH as in Action 4.

7. Remove gloves and wash hands.



Figure 6-2-8 After feeding or administering medications, flush the tube with 30 cc of warm water to rinse out residue.

- Assesses placement of the feeding tube.
- Assesses placement of the feeding tube.

7. Reduces transmission of microorganisms.

> EVALUATION

- The tube remains in place and intact.
- The tube feeding or medication is infusing into the client's GI tract.
- The client has not experienced any respiratory distress.
- The client is not experiencing any pain.
- The client is able to describe the reason for checking the tube's placement.

> DOCUMENTATION

Nurses' Notes

- Document the type of tube placed.
- Note the character of GI contents.
- Record the pH measurement.
- Document the assessment of air injected into stomach.
- Note any client complaints or unusual findings.

Intake and Output Record

- Record the amount of any fluid infused or removed in the appropriate category.



▼ REAL WORLD ANECDOTES

Claudia, 18 years old, was comatose after a motor vehicle accident. She had a head injury and broken clavicle, radius, and pelvis. After the accident she had been in the intensive care unit on a ventilator for 5 days but later was transferred to a medical floor. She was breathing on her own but had not regained consciousness. A large-bore nasogastric feeding tube had been placed for enteral feedings and medication administration. The feedings were intermittent so the nurse began her assessment of its placement before starting the feeding. When the nurse injected air, she heard the characteristic gurgle, but when she started the feeding, Claudia started coughing. The nurse immediately stopped the feeding and assessed her for respiratory distress. She notified the physician, who ordered an x-ray. The tube was found to be looped with the end near Claudia's bronchus. The physician repositioned the tube and obtained another x-ray, which showed it was in good position and the feeding was restarted.

> CRITICAL THINKING SKILL

Introduction

Displacement of a large-bore feeding tube may occur when a client coughs, gags, or vomits. The nurse needs to assess the client for any symptoms that may cause a tube displacement.

Possible Scenario

Brian was 16 years old when he needed to have a tube placed for feeding. He hated the feeling of the tube in his throat and could not get used to it. He gagged and coughed, sometimes so vigorously that he vomited. When the nurse came to assess the tube placement, she noted that the end of the tube was visible in the back of Brian's throat.

Possible Outcome

The nurse could see the tube was not in its proper position and knew that it could not be repositioned. So she gently removed the entire tube and notified the physician. He reevaluated Brian's need for the tube, considered the risk of aspiration and Brian's difficulty with the tube, and decided to stop the tube feedings and to let Brian try to eat on his own.

Prevention

Client teaching and reassurance are an important part of maintaining a large-bore feeding tube in place. Antiemetic or antianxiety medications may be needed to help clients tolerate the tube if it is placed orally or nasally.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have more fragile tissue that could be damaged with a large-bore feeding tube.*
- *Older clients with other respiratory conditions are at increased risk for respiratory complications if the feeding tube migrates to the pulmonary tree.*



Pediatric Variations:

- *Inject only 0.5 to 1.0 ml of air into a pediatric feeding tube.*
- *Be sure the child is quiet and calm while checking for placement so you can hear the air being injected.*



Home Care Variations:

- *Assess the sanitation of the home to determine the client's risk for infection.*
- *The caregiver should be taught the normal range of pH for GI contents.*
- *The caregiver should be taught the signs and symptoms of feeding tube displacement and what to do if displacement is suspected.*



Long-Term Care Variations:

- *The staff should be taught the normal range of pH for GI contents.*
- *Equipment for verifying tube placement should be at the client's bedside at all times.*
- *Staff members should be taught the signs and symptoms of tube displacement and to whom to report the symptoms.*
- *Staff members should be taught how to discontinue a feeding if they suspect tube displacement.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You do not wait 1 hour after the last tube feeding has finished to check for tube placement so the pH of the aspirated GI contents is inaccurate.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Plan a schedule for feeding, medications, and checking for tube placement so that an accurate measurement will be obtained. Write this plan into the client's plan of care so all staff can comply. If this error does occur, flush the tube with 30 ml warm water. Wait 1 hour. Begin tube placement assessment again.

> NURSING TIPS

- A muffled or faint sound of injected air may signal that the tube is in the lungs.
- It may be necessary to inject air two or three times in obese clients since the sound of injected air may be faint.
- Do not withdraw or advance the tube into clients who have had gastric resections or other abdominal surgery as it could damage the suture lines and cause hemorrhage.

SKILL 6-3

Assessing Placement of a Small-Bore Feeding Tube

Nancy E. Chambers, RN, BSN

KEY TERMS

Enteral nutrition
Feeding tube
Gastric contents

Nasogastric tube
Nasointestinal tube
pH



> OVERVIEW OF THE SKILL

Clients with a small-bore feeding tube must have placement of the tube verified at time of insertion and every shift to prevent insertion/migration of the tube into the esophagus, trachea, or lungs and aspiration of feeding. Placement of a feeding tube is easy to disrupt because the tubes are small, flexible, and secured only with tape on the nose. There are three ef-

fective methods of verifying placement. The first method is to inject air through the feeding tube and simultaneously auscultate the air bubble over the stomach. The second is to aspirate a sample of gastric contents and check pH levels. Finally, the most precise way to verify placement is to obtain an abdominal x-ray.

> ASSESSMENT

1. Assess client for any signs of respiratory distress such as choking, coughing, shallow breathing, or decreasing oxygen saturations. **These symptoms could be indicative of aspiration of the feeding tube.**
2. Check for a tape marker on the tube, near the nose, which indicates the length of tube inserted. **If tube has become displaced, marker will be farther away from nose.**
3. Assess sputum for distinguishing features that would indicate aspiration, such as blue color (tube feeding formula is mixed with blue food coloring to distinguish feeding from normal white sputum). **Blue sputum could signify aspiration of feeding, which could lead to pneumonia.**

> DIAGNOSIS

- 1.1.2.2 Altered Nutrition: Less Than Body Requirements
- 1.6.1.4 Risk for Aspiration

> PLANNING

Expected Outcomes:

1. The client's feeding tube will be intact in the ordered area of the GI tract.
2. The client will not experience aspiration secondary to tube feedings.

Equipment Needed:

- Syringe: 20 or 60 ml for adults, 5 or 10 ml for pediatrics.
- Stethoscope

- pH testing equipment (see Figure 6-3-2)
- Progress notes/flow sheets



Figure 6-3-2 Equipment used to test pH



Estimated time to complete the skill:
5–30 minutes

> **CLIENT EDUCATION NEEDED:**

1. Explain reason for verifying placement.
2. Explain steps of procedure.
3. Answer questions from client/family.
4. Instruct client to notify staff immediately if experiencing respiratory distress or blue sputum.
5. Explain purpose of x-rays, if needed.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and apply clean gloves.
2. Prepare equipment, put pH testing equipment nearby.
3. Clamp the tube feeding infusion if it has already been running (see Figure 6-3-3).

1. Practices clean technique.
2. Promotes efficiency and speed.
3. Prevents spilling of feeding.



Figure 6-3-3 Clamp the tube feeding infusion.



Figure 6-3-4 Find the connection between the feeding tube and feeding bag tubing.

4. Locate the connection between the feeding tube and feeding bag tubing (see Figure 6-3-4).
5. Disconnect infusion tubing from feeding tube and attach a cap to tubing and feeding tube (see Figure 6-3-5).
6. Draw 10–20 ml of air into syringe.
7. Attach syringe to proximal end of feeding tube.

4. To disconnect the tubing.
5. Prevents contamination of tubing.
6. Provides enough air to hear an air bubble as it is inserted.
7. Allows for insertion of air.

continues



Figure 6-3-5 Disconnect and attach a cap to both the tubing and feeding tube.



Figure 6-3-6 While the syringe is connected to the feeding tube, aspirate approximately 20 ml of gastric contents.

8. Place diaphragm of stethoscope in epigastric area over stomach: upper left quadrant near midline.
 9. Inject air quickly into feeding tube and listen for air rush.
 10. If unsuccessful in hearing rush of air, repeat Actions 6 to 9. It may be necessary to reposition stethoscope over stomach, use more air, or inject more slowly.
 11. While syringe is connected to feeding tube, aspirate approximately 20 ml of gastric contents (see Figure 6-3-6).
 12. Check the contents and obtain pH level (see Figures 6-3-7 and 6-3-8).
 - pH below 4 means tube is in stomach.
 - pH range of 6–7 means tube is in intestine.
 13. Assess the color of aspirate (see Figure 6-3-9).
8. Facilitates accurate auscultation.
 9. Facilitates auscultation of air rush.
 10. Air bubbles may be difficult to hear due to client position or gastric contents.
 11. To provide gastric contents for visual inspection and pH testing.
 12. The pH of the fluid aspirate can help to verify tube placement.
 - The pH reading can be altered by the presence of medication or formula, so pH should be tested after the client's stomach has been empty for approximately 1 hour.
 13. Gastric contents may be green, tan, off-white, bloody, or brown. Intestinal contents may be clear yellow or bile-colored. Pleural contents may be tan, off-white, or pale yellow.



Figure 6-3-7 Check the pH of gastric contents.

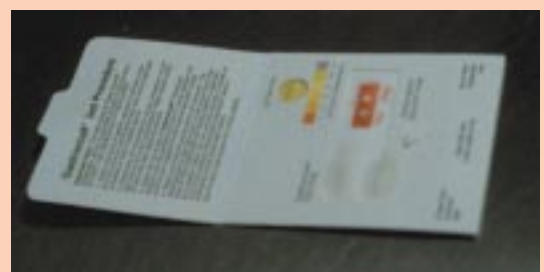


Figure 6-3-8 Read and record the results of the gastric pH test.



Figure 6-3-9 Assess the color of the gastric aspirate.



Figure 6-3-10 Once placement is verified, reattach the feeding tube and resume the feeding.

14. If unable to aspirate contents or unsure of results of visualization, call physician or qualified practitioner and consider confirmation with x-ray.
15. Record method of verification and results in flow sheets/progress notes.
16. If placement in stomach is verified, reattach feeding tubing and resume tube feedings (see Figure 6-3-10). Recheck placement in 4 hours if feeding is continuous.
17. Wash hands.
14. X-ray is most precise method of verifying placement of tube in stomach. Keep physician or qualified practitioner informed of progress.
15. Provides continuity for other staff and legal documentation.
16. Ensures adequate nutrition and consistent prevention of aspiration.
17. Reduces transmission of microorganisms.

> EVALUATION

- The client's feeding tube continues to be intact in the ordered area of the GI tract.
- The client has not experienced aspiration secondary to the tube feedings.
- Note the color of any aspirate and the pH if it was tested.
- Note any unusual findings or suspicion of migration.
- If migration is suspected or placement cannot be verified, note the interventions implemented.
- Record the client's condition and response to any possible aspiration.

> DOCUMENTATION

Nurses' Notes

- Document the time and method of verification of tube placement.



▼ REAL WORLD ANECDOTES

After inserting a small-bore feeding tube in a comatose client, the nurse attempted to verify the tube placement by aspirating gastric contents. She was unable to aspirate any fluid through the tube and thought that perhaps the tube was collapsing under the vacuum of the aspiration. She then attempted to verify the tube position by instilling air through the tube and listening for air bubbles. This too was unsuccessful. The policy in this institution was to verify all new tube placements with abdominal x-rays as well as the traditional methods and a portable flat abdominal x-ray was performed. When the x-ray was read, there was no sign of the feeding tube in the abdomen or the lungs. The nurse had inserted nearly 2 feet of tubing, and she was concerned about where that tubing might have gone. Finally it occurred to her to check the back of the client's mouth. There, curled up tightly was the entire length of the feeding tube. The nurse removed the tube and successfully reinserted a new small-bore feeding tube.

> CRITICAL THINKING SKILL

Introduction

Feeding tubes are generally secured only by tape to the nose and face. It is easy to disconnect or completely remove a tube.

Possible Scenario

Clara is an 80-year-old woman who is now disoriented and restless at midnight. Upon arrival, her nurse discovers Clara with a respiratory rate of 35, productive cough of blue-tinged sputum, and the tape marker on her feeding tube pulling a fair distance away from her nose. The tape, which secured the tube to her nose, has been pulled off.

Possible Outcome

When the nurse tries to verify placement, she is unable to hear the air rush. The nurse removes the feeding tube and pages the doctor to the room immediately. She assesses for additional signs and symptoms of aspiration.

Prevention

Secure the tube well with tape to the nose, a transparent dressing over the tube on the cheek or forehead, and tape around the tubing secured to the gown. Observe confused clients very closely, and restrain as needed to prevent injury and aspiration.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have problems with confusion. Secure the tubing well and monitor the client closely.



Pediatric Variations:

- Infants will require less air for the injection into stomach. Use a pediatric stethoscope and a smaller syringe.
- Due to the much smaller anatomy of a child, a feeding tube has a much shorter distance to migrate before it is in the trachea or lungs. Be sure to assess the tube feeding placement prior to instilling anything into the feeding tube or at least every 4 hours during a continuous feeding.



Home Care Variations:

- Teach family members to verify tube placement when administering tube feedings.
- Teach the client or caregivers what to do if tube migration is suspected.



Long-Term Care Variations:

- Clients with long-term respiratory conditions may cough intensely enough to dislodge a feeding tube. Be sure to assess tube placement regularly.
- Be sure the staff members caring for a tube feeding client are aware of the signs and symptoms of aspiration and tube migration.
- Teach the staff what to do and who to notify if they believe a feeding tube has migrated into the pulmonary tree.

▼ COMMON ERRORS—ASK YOURSELF

Common Error:

The nurse doesn't place the stethoscope correctly to hear the air bubbles while assessing tube placement.

Ask Yourself:

How do I prevent this error?

Prevention:

Keep the stethoscope firmly in place over the epigastric region. If unable to hear air rush, always reassess, or ask a coworker to assist. Use one hand for syringe and one hand to hold diaphragm of stethoscope.

> NURSING TIPS

- Elevate the bed to a good height for you.
- A 60-ml syringe works best if you expect a lot of aspirate.
- Involve the client; ask them to hold the tubing if you need help.
- Remove tube and replace if unable to verify placement in stomach or small intestine.
- Reevaluate placement before starting a new feeding, giving boluses, every 4 hours while continuous feed or every shift when the tube is not in use.
- Keep the client's head elevated at 30° while receiving feeding to prevent aspiration.
- Small, thin feeding tubes may collapse with attempted aspiration. The inability to aspirate anything via the feeding tube is not necessarily an indication of a misplaced tube. Use a second method to verify placement.

SKILL 6-4

Removing a Nasogastric Tube

Hsin-Yi Tang, RN, MS, and Jung-Chen Chang, RN, MN

KEY TERMS

Nasogastric tube
Tube feeding
Tube irrigation

Tube removing
Tube suction
(decompression)



> OVERVIEW OF THE SKILL

Once the reason for the nasogastric tube (NG) has been resolved, the physician or qualified practitioner will order the tube removed. Prior to removal, the nurse should check the orders and assess the client.

If the tube was placed to keep the stomach empty during and after surgery, auscultate all four quadrants of the abdomen to verify that peristalsis is present. Ask the client if he or she is passing gas, or flatus. If the tube was in place to measure and monitor gastric bleeding, make sure that little or no blood is being produced. Make sure the tube is not draining large amounts of gastric secretions, which could indicate poor gastric emptying, obstruction, or ileus.

If any problems are noted, report these findings and verify the order to remove the tube before proceeding. After the removal, the nurse should monitor the client's condition, watching especially for signs that the tube may need to be reinserted. Nausea, vomiting, abdominal distention, vomiting blood, and complaints of pain or gastric distress are all signs that should be reported.

If the tube has been in place for more than a few days, the potential for complications from the tube arises. Gastric ulceration occurs when the suction from the tube erodes the gastric wall. Sinusitis and esophagitis can occur from irritation from the NG tube.

> ASSESSMENT

1. Assess client's consciousness level to determine the ability of the client to cooperate during the NG tube removal.
2. Check the client's chart for orders to remove the tube. Reduces the risk for a nursing error and the need to reinsert the tube.

3. Use a penlight to assess nostrils for irritation and dryness. Establishes a baseline and identifies the risk for nasal irritation and bleeding.

> DIAGNOSIS

- 1.6.1.4 Risk for Aspiration
- 1.6.2.1.1 Altered Mucous Membranes

- 9.1.1 Pain
- 1.6.2.1.2.1 Impaired Skin Integrity

> **PLANNING**

Expected Outcomes:

1. Client will be able to tolerate the removal of the tube without undue anxiety, nausea, pain, or distress.
2. Client will understand the reasons for tube removal.
3. Skin around the tube will remain intact, with no redness or blisters.
4. Client will understand signs and symptoms to report of potential complications.

Equipment Needed (see Figure 6-4-2):

- Syringe with catheter tip or adapter, 20–50 ml
- Towel and tissue, or disposable waterproof pad
- Emesis basin
- Tongue blade
- Stethoscope
- Disposable gloves (nonsterile), gargle, gown
- Penlight or flashlight



Estimated time to complete the skill:
15–20 minutes

> **CLIENT EDUCATION NEEDED:**

1. Inform the client of the reason the NG tube is being removed.
2. Explain the procedure and any expected discomfort. Tell the client removing the tube will not be nearly as uncomfortable or lengthy a procedure as the NG tube insertion was.
3. Establish and clarify a “hand signal” to indicate the need to temporarily stop the NG tube removal.
4. Explain how the client can cooperate during tube removal.
5. Explain potential complications, such as gastric distention or vomiting, if there is a possibility that the tube might need to be reinserted.



Figure 6-4-2 Stethoscope, syringe, and penlight are used to assess placement of the tube.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Removing a Nasogastric Tube

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Check the qualified health care provider’s order for tube removal. 3. Assess client’s consciousness and ability to understand and explain the procedure. 4. Prepare the equipment: gloves, gown, goggles, tissue, 20-cc syringe, 20 cc normal saline, emesis basin. 5. Prepare the environment; privacy curtain, and place the client in high Fowler’s position (see Figure 6-4-3). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Reduces the risk of removing the tube prematurely. 3. Decreases client’s anxiety level and promotes cooperation. 4. Facilitates an efficient procedure. 5. Elevated position helps removal of the tube and prevents the chance of aspiration if the client vomits. Prevents strain on the nurse’s back. |
|---|---|

continues

Removing a Nasogastric Tube *continued*



Figure 6-4-3 Position the client in high Fowler's position to help facilitate removal of the tube.



Figure 6-4-4 Flush tube and inject with 10 cc of air.

6. Put on gloves.
 7. Place a clean towel over client's chest.
 8. Have the client hold emesis basin and a towel or tissue while the tube is removed.
 9. Disconnect suction or feeding pump, if any. Remove the tape and safety pin.
 10. Check placement of the tube.
 11. Flush tube with 10–20 cc normal saline and follow by injecting 10 cc air into the tube (see Figure 6-4-4).
6. Practices clean technique.
 7. Enhances cleanliness and the comfort of the client.
 8. Keeps these items handy for the client in case of gagging when the tube is removed.
 9. Prevents the spillage of gastric secretions or tube feeding solution. Protects the esophageal tissue from suction pressure damage.
 10. Ensures correct placement before flushing.
 11. Clears the tube of gastric drainage, which could irritate the esophagus and nasal mucosa or be aspirated into the lungs during removal.
12. Ask the client to take a deep breath and hold still while you are pulling the tube out (coiling the tube around your hand as you are pulling). Remove the tube slowly but evenly over the course of 3–6 seconds (see Figure 6-4-5).
 12. Facilitates removal of the tube. Coiling the tube prevents spillage of gastric contents.



Figure 6-4-5 Remove the tube slowly but evenly.

- | | |
|--|---|
| <p>13. Cover or wrap the tube in a towel and remove from the client's bedside.</p> <p>14. Provide oral hygiene and assist the client to clean the nares.</p> <p>15. Remove gloves, dispose of contaminated materials in proper container, and wash hands.</p> <p>16. Document the NG tube removal and client's responses.</p> <p>17. Wash hands.</p> <p>18. Review the original purpose of the tube. Assess for signs that the tube may need to be reinserted.</p> | <p>13. Seeing the tube can cause nausea or distress. Removing it quickly will minimize this risk.</p> <p>14. Promotes the client's comfort.</p> <p>15. Reduces the transmission of microorganisms.</p> <p>16. Records implementation of intervention and promotes continuity of care.</p> <p>17. Reduce transmission of microorganisms.</p> <p>18. Allows the nurse to provide the qualified practitioner with feedback regarding the client's tolerance of the tube removal.</p> |
|--|---|

> EVALUATION

- The client was able to tolerate the removal of the tube without undue anxiety, nausea, pain, or distress.
- The client understands the reasons for tube removal.
- Skin around the tube remained intact, with no redness or blisters.
- Client understands signs or symptoms to report of complications.

> DOCUMENTATION

Nurses' Notes

- Document NG tube removal and the client's responses.
- Document any signs of irritation around the nares or complaints of nose or throat pain.

Intake and Output Record

- If the NG tube was attached to suction or a feeding pump, record the amount of intake or drainage.



▼ REAL WORLD ANECDOTES

A nurse addressed the client's anxiety by giving her a hand signal to use when she wanted the removal procedure paused. The nurse did not address the client's anxiety directly with support and education about the procedure. The client was so frightened that she used the hand signal every time she felt the tube moving. It took a long time to get the tube out, and the procedure was made more complicated and traumatic for an already upset client. The nurse should have taken the time to carefully address the client's fears by explaining the procedure and what the client would feel during the process.

> CRITICAL THINKING SKILL

Introduction

The nurse must continuously reassess the client's condition and symptoms.

Possible Scenario

Mrs. Marino is a very demanding client. Everything the nurses do seems to cause her pain, and nothing is ever quite right. The NG tube that has been in place for approximately

1 week has been a major source of complaint, and the nurses are finding it difficult to listen and respond with much compassion. As predicted, removing the tube causes screams of anguish. The nurse quickly wipes Mrs. Marino's nose, offers a tissue, and leaves the room with the tube.

Possible Outcome

Upon discarding the tube, the nurse notices it has blood on the outside. Reassessing the client, she

discovers a very red and eroded area just inside the nostril. She reports her findings, and upon further assessment, another ulcerated area at the back of her throat is discovered. The client requires additional treatment for complications from the NG tube.

Prevention

Nurses caring for this client needed to conduct daily assessments of the condition of the nares, look for signs of developing pressure sores from the tube, reposition the tube if needed, and listen to complaints of pain from the client.

▼ VARIATIONS



Geriatric Variations:

- *Make sure the elderly client can hear and understand your instructions and education regarding removal of the tube.*
- *Elderly skin is more delicate and fragile. After tube removal, be especially careful to assess for skin breakdown around the nares and to provide good cleaning and care of the nares.*



Pediatric Variations:

- *A parent may need to assist to hold the child while the tube is being removed. A toddler especially will find the procedure frightening. Sitting on a parent's lap will help the child feel a sense of trust and security.*
- *An older child can help by holding the emesis basin and tissue. An older child will feel less anxiety if provided choices and information about the procedure.*
- *The child may prefer to close their eyes while the tube is being removed.*



Home Care Variations:

- *Make sure the home care provider knows what signs and symptoms to assess for after the tube is removed.*



Long-Term Care Variations:

- *Long-term NG tube placement increases the risk of complications such as sinusitis, esophagitis, and gastric ulceration. Make sure staff members in a long-term care facility understand how to assess for these complications even after the tube is removed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Forgetting to coil the tube around your hand while removing the tube may cause the spillage of gastric content.

Ask Yourself:

How do I prevent this error?

Prevention:

Remove the towel and the tube immediately. Change the client's gown and any soiled bed linen to remove the spill.

Possible Error:

Forgetting to clear the tube of gastric secretions or feeding solution could cause these liquids to be aspirated into the lungs as the tube is being removed.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Assess the client for signs of choking or coughing. Notify the physician or qualified practitioner immediately if aspiration is suspected.

> NURSING TIPS

- Adjust the height of bed to eliminate back strain when removing the tube.
- This can be an anxiety-provoking procedure. Remind the client that tube removal is quick and painless compared to tube insertion.
- Carefully observe client's verbal and nonverbal responses during the entire procedure.
- Assess the lungs and breathing carefully after an NG tube has been removed. There is a risk for aspiration. Also, the presence of the tube may suppress the client's coughing and attempts to clear secretions from the throat, which could cause respiratory complications. These complications may not appear until after the tube is removed.

SKILL 6-5

Feeding and Medicating via a Gastrostomy Tube

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Aspiration
Distention
Gastrostomy
Jejunum
Lumen
Patent

Percutaneous
endoscopic
gastrostomy (PEG)
Peristalsis
Residual



> OVERVIEW OF THE SKILL

Enteral nutrition is a procedure whereby liquid food (formula) is instilled directly into the stomach or small intestines using a tube. Other names for this procedure are tube feedings and gastric gavage. Candidates for tube feedings are clients who have a functional GI tract and will not, should not, or cannot eat. Tube feedings are used for clients who are (or may become) malnourished and in whom oral feedings are insufficient to maintain adequate nutritional status.

Enteral tube feedings maintain the structural and functional integrity of the GI tract, enhance the utilization of nutrients, and provide a safe and economical method of feeding. Enteral tube feedings are contraindicated in clients with the following:

- Diffused peritonitis
- Intestinal obstruction that prohibits normal bowel functioning
- Intractable vomiting; paralytic ileus
- Severe diarrhea

Enteral tube feedings are used with caution in clients with the following:

- Severe pancreatitis

- Enterocutaneous fistulae
- GI ischemia

Feeding Tubes

Most feeding tubes are made of silicone or polyurethane, which are durable and biocompatible with formulas. They vary in diameter (8–12 French) and length in accord with the route and formula. The physician or qualified practitioner selects the route and type of feeding tube on the basis of the anticipated duration of feeding, the condition of the GI tract, and the potential for aspiration.

The gastrostomy tube is placed through an opening in the abdominal wall into the intestines. This is done via an enterostomy, the surgical creation of an artificial fistula into the intestines. Tube enterostomies can be placed at various points along the GI tract and are performed when long-term tube feeding is anticipated or when obstruction makes nasogastric tube feeding impossible.

Percutaneous endoscopic gastrostomy (PEG) tube placement is performed by the physician or qualified practitioner at the bedside or in the en-

doscopy room; insertion of a PEG tube does not require general anesthesia surgery. This method of enteral feeding is more common than conventional enterostomies; it is less risky because surgery is not required, and it is more economical.

Administration of Enteral Feedings

Once feeding tube position has been radiographically verified, the formula can be administered as prescribed. There are two typical methods of administering tube feedings. Intermittent feeding is given four to six times a day in the form of a bolus. Intermittent feedings are generally given through a large-bore tube. The bolus (generally 250–400 ml of formula for adult clients) can be given using a large syringe fitted into the end of the feeding tube or using a gravity drip over 20 to 30 minutes. The intermittent method is generally practiced in the home care setting due to its ease and need for minimal equipment. It is not the preferred method, however, because the large amount of food it places in the stomach at one time often causes cramping, vomiting, aspiration, flatus, or diarrhea. This method works best with clients who have normal gastrointestinal function. Continuous feeding delivers formula with a pump to regulate the rate. Most clients with a small-bore tube receive continuous feeding. One of the advantages of continuous feeding is that it keeps gastric volume small, minimizing residual volume and reducing the risk of aspiration pneumonia; the client is less likely to experience bloating, nausea, abdominal distention, and diarrhea. Continuous feeding is recommended for the seriously ill or comatose client.

Safety Considerations

Clients receiving enteral nutrition through a tube feeding are at risk for aspiration. Tube feeding aspiration can result from several factors: displacement of the tube into the esophagus, large amounts of gastric residual, and lowered intestinal motility and delayed gastric emptying, which may occur in clients who are on bed rest or receiving narcotics for pain relief. Auscultate for bowel sounds to determine gastric motility. If the bowel sounds are hypoactive or absent, stop

or withhold additional feeding and notify the physician or qualified practitioner.

Always assess placement of the feeding tube before administering any liquids. Clients who are receiving continuous gastric feeding should be assessed every 4 hours for tube placement and residual gastric contents. Aspirate gastric contents with a syringe. This is done more easily with a large-bore tube. The lumen of a small-bore tube collapses easily, making aspiration difficult and sometimes impossible. Observe and check the pH of the aspirate. If less than 100 cc, replace stomach contents after checking the residual to prevent fluid and electrolyte imbalance.

Another way of determining tube placement is to visually examine the aspirate. Gastric aspirate is usually cloudy and green, tan or off-white, or bloody or brown. Intestinal aspirates are basically clear and yellow to bile color. Pleural aspirates are tan or off-white mucus. They may be pale yellow and serous (indicating blood). If pleural aspirates contain blood, they will fail to show their normal characteristics.

Client safety and comfort require daily cleansing of the feeding tube exit site. Cleanse the skin with a clean washcloth, soap, and water. Enterostomy tubes require surgical asepsis of the exit site until the incision heals; rotate the tubes within the stoma to promote healing. Report any observations of redness, irritation, or gastric leakage at the site. Between feedings, a prosthetic device may be used to cover the ostomy opening.

The PEG tubes require daily rotation to relieve pressure on the skin. Notify the physician or qualified practitioner if you are unable to rotate the PEG; it may be an indication of internal embedding of the tube into the gastric wall. When the tube is internally embedded, it can cause gastric acid reflux, which results in skin breakdown, sepsis, and cellulitis. Care must be taken to avoid dislodgment of the tube. Keep it secured to the client's abdomen with tape, being careful not to use excessive tension. The PEG tubes require frequent flushing to prevent clogging. These tubes have small lumens. If a tube becomes clogged, flush it with 60 ml of lukewarm tap water.

> ASSESSMENT

1. Assess the client for signs of gastric distress, such as nausea, vomiting, and cramping, to determine the client's tolerance for the tube feeding.
2. Assess the feeding tube placement every 4 hours to confirm tube placement in the GI tract.
3. Assess the client's respiratory status to evaluate for pulmonary aspiration of gastric contents.
4. Assess the client's ongoing nutritional status to evaluate the effectiveness of the tube feeding.
5. Assess the client's intake and output to evaluate for fluid deficit or excess.

> DIAGNOSIS

- 1.1.2.2 Risk for Altered Nutrition: Less Than Body Requirements
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit
- 1.6.1.4 Risk for Aspiration

> PLANNING

Expected Outcomes:

1. The client will receive the correct feeding formula and the correct volume of formula over the correct time period.
2. The client will not experience any undesirable effects: aspiration, nausea, vomiting, abdominal distention, cramping, diarrhea, or constipation.
3. The client's weight and nutritional status will remain stable or improve.
4. The client will not experience any adverse skin or gastrointestinal effects from the gastrostomy or PEG tube.

Equipment Needed:

- Asepto syringe or 20- to 50-ml syringe
- Emesis basin
- Clean towel
- Disposable gavage bag and tubing (see Figure 6-5-2)
- Formula (see Figure 6-5-3)
- Infusion pump for feeding tube (see Figure 6-5-4)
- Water to follow feeding
- Nonsterile gloves



Figure 6-5-3 Feeding formulas



Estimated time to complete the skill:
30 minutes

> CLIENT EDUCATION NEEDED:

1. If the client will be receiving feedings at home, the client or his caregiver must be trained to administer the feeding and care for the tube insertion site.
2. Teach the client the importance of reporting any adverse effects from the tube feeding.
3. Teach the client to keep his head or the head of his bed elevated during and after tube feedings to avoid aspiration. High Fowler's position, a minimum of 30 degrees elevation, is recommended for the feeding. The client should remain in this position for 30 minutes after the feeding if possible.



Figure 6-5-2 Gavage bags



Figure 6-5-4 Feeding pump

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Review client's medical record for formula, amount, and time.
2. Gather equipment and formula.
3. Check client's armband.
4. Explain procedure to client.
5. Assemble equipment. Add color to formula per institutional policy. If using a bag, fill with prescribed amount of formula (see Figure 6-5-5).



Figure 6-5-5 Fill the bag with the prescribed amount of formula.

6. Place client on right side in high Fowler's position.
7. Wash hands and don nonsterile gloves.
8. Provide for privacy.
9. Observe for abdominal distention; auscultate for bowel sounds.
10. Check feeding tube (see Figure 6-5-6). Insert syringe into adapter port, aspirate stomach contents, and determine amount of gastric residual. If residual is greater than 50–100 ml (or in accordance with agency protocol), hold feeding until residual diminishes. Instill aspirated contents back into feeding tube.

1. Verifies physician's or qualified practitioner's prescription for appropriate formula and amount.
2. Promotes efficiency during procedure.
3. Verifies correct client.
4. Reduces anxiety and increases client cooperation.
5. Ensures efficiency when initiating feeding. Color will distinguish formula aspirate.



Figure 6-5-6 Check that the feeding tube is intact and in place, auscultate for bowel sounds, and look for abdominal distention.

6. Reduces risk of pulmonary aspiration in the event client vomits or regurgitates formula.
7. Reduces transmission of pathogens from gastric contents.
8. Places client at ease.
9. Assesses for delayed gastric emptying; indicates presence of peristalsis and ability of GI tract to digest nutrients.
10. Indicates whether gastric emptying is delayed. Reduces risk of regurgitation and pulmonary aspiration related to gastric distention. Prevents electrolyte imbalance.

11. Administer tube feeding.

Intermittent Bolus

12. Pinch the tubing.
13. Remove plunger from barrel of syringe and attach to adapter.
14. Fill syringe with formula.
15. Allow formula to infuse slowly; continue adding formula to syringe until prescribed amount has been administered.
16. Flush tubing with 30–60 ml or prescribed amount of water.

Intermittent Gavage Feeding

17. Hang bag on IV pole so that it is 18 inches above the client's head (see Figure 6-5-7).



Figure 6-5-7 Hang the formula bag on an IV pole approximately 18 inches above the client's head.

18. Remove air from bag's tubing.
19. Attach distal end of tubing to feeding tube adapter and adjust drip to infuse over prescribed time.
20. When bag empties of formula, add 30–60 ml or prescribed amount of water; close clamp.
21. Wash reusable gavage bag with soap and hot water every 24 hours.

11. Provides nutrients as prescribed.
12. Prevents air from entering tubing.
13. Provides system to delivery feeding.
14. Allows gravity to control flow rate, reducing risk of diarrhea from bolus feeding.
15. Prevents air from entering stomach. Decreases risk of diarrhea.
16. Ensures that remaining formula in tubing is administered and maintains patency of tube; prevents air from entering the stomach.
17. Allows gravity to promote infusion of formula.



Figure 6-5-8 Thread the gavage bag tubing through the feeding pump.

18. Prevents air from entering stomach. Decreases risk of diarrhea.
19. Allows gravity to control flow rate, reducing risk of diarrhea from bolus feeding.
20. Prevents air from entering stomach and reduces risk for gas accumulation. Maintains patency of feeding tube.
21. Decreases risk of multiplication of microorganisms in bag and tubing.

Continuous Gavage

- | | |
|--|---|
| 22. Check tube placement at least every 4 hours. | 22. Ensures that feeding tube remains in stomach. |
| 23. Check residual at least every 8 hours. | 23. Indicates ability of GI tract to digest and absorb nutrients. |
| 24. If residual is above 100 ml, stop feeding. | 24. Reduces risk of regurgitation and pulmonary aspiration related to gastric distention. |
| 25. Add prescribed amount of formula to bag for a 4-hour period; dilute with water if prescribed. | 25. Provides client with prescribed nutrients and prevents bacterial growth (formula is easily contaminated). |
| 26. Hang gavage bag on IV pole. Prime tubing. | 26. Removes air from tubing. |
| 27. Thread tubing through feeding pump (see Figure 6-5-8) and attach distal end of tubing to feeding tube adapter; keep tubing straight between bag and pump. | 27. Provides for controlled flow rate; prevents loops in tubing. |
| 28. Adjust drip rate. | 28. Infuses formula over prescribed time. |
| 29. Monitor infusion rate and signs of respiratory distress or diarrhea. | 29. Prevents complications associated with continuous gavage. |
| 30. Flush tube with water every 4 hours as prescribed or following administration of medications. | 30. Maintains patency of tube. |
| 31. Replace disposable feeding bag at least every 24 hours, in accord with agency's protocol. | 31. Decreases transmission of microorganisms. |
| 32. Turn client every 2 hours. | 32. Promotes digestion and reduces skin breakdown. |
| 33. Provide oral hygiene every 2–4 hours. | 33. Provides comfort and maintains the integrity of buccal cavity. |
| 34. Administer water as prescribed with and between feedings. | 34. Ensures adequate hydration. |
| 35. Remove gloves and wash hands. | 35. Reduces transmission of microorganisms. |
| 36. Record total amount of formula and water administered on intake and output (I&O) form and client's response to feeding. | 36. Documents administration of feeding and achievement of expected outcome; e.g., client tolerates feeding and weight is maintained or increased. |

> EVALUATION

- The client received the correct feeding formula and the correct volume of formula over the correct time period.
- Client did not experience any undesirable effects such as aspiration, nausea, vomiting, abdominal distention, cramping, diarrhea, or constipation.
- Client's weight and nutritional status remained stable or improve.
- Client did not experience any adverse skin or gastrointestinal effects from the gastrostomy or PEG tube.
- Note the amount of residual that was aspirated prior to the feeding.
- Note that tube placement was checked and what method was used.
- Note if the dressing at the tube insertion site was changed and the condition of the client's skin.
- Note if the tube was rotated or adjusted.
- Note any client complaints or adverse effects such as bloating, nausea, vomiting, diarrhea, or constipation.

> DOCUMENTATION

Nurses' Notes

- Document time, date, formula, and amount of feeding.

Medication Administration Record

- Note the date and time the feeding was instilled (per agency specifications).

Intake and Output Record

- Record the amount of tube feeding instilled and the amount of water used to flush the feeding tube.



▼ REAL WORLD ANECDOTES

Penny was a long-term care client in a nursing facility. She was an elderly frail woman with a long-term gastrostomy tube. She had shared this room with the same roommate for several years. Shortly after her roommate died, Penny began to be confused and lethargic. Most of the nurses felt this was due to the loss of her roommate and advised understanding and waiting to see if she improved. However, one of the younger, newly graduated nurses noted that these same symptoms could be due to an electrolyte imbalance from Penny's tube feeding. After checking Penny's chart, she found that shortly before the death of Penny's roommate the doctor had changed the formula of Penny's feeding hoping to help her gain some weight. The nurse informed Penny's doctor of her symptoms and when they had started. The doctor ordered laboratory tests to check Penny's electrolyte balance, and he found that her electrolytes were, in fact, out of balance. He ordered a return to Penny's previous feeding formula, and the staff noted a gradual improvement in Penny's mental and physical condition.

> CRITICAL THINKING SKILL

Introduction

Be aware of the effects tube feeding can have on the client.

Possible Scenario

You are giving Mrs. Takai her scheduled tube feeding. She receives 400 ml in an intermittent bolus. Immediately after infusing the tube feeding Mrs. Takai complains of abdominal discomfort. You check her abdomen and note that it is distended and bloated.

Possible Outcome

If Mrs. Takai's stomach remains bloated, she is at risk for nausea, vomiting, and potential aspiration of stomach contents.

Prevention

Several things can cause bloating. If the bolus feeding is given too quickly or if it is cold, the client can become distended. Check for bowel sounds. If the client does not have bowel tones, she may be distended due to lack of peristalsis. What was the residual prior to this feeding? Did she already have a large amount of residual from her previous feeding? Perhaps the feedings are too closely spaced or too large.

Raise the client's head, if possible, to avoid vomiting and possible aspiration. Be sure to have suction ready in case the client does vomit. If the client continues to have trouble with bloating, her physician should be informed.

▼ VARIATIONS



Geriatric Variations:

- *Elderly people often have delicate skin. The gastrostomy insertion site should be checked carefully for breakdown.*
- *Diarrhea can cause skin breakdown quickly in the elderly, and measures to control it should be taken if the tube feedings cause diarrhea.*
- *If the elderly client cannot take anything by mouth, be sure to perform frequent oral care to prevent drying and cracking of the mucous membranes.*
- *The elderly client may feel particularly deprived at not being able to “really eat.” It is important to present the feeding as a meal time rather than as a procedure.*



Pediatric Variations:

- *Due to a child’s smaller body mass, they are at a higher risk of electrolyte imbalance, dehydration, or fluid overload. When assessing a child with a feeding tube, be aware that a little diarrhea or a little too much water to flush the feeding tube can seriously compromise a small child’s health.*
- *Children with feeding tubes can have concerns that adults consider silly. Be sure to talk to the child and find out if they have any misconceptions regarding their tube feeding or illness.*
- *Infants and toddlers may need to be restrained from pulling on the gastrostomy tube and displacing it.*
- *Children in the home care setting may feel deprived when everyone else can eat and they cannot. It is important for the caregiver to remind the child that this is not a punishment and to encourage the child to see the tube feeding as a special kind of meal.*



Home Care Variations:

- *The client’s caregiver and/or the client must be taught how to administer the tube feeding and then supervise until the nurse is confident that the caregiver can perform the procedure independently.*
- *The client’s physician or qualified practitioner may allow the caregiver to use a home-made formula as a cost-cutting measure. If so, the nurse must be sure the formula is being prepared correctly and in a clean environment.*
- *The client’s caregiver must be taught how to assess the insertion site for signs of infection or skin breakdown and how to tape and rotate the tube to prevent pressure at the insertion site.*



Long-Term Care Variations:

- *Feeding tubes can crack and wear when used long term. The nurse should be sure to check for damage and wear to the tube and alert the physician or qualified practitioner if it shows signs of damage.*
- *Tube feeding infusion sets should be changed at set intervals, every 24 hours, or the facility policy or the client’s qualified practitioner will determine how often the tube feeding set should be changed. The nurse is responsible to track when the infusion set was last changed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not using enough water to flush the tube.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Be sure to use enough water to completely clean the inside lumen of the feeding tube. Unless the client is on a fluid restriction, the nurse should be able to use up to 100 cc of water to flush the tube after a feeding. If the tube is not adequately flushed following a feeding, the residual formula provides an ideal breeding ground for bacteria. The tube is also much more likely to become occluded by formula and medication particles, leaving the nurse with the problem of unplugging the feeding tube for the next feeding.

> NURSING TIPS

- If a feeding tube becomes plugged or seems to be running slowly, water, a carbonated beverage, or cranberry juice instilled into the tube will sometimes help clean out the inside of the tube. Be sure this is compatible with the client's diet and orders before trying this.
- Be sure to warm the formula to at least room temperature before using it for feeding. The temperature of formula can be judged the same way a baby's formula is, on the inside of the wrist.
- If the client's head can be elevated, do so after the feeding to prevent vomiting and possible aspiration of formula. If the client's head cannot be elevated, then it is crucial to turn his head to the side to allow any emesis to drain from the mouth onto the bed.
- If using food coloring to identify formula in pulmonary aspirate, be sure to use a small amount. It only needs a tinge of color to be identifiable. Some food colorings, such as methylene blue, can deposit in the client's tissues and mucous membranes causing a blue tinge in the skin.
- Remember, formulas can spoil. This is especially true in non-air conditioned areas in hot, humid weather. Discard them if they have been opened and unused as per manufacturers' specifications.
- The social aspect of eating should be emphasized. All gastric feedings should have a friendly atmosphere and should be treated as a meal rather than a procedure.

SKILL 6-6

Maintaining Gastrointestinal Suction Devices

Sally Ann Rinehart, RN, BSN

KEY TERMS

Decompression

Intermittent suction

Irrigation

Patency

Salem sump

**Semi-Fowler's
position**



> OVERVIEW OF THE SKILL

Gastrointestinal (GI) suctioning is the process of attaching a nasogastric tube (NG) to a portable or in-wall suction device. Gastrointestinal suctioning is used for several reasons, including decompression and drainage of the stomach, to allow the GI system to rest and heal, and to measure and monitor gastric bleeding.

The Salem sump tube is most frequently used for GI suctioning (see Figure 6-6-2). It is a double-lumen tube. The larger lumen is clear and collects drainage. The smaller lumen is blue and is an air vent. The air vent must remain open at all times to provide safe suctioning of the stomach. The air vent prevents the suction catheter tip from sticking the tube to the gastric wall.

The nursing care of GI suctioning devices is a clean procedure. The nurse should always wear clean gloves and dispose of the suction drainage containers as outlined by hospital procedure.



Figure 6-6-2 Salem sump nasogastric tubes

> ASSESSMENT

1. Review the chart to understand the client's diagnosis and the need for suctioning to evaluate the need for suctioning.
2. Assess the client's ability to cooperate with the suctioning set-up and continuous suctioning to evaluate how suctioning will be set up and monitored to prevent client from pulling NG tube out or disconnecting the suction.
3. Assess for proper placement of the NG tube to prevent damage to the lung or air passages.
4. Assess for patency of the NG tube to establish the effectiveness of suctioning.
5. Monitor gastric contents for amount, color, consistency, and odor to assess for evidence of bleeding or infection and the need for suctioning.
6. Assess the client's understanding of the suctioning procedure. The suctioning procedure can be distressing for clients. With proper instruction, the client's anxiety may be decreased.

> DIAGNOSIS

- 8.1.1 Knowledge Deficit
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit
- 1.6.1.3 Risk for Trauma to the Gastric Wall

> PLANNING

Expected Outcomes:

1. The client will have a patent NG tube with effective suctioning of the gastric contents.
2. The client will understand the need for suctioning.
3. The client will not experience pain or discomfort from the suctioning or the NG tube.
4. The client will not experience trauma to the gastric wall or the nares from the suction or the NG tube.

Equipment Needed (see Figures 6-6-3A and B):

- Source of negative pressure (wall suction or portable suction machine)
- NG tube in place: 12–18 French for adults 8–12 French for children 5–10 French for infants
- Connecting tubing with adapter

- Clean gloves
- Suction canister



Estimated time to complete the skill:

5 minutes

> CLIENT EDUCATION NEEDED:

1. Explain procedure to client including rationale for performing the procedure.
2. Inform client that the procedure may produce sucking noises, gastric content, and the movement of gastric content through the tubing.
3. Prepare the client for the sights and sounds he will encounter. Review the suction set-up with the client.
4. Teach client and family how to recognize signs of ineffective suction and to report any signs and symptoms to the nurse.
5. Remind the client to reposition himself frequently to avoid the catheter sticking to one place in the stomach.
6. Explain the action of the system and the importance of alerting someone if the system has failed.
7. Advise the client of comfort measures that can be taken to minimize stress on the nares, mouth, and throat.
8. The best position for the client to sit in is semi-Fowler's position to avoid the chance of aspiration and to allow the catheter tip to move freely.



A.



B.

Figure 6-6-3 A. Portable suction device; B. Wall suction device

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | ACTION | RATIONALE |
|---|--|
| 1. Assess the physician's or qualified practitioner's order. | 1. To determine what equipment will be needed and what client evaluations will be required. |
| 2. Gather the equipment needed at the client's bedside. | 2. Promotes organization and efficiency. |
| 3. Explain the reason for the suction to the client. Reassure the client regarding the appearance of the gastric contents. | 3. Helps allay client fears. Client's are often unfamiliar with the appearance of bodily fluids and may be disturbed by the appearance of the gastric contents. |
| 4. Set up the suction source. If using wall suction, insert the suction regulator into the suction port. If using portable suction, plug the machine in to the power source. | 4. To provide a suction source. |
| 5. Attach the suction tubing and canister to the suction head. Turn the suction on and test the equipment. Turn the suction off. | 5. Evaluates the functionality of the equipment. |
| 6. Wash hands and apply gloves. | 6. Reduces the transmission of microorganisms. |
| 7. Remove syringe or plug, if present, from the free end of tube. Connect the NG tube to the suction tubing; set the suction control on type of suction and pressure as prescribed. | 7. Provides for decompression as prescribed by physician or qualified practitioner; intermittent or continuous suctioning is determined by type of tube inserted. Single lumen tubes are connected to intermittent low pressure. Double lumen tubes are connected to continuous low suction. |
| 8. Upon instituting suction and at least every four hours thereafter: <ul style="list-style-type: none"> • Observe nature and amount of gastric tube drainage (see Figure 6-6-4). Empty drainage container every 8 hours or when it passes three-quarters full. • Assess client for nausea, vomiting, and abdominal distention. • Assess the nares and the skin around the nares for signs of irritation or skin breakdown (see Figure 6-6-5). | 8. <ul style="list-style-type: none"> • Provides information about patency of tube and gastric contents. • Indicates effectiveness of intervention. • Indicates need for skin care. |
| 9. Remove gloves, dispose of contaminated materials in proper container, and wash hands. | 9. Reduces transmission of microorganisms. |

continues



Figure 6-6-4 Observe the nature and amount of gastric drainage and empty the container every 8 hours or when it becomes full.



Figure 6-6-5 Assess the client. Check the nares for signs of irritation. Assess for nausea, vomiting, or abdominal distention.

10. Position client for comfort, in a semi-Fowler's position, and place the call light within easy reach.
11. Document the procedure.

10. Promotes comfort and safety.
11. Promotes continuity of care and shows implementation of intervention.

> EVALUATION

- The client will have a patent NG tube with effective suctioning of the gastric contents.
- The client understands the need for suctioning.
- The client did not experience pain or discomfort from the suctioning or the NG tube.
- The client did not experience trauma to the gastric wall or the nares from the suction or the NG tube.
- Record the type (intermittent or continuous) of suctioning and pressure setting.
- Record the nature and amount of aspirate and drainage.
- Record the client's tolerance of the procedure.
- Record the effectiveness of the intervention, such as nausea relieved.

> DOCUMENTATION

Nurses' Notes

- Record the reason for the tube insertion.
- Record the type of tube inserted.

Intake and Output Record

- Record the amount of drainage.



▼ REAL WORLD ANECDOTES

While caring for Mr. Baranski, the student nurse assembled and set up the equipment needed to decompress Mr. Baranski's stomach. Mr. Baranski had a Salem sump tube in place and the student turned the suction on to continuous. However, she did not check the suction level, which was set at high suction. The student observed that gastric contents were being suctioned through the NG tube, she provided for Mr. Baranski's comfort and went on to other duties. About an hour later Mr. Baranski turned on his call light. When the student answered the light, Mr. Baranski was panicked, pointing out that the fluid being suctioned through the NG tube appeared to be blood. The student turned the suction off and requested another nurse to evaluate the suction return. The nurse quickly realized that Mr. Baranski was bleeding. As the student evaluated Mr. Baranski's vital signs the nurse contacted his physician. Mr. Baranski had to be taken in for emergency surgery where it was discovered that the high suction had caused the NG tube to erode a hole in Mr. Baranski's stomach, nearly causing him to bleed to death.

> CRITICAL THINKING SKILL

Introduction

Fluid in the drainage container does not guarantee that the suction is working properly.

Possible Scenario

Mr. Ross is a large man who has just undergone abdominal surgery. The nurse enters his room to check the IV line. He is attached to continuous GI suction postsurgery. He complains of fullness in his midsection and nausea. The nurse sees that the GI suction is turned on and there is drainage in the container. He reassures Mr. Ross that it is normal to feel “woozy” after surgery, and leaves the room.

Possible Outcome

Mr. Ross calls again. More concerned, the nurse checks the surgical site. As he removes the dressing, Mr. Ross forcefully vomits approximately 250 cc of gastric contents. The force of the vomiting dislodges his stitches and reopens the wound. There is gastric content all over the bed, the client, and in the gaping wound. The wound starts to bleed profusely. Mr. Ross is returned to surgery to explore and repair the damage and to clean the contaminated surgical site.

Prevention

The nurse should have assessed the patency of the tube, as well as the suction. The presence of drainage in the collection chamber does not indicate that a tube is currently patent.

▼ VARIATIONS



Geriatric Variations:

- *Make sure the elderly client can hear and understand the importance of maintaining the suctioning system.*
- *The client needs to know that a soft hissing noise is normal and an indication the system is working correctly.*



Pediatric Variations:

- *The size of the tubing and the amount of pressure used will be adjusted according to the age and the size of the client.*
- *The parents should be instructed on the actions and purpose for suctioning.*
- *If the child pulls at the tubing, or is restless and might dislodge the tubing, the qualified practitioner may need to order soft restraints.*



Home Care Variations:

- *Gastric suctioning is a short-term procedure and rarely seen in the home. If used as a temporary home procedure, the client would need to be instructed on troubleshooting the portable system.*



Long-Term Care Variations:

- *GI suctioning is never used as a long-term care option because of the trauma to the esophagus and gastric lining. Long-term care for these clients is based on assessing the client for complications well after the tube has been removed. The damage may be subtle at first and become more pronounced after the client is discharged.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The tip of the suction catheter becomes plugged.

Ask Yourself:

How do I prevent this error?

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Check for movement in the tubing and check the container for increased drainage. Gently milk the tubing if the tip becomes plugged. If policy permits, irrigate the NG tube with 30 cc of normal saline.

> NURSING TIPS

- Assess all the connections in the system.
- Reposition the client frequently to prevent the catheter from adhering to the stomach wall and causing tissue damage.
- Gently milk the connecting tubing to break up thick drainage.
- If you have a concern about the suction machine, disconnect the NG from the connection tubing. Test the tubing with your gloved finger to see if the suction is working. (You can also put the suction tubing in a small glass of water to see if the water is sucked up.) If the machine is not working, replace it with a new system.
- If irrigation is allowed, gently irrigate the NG tube with 30 cc of normal saline and then draw the solution back out.
- Empty and record the drainage every 8 hours or when the container is at three-quarters full.
- Gastric suction should be set on low suction unless specifically ordered otherwise.
- Do not irrigate the NG tube in clients who have had gastric surgery unless specifically ordered.

SKILL 6-7

Applying a Condom Catheter

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Catheter

Condom catheter

Incontinence

Urinary output

Urinary output devices



> OVERVIEW OF THE SKILL

The condom catheter is an external drainage system to collect urine from male clients who have incontinence. It is less invasive than a retention catheter and allows

less contact of the skin with urine than a diaper or blue pad. Condom catheters are applied by the nurse, with an order from an appropriate health care provider.

> ASSESSMENT

1. Assess skin integrity around the penis and perineal area to look for signs of irritation and skin breakdown.
2. Assess the client for ability to cooperate with the application and retention of the condom catheter to determine what type of teaching will be necessary.
3. Assess the amount and pattern of urinary incontinence to determine if the condom catheter is the best continence method for the client.

> DIAGNOSIS

- 1.3.2 Altered Urinary Elimination
1.6.2.1.2.2 Risk for Impaired Skin Integrity
6.5.4 Toileting Self-Care Deficit

> PLANNING

Expected Outcomes:

1. The client will have a condom catheter in place without leakage or discomfort.
2. The client will have no skin irritation from the condom catheter.
3. The client will understand the reason for, and cooperate with, the placement and retention of the condom catheter.

Equipment Needed (see Figure 6-7-2):

- Condom catheter kit with adhesive strip
- Urinary drainage bag
- Clean gloves
- Basin with warm water and soap
- Towel and washcloth



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the need for the catheter carefully so as not to embarrass client.
2. If the client gets an erection, assure him that it is not unusual when applying a condom catheter. Your calm reassurance and matter-of-fact attitude will help decrease client embarrassment and provide guidance for his coping responses.

3. Tell the client to make sure the bag is carried with him lower than the level of the bladder if he ambulates.
4. Tell the client to inform the nurse if irritation occurs.



Figure 6-7-2 Condom catheters

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Protect the client's privacy by closing the door and pulling curtains around the bed. | <ol style="list-style-type: none"> 2. Allows privacy for the client. |
| <ol style="list-style-type: none"> 3. Position the client in a comfortable position, preferably in a supine position, if tolerated by the client. Raise the bed to a comfortable height for the nurse. | <ol style="list-style-type: none"> 3. The client will be more comfortable and better tolerate the procedure; a supine position facilitates the cleaning and application of the catheter. Raising the bed to a comfortable height promotes good body mechanics. |
| <ol style="list-style-type: none"> 4. Apply gloves. | <ol style="list-style-type: none"> 4. Gloves should be worn to prevent the possible transmission of microorganisms when there is a chance of coming into contact with any body fluid. |
| <ol style="list-style-type: none"> 5. Fold the client's gown across the abdomen and pull the sheet up over the client's legs. | <ol style="list-style-type: none"> 5. Provides minimal exposure of the client, reducing the client's embarrassment. |
| <ol style="list-style-type: none"> 6. Assess the client's penis for any signs of redness, irritation, or skin breakdown. | <ol style="list-style-type: none"> 6. The client may require an indwelling catheter if there is a significant amount of skin breakdown. Assessment will give baseline data for comparison with future assessments. |
| <ol style="list-style-type: none"> 7. Clean the client's penis with warm soapy water. Retract the foreskin on the uncircumcised male and clean thoroughly in folds. | <ol style="list-style-type: none"> 7. Removes microorganisms present in any drainage or feces that could enter the urinary meatus and cause a urinary tract infection. Avoids trapping microorganisms in folds around the meatus. |

8. Return the client's foreskin to its normal position (see Figure 6-7-3).



Figure 6-7-3 After cleaning the client's penis, return the foreskin to its normal position.

9. Shave any excess hair around the base of the penis if required by institutional policy.
10. Rinse and dry the area.
11. If a condom kit is used, open the package containing the skin preparation (see Figure 6-7-4). Wipe and apply skin preparation solution to the shaft of the penis. If the client has an erection, wait for termination of erection before applying the catheter.
12. Apply the double-sided adhesive strip around the base of the client's penis in a spiral fashion. The strip is applied 1 inch from the proximal end of the penis. Do not completely encircle the penis or tightly encompass penis.
13. Position the rolled condom at the distal portion of the penis and unroll it, covering the penis and the double-sided strip of adhesive. Leave a 1- to 2-inch space between the tip of the penis and the end of the condom (see Figure 6-7-5).
14. Gently press the condom to the adhesive strip.
15. Attach the drainage bag tubing to the catheter tubing. Make sure the tubing lays over the client's legs, not under. Secure the drainage bag

8. Failure to return the foreskin to a normal position can lead to swelling of the penis and possible constriction.



Figure 6-7-4 After preparing the penis, open the condom kit. Apply the skin preparation solution.

9. Prevents additional discomfort from the adhesive strip when the condom catheter is removed. Also prevents hair from catching onto the adhesive strip, causing discomfort.
10. Moist warm environment can lead to the growth of microorganisms.
11. Preparation solutions protect the client's skin from irritation. An erection may occur due to manipulation of the penis while cleaning the area. This is a normal reaction and will terminate in a few minutes.
12. Applying the adhesive in a spiral fashion does not compromise circulation of the penis. Encircling the penis can constrict the penis, impair circulation, and cause edema.
13. The condom sticks to the adhesive and remains in place. The extra spacing prevents pressure and erosion of the tip of the penis.
14. Enables the condom to adhere evenly to the adhesive strip.
15. The drainage bag is positioned below the level of the client's bladder to prevent reflux of the urine onto the penis and microorganisms from

Figure 6-7-5 Unroll the condom from the distal portion of the penis upward to the base.



to the side of the bed below the level of the client's bladder or to the drainage bag attached to the leg (see Figures 6-7-6 and 6-7-7).



Figure 6-7-6 Attach the drainage bag tubing to the catheter tubing.

entering the penis. The tubing is placed over the leg to promote urine flow away from the client. Constant exposure to urine and moisture can irritate the penis.



Figure 6-7-7 Make sure the drainage bag tubing lays over the client's leg.

16. Determine that the condom and tubing are not twisted.
 17. Cover the client.
 18. Dispose of the used equipment in appropriate receptacle and wash hands.
 19. Return the client's bed to the lowest position and reposition client to comfortable or appropriate position.
 20. Empty the bag, measure the client's urinary output, and record every 4 hours.
 21. Remove the condom once a day to clean the area and assess the skin for signs of impaired skin integrity.
16. If the condom or tubing is twisted, the urine cannot flow out and the condom will leak or fall off.
 17. Maintains privacy of the client.
 18. Reduces the transmission of microorganisms.
 19. Reduces potential injury from falls.
 20. Records output and prevents bag from becoming overfull and/or too heavy.
 21. Promotes hygiene and reduces the possibility of skin breakdown.

> EVALUATION

- The client's condom catheter is in place without leakage or discomfort.
- The client does not have any skin irritation from the condom catheter.
- The client understands the reason for, and cooperates with, the placement and retention of the condom catheter.

> DOCUMENTATION

Nurses' Notes

- Document the time the procedure was performed.
- Note the condition of the client's skin, recording any irritation, rashes, or open areas.
- Record any client teaching performed.

Intake and Output Record

- Record the amount of urine emptied from the urine drainage bag.



▼ REAL WORLD ANECDOTES

Nurse Griniv was making a home health visit to evaluate Mr. Rodygin's condition. Mr. Rodygin was a confused, bedridden client. His elderly wife was his primary caregiver. While performing an assessment, the nurse noticed that Mr. Rodygin's condom catheter was leaking. When she removed the condom she discovered the skin beneath it was excoriated and inflamed. When asked about the condom catheter, Mrs. Rodygin stammered and was evasive. She finally admitted that she hadn't changed it in several weeks. She noted that she always had difficulty getting the condom to adhere to the skin so she had decided not to change it as long as it remained in place. The nurse called Mr. Rodygin's doctor requesting orders for skin care ointment and an indwelling catheter until Mr. Rodygin's skin was healed. She then gently reinforced the instructions for applying a condom catheter with Mrs. Rodygin.

> CRITICAL THINKING SKILL

Introduction

The client complains that the condom catheter is painful.

Possible Scenario

While making rounds, Mr. Zgonc complains that he hurts "down there." Upon examination, the nurse notes that the adhesive strip for Mr. Zgonc's condom catheter completely encircles the shaft of his penis. The area below the adhesive strip is reddened and edematous.

Possible Outcome

The constriction of blood flow could cause tissue and nerve damage, perhaps even necrosis of the penis.

Prevention

It is important to always check that the catheter is not constricting the penis and causing skin breakdown. Wrap the adhesive strip in a spiral. Do not wrap it in a rubber band/tourniquet fashion. Inspect the catheter at least every four hours, more frequently if the client is restless or confused.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients have thinner skin, which may more readily break down.
- Clients may be embarrassed by erection. Inform that this is normal.



Pediatric Variations:

- Use a size appropriate to the child.
- Other means such as diapers can be used for younger children; however, if output measurements are needed, a condom catheter may be necessary.
- This procedure can be extremely embarrassing to children. If the use of a condom catheter is absolutely necessary, the procedure may be best performed by a male staff member.
- If child has erection, inform them that this can naturally occur.



Home Care Variations:

- Change the catheter often since the adhesive and the condom can lead to skin breakdown. Diapers, blue pads, or Attends may be more useful or may be used periodically to give the skin on the penis a chance to heal.

▼ VARIATIONS *continued*

- *Instruct the home caregiver on how to clean, use, apply, and remove the condom catheter.*
- *Discuss signs and symptoms of irritation or skin breakdown.*
- *Discuss alternatives to the condom should it need to be removed.*



Long-Term Care Variations:

- *If irritation occurs, remove the condom and clean the area more frequently, three times a day if possible.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Condom placed too tight or too loose.

Ask Yourself:

How do I prevent this error?

Prevention:

Do not place catheter when client has an erection. Make sure the adhesive strip is snug but do not pull tightly when applying.

Possible Error:

Skin not prepared appropriately. Skin oils not removed and adhesive will not stick.

Ask Yourself:

How do I prevent this error?

Prevention:

Take the time to cleanse the skin properly prior to placing the adhesive strip.

Possible Error:

Condom catheter becomes twisted and urine leaks out.

Ask Yourself:

How do I prevent this error?

Prevention:

Position the tubing and bag to allow the client maximum mobility without undue tugging or twisting of the tubing or catheter. Teach the ambulatory client wearing a condom catheter to detach the bag from the bed and position it where it will not be twisted when he gets up.

> NURSING TIPS

- Use skin preparation solution if available to remove skin oils. This will help condom catheter stay in place.
- Do not reattach a condom catheter if it falls off. It will not stick any better the second try. Start over with a new strip and catheter.
- If client has excessive hair, this can be quite uncomfortable to client and may require partial shaving.
- In an unconscious or confused client one may need to position tubing where the client will not pull on the catheter or tubing or use restraints.

SKILL 6-8

Inserting an Indwelling Catheter: Male

Valerie Coxon, RN, PhD

KEY TERMS

Bladder
Catheter
Catheterization
Collection bag
Foley

Indwelling catheter
Intermittent
catheterization
Male catheterization
Urethra



> OVERVIEW OF THE SKILL

Catheterization involves passing a rubber or plastic tube into the bladder via the urethra to drain urine from the bladder or to obtain a urine specimen. Intermittent catheterization may be used to obtain a sample or to relieve bladder distention. Indwelling catheters may be used short term to keep the bladder empty, prevent urinary retention, or allow precise measurement of urine. Long-term indwelling, or retention, catheters are used to control incontinence, prevent retention, or prevent the leakage of urine (see Figure 6-8-2). Catheterization is a sterile procedure.



Figure 6-8-2 Indwelling and straight catheters

> ASSESSMENT

1. Assess the need for catheterization and the type of catheterization ordered to assure the proper procedure is carried out.
2. Assess for the need for peritoneal care prior to catheterization to reduce the transmission of microorganisms.
3. Assess the urinary meatus for signs of infection or inflammation. Ask the client for any history of difficulty with prior catheterizations, anxiety, or urinary strictures. Allows detection of potential complications.
4. Assess the client's ability to assist with the procedure. Can he maintain the proper position while you perform the procedure? Is the client agitated, and could he contaminate the sterile field? Will you need assistance to hold the client's legs in position? Determines how the procedure is carried out.
5. Assess the light. Will you be able to see well enough to place the catheter, or do you need a secondary light source? Determines what preparation needs to be done to assure a successful procedure.
6. Assess for an allergy to povidone-iodine and/or latex to avoid an allergic reaction.

7. Watch for indications of distress or embarrassment, especially if the nurse is the opposite gender, to determine what teaching and support are needed. Explore further if indicated.

- Towel
- Forceps



Estimated time to complete the skill:

20 minutes

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to insertion of the catheter

> PLANNING

Expected Outcomes:

1. The catheter will be inserted without pain, trauma, or injury to the client.
2. The client's bladder will be emptied without complication.
3. The nurse will maintain the sterility of the catheter during insertion.

Equipment Needed (see Figure 6-8-3):

- Indwelling or straight catheter with drainage system
- Sterile catheterization kit
- Adequate lighting source
- Disposable gloves
- Blanket or drape
- Soap and washcloth
- Warm water

> CLIENT EDUCATION NEEDED:

1. Explain the procedure to client, and describe anticipated sensations of burning and urgency that occur when the catheter is placed.
2. Explain the need for the catheter.
3. Explain the basics of aseptic technique and the need not to touch or contaminate the sterile field.



Figure 6-8-3 Catheterization kit

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Performing Urinary Catheterization: Male Client

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Gather the equipment needed. Read the label on the catheterization kit. Note if the catheter is included in the kit and, if so, what type it is. Gather any supplies you will need that are not in the prepackaged kit. 2. Provide for privacy and explain procedure to client. 3. Set the bed to a comfortable height to work, and raise the side rail on the side opposite you. | <ol style="list-style-type: none"> 1. Promotes efficiency in the procedure. Kits from various manufacturers come with different equipment. The catheter may or may not be packaged in the kit. Sterile gloves and the urine drainage bag may also need to be gathered separately. 2. Promotes cooperation and client dignity. 3. Promotes proper body mechanics and assures client safety. |
|--|---|

4. Assist the client to a supine position with legs slightly spread (see Figure 6-8-4).



Figure 6-8-4 Assist the client to a supine position with legs spread. This allows visualization of the area and relaxes muscles.

4. Relaxes muscle and allows visualization of the area to facilitate insertion of the catheter.



Figure 6-8-5 Open the catheterization kit, using the wrapper to establish a sterile field between the client's legs.

5. Drape the client's abdomen and thighs if needed.
6. Ensure adequate lighting of the penis and perineal area.
7. Wash hands, apply disposable gloves, and wash perineal area.
8. Remove gloves and wash hands.
9. Open the catheterization kit, using aseptic technique. Use the wrapper to establish a sterile field (see Figure 6-8-5).
10. If the catheter is not included in the kit, carefully drop the sterile catheter onto the field using aseptic technique. Add any other items needed.
11. Apply sterile gloves. These may be included in the kit.
12. Place the fenestrated drape from the catheterization kit over the client's perineal area with the penis extending through the opening.
13. If inserting a retention catheter, attach the syringe filled with sterile water to the Luer-Lok tail of the catheter. Inflate and deflate the retention balloon. Detach the water-filled syringe (see Figure 6-8-6).
14. Attach the catheter to the urine drainage bag if it is not preconnected.
5. Promotes client comfort and warmth.
6. Facilitates proper execution of technique.
7. Reduces transfer of microorganisms.
8. Reduces transfer of microorganisms.
9. Provides an area for the sterile equipment to be laid out and assembled. Establish the sterile field close to the client. If the client is able to cooperate, the sterile field can sometimes be established in the open area between the client's legs.
10. Prevents contamination of the sterile equipment and the sterile field.
11. Prevents contamination of the sterile equipment and the sterile field.
12. Provides a sterile field at the procedural site. Prevents accidental contamination from adjacent areas.
13. Tests the patency of the retention balloon. Detaching the syringe prevents accidental inflation during catheter insertion.
14. The catheter and drainage system may be preconnected; otherwise it is connected before

continues

Performing Urinary Catheterization: Male Client *continued*



Figure 6-8-6 Inflate and deflate the retention balloon to test its patency.



Figure 6-8-7 Cleanse the glans penis with a povidone-iodine solution.

15. Generously coat the distal portion of the catheter with water-soluble, sterile lubricant and place it nearby on the sterile field.
16. With your nondominant hand, gently grasp the penis and retract the foreskin (if present). With your dominant hand, cleanse the glans penis with a povidone-iodine solution or other antimicrobial cleanser (see Figure 6-8-7).
17. Hold the penis perpendicular to the body and pull up gently.
18. Inject 10 ml sterile, water-soluble lubricant (use a 2% Xylocaine lubricant whenever feasible) into the urethra.
19. Holding the catheter in the dominant hand, steadily insert the catheter about 8 inches, until urine is noted in the drainage bag or tubing (see Figure 6-8-8).

catheterization to avoid exposing the client to ascending infection from an open-ended catheter.

15. Facilitates catheter insertion.
16. Removes dirt and minimizes the risk of urinary tract infection by removing surface pathogens.
17. Facilitates catheter insertion by straightening urethra.
18. Avoids urethral trauma and discomfort during catheter insertion and facilitates insertion.
19. Provides a visual confirmation that the catheter tip is in the bladder.



Figure 6-8-8 Steadily insert the catheter.

20. If the catheter will be removed as soon as the client's bladder is empty, insert the catheter another inch, place the penis in a comfortable position and hold the catheter in place as the bladder drains.
21. If the catheter will be indwelling with a retention balloon, continue inserting until the hub of the catheter (bifurcation between drainage port and retention balloon arm) is met (see Figure 6-8-9).



Figure 6-8-9 Continue inserting the catheter until the bifurcation between the drainage port and the retention balloon reaches the end of the penis. This ensures the retention balloon will be fully in the bladder prior to inflation.

20. The catheter needs to be inserted far enough to allow complete bladder drainage, but not so far as to possibly irritate the bladder, causing spasms.
21. Ensures adequate catheter insertion before retention balloon is inflated.



Figure 6-8-10 Inflate the retention balloon.

22. Reattach the water-filled syringe to the inflation port.
23. Inflate the retention balloon with sterile water per manufacturer's recommendations or the physician's or qualified practitioner's orders (see Figure 6-8-10).
24. Instruct the client to immediately report discomfort or pressure during balloon inflation; if pain occurs, discontinue the procedure, deflate the balloon, and insert the catheter farther into the bladder. If the client continues to complain of pain with balloon inflation, remove the catheter and notify the client's qualified practitioner.
25. Once the balloon has been inflated, gently pull the catheter until the retention balloon is resting snug against the bladder neck (resistance will be felt when the balloon is properly seated).
26. Secure the catheter according to institutional policy. Securing it to either the client's thigh or abdomen is generally acceptable.
22. Provides a sterile method of inflating the retention balloon.
23. Ensures retention of the balloon. Retention catheters are available with a variety of balloon sizes. Use a catheter with the appropriate size balloon.
24. Pain or pressure indicates inflation of the balloon in the urethra; further insertion will prevent misplacement and further pain or bleeding.
25. Maximizes continuous bladder drainage and prevents urine leakage around the catheter.
26. Prevents excessive traction from the balloon rubbing against the bladder neck, inadvertent catheter removal, or urethral erosion.

Performing Urinary Catheterization: Male Client *continued*

27. Place the drainage bag below the level of the bladder. Do not let it rest on the floor (see Figures 6-8-11 and 6-8-12). Secure the drainage tubing to prevent pulling on the tubing and the catheter.



Figure 6-8-11 Place the drainage bag tubing over the leg.

27. Maximizes continuous drainage of urine from the bladder (drainage is prevented when the drainage bag is placed above the abdomen).



Figure 6-8-12 Place the drainage bag below the level of the bladder, but do not rest it on the floor.

28. Remove gloves, dispose of equipment, and wash hands.

28. Prevents transfer of microorganisms.

29. Help client adjust position. Lower the bed.

29. Promotes client comfort and safety.

30. Assess and document the amount, color, odor, and quality of urine.

30. Monitors urinary status.

> EVALUATION

- The catheter was inserted without pain, trauma, or injury to the client.
- The client's bladder was emptied without complication.
- The nurse maintained the sterility of the catheter during insertion.

> DOCUMENTATION

Nurses' Notes

- Record the time and date the catheter was inserted.
- Note the size and type of catheter used, including the size of the retention balloon and the amount of sterile water used to inflate the balloon.
- Record the client's response to the procedure and the amount, color, and quality of urine returned.

Intake and Output Record

- Record the amount of urine returned.



▼ REAL WORLD ANECDOTES

Scenario 1

A nurse is checking on an elderly nursing home client late at night. She found him sitting in the dark, in a chair, complaining that he has to urinate. She knows he has a Foley catheter in place and decides to investigate. Turning on the lights, she sees the client has pulled out his catheter with the 35-cc retention balloon still inflated. She notes that he is bleeding from the urethra and there is blood

▼ REAL WORLD ANECDOTES *continued*

in the bathroom. This client required several hours of bladder irrigation to stop the bleeding, a new catheter with a 45-cc retention balloon, and increased supervision.

Scenario 2

Mr. Muon was an elderly client in a long-term care facility. His indwelling urinary catheter was due to be changed. As the nurse prepared Mr. Muon for the catheter, she noted that he had bilateral inguinal hernias that had severely distended his scrotum. She prepped Mr. Muon and started inserting the catheter. As the catheter was inserted, the nurse noted that she could see the catheter tip within the client's scrotum. She was concerned that the catheter was no longer in the client's urethra but the client was not in pain and there did not appear to be any obvious trauma. She continued to gently insert the catheter. She started to become concerned when she noted that she had inserted the catheter almost to its hub without a urine return. Just as she was ready to remove the catheter and call Mr. Muon's physician, she noted a urine return. She slid the catheter into the urethra a little further and inflated the retention balloon. The client tolerated the procedure well, despite his obvious urethral displacement. The catheter had been inserted almost to the hub in order to reach Mr. Muon's bladder. After seeing to Mr. Muon's comfort and recording her findings, the nurse reported her observations to Mr. Muon's physician.

> CRITICAL THINKING SKILL

Introduction

Each client is different. Complete assessment, including a client history, will help avoid mistakes.

Possible Scenario

You are working in the emergency room. A 27-year-old coworker comes in complaining of not being able to void. Not wanting to get too personal with a coworker, you skip lightly through your assessment. The physician orders you to catheterize this client. As you begin to insert the catheter, the client

suddenly complains of sharp pain and pulls back away from the catheter.

Possible Outcome

You stop and notify the physician. This client has urethral strictures, scar tissue from an earlier procedure that would have been torn if you had forced the catheter into the urethra.

Prevention

Assess every client for any history of difficulty with catheterization. Always stop the procedure immediately if resistance or excess pain is felt.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients may need help holding the correct position.
- Anatomical landmarks may be more difficult to visualize in an older client.



Pediatric Variations:

- Children need the support of a parent, who can also help the child hold the position and provide distraction during the procedure.



Home Care Variations:

- If the client will be catheterized at home, go over the catheterization technique step by step to determine how it will be accomplished in the home setting. For example, will the procedure be done in bed, on a couch, or in the bathroom? Where will clean supplies be obtained and stored? How will the procedure be assessed and documented. Is urine testing needed?

continues

▼ VARIATIONS *continued*

- *Emphasize the need for good handwashing, cleaning of the catheter, and adequate lubrication of the catheter to reduce the frequency of infection and urethral trauma.*



Long-Term Care Variations:

- *Clients who practice long-term self-catheterization may use clean, instead of sterile, technique to catheterize themselves. Reinforce the need for good handwashing and cleaning of the catheter and adequate lubrication of the catheter to reduce the frequency of infection and urethral trauma.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client moves a foot and contaminates the edge of the sterile field.

Ask Yourself:

How do I prevent this error?

Prevention:

If the client has touched a sterile item, such as the catheter or your gloves, you need to replace the item and start over. If the contamination is on the sterile field and you can avoid contact with the area, you may proceed with caution. Make sure the client understands the need to protect the sterile area. Remind him as needed during the procedure, and get assistance holding the client's legs in position during the procedure if you have doubts.

> NURSING TIPS

- Make sure a drainage system is in place prior to inserting the catheter, to prevent the spill of urine.
- Consider taping connections closed if you are concerned the client might become confused and pull them apart, breaking the sterility of the closed-system drainage.
- Hold the sides of the penis with gentle pressure to help the meatus stay open as you prepare to insert the catheter.
- If you feel resistance, try gently twisting the catheter one-quarter turn. Try holding the penis at a 90-degree angle to the body, and pull very slightly as you advance the catheter.
- If 700 to 800 ml of urine has drained right away, clamp the catheter for 20 minutes. Then unclamp and let urine flow. This helps prevent bladder spasms.
- Up to twice the recommended volume of fluid may be inserted safely into the retention balloon if needed.

SKILL 6-9

Inserting an Indwelling Catheter: Female

Valerie Coxon, RN, PhD

KEY TERMS

Catheter
Foley catheter
Indwelling catheter
Labia
Perineum

Retention catheter
Straight catheter
Urethra
Urinary meatus



> OVERVIEW OF THE SKILL

Catheterization involves passing a rubber or plastic tube into the bladder via the urethra to drain urine from the bladder or to obtain a urine specimen. Intermittent catheterization may be used to obtain a sample or to relieve bladder distention. Indwelling catheters may be used short term to keep the bladder

empty, prevent urinary retention, or allow precise measurement of urine. Long-term indwelling, or retention, catheters are used to control incontinence, prevent retention, or prevent the leakage of urine. Catheterization is a sterile procedure.

> ASSESSMENT

1. Assess the need for catheterization and the type of catheterization ordered to assure the proper procedure is carried out.
2. Assess for the need for perineal care prior to catheterization to reduce the transmission of microorganisms.
3. Assess the urinary meatus for signs of infection or inflammation. Ask the client for any history of difficulty with prior catheterizations, anxiety, or urinary strictures. Allows detection of potential complications.
4. Assess the client's ability to assist with the procedure. Can she maintain the proper position while you perform the procedure? Is the client agitated, and could she contaminate the sterile field? Will you need assistance to hold her legs in position? Determines how the procedure is to be carried out.
5. Assess the light. Will you be able to see well enough to place the catheter, or do you need a

secondary light source? Determines what preparation needs to be done to assure a successful procedure.

6. Assess for an allergy to povidone-iodine and/or latex to avoid an allergic reaction.
7. Watch for indications of distress or embarrassment, especially if the nurse is of the opposite gender, to determine what teaching and support are needed. Explore further if indicated.

> DIAGNOSIS

- 1.2.1.1 High Risk for Infection, related to invasive device
- 1.6.2.1.2.2 High Risk for Impaired Skin Integrity, related to infection and pressure from catheter
- 8.1.1 Knowledge Deficit, related to insertion of the catheter

> PLANNING**Expected Outcomes:**

1. A catheter will be inserted without pain, trauma, or injury to the client.
2. The client's bladder will be emptied without complication.
3. The nurse will maintain the sterility of the catheter during insertion.

Equipment Needed (see Figure 6-9-2):

- Indwelling or straight catheter with drainage system
- Sterile catheterization kit
- Adequate lighting source
- Disposable clean gloves
- Blanket or drape
- Soap and washcloth
- Warm water
- Towel



Estimated time to complete the skill:
20 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the procedure to the client, and describe anticipated sensations of burning or urgency that occur when the catheter is placed.
2. Explain the need for the catheter.
3. Explain the basics of aseptic technique and the need not to touch or contaminate the sterile field.



Figure 6-9-2 Catheterization kit

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Performing Urinary Catheterization

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Gather the equipment needed. Read the label on the catheterization kit. Note if the catheter is included in the kit and, if so, what type it is. Gather any supplies you will need that are not in the prepackaged kit. 2. Provide for privacy and explain procedure to client. Assess for allergy to povidone-iodine. 3. Set the bed to a comfortable height to work, and raise the side rail on the side opposite you. 4. Assist the client to a supine position with legs spread and feet together or to a side-lying position with upper leg flexed (see Figure 6-9-3). 5. Drape the client's abdomen and thighs for warmth if needed. | <ol style="list-style-type: none"> 1. Promotes efficiency in the procedure. Kits from various manufacturers come with different equipment. The catheter may or may not be packaged in the kit. Sterile gloves and the urine drainage bag may also need to be gathered separately. 2. Promotes cooperation and client dignity. 3. Promotes proper body mechanics and assures client safety. 4. Relaxes muscles and allows visualization of the area to facilitate insertion of the catheter. 5. Promotes client comfort and warmth. |
|---|---|



Figure 6-9-3 Position the client supine with legs spread.



Figure 6-9-4 Open the catheterization kit, using the wrapper to establish a sterile field between the client's legs.

6. Ensure adequate lighting of the perineal area.
7. Wash hands and apply disposable gloves.
8. Wash perineal area.
9. Remove gloves and wash hands.
10. Open the catheterization kit, using aseptic technique. Use the wrapper to establish a sterile field (see Figure 6-9-4).
11. If the catheter is not included in the kit, drop the sterile catheter onto the field using aseptic technique. Add any other items needed.
12. Apply sterile gloves. These may be included in the kit.
13. If inserting a retention catheter, attach the syringe filled with sterile water to the Luer-Lok tail of the catheter. Inflate and deflate the retention balloon. Detach the water-filled syringe.
14. Attach the catheter to the urine drainage bag if it is not preconnected.
15. Generously coat the distal portion of the catheter with water-soluble, sterile lubricant and place it nearby on the sterile field (see Figure 6-9-5).
16. Place the fenestrated drape from the catheterization kit over the client's perineal area with the labia visible through the opening.
6. Facilitates proper execution of technique.
7. Reduces transfer of microorganisms.
8. Reduces transfer of microorganisms.
9. Reduces transfer of microorganisms.
10. Provides an area for the sterile equipment to be laid out and assembled. Establish the sterile field close to the client. If the client is able to cooperate, the sterile field can sometimes be established in the open area between the client's legs.
11. Prevents contamination of the sterile equipment and the sterile field.
12. Prevents contamination of the sterile equipment and the sterile field.
13. Tests the patency of the retention balloon. Detaching the syringe prevents accidental inflation during catheter insertion.
14. The catheter and drainage system may be preconnected; otherwise connect it before catheterization to avoid exposing the client to ascending infection from an open-ended catheter.
15. Facilitates catheter insertion.
16. Provides a sterile field at the procedural site. Prevents accidental contamination from adjacent areas.

Performing Urinary Catheterization *continued*

Figure 6-9-5 Open the lubrication package and squeeze lubricant onto the sterile field where it will be used to lubricate the catheter.



Figure 6-9-6 Spread the labia minora and visualize the urinary meatus.

- 17.** Gently spread the labia minora with the fingers of your nondominant hand and visualize the urinary meatus (see Figure 6-9-6).
- 18.** Holding the labia apart with your nondominant hand, use the forceps to pick up a cotton ball soaked in povidone-iodine, and cleanse the periurethral mucosa. Use one downward stroke for each cotton ball and dispose. Keep the labia separated with your nondominant hand until you insert the catheter (see Figure 6-9-7).



Figure 6-9-7 Using forceps, pick up a cotton ball soaked in povidone-iodine. Cleanse the periurethral mucosa.

- 17.** Helps locate the meatus, so the catheter can be placed in the correct spot.
- 18.** Cleans the area and minimizes the risk of urinary tract infection by removing surface pathogens.



Figure 6-9-8 Steadily insert the catheter into the meatus.

- 19.** Holding the catheter in the dominant hand, steadily insert the catheter into the meatus until urine is noted in the drainage bag or tubing (see Figure 6-9-8).
 - 20.** If the catheter will be removed as soon as the client's bladder is empty, insert the catheter another inch and hold the catheter in place as the bladder drains.
- 19.** Provides a visual confirmation that the catheter tip is in the bladder.
 - 20.** The catheter needs to be inserted far enough to allow complete bladder drainage, but not so far as to possibly irritate the bladder, causing spasms.

21. If the catheter will be indwelling with a retention balloon, continue inserting another 1 to 3 inches.
22. Reattach the water filled syringe to the inflation port.
23. Inflate the retention balloon using manufacturer's recommendations or according to the physician's or qualified practitioner's orders (see Figure 6-9-9).



Figure 6-9-9 Inflate the retention balloon.

21. Ensures adequate catheter insertion before retention balloon is inflated.
22. Provides a sterile method of inflating the retention balloon.
23. Ensures retention of the balloon. Retention catheters are available with a variety of balloon sizes. Use a catheter with the appropriate size balloon.



Figure 6-9-10 Tape the catheter to the client's thigh.

24. Instruct the client to immediately report discomfort or pressure during balloon inflation; if pain occurs, discontinue the procedure, deflate the balloon, and insert the catheter farther into the bladder. If the client continues to complain of pain with balloon inflation, remove the catheter and notify the client's qualified practitioner.
25. Once the balloon has been inflated, gently pull the catheter until the retention balloon is resting snug against the bladder neck (resistance will be felt when the balloon is properly seated).
26. Tape the catheter to the abdomen or thigh snugly, yet with enough slack so it will not pull on the bladder (see Figure 6-9-10).
27. Place the drainage bag below the level of the bladder. Do not let it rest on the floor. Make sure the tubing lies over, not under, the leg.
28. Remove gloves, dispose of equipment, and wash hands.
29. Help client adjust position. Lower the bed.
24. Pain or pressure indicates inflation of the balloon in the urethra; further insertion will prevent misplacement and further pain or bleeding.
25. Maximizes continuous bladder drainage and prevents urine leakage around the catheter.
26. Prevents excessive traction from the balloon rubbing against the bladder neck, inadvertent catheter removal, or urethral erosion.
27. Maximizes continuous drainage of urine from the bladder (drainage is prevented when the drainage bag is placed above the abdomen).
28. Prevents transfer of microorganisms.
29. Promotes client comfort and safety.

continues

Performing Urinary Catheterization *continued*

30. Assess and document the amount, color, odor, and quality of urine (see Figure 6-9-11).

30. Monitors urinary status.



Figure 6-9-11 Monitor the urinary status. Assess and document the amount, color, and quality of urine.

31. Wash hands.

31. Reduces transmission of microorganisms.

> EVALUATION

- The catheter was inserted without pain, trauma, or injury to the client.
- The client's bladder was emptied without complication.
- The nurse maintained the sterility of the catheter during insertion.

> DOCUMENTATION**Nurses' Notes**

- Record the time and date the catheter was inserted.
- Note the size and type of catheter used, including the size of the retention balloon and the amount of sterile water used to inflate the balloon.
- Record the client's response to the procedure and the amount, color, and quality of urine returned.

Intake and Output Record

- Record the amount of urine returned.

**▼ REAL WORLD ANECDOTES****Scenario 1**

Entering a room to check a client, the nurse notes that the client's family is visiting. The client's husband has pulled a chair up close to the side of the bed and, not wanting to kick the catheter bag, has rehung the bag from the IV stand adjustment knob. The bag is higher than the bladder. The nurse lowers the bag and provides client and caregiver education about the need to keep the bag lower than the bladder. She documents the incident.

Scenario 2

The nurse caring for a client undergoing a catheter ablation procedure forgot to include the possibility that a retention catheter would be placed during the procedure. She returned to the client's room and informed the client, but preprocedure antianxiety medication and a sedative had already been given. The client woke up after 3 hours of conscious sedation with a retention catheter in place but could not remember what it was and why it was there.

> CRITICAL THINKING SKILL**Introduction**

You should always ask for assistance when necessary.

Possible Scenario

A nurse is catheterizing a client in the emergency department to obtain a sterile urine sample as per the

physician's request. She notes the perineal area is very swollen, and the patient, who is obese, is restless. Since this is a busy night shift, she does not seek assistance but attempts to insert the catheter. She cannot clearly see the urinary meatus but has "some idea" where it is.

Possible Outcome

On her first and second attempts, she inserts the catheter into the vagina. She has to stop the procedure

twice and obtain a new catheter, prolonging the procedure and increasing the expense of the procedure.

Prevention

This nurse needed to look carefully and be sure she knew where the meatus was. Sometimes it is very difficult to spot. She needed to seek assistance in positioning the client and/or locating the meatus.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients may need help holding the position.
- Anatomical landmarks may be more difficult to visualize.
- It is important to clearly explain the procedure and check that client understands.



Pediatric Variations:

- When a catheter is used with a child or adolescent, provide simple explanations.
- Allow for privacy and respect the child's or adolescent's wishes regarding the presence of a parent during catheter insertion and care.
- Children or adolescents may be more tempted to pull or tug on the catheter. Children and adolescents may be more active in or out of bed, so the catheter must be taped securely to the thigh to prevent it from being pulled out.



Home Care Variations:

- Clients who practice long-term self-catheterization may use clean, instead of sterile, technique to catheterize themselves. Reinforce the need for good handwashing, cleaning of the catheter, and adequate lubrication of the catheter to reduce the frequency of infection and urethral trauma.



Long-Term Care Variations:

- Follow institutional policy regarding the long-term use and replacement schedule for an indwelling catheter.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The catheter is inserted into the vagina instead of the urethra.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to visually locate the urinary meatus before attempting to insert the catheter. In some women the meatus may be located very near the vagina. If unable to visualize the urinary meatus, gentle upward traction on the perineal floor may expose the meatus.

> NURSING TIPS

- If you miss and insert the catheter in the vagina, leave it there, so you can use it as a landmark to find the meatus on the next try.
- Consider taping connections closed if you are concerned the client might become confused and pull them apart, breaking the sterility of the closed-system drainage.
- If 700 to 800 ml of urine has drained right away, clamp the catheter for 20 minutes. Then unclamp and let urine flow. This helps prevent bladder spasms.
- Make sure a drainage system is in place prior to inserting the catheter to prevent the spill of urine.
- If the client is unable to tolerate lying supine with her legs spread, attempt to visualize the meatus with the client in the side-lying position.
- If you feel resistance, try gently twisting the catheter one-quarter turn.
- Up to twice the recommended volume of fluid may be inserted safely into the retention balloon if needed.
- Be aware that a client with a history of sexual assault or trauma may be anxious or apprehensive about the procedure.
- The lithotomy position can be used for women with a history of knee or hip disease or surgery.

SKILL 6-10

Routine Catheter Care

Joan M. Mack, RN, MSN, CS

KEY TERMS

**Antibacterial
Antiseptic
Catheter**

**Meatus
Perineal area**



> OVERVIEW OF THE SKILL

An indwelling catheter is used to drain urine from the bladder but may provide a route for infection to enter the body. Therefore care must be taken to ensure that the surrounding area is clean to decrease contamina-

tion of the catheter by bacterial flora. It is also important to remember that many clients are embarrassed or frightened by the catheter and related care, so emotional needs should be addressed.

> ASSESSMENT

1. Assess catheter patency and urine color, consistency, and amount while doing the care to determine if catheter and drainage system are functioning correctly.
2. Determine the condition of the urinary meatus and perineal area to monitor for redness, swelling, or drainage, stool, or vaginal discharge, as indicators of infection. External infections may migrate up the catheter and lead to urinary tract infection.
3. Determine the client's emotional reaction and feelings related to the catheter. This may prevent untoward reactions to the care and allow the nurse to help the client deal with some deeper emotional issues.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection, related to invasive device
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity, related to infection and pressure from catheter

- 7.1.1 Risk for Altered Body Image, related to the catheter

> PLANNING

Expected Outcomes:

1. The client will be free of signs and symptoms of urinary tract infection.
2. The client will understand the reason for the catheter and related cares.
3. The meatus and surrounding area will be clean and free of drainage.

Equipment Needed (see Figure 6-10-2):

- Prepackaged kit
- Antiseptic solution
- Sterile swabs
- Clean gloves
- Sterile bowl
- Wash cloth, soap, and water



Figure 6-10-2 Clean gloves, povidone-iodine solution, and cotton balls are used in routine catheter care.



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain that catheter care is done to keep the catheter and the area surrounding it clean.
2. Explain to the client that he should not pull on the catheter.
3. Explain that it is normal to feel the urge to void while a catheter is in place.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Check agency protocol or care plan. | 2. Ensures proper procedure. |
| 3. Identify client and explain procedure. | 3. Prepares client. |
| 4. Provide privacy. | 4. Protects client dignity. |
| 5. Place client in supine position and expose perineal area and catheter. | 5. Allows for visualization of field. If unable to visualize the perineal area with the client supine, try placing the client in a side-lying position. |
| 6. Put on clean gloves. | 6. Reduces transmission of microorganisms. |
| 7. Cleanse perineal area with soap and water (see Figure 6-10-3). | 7. Soap has antibacterial qualities adequate to clean the area and will not usually irritate the skin or mucous membranes. |



Figure 6-10-3 Using a washcloth, cleanse the penis and perineal area with soap and warm water.



Figure 6-10-4 Cleanse the meatus. An antiseptic solution on a cotton ball or cotton swab may be used if there is excessive drainage.

8. Cleanse meatus in circular motion from the most inner surface to the outside. Use soap and water unless there is excessive purulent drainage. Then other antiseptic solutions on cotton balls may be used (see Figure 6-10-4).
9. Cleanse catheter from meatus out to end of catheter, taking care not to pull on catheter (see Figure 6-10-5).



Figure 6-10-5 While cleaning, take care not to pull on the catheter.

8. Moving from the most clean area out decreases risk of recontamination.
9. Moving from most clean area out does not traumatize urethra or bladder.



Figure 6-10-6 Meticulous catheter care is important, especially if the perineal area becomes soiled with stool or other drainage.

10. Be sure to repeat catheter care anytime it becomes soiled with stool or other drainage (see Figure 6-10-6).
11. Place linen or cotton balls in proper receptacle for laundry or disposal.
12. Wash hands.

10. Prevents infection.
11. Reduces transmission of infection to other clients.
12. Reduces transmission of microorganisms.

> EVALUATION

- The client is free of signs and symptoms of urinary tract infection.
- The client understands the reason for the catheter and related care.
- The meatus and surrounding area are clean, intact, and free of drainage.

> DOCUMENTATION

Nurses' Notes

- Document the time the procedure was performed and the condition of the area surrounding the catheter.



▼ REAL WORLD ANECDOTES

Mr. Qadri, a confused, long-term care client, required routine care of his indwelling catheter. Mr. Qadri's catheter care was performed irregularly due to his tendency to behave inappropriately during catheter care. Caregivers complained of being groped and pinched. All of Mr. Qadri's caregivers met to work out a plan that would allow them to provide catheter care without the inappropriate behavior. The suggestions ranged from diverting Mr. Qadri's attention to restraining him during care. The plan of care that finally worked was to have one caregiver firmly hold Mr. Qadri's

continues

▼ REAL WORLD ANECDOTES *continued*

hands while talking to him and distracting his attention, while a second caregiver provided catheter and perineal care. Since it required a second caregiver, Mr. Qadri's catheter care took a bit more staff time but this method resulted in a happier staff and consistent catheter care for Mr. Qadri.

> CRITICAL THINKING SKILL

Introduction

Some clients have contractures, casts, or surgical dressings that may impede catheter care.

Possible Scenario

A handicapped client who has been on long-term bedrest and has developed contractures has an indwelling catheter and needs care. Her legs are contracted together so that she cannot lie supine.

Possible Outcome

Client will not receive adequate care and may develop bacterial or yeast infection in the area surrounding the catheter.

Prevention

Position client on the side and perform care from behind the client with the assistance of two people to help support the client and allow access to the area surrounding the catheter so that proper care can be done.

▼ VARIATIONS



Geriatric Variations:

- *Contractures, arthritis, and other conditions causing stiffness and pain may make it difficult to position the client for the care.*



Pediatric Variations:

- *Use a doll to demonstrate care first. In the child with a history of abuse you may need to involve the child's therapist.*



Home Care Variations:

- *Teach family members to do care.*



Long-Term Care Variations:

- *Clients with long-term indwelling catheters are at high risk of skin breakdown and infection. Catheter care must be performed regularly and thoroughly.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not cleaning from the most clean area out to the most dirty area and contaminating the catheter or the area surrounding it.

Ask Yourself:

How do I prevent this error?

Prevention:

Clean area from the urinary meatus outward to avoid contamination.

> NURSING TIPS

- Remember when doing catheter care not to allow urine to drain back into the bladder.
- If your hospital policy dictates the use of alcohol swabs to clean any part of the catheter system, remember to keep them away from the urinary meatus.

SKILL 6-11

Obtaining a Residual Urine Specimen from an Indwelling Catheter

Joan M. Mack, RN, MSN, CS

KEY TERMS

Bifurcation
Residual urine specimen
Specimen collection port

Specimen container
Urinalysis



> OVERVIEW OF THE SKILL

Indwelling catheters are used frequently in acute-care settings and may provide a route for infection. Specimens may be required to evaluate urine content or renal function. They can also help determine if the catheter needs to be removed or if antibiotic

therapy is indicated. Catheter tubing is generally designed to allow for easy access to obtain specimens without disconnecting the catheter from the tubing, which may increase the risk of contaminating the system.

> ASSESSMENT

1. Identify the purpose of the urine test to determine the amount of urine needed and the proper container to collect it in.
2. Assess the client's ability to understand purpose of the test to determine amount of instruction needed.
3. Identify the type of collecting tubing attached to the indwelling catheter to determine if you will need to disconnect the catheter from the system or can obtain the specimen from a closed system.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection, related to indwelling catheter

> PLANNING

Expected Outcomes:

1. Client understands the reason for the specimen.
2. Specimen is obtained in the proper container in a timely manner.
3. Specimen will remain uncontaminated.

Equipment Needed (see Figure 6-11-2):

- Nonserrated clamp or rubber band
- Nonsterile gloves
- Syringe with needle (1 inch), 10 cc
- Specimen container, plastic bag, and labels
- Povidone-iodine swabs



Figure 6-11-2 Specimen container, syringe, nonsterile gloves, and a rubber band are used to obtain a urine specimen from an indwelling catheter.



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the reason for urine specimen and possible changes in therapy based on results of the test.
2. Explain steps of procedure so client knows what to expect.
3. Explain the reason for the test in terms the client will understand.
4. Make sure the client holds still during specimen collection to prevent contamination of specimen or injury to the client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Check physician's or qualified practitioner's order.
3. Explain procedure to the client and provide privacy.
4. Check for urine in the tubing.
5. If more urine is needed, clamp the tubing using a nonserrated clamp or a rubber band for 10 to 15 minutes (see Figure 6-11-3).



Figure 6-11-3 Clamp the tubing by folding it over and securing it with a rubber band to collect an adequate sample.

RATIONALE

1. Reduces transmission of microorganisms.
2. Determines test and container needed for the specimen.
3. Informs client and maintains client dignity.
4. Determines if there is sufficient urine in the collecting tubing for a specimen. Urine from the collection bag should not be used for sterile specimens.
5. Collects 10 cc of urine, which is needed for most urinalysis.



Figure 6-11-4 Cleanse the sample port and insert a sterile needle and syringe into the sample port.

- | | |
|---|---|
| <p>6. Put on clean gloves.</p> <p>7. Clean sample port with a povidone-iodine swab.</p> <p>8. Insert sterile needle and syringe into the sample port or catheter at a 45° angle and withdraw 10 ml of urine (see Figure 6-11-4).</p> <p>9. Put urine into sterile container and close tightly, taking care not to contaminate the lid of the container.</p> <p>10. Remove clamp and rearrange tubing avoiding dependent loops.</p> <p>11. Label specimen container, put it in a plastic bag, and send to the laboratory.</p> <p>12. Wash hands.</p> | <p>6. Practices universal precautions.</p> <p>7. Prevents entrance of microorganisms into the system.</p> <p>8. Obtains specimen with sufficient volume for most urine tests.</p> <p>9. Prevents contamination of specimen and spill of urine.</p> <p>10. Reestablishes urine flow and drainage into the system.</p> <p>11. Ensures right test and controls transfer of pathogens.</p> <p>12. Reduces transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- Client understands the reason for the specimen.
- Specimen was obtained in the proper container in a timely manner.
- Specimen remained uncontaminated.

> DOCUMENTATION

Nurses' Notes

- Record the date and time the specimen was sent to the laboratory.
- Note the test(s) ordered.

Laboratory Requisition

- Record the date, time, client name and room number.
- Note the test(s) ordered.

Intake and Output Record

- Record the amount of urine collected for the specimen.



▼ REAL WORLD ANECDOTES

During change of shift report, Doris the oncoming nurse, noted that Mr. Clovis' urinalysis laboratory requisition had not been sent. When Doris asked Olga, who was completing her shift, about the urinalysis, Olga realized that she had clamped Mr. Clovis' catheter several hours earlier and then forgotten to return and collect a specimen. When Doris and Olga arrived in Mr. Clovis' room they found him to be quite uncomfortable with a distended bladder. Olga quickly collected the specimen and sent it to the laboratory while Doris unclamped Mr. Clovis' catheter and monitored his condition.

> CRITICAL THINKING SKILL

Introduction

This is generally a simple procedure without difficulty. Clients with low urine volume may present a challenge.

Possible Scenario

You are running late, and you follow the correct procedure for obtaining a specimen. No urine is obtained when withdrawing from the port.

Possible Outcome

The laboratory is unable to perform test and the procedure must be repeated.

Prevention

Make sure client has had adequate fluid intake and is having sufficient urinary flow before clamping the tubing. You may need to leave the tubing clamped for a longer period of time to obtain the specimen, but be sure to check the client every 15 minutes.

▼ VARIATIONS**Geriatric Variations:**

- *The elderly are particularly prone to urinary tract infections and sepsis. Avoid prolonged use of indwelling catheters and keep the system closed.*

**Pediatric Variations:**

- *Enlist the parent's help if needed.*
- *Use pictures or dolls to explain the procedure to the child.*
- *Before the child sees the syringe and needle, reassure the child that he or she won't be poked with the needle. The simple sight of a needle may frighten the child too much to listen to instructions and reassurances.*

**Home Care Variations:**

- *The catheter may be a suprapubic catheter at home. Care will have to be taken not to break the sterility of the system. Take precautions to prevent contamination.*
- *Take extra care to avoid needlestick injuries when working in an unfamiliar home environment, especially when using a needle at a crowded bedside.*

**Long-Term Care Variations:**

- *Catheters can crack and break down over the long term. If drawing samples frequently, vary the sample site to prevent breakdown of the rubber.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

The nurse forgets to check on the client in 15 minutes and leaves the catheter clamped.

Ask Yourself:

How do I prevent this error?

Prevention:

Write a note to yourself, reminding you to check the client in 15 minutes. If the client is alert, ask them to turn on the call light in 15 minutes.

> NURSING TIPS

- Open the urine container before starting to aspirate the urine from the port so that you can inject it into the container without having to cap the needle.
- Make sure not to contaminate the inside of the container lid if you are collecting urine for culture and sensitivity.
- Be sure to have adequate help with the confused or combative client so you are able to obtain the specimen safely.

SKILL 6-12

Irrigating a Urinary Catheter

Marianne Frances Moore, RN, MSN

KEY TERMS

Bladder
Catheter

Foley catheter

Irrigant

Irrigation

Sediment

Solution

Sterile procedures

Toomey syringe

Urinary



> OVERVIEW OF THE SKILL

Open intermittent irrigation of a urinary catheter is generally done for one of two reasons: either to instill medication into the bladder or to irrigate the catheter itself, which may be blocked by either blood clots or urinary sediment. This irrigation is referred to as

“open” because the closed bladder drainage system is opened where the drainage tubing inserts into the urinary catheter; the catheter is generally indwelling. Maintaining sterility of the system is paramount in this type of irrigation.

> ASSESSMENT

1. Identify the following items in the physician’s or qualified practitioner’s orders: type of irrigation (bladder or catheter); purpose of the irrigation; type and amount of solution to irrigate with; any premedication ordered; and any other details of the order. **This allows the nurse to anticipate responses to the procedure and assess pertinent features of the client’s condition.**
2. Assess the condition of the client as it relates to the procedure: patency of the catheter, characteristics of urinary drainage, and total intake and output status of the client. **This establishes a baseline of the client’s condition as it relates to elimination and in the case of prn catheterization, which may indicate whether or not there is a need for the procedure.**
3. Assess for current pain or bladder spasms. **Even when medication is not specifically ordered,**

medicating for pain before the procedure can increase client comfort, and if irrigation does not relieve spasms, the client may need medication afterward.

4. **Assess client’s knowledge about the procedure to determine need for education and reduce anxiety about the procedure.**
5. **If this is a repeat of the procedure, read the charting from previous nurses. This provides the nurse with a history of how this client tolerates the procedure and of any teaching done.**

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.3.2 Altered Urinary Elimination
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit, related to inadequate fluid intake
- 9.1.1 Pain

> PLANNING**Expected Outcomes:**

1. Urinary catheter will be patent.
2. Sediment/blood clots will be passed through the catheter.
3. Bladder will be free of sources of local irritation.
4. Urinary pH will be assisted to a more acidic state.

Equipment Needed (see Figure 6-12-2):

- Sterile gloves
- Sterile cover for the end of the drainage tubing
- Disposable, water-resistant drape or towel
- Sterile asepto or Toomey syringe with container for irrigant
- Sterile antiseptic swabs
- Sterile irrigating solution (labeled with date and time of opening, if opened)



Estimated time to complete the skill:
15–20 minutes



Figure 6-12-2 Irrigation kit

> CLIENT EDUCATION NEEDED:

1. Carefully explain the purpose of the procedure and the steps of the procedure as it has been ordered.
2. Explain to the client that the nurse must be notified of any unusual pain or pressure as the procedure is performed.
3. If pain medications are needed, carefully explain the role of pain medication in easing discomfort with the procedure.
4. Irrigation setups (syringes and containers) can be washed in very hot water or boiled for 20 minutes if sterility is desired to reduce costs for the home care client. If sterile saline is desired for irrigation, use 1 to 1.5 tsp of salt per quart of water; then use the solution to boil the equipment in a closed pan. Open the pan, and *carefully* stand up the irrigant container. Whatever is inside is sterile solution. Then, handling the syringe by the upper end, lift it out and place into the container. Plastic irrigation sets can last 1 to 2 weeks, depending on how often they are boiled, and this reduces costs to the client.
5. Teach clients who perform the irrigation to notify the nurse if there are any changes in the amount or character of returns when irrigating, as it can indicate bladder or systemic changes. Clients should be able to identify the usual color and clarity of the urine and should realize that mucus or sediment can be found in urine.
6. Be sure that caretakers are able to use whatever thermometer at hand to correctly take a temperature, and instruct them to call the home care nurse for oral temperatures over 100.5°F, as infection may be beginning.
7. Clients and caretakers should report any severe lower back pain, as it may indicate a kidney infection.

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Verify the need for bladder or catheter irrigation.
2. For prn catheter irrigation, palpate for full bladder and check current output against previous totals.

RATIONALE

1. Ensures that procedure is being applied correctly, to reduce unnecessary opening of the system and risk of infection.
2. If irrigation is on a prn basis, may not be needed currently.

3. Verify physician's or qualified practitioner's orders for type of irrigation and irrigant as well as amount.
 4. If repeat procedure, read previous documentation in the record.
 5. Assemble all supplies.
 6. Premedicate client if ordered or needed.
 7. Provide teaching to the client as needed, based on what client already knows.
 8. Assist the client to a dorsal recumbent position.
 9. Wash your hands.
 10. Provide for client privacy with a closed door or curtain.
 11. Empty the collection bag of urine.
 12. Expose the retention catheter, and place the water resistant drape underneath it (see Figures 6-12-3 and 6-12-4).
3. Ensures accuracy in the provision of treatment.
 4. Establishes prior client responses to prior teaching done by staff.
 5. Having all supplies in room enables the nurse to maintain sterility of supplies once they are opened and laid out.
 6. Increases comfort for the procedure.
 7. Knowledge will increase patient cooperation and decrease anxiety.
 8. Facilitates the flow of irrigant into the bladder.
 9. Decreases transmission of microorganisms.
 10. Decreases patient anxiety.
 11. Starting with an empty collection bag makes it easier to identify clots or sediment passed as a result of irrigation.
 12. Protects the bedclothes and client from urine and body fluids.



Figure 6-12-3 Expose the retention catheter.



Figure 6-12-4 Place a water-resistant drape under the retention catheter.

13. Open the sterile syringe and container. Stand it up carefully in or on the wrapper and add 100 to 200 cc sterile diluent without touching or contaminating the tip of the syringe or the inside of the receptacle.
 14. Open the end of the antiseptic swab package, exposing the swab sticks.
13. Enables nurse to maintain sterility of gloves once they are applied.
 14. Enables nurse to maintain sterility of gloves once they are applied.

15. Open the sterile cover for drainage tube.
16. Apply the sterile gloves.
17. Disinfect the connection between the catheter and the drainage tubing.
18. After the disinfectant dries, loosen the ends of the connection.
19. Grasp the catheter and tubing 1 to 2 inches from their ends, catheter in the nondominant hand.
20. Fold the catheter to pinch it closed between the palm and last three fingers; use the thumb and first finger to hold the sterile cap for the drainage tube.
21. Separate the catheter and tube, covering the tube tightly with the sterile cap.
22. Fill the syringe with 30 cc for catheter irrigation, 60 cc for bladder irrigation. Insert the tip of the syringe into the catheter and gently instill the solution into the catheter (see Figures 6-12-5 and 6-12-6).



Figure 6-12-5 Separate the catheter and tube.



Figure 6-12-6 Insert the tip of the syringe into the catheter and gently instill the solution.

23. Clamp catheter if ordered (medicated solution). If not clamped, irrigant may be released into a collection container or aspirated back into the syringe (see Figure 6-12-7).
 24. If the bladder or catheter is being irrigated to clear solid material, repeat irrigation until return is clear.
 25. Reconnect system and remove sterile gloves. Wash your hands (see Figure 6-12-8).
15. Enables nurse to maintain sterility of gloves once they are applied.
 16. Maintains sterility of the procedure.
 17. Minimizes risk of contaminating the system.
 18. Enables the nurse to open the connection without accidentally contaminating either end.
 19. Maintains sterility of the procedure and allows the nurse to be positioned to use the dominant hand for the syringe.
 20. Allows for a single nurse to handle all equipment simultaneously, maintaining sterility.
 21. Maintains sterility of equipment.
 22. Catheter can be irrigated with 30 cc of solution, minimizing bladder discomfort, while irrigating a bladder would take 60 cc.
 23. Fine sediment or clear irrigant with medication can run freely; material with more solids (sediment or clots) may need gentle aspiration.
 24. Clearing the catheter completely in this irrigation means a lower total number of irrigations and less opening of the system, decreasing the risk of infection.
 25. Maintains sterility of system and reduces transmission of microorganisms.



Figure 6-12-7 Irrigant is released into a collection container.



Figure 6-12-8 Reconnect the tubing to the catheter.

26. When irrigation is finished, chart type of returns and total amount of irrigation fluid used.

27. Monitor client for pain, urine color and clarity, any solid material passed, and total intake and output.

28. Wash hands.

26. This information can be compared to evaluate status of the urinary tract and catheter. A catheter that is being frequently irrigated for sediment, for instance, may need to be changed, or medications may need to be adjusted.

27. Monitoring output after irrigation evaluates the efficacy of the treatment.

28. Reduces the transmission of microorganisms.

> EVALUATION

- Urinary catheter remains patent.
- Any sediment/blood clots were passed through the catheter.
- Bladder is free of sources of local irritation.
- Urinary pH was assisted to a more acidic state.

> DOCUMENTATION

Nurses' Notes

- Any assessment indicating need for irrigation, such as decreased output, increased sediment, clots, bladder spasms/pain, or palpation of a full bladder
- Type of irrigant and amount in each instillation
- Amount and quality of returns (returns often include urine trapped in the bladder)

- Any medication given before or after the procedure and response to same
- Urine output, color, and clarity and any solids passed 30 to 60 minutes after procedure
- Client response, especially changes in pain, spasms, or discomfort

Medication Administration Record

- Type of irrigant, if medicated, and amount in each instillation
- Any medication given before or after the procedure

Intake and Output Record

- Amount of urine emptied from the drainage bag prior to and following the procedure
- Amount of irrigant instilled



▼ REAL WORLD ANECDOTES

Deciding to use open or closed irrigation for post-TURP (transurethral resection of the prostate) clients is a matter of physician preference. A TURP client whose physician preferred open prn irrigation was cared for on the 7 AM to 3:30 PM shift by an agency nurse unfamiliar with the care of TURP clients using open irrigation. When the 3 PM to 11:30 PM nurse inquired about when this client had last been irrigated, the day nurse said, "Oh, I didn't want to open the system, so the last irrigation was about 10 AM, when the charge nurse did it for me." When the evening nurse went in,

continues

▼ REAL WORLD ANECDOTES *continued*

the bladder was full and the output was scanty. This client needed 45 minutes of irrigation to remove an amount equal to approximately three 60-cc syringes full of blood clots as well as medication for pain. This placed the client at risk for bladder rupture or kidney infection as well as causing the client a great deal of pain.

> CRITICAL THINKING SKILL

Introduction

Never try to force irrigation of any tube.

Possible Scenario

In a long-term care facility, all clients with long-term indwelling catheters had orders for a daily catheter irrigation to prevent catheter blockage. The irrigations were performed on the night shift by the charge nurse. As she was irrigating the client's catheter, she noted resistance. The nurse felt that the client's catheter was probably up against the wall of his bladder and she pressed harder on the irrigation syringe to push the catheter away from the bladder wall. As she did this, the client began to complain of severe abdominal pain. The nurse stopped irrigating the catheter to assess the client's condition. The nurse noted that the catheter was not being held in place by the balloon and seemed to be partially dislodged.

Potential Outcome

The client continued to complain of severe abdominal pain and began to be pale and diaphoretic. His abdomen was swollen and hard. The nurse notified the client's physician regarding his change in condition. The physician ordered the client to be transported to the hospital. After being admitted to the hospital, it was determined that the client's prostate had been traumatized by the force of the nurse's irrigation and he was bleeding internally.

Prevention

Never try to force irrigation of any tube. If the tube does not irrigate smoothly, especially if this is a change from previous experience, stop and assess the situation. If you cannot determine the cause of the difficulty, ask for another opinion. Do not plunge ahead and force the irrigant into the bladder.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients are most likely to have poor oral intakes; assess intake and output (I&O) carefully, especially if the bladder is not palpable, before deciding to irrigate.
- Be very slow and clear about discussing the procedure with older clients to facilitate their understanding of what will be done. Take another nurse if the older client is demented or confused.
- Use smaller volumes to irrigate as bladder capacity and sphincter tone are decreased.



Pediatric Variations:

- Use very small volumes, as children's bladders are smaller than adults.
- Use plain language that young children can understand ("pee," not urinate, for instance). A demonstration doll is useful to explain the procedure to younger children.



Home Care Variations:

- Irrigation setups (syringes and containers) can be washed in very hot water and boiled for 20 minutes if sterility is desired to reduce costs for the home care client.
- The person performing the irrigation must notify the nurse if there are any changes in the amount or character of returns when irrigating, as it can indicate bladder or systemic changes.
- Caretakers must be able to use whatever thermometer at hand to correctly take a temperature and should call the home care nurse for temperatures over 100.5°F, as infection may be beginning.
- Any severe lower back pain should be reported, as it may indicate a kidney infection.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Agitation in the elderly can be associated with bladder pressure, so irrigation may help open the catheter.*
- *Another possible cause of agitation in the elderly can be infection, which may have resulted from poor technique.*
- *Remember to offer fluids that the client likes to facilitate proper intake; do not use irrigation for a substitute for proper hydration.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The tip of the irrigation syringe becomes contaminated.

Ask Yourself:

How do I prevent this error?

Prevention:

Have all equipment at bedside before exposing the tip of the syringe. Drape the area properly. Never leave client unattended with the setup. Ask for the help of another nurse, in the form of an extra pair of hands, if you cannot handle the catheter, tubing, and syringe without contaminating them. If the syringe has not touched the irrigant, you need a sterile syringe. Call the desk to ask someone to bring it to you, so the rest of the setup does not become contaminated. Have them open the package so you can remove it and maintain sterility.

> NURSING TIPS

- If the client has a surgically inserted suprapubic catheter, you may need to use a syringe with a smaller tip to irrigate it. Match the tip of the syringe to the size of the opening of the catheter.
- If a bladder has been surgically repaired, irrigate with 10 cc solution *very gently* to avoid disturbing sutures.
- Tell the client that they may feel pressure when irrigation begins; if the client complains, cease instilling irrigant, as client's bladder may be full.
- Confused or agitated clients may become increasingly agitated as bladder fills; use the behavior as an indicator to stop instilling fluid.

SKILL 6-13

Irrigating the Bladder Using a Closed-System Catheter

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Clarity

Closed system

Color

Drainage

Irrigant

Retention catheter

Three-way catheter

Y adapter



> OVERVIEW OF THE SKILL

Surgical procedures such as prostate resections and bladder surgery or traumatic injury may require frequent or continuous bladder irrigation. To prevent the potential introduction of infectious organisms and as a practical matter, open bladder irrigation is not used in these cases. A closed bladder irrigation system is preferable under these circumstances. Closed bladder irrigation may be used to instill medication, encourage hemostasis, or flush clots and debris out of the catheter and bladder.

A three-way catheter is used for closed bladder irrigation. If the client will require closed irrigation following surgery, the surgeon often places the three-way catheter during the operation. If the decision to perform closed bladder irrigation is made after a

standard retention catheter has been placed, a Y adapter can be used for intermittent irrigation. If continuous irrigation is ordered, a three-way catheter must be placed. A standard catheter has two ports: one for inflation of the retention balloon and one for urine drainage. A three-way catheter has three ports: one for inflation of the retention balloon, one for urine drainage, and one for infusing irrigant.

As with open bladder irrigation, closed bladder irrigation is a sterile procedure. The irrigant, tubing, and drainage systems must be maintained as a closed sterile system to decrease the risk of infection. Because of the risk of blockage due to clots and debris, the system must also be monitored closely for equal amounts of irrigant infused and irrigant returned.

> ASSESSMENT

1. Assess the client for bladder distention or complaints of fullness or discomfort to assess the patency of the drainage system.
2. Assess the drainage system for equal or larger amounts of drainage versus infused irrigant to assess the patency of the system.
3. Assess the color, consistency, and clarity of the bladder drainage as well as noting any clots or debris present to assess the effectiveness of the irrigation.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.3.2 Altered Urinary Elimination

> PLANNING

Expected Outcomes:


1. The client will not exhibit signs or symptoms of bladder or urinary tract infection.

2. The client will not experience pain or discomfort as a result of the bladder irrigation.
3. The catheter will remain patent, and the client's bladder will not be distended.

Equipment Needed (see Figure 6-13-2):

- Three-way indwelling catheter or Y adapter
- IV pole
- Ordered irrigating solution
- Sterile gloves
- Closed-irrigation tubing
- Large urine drainage bag
- Antiseptic swabs

- procedure due to the area being irrigated, and an explanation can help ease embarrassment.
2. Teach the client the signs and symptoms of bladder distention. Have him notify a nurse if he notes any of these signs and symptoms.
 3. Explain to the client the reason for the bladder irrigation and the need to assess for bladder distention or bleeding around the meatus.



Estimated time to complete the skill:
10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the procedure to the client and the reason it is being performed. This can be an embarrassing



Figure 6-13-2 IV pole, irrigating solution, and irrigation tubing are used to irrigate the bladder using a closed-system catheter.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Intermittent Bladder Irrigation Using a Standard Retention Catheter and a Y Adapter

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Close privacy curtain or door. 3. Hang the prescribed irrigation solution from an IV pole. 4. Insert the clamped irrigation tubing into the bottle of irrigant and prime the tubing with fluid, expelling all air and reclamping the tube. 5. Prepare sterile antiseptic swabs and sterile Y connector if one will be used. 6. Apply sterile gloves. | <ol style="list-style-type: none"> 1. Prevents the spread of microorganisms. 2. Provides privacy. 3. Different solutions may be ordered depending on the results the physician or qualified practitioner desires. Bladder irrigant is generally packaged in 2,000- to 4,000-ml bottles. 4. Prevents introduction of air into the bladder. 5. Prevents contamination of sterile gloves and field. 6. Minimizes the client's risk of infection when connecting the irrigant to the catheter and drainage system. |
|---|--|

continues

Intermittent Bladder Irrigation Using a Standard Retention Catheter and a Y Adapter *continued*

7. Clamp the urinary catheter.
8. Unhook the drainage bag from the retention catheter.
9. While holding the drainage tubing and the drainage port of the catheter in your nondominant hand, cleanse both the tubing and the port with antiseptic swabs.
10. Connect one port of the Y connector to the drainage port of the retention catheter.
11. Connect another port of the Y adapter to the drainage tubing and bag.
12. Attach the third port of the Y adapter to the irrigant tubing.
13. Unclamp the urinary catheter and establish that urine is draining through the catheter into the drainage bag.
14. To irrigate the catheter and bladder, clamp the drainage tubing distal to the Y adapter.
15. Infuse the prescribed amount of irrigant.
16. Clamp the irrigant tubing (see Figure 6-13-3).
17. If the physician or qualified practitioner has ordered the irrigant to remain in the bladder for a measured length of time, wait the prescribed length of time.
18. Unclamp the drainage tubing and monitor the drainage as it flows into the drainage bag.
7. Prevents urine leakage onto the bed linens.
8. Allows the Y adapter to be inserted into the system.
9. Prevents contamination and infection.
10. Provides a bifurcation for irrigant to infuse as well as urine to drain.
11. Collects the urine and drained irrigant. This may be the established urine drainage bag or a new, sterile bag that is large enough to hold the increased volume of drainage.
12. Infuses the irrigant into the closed system.
13. If the urine does not flow freely after unclamping, the catheter may have become clogged with a clot or debris. Notify the client's physician or qualified practitioner of the lack of urine drainage.
14. Prevents the irrigant from bypassing the bladder and flowing directly into the drainage bag.
15. The bladder normally feels full when it contains approximately 300 cc of urine. If a prescribed amount of irrigant was not ordered, do not infuse more than 150 cc of irrigant. If the client has undergone bladder surgery, do not infuse irrigant without knowing the specific amount ordered.
16. Prevents further infusion of irrigant.
17. Some irrigation solutions contain medication and are meant to remain in contact with the bladder wall for a prescribed length of time.
18. Assess the drainage for volume, color, clarity, and the presence of any clots or debris.



Figure 6-13-3 Clamp the irrigant tubing.



Figure 6-13-4 Insert the clamped irrigation tubing into the bottle of irrigant.

Closed Bladder Irrigation Using a Three-Way Catheter

19. Wash hands.
20. Close privacy curtain or door.
21. Explain the procedure to the client. Answer questions and provide support.
22. Hang the prescribed irrigation solution from an IV pole.
23. Insert the clamped irrigation tubing into the bottle of irrigant and prime the tubing with fluid, expelling all air and reclamping the tube (see Figure 6-13-4).
24. Prepare sterile antiseptic swabs and any other sterile equipment needed.
25. Apply sterile gloves (see Figure 6-13-5).
19. Reduces the transmission of microorganisms.
20. Provides privacy.
21. Reduces anxiety and uncertainty associated with the procedure.
22. Different solutions may be ordered depending on the results desired. Bladder irrigant is generally packaged in 2,000- to 4,000-ml bottles.
23. Prevents introduction of air into the bladder.
24. Prevents contamination of sterile gloves and field.
25. Minimizes the client's risk of infection when connecting the irrigant to the catheter and drainage system.

Figure 6-13-5 Apply sterile gloves.



continues

Closed Bladder Irrigation Using a Three-Way Catheter *continued*

- 26. Clamp the urinary catheter.
- 27. Remove the cap from the irrigation port of the three-way catheter (see Figure 6-13-6).



Figure 6-13-6 Remove the cap from the irrigation port of the three-way catheter.

- 28. Cleanse the irrigation port with the sterile anti-septic swabs.
- 29. Attach the irrigation tubing to the irrigation port of the three-way catheter.
- 30. Remove the clamp from the catheter and observe for urine drainage (see Figure 6-13-7).

If intermittent irrigation has been ordered:

- 31. Infuse the prescribed amount of irrigant.
- 32. Clamp the irrigant tubing.
- 33. If the physician or qualified practitioner has ordered the irrigant to remain in the bladder for a measured length of time, clamp the drainage tube prior to infusing the irrigant and wait the prescribed length of time.
- 34. Monitor the drainage as it flows into the drainage bag.

- 26. Prevents leakage of urine onto the bedclothes.
- 27. Allows access for the irrigant tubing.



Figure 6-13-7 Attach the irrigation tubing, remove the clamp from the catheter, and observe for urine drainage. Carefully observe the drainage for color, clarity, and the presence of debris.

- 28. Minimizes the risk of infection.
- 29. Introduces the irrigant into the system.
- 30. Ensures catheter remains patent after being clamped. Some surgical procedures can cause bleeding and clotting of the catheter.
- 31. The bladder normally feels full when it contains approximately 300 cc of urine. If a prescribed amount of irrigant was not ordered, do not infuse more than 150 cc of irrigant. If the client has undergone bladder surgery, do not infuse irrigant without knowing the specific amount ordered.
- 32. Prevents further infusion of irrigant.
- 33. Some irrigation solutions contain medication and are meant to remain in contact with the bladder wall for a prescribed length of time.
- 34. Assesses the drainage for volume, color, clarity, and the presence of any clots or debris.

If continuous bladder irrigation has been ordered:

- | | |
|--|---|
| <p>35. Adjust the clamp on the irrigation tubing to allow the prescribed rate of irrigant to flow into the catheter and bladder.</p> <p>36. Monitor the drainage for color, clarity, debris, and volume as it flows back into the drainage bag.</p> <p>37. Tape the catheter securely to the thigh (see Figure 6-13-8).</p> | <p>35. Regulates the amount of irrigant flowing in and out of the bladder to prevent distention or damage to any surgical site.</p> <p>36. Assesses for bleeding, clotting, and blockage of urine drainage or other complications.</p> <p>37. Prevents the catheter from becoming dislodged.</p> |
|--|---|



Figure 6-13-8 Securely tape the catheter to the thigh to prevent it from becoming dislodged.

38. Wash hands.

38. Reduces the transmission of microorganisms.

> EVALUATION

- The client does not exhibit signs or symptoms of bladder or urinary tract infection.
- The client has not experienced pain or discomfort as a result of the bladder irrigation.
- The catheter remains patent, and the client's bladder is not distended.

> DOCUMENTATION

Intake and Output Record

- Amount of irrigant infused and amount of drainage measured. Subtracting the used irrigant from the drainage total will leave the amount of the client's urine output.

Nurses' Notes

- Describe client's tolerance for the procedure.
- Note the color, clarity, volume, and debris in the drainage.



▼ REAL WORLD ANECDOTES

Mr. Elizondo was one day postoperative. His physician had ordered constant closed bladder irrigation. Mr. Elizondo's nurse checked his irrigant periodically throughout her shift and noted that it was infusing well. She did not, however, note that the urine drainage bag was becoming quite full. About 5 hours into the shift, Mr. Elizondo turned on his call light and started to call out for help. When help arrived, Mr. Elizondo was very agitated. He reported hearing an explosion and was concerned that something inside him had ruptured. While one nurse took Mr. Elizondo's vital signs and calmed and assessed him, a second nurse noted that the floor was wet. Upon closer investigation she discovered that Mr. Elizondo's urine drainage bag had overfilled to the breaking point, causing the loud explosive sound that he had heard.

> CRITICAL THINKING SKILL

Introduction

Standard descriptions are needed for continuity of care.

Possible Scenario

You are starting your shift and have been assigned to care for Mr. Turner, who had a transurethral prostatectomy the day before. During report you were told that Mr. Turner's urine/irrigant output was dark tea colored with small clots. When you are making rounds after report, you note that Mr. Turner's urine/irrigant output looks more burgundy colored than tea.

Possible Outcome

You assume that the color difference is simply a difference in reporting, noting that the urine could possibly be described as dark tea colored. You check the continuous irrigation setup and assess Mr. Turner's vital signs. Four hours into your shift, when you return to reassess Mr. Turner's vital signs, his urine/irrigant is frankly

bloody and Mr. Turner is pale and clammy. You notify Mr. Turner's surgeon, who urgently returns Mr. Turner to surgery. Due to a large blood loss, Mr. Turner requires transfusions and spends 2 days in surgical intensive care.

Prevention

You wonder if this is the color that the previous nurse reported as dark tea. Since it seems darker than the report you received, you decide to monitor Mr. Turner more closely for a while. You return in 1 hour to check Mr. Turner's bladder irrigation and note that it continues to be burgundy and seems to actually be darker than earlier. You assess Mr. Turner's vital signs and update his physician regarding Mr. Turner's progress. The physician orders an increase in the rate of continuous irrigation and vital signs every 2 hours for the next 8 hours. Within 2 hours Mr. Turner's output has lightened considerably and he no longer seems to be bleeding.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have a larger amount of debris in their urine. Their urine/irrigant output must be monitored closely for potential blockages or retention.*



Pediatric Variations:

- *Children have much smaller bladders and require smaller amounts of irrigant.*
- *Children have smaller bladders and a catheter is more prone to plug with mucus or clots. The patency of the catheter and the first signs of bladder distention must be carefully watched for.*
- *Children may be very embarrassed regarding bladder irrigation and monitoring for clots or distention. Be sure to provide privacy and explanations to allay their fears and embarrassment.*



Home Care Variations:

- *Closed bladder irrigation is not commonly used in the home care setting.*



Long-Term Care Variations:

- *Closed bladder irrigation is not commonly used in the long-term care setting.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Slowing the irrigation rate if a new bottle of irrigant is not readily available.

Ask Yourself:

How do I prevent this error?

Prevention:

Continuous irrigation is often ordered to flush clots and debris out of the bladder and the catheter. Slowing the irrigation rate could allow clots and debris to build in the bladder or plug the catheter leading to bladder distention. Be sure to have the supplies needed before the critical moment when they are needed.

> NURSING TIPS

- Do not slow a continuous irrigation without specific orders from the client's physician or qualified practitioner, obvious signs of bladder distention, or a plugged catheter.
- Be sure to track the amount of irrigant infused and the amount of drainage. The drainage must always equal or exceed the amount infused.
- Be sure to note the amount of irrigant infused in the intake and output record so the amount infused can be subtracted from the output to determine the urine output. Negative amounts must be reported.
- Confused clients may interpret the feeling of bladder irrigation as the need to urinate. Attempt to re-orient the client regarding the presence of the catheter and not to try to pull it out. It may be necessary to restrain the client's hands while the catheter is in place.
- Try to maintain as much privacy as possible for the client. This procedure can be embarrassing for the client.
- Be sure the irrigant is at least room temperature to avoid bladder spasms. Body temperature is preferable.
- The solution can be soaked in a water bath prior to use. Sterility must be maintained at all times.

SKILL 6-14

Removing an Indwelling Catheter

Joan M. Mack, RN, MSN, CS

KEY TERMS

Balloon port
Dysuria
Incontinence
Indwelling or retention catheter

Kegel exercises
Urgency



> OVERVIEW OF THE SKILL

Indwelling catheters may be placed for surgery for a few days postoperatively or for months if the client has long-term incontinence. Even if the catheter is considered permanent, it is changed every 1 to 2

months depending on the agency's policy. Therefore, the nurse may be removing the catheter in a variety of situations, e.g., postanesthesia recovery, acute care, or long-term care.

> ASSESSMENT

1. Determine previous history of incontinence, infection, urinary patterns, fluid intake, and rationale for current treatment to prepare for potential problems after the catheter is removed and to understand reasons for procedure.
2. Assess client for temperature, current condition of urinary meatus and perineal area, and urine color, consistency, and clarity to determine skin condition and assess for potential urinary tract infection, dehydration, or breakdown.
3. Assess client for understanding of the procedure and ability to cooperate with positioning to encourage client to participate in care to the best of their abilities.
4. Assess room setup to determine ability of client to get to the bathroom and/or need for bedside commode or urinal to facilitate client's easy return to normal voiding patterns if catheter will remain out.

DIAGNOSIS

- 1.2.1.1 Risk for Infection, related to indwelling catheter
- 1.3.2.1.3 Urge Incontinence
- 1.3.2.1.1 Stress Incontinence
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Catheter will be removed intact.
2. Client will void within 8 hours of removal without burning, urgency, or incontinence.
3. Client will not develop any bleeding, pain, or other complications related to removal.
4. Client will verbalize understanding of the procedure and the need to notify staff when they void or if they have any difficulty with voiding.

Equipment Needed (see Figure 6-14-2):

- Syringe without needle or Luer-Lok, 10 cc
- Nonsterile gloves
- Protective pad
- Soap, towel, and washcloth
- Container for waste disposal
- Urinal or bedpan in room if client is nonambulatory
- Sterile specimen cup and sterile scissors for catheter tip culture if needed



Estimated time to complete the skill:
6–10 minutes

> CLIENT EDUCATION NEEDED:

1. Provide rationale for changing or removing catheter.
2. Instruct the client to notify the nurse when he or she first voids after the catheter is removed.
3. Instruct to inform health care team if any difficulty voiding or incontinence.

4. Teach the client the symptoms of bladder infection and bladder irritation. Instruct to inform the nurse if experiencing any pain or symptoms after the catheter is removed.
5. Instruct to perform Kegel exercises (contract and tighten perineal muscles for a count of five; relax muscles as if trying to void between each contraction) 10 to 20 times qid and increase duration for a longer count.



Figure 6-14-2 A syringe and a protective pad are used in removing an indwelling catheter.

IMPLEMENTATION—ACTION/RATIONALE

ACTION	RATIONALE
1. Wash hands.	1. Decreases the transmission of microorganisms.
2. Check physician's or qualified practitioner's order and unit protocol.	2. Ensures correct client and treatment.
3. Identify client and explain procedure.	3. Elicits client cooperation.
4. Provide privacy and position client on back.	4. Providing privacy demonstrates respect for client dignity.
5. Remove covers and drape so as to expose catheter but do not overly expose perineal area.	5. Protects client privacy and reduces embarrassment.
6. Put on nonsterile gloves.	6. Practices universal precautions.
7. Place protective pad under client's thighs (see Figure 6-14-4).	7. Prevents bed from becoming soiled.
8. Empty urine in tubing into catheter bag.	8. Prevents leakage from catheter onto client when the catheter is removed.

continues



Figure 6-14-3 Remove the tape holding the catheter to the thigh.



Figure 6-14-4 Place a protective pad under the client's thigh and perineal area.

9. Remove any tape that may be holding the catheter to the leg (see Figure 6-14-3).
10. Insert syringe end into balloon port and remove all of the air or fluid from the balloon, generally 5 to 10 cc. Do not cut the port. On some systems, the port should flatten out as all contents are evacuated (see Figure 6-14-5).



Figure 6-14-5 Insert the syringe into the balloon port and remove all the air or fluid from the retention balloon.



Figure 6-14-6 Gently remove the catheter.

11. Ask the client to take a deep breath if able and gently and smoothly remove the catheter on expiration. Stop if you meet resistance and recheck the balloon port (see Figure 6-14-6).
 12. Note any sediment, mucus, or blood that may be on the catheter. If needed, culture tip of catheter by cutting it off with a sterile scissors and placing in appropriate container.
 13. Cleanse the client's perineal area or provide a warm, moist cloth with instructions for self-cleaning. Remove materials (see Figure 6-14-7). Remove gloves and wash hands. Cover client and put in position of comfort (unless you will be replacing the catheter).
 14. Instruct the client to drink oral fluids as tolerated and to call when they need to void. Record time and amount of first voiding. If needed, offer bedpan/urinal q 2–4 h until client is able to void.
9. Allows for easy removal of catheter.
 10. Keeping port intact ensures the ability to drain the contents of the balloon. Cutting the port does not always drain the balloon, and once the port is cut, there is no other way to drain the balloon contents.
 11. Damage to the urethra may occur if the balloon is not fully deflated.
 12. Assesses for any indications of infection or trauma related to the catheter.
 13. Provides for privacy and comfort. Reduces transmission of microorganisms.
 14. It is important to determine that client has returned to usual voiding pattern or other interventions will need to be implemented.



Figure 6-14-7 Remove used materials and make the client comfortable.

15. If the client is unable to void within 8 hours, report to the physician or qualified practitioner.

15. Allows assessment and intervention to determine the cause of the client's inability to void after the catheter is removed.

> EVALUATION

- Catheter was removed intact.
- Client voided within 8 hours of removal without burning, urgency, or incontinence.
- Client did not develop any bleeding, pain, or other complications related to removal.
- Client verbalized understanding of the procedure and the need to notify staff when they void or if they have any difficulty with voiding.

> DOCUMENTATION

Patient Flow Sheet or Progress Notes

- Record the time the catheter was removed and the condition of the catheter and client.
- Note the time and amount of first voiding, if applicable.

Intake and Output Record

- Record the amount of urine in the collection bag.



▼ REAL WORLD ANECDOTES

A nurse is removing an indwelling catheter. She deflates the balloon and removes 10 cc of fluid from the balloon, since she habitually inflates the retention balloon with 10 cc of fluid when inserting retention catheters on her clients. She encounters resistance, and the client cries out in pain. She then reinserts the syringe and draws out another 7 cc of fluid from the retention balloon. The nurse who inserted the catheter added the extra fluid because this client had a history of retention catheters pulling out. The nurse who inserted the catheter had documented the amount of fluid used to inflate the balloon, but the nurse removing the catheter had failed to check the nursing notes.

> CRITICAL THINKING SKILL

Introduction

Physicians may write to have a catheter discontinued but may not be aware of all the other orders the client has. Being aware of the interactions of different orders may help a client.

Possible Scenario

A postoperative cardiac surgical client had an order to have their indwelling catheter removed and also an order for Lasix (furosemide) 80 mg IV.

Possible Outcome

The client would need to get up frequently as a result of the diuretic effects of the Lasix, causing fatigue and possible undue strain on their heart.

Prevention

The nurse prevented this by looking at all the client's orders and determining priorities. She then discussed her concerns with the client's physician, who

agreed that the catheter could be discontinued after the effects of the Lasix had worn off. The nurse discussed it with the client, explaining the reason for

waiting to discontinue the catheter. The client was reassured and saved the stress of frequent trips to the bathroom.

▼ VARIATIONS



Geriatric Variations:

- An elderly client may need incontinence pads after catheter removal.
- The client may need to perform Kegel exercises to regain urinary continence.
- The client may need more skin care to maintain perineal and perianal areas and skin free of irritation and breakdown.



Pediatric Variations:

- The child may be very frightened. Demonstration on a doll along with much reassurance and step-by-step instructions will help to allay some of their fears. Focus on the positive effects of removal. Two people may be needed to complete the task.



Home Care Variations:

- Indwelling catheters are a last resort for incontinence at home.
- A nurse may be removing the catheter in the home setting to change it.
- Make sure to take all the equipment needed to remove the catheter in the home setting.
- Make sure to educate the home caregiver to report if the client has not voided within 8 hours of catheter removal.
- Discuss how to continue to measure intake and output using a urinal, bedpan, or toilet hat if intake and output are to be measured.



Long-Term Care Variations:

- The nurse will probably be replacing the catheter if it is being used for incontinence.
- Long-term care facilities are using straight catheters more frequently since indwelling catheters provide such a good route for infections and urosepsis.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not removing all the air or water in the balloon.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to remove the catheter slowly and note any resistance. If resistance is felt, check to make sure the balloon is completely deflated. If resistance is still felt, do not force or pull on the catheter. Stop the procedure and report findings to the physician or qualified practitioner.

> NURSING TIPS

- Remember to measure output in the drainage bag prior to disposing of the bag.

SKILL 6-15

Catheterizing a Noncontinent Urinary Diversion

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Clean catch urine
Colon conduit
Ileal conduit
Noncontinent urinary diversion

Urinary diversion
Urine sample
Stoma catheterization
Urostomy



> OVERVIEW OF THE SKILL

Catheterizing a noncontinent urinary diversion is done in order to obtain a sterile urine sample for culture and sensitivity. Clients with urinary diversions

are at increased risk of urinary infections. Collecting a specimen without further introducing bacteria into the system is essential to the client's well-being.

> ASSESSMENT

1. Inspect the stoma for color and texture. Allows the nurse to determine the viability and turgor of the stoma.
2. Observe the color and odor of the urine. Clues the nurse of the possibility of a urinary tract infection being present.

> DIAGNOSIS

- 7.1.1 Body Image Disturbance
1.3.2 Altered Urinary Elimination
1.6.2.1.2.2 Risk for Impaired Skin Integrity, secondary to potential trauma caused by the procedure

> PLANNING

Expected Outcomes:

1. Client will express positive feelings about self.
2. Client will voice understanding of the procedure.

3. The stoma and peristomal skin will not be traumatized by the procedure.
4. The client will not suffer infection secondary to this procedure.

Equipment Needed:

- Clean and sterile gloves
- Gauze 4 × 4 pads
- Povidone-iodine solution
- Sterile straight catheter (size is dependent on stoma orifice; 14 French is usually used) (see Figure 6-15-2)
- Sterile container (see Figure 6-15-3)
- Straight catheter specimen kit (if available, replaces gloves, gauze, povidone-iodine, and catheter above)
- Appropriate urinary ostomy equipment



Estimated time to complete the skill:
15–20 minutes



Figure 6-15-2 Straight catheters



Figure 6-15-3 Sterile specimen container and gloves

> CLIENT EDUCATION NEEDED:

1. Explain rationale for obtaining a sterile urine specimen.
2. Explain need to replace current ostomy appliance with a clean system if only obtaining a clean specimen.
3. Instruct client on how to prevent occurrences of urinary tract infection by increasing fluid intake to at least eight 8-oz glasses of fluid (64 oz) per day.
4. Instruct client on the signs and symptoms of a urinary tract infection. Instruct client to inform nurse and/or physician or qualified practitioner whenever there are signs and symptoms of a possible urinary tract infection.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces transmission of microorganisms. |
| 2. Assemble equipment (straight catheter, sterile container, gauze, and povidone-iodine OR straight catheter specimen kit). | 2. Assures that all equipment is ready to use. |
| 3. Apply clean gloves. | 3. Practices clean technique. |
| 4. Remove current ostomy appliance (see Figure 6-15-4). | 4. This system cannot be used to collect a clean urine sample since it is already contaminated with microorganisms. |
| 5. Dispose of appliance in appropriate waste container. | 5. Practices infection control policies. |
| 6. Wash hands. | 6. Practices aseptic technique. |
| 7. Open all sterile equipment. | 7. Assures that all equipment is ready to use. |
| 8. Squeeze a moderate amount of water-soluble jelly onto sterile field of one of the opened packages. | 8. Water-soluble jelly will be used on tip of catheter to facilitate insertion into stoma. |
| 9. Apply sterile gloves. | 9. Practices aseptic technique. |



Figure 6-15-4 Remove the ostomy appliance.



Figure 6-15-5 Gently insert the straight catheter into the stoma.

10. Lubricate one gloved finger and insert into orifice of stoma.
 11. Cleanse stoma with povidone-iodine on gauze or cotton ball. Pat dry.
 12. Wipe excess povidone-iodine off of stoma.
 13. Holding catheter, lubricate tip with water-soluble jelly.
 14. Gently insert catheter into orifice of stoma (see Figure 6-15-5).
 15. Place other end of catheter into sterile container, if not using a closed specimen system, to collect urine.
 16. If urine does not readily drain from catheter, apply slight suction to end of catheter using a syringe (see Figure 6-15-6).
10. Determining direction of stoma prior to catheterization prevents trauma to mucosa and conduit.
 11. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable.
 12. Prevents destruction of any microorganisms in urine sample.
 13. Facilitates insertion of catheter into stoma.
 14. Prevents trauma to the mucosa and conduit.
 15. Collects urine sample.
 16. Facilitates obtaining a urine sample.

Figure 6-15-6 If urine does not drain freely, apply mild suction.



17. After collecting an adequate sample, remove catheter and dispose in an appropriate waste container.
17. Practices infection control policies.

18. Remove gloves. Label container and send to laboratory.

19. Apply clean gloves. Cleanse stoma and skin with warm tap water. Pat dry (see Figure 6-15-7).



Figure 6-15-7 Cleanse the area with warm tap water and dry carefully.

20. If replacing the entire appliance, measure stoma using a measuring guide for appropriate length and width of stoma at base (where skin meets stoma). (See Figure 6-15-8.)

21. Place wick of gauze or slender tampon into orifice of stoma to wick urine while you are preparing the wafer and pouch for application.

22. Trace pattern onto paper backing of wafer.

23. Cut wafer as traced.

24. Attach clean pouch to wafer. Make sure port is closed.

25. Remove wick from orifice of stoma.

26. Remove paper backing from wafer and place on skin with stoma centered in cutout opening of wafer.

27. Remove gloves. Wash hands.

18. Appropriate labeling of specimen ensures that client is treated correctly following results of laboratory test.

19. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable.



Figure 6-15-8 Measuring the stoma

20. Correct measurement of the stoma's dimensions ensures a good fit of the ostomy appliance without excess skin at the base of the stoma exposed to urine.

21. Using something to wick urine away from the skin ensures a good seal of the wafer to the client's skin.

22. It is important to trace the measurements of the stoma and not "eye ball" the stoma measurements. Inaccurate pattern size results in either laceration of the stoma by the wafer or maceration of peristomal skin from constant contact with urine.

23. Accurately cutting the traced pattern ensures a snug fit.

24. Preattaching the pouch to the wafer saves time and prevents urine from leaking underneath the wafer during the application process.

25. Since the wick has absorbed urine, allowing it to fall into the pouch contaminates the clean catch being obtained.

26. Paper backing needs to be removed from wafer in order for wafer to become adherent to skin.

27. Reduces transmission of microorganisms.

> EVALUATION

- Client expressed positive feelings about self and the procedure.
- Client voiced understanding of procedure.
- The stoma and peristomal skin were not traumatized by the procedure.
- The client did not suffer infection secondary to this procedure.

> DOCUMENTATION

Nurses' Notes

- Time and date of urine specimen collection
- Size and type of catheter used

- Condition of stoma and peristomal skin before and after specimen collection
- Amount, color, and odor of urine collected
- How client tolerated procedure

Intake and Output Record

- If the client is on intake and output measurements, note the amount of urine collected in the output record.

Stoma Care Checklist

- If there is a stoma care checklist, note if the pouch was changed, the condition of the peristomal skin, and the condition of the stoma.



▼ REAL WORLD ANECDOTES

A female with a primary history of myelomeningocele comes to clinic complaining of her urine being thick and foul smelling. She has had an ileal conduit for the past 20 years secondary to neurogenic bladder. The client is known to have a history of noncompliance in regard to maintaining adequate fluid intake to prevent possible urinary tract infection. While catheterizing the stoma, the nurse notes that the client is crying and refuses to watch the procedure. When questioned by the nurse, the young woman explains, “I’m just so tired of dealing with all of this. I hate to even drink a glass of water because it just pours out the other end.” The nurse determines that the client has not been taking in an adequate amount of fluids for some time secondary to not wanting to care for her stoma. The urine sample shows a urinary tract infection. The young woman is treated for the infection and counseled regarding the care of her stoma and acceptance of the continued need for it.

> CRITICAL THINKING SKILL

Introduction

A client with a urinary diversion is experiencing signs and symptoms of possible urinary tract infection.

Possible Scenario

A 63-year-old white male, status post–ileal conduit for bladder cancer, is seen in clinic by the ostomy nurse specialist (ET nurse) for complaints of foul odor from urine and increased amount of mucus in urine. Assessments of stoma and peristomal skin are not remarkable. Urine is dark yellow with thick mucous threads and a very strong odor. Client responds to questions on self-care by stating, “I don’t have the time during the day to empty my pouch of urine, so I limit how much I drink.” Further questioning reveals that the client is only drinking approximately 32 oz of fluid every 24 hours for the past week. The ET nurse obtains

two urine samples. One is a clean catch and the other is a sterile sample.

Possible Outcome

If the nurse is not astute enough to pick up the correlation between increased color tone of urine, mucous threads, and a very strong odor, the client is at potential risk for a silent infection and possible extension of infection to the kidneys.

Prevention

The nurse should immediately notify the physician regarding the change in the client’s status. The second nursing action is to obtain a urine sample. This action allows the physician to appropriately treat the client’s urinary tract infection. The nurse also needs to provide client education on the importance of preventing future episodes of urinary tract infection, which is a normal complication in urinary diversion surgeries.

▼ VARIATIONS



Geriatric Variations:

- Be especially alert for signs of infection in older or debilitated clients who may not be able to easily maintain adequate fluid intake.



Pediatric Variations:

- The nurse will need to use a smaller sized catheter to obtain a specimen in a child. The size of the catheter is dependent on the size of the orifice at the fascia level.
- Explain to the child, if appropriate, what you will be doing and why. Describe any sensations the child might experience, and reassure the child that the procedure will not hurt.
- Obtain assistance of a parent to distract and, if necessary, briefly restrain the child to avoid contaminating the sterile catheter.



Home Care Variations:

- When obtaining a sterile specimen using a catheter in the home care setting, make sure to plan in advance and bring along the necessary equipment. This may include a small portable table to lay out supplies, extra catheters in case of contamination, and wafers and pouches to reapply after the procedure.
- Explain to the client the difference between a clean catch and a sterile specimen so they understand why the extra “hassle” is necessary in the home setting.



Long-Term Care Variations:

- Be especially alert for signs of infection in older or debilitated clients who may not be able to easily maintain adequate fluid intake.
- Staff in long-term care settings may not have much experience working with clients who have noncontinent urinary diversions. Make sure a resource person is available on the phone and in person, if needed, to provide staff education and answer questions. Informed care will help reduce the risk of infection for the client and allow the staff to feel more comfortable performing unfamiliar procedures on the client.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Urine is not easily obtained using the catheter method.

Ask Yourself:

How do I prevent this error?

Prevention:

Slowly rotate catheter in conduit and apply suction using a syringe. Use of suction with syringe will facilitate obtaining a sample. Also, encourage client to hydrate self prior to obtaining a urine sample. A dehydrated client will not produce adequate amounts of urine to sample for cultures.

> NURSING TIPS

- Recognize that all urinary stomas are not the same. Each stoma needs to be assessed for the appropriate catheter size to be used for obtaining a sterile urine sample.
- Client teaching is easily incorporated into the procedure of obtaining a urine sample by encouraging the client to express their knowledge on urinary tract infections.
- Use of a clean, new urinary pouching system is the simplest way to obtain a urine sample and is accurate since the bowel used for urinary diversions is already contaminated with microorganisms.
- Costs to the client and the health care institution are reduced when using a clean, new urinary pouching system to obtain a clean urine sample for culture.

SKILL 6-16

Maintaining a Continent Urinary Diversion

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Continent urinary diversion
Cystectomy

Indiana Pouch
Neobladder
Orthotopic bladder



> OVERVIEW OF THE SKILL

A continent urinary diversion is cared for initially by irrigating the various tubes and stents to maintain patency. The client does not begin to learn catheterization of the “new bladder” until 3 weeks after surgery. A client with an orthotopic bladder will learn inter-

mittent catheterization as a safety measure in case of mucous plug obstruction. All clients will learn how to perform irrigation of tubes prior to discharge home from the hospital.

> ASSESSMENT

1. Inspect the stoma for color and texture, if present. Allows the nurse to determine the viability and turgor of the stoma.
2. Inspect the condition of the skin surrounding the stoma, if present. Alterations in skin integrity will prohibit a closed drainage system from adhering to the skin.
3. Inspect all tubes and drains (immediate postoperative period). Allows the nurse to ascertain that all tubes and drains are functioning appropriately.

> DIAGNOSIS

- 1.3.2 Altered Urinary Elimination
- 1.6.2.1.2.1 Impaired Skin Integrity
- 7.1.1 Body Image Disturbance

8.1.1 Knowledge Deficit, regarding the continent urinary diversion and its care

1.4.1.2.2.2 Risk for Fluid Volume Deficit

> PLANNING

Expected Outcomes:

1. Peristomal skin integrity will remain intact if stoma is present.
2. Irritated or denuded peristomal skin integrity will heal if stoma is present.
3. Client will acknowledge the change in body image and express positive feelings about self.
4. Client will maintain fluid balance.
5. Client will express understanding regarding the need for a urinary diversion and how to maintain it.

- Instruct client to report changes in urine flow or difficulty catheterizing and/or flushing neobladder to wound/ostomy care nurse (ET nurse).

Equipment Needed (see Figure 6-16-2):

Irrigation of Tubes/Drains

- Normal saline
- Red rubber catheter, 16 French (Do not use rubber catheter if client is allergic or sensitive to latex.)
- Water-soluble lubricant
- Piston syringe
- Bowl
- Emesis basin

Catheterization of Continent Urinary Diversion

- Red rubber catheter, 16 French (Do not use rubber catheter if client is allergic or sensitive to latex.)
- Water-soluble jelly
- Gauze pad (2 × 2) or Band-Aid



Estimated time to complete the skill:
10–15 minutes

> CLIENT EDUCATION NEEDED:

- Instruct client to flush tubes and drains every 2 to 4 hours.
- Instruct client to catheterize neobladder (with stoma) initially every 2 hours and increasing time

frame by 1 hour until an every-4-hour schedule is reached.

- Instruct client to clean catheter after use with soap and water, rinse, and pat dry. Clean catheter is stored in a closed sealable plastic bag.
- Instruct the client to replace the catheter every 3 months or when the catheter begins to look worn.
- Provide the client with a list of equipment and product numbers and a list of retailers where supplies can be purchased.
- Instruct client with a continent urinary stoma to obtain a MedicAlert tag, which identifies the type of urinary diversion that requires catheterization.
- Instruct client to report changes in urine flow or difficulty catheterizing and/or flushing neobladder to wound/ostomy care nurse (ET nurse).



Figure 6-16-2 Straight catheter, emesis basin, syringe, gloves, lubricant, and gauze sponges

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Flushing Tubes and Drains

- | | |
|--|--|
| 1. Wash hands. | 1. Practices aseptic technique. |
| 2. Assemble equipment. | 2. Assures that all equipment is ready to use. |
| 3. Pour sterile normal saline into a basin. | 3. Assures that all equipment is ready to use. |
| 4. Open remaining sterile packages. | 4. Assures that all equipment is ready to use. |
| 5. Apply sterile gloves. | 5. Practices aseptic technique. |
| 6. Draw up 30 ml of sterile normal saline into piston syringe. | 6. Prepares irrigant for use. |

7. Disconnect the tube into the stoma from the drainage system (see Figure 6-16-3).



Figure 6-16-3 Disconnect the catheter that leads into the stoma from the drainage system.

7. Facilitates flushing of tube.



Figure 6-16-4 Attach the syringe to the catheter.

8. Attach syringe to catheter marked for the stoma (see Figure 6-16-4).

8. Catheter is flushed to remove clumps of mucus.

9. Flush catheter until irrigant is free of mucus strands (see Figures 6-16-5 and 6-16-6).

9. Prevents possible plugging of the tubes by mucus strands.



Figure 6-16-5 Flush the catheter with irrigant.



Figure 6-16-6 Flush the catheter until returning irrigant is free of mucus strands.

10. Reconnect Foley/tube to drainage system (see Figures 6-16-7 and 6-16-8).

10. Facilitates continuous drainage of urine.

Figure 6-16-7 Reconnect the catheter to the drainage system.



Flushing Tubes and Drains *continued***Figure 6-16-8** Make sure all connections are secure.

- 11. Repeat the procedure if ordered for additional catheters or stents using a new sterile syringe for each catheter.
- 12. Remove gloves and wash hands.

Catheterizing Continent Urinary Diversion:

- 13. Wash hands.
- 14. Assemble equipment.
- 15. Open packages.
- 16. Apply sterile gloves.
- 17. Draw up 30 ml of sterile normal saline into piston syringe.
- 18. Gently insert catheter into new bladder.
- 19. Place other end of catheter into container.
- 20. Irrigate new bladder with sterile normal saline (after all urine has drained out) until irrigant is free of mucus strands.
- 21. Remove catheter.
- 22. Apply Band-Aid over stoma.
- 23. In hospital, dispose of catheter. At home, client can reuse catheters by washing in soap and water, rinsing, and drying. Once cleaned, catheter is placed in a sealable plastic bag.
- 24. Wash hands.

- 11. A new sterile syringe prevents cross contamination.
- 12. Reduces transmission of microorganisms.
- 13. Reduces transmission of microorganisms.
- 14. Assures that all equipment is ready to use.
- 15. Assures that all equipment is ready to use.
- 16. Practices aseptic technique.
- 17. Assures that all equipment is ready to use.
- 18. Mucosa is friable and rough insertion may cause trauma.
- 19. Allows for measurement of urine in initial post-operative period.
- 20. Prevents possible plugging of the tubes by mucus strands.
- 21. Catheter is flushed to remove clumps of mucus.
- 22. Prevents possible plugging of the tubes by mucus strands.
- 23. In hospital, prevents possible nosocomial infection. At home, reduces client cost. There is less risk of nosocomial infection in the client's home setting.
- 24. Reduces transmission of microorganisms.

> EVALUATION

- Peristomal skin integrity remains intact if stoma is present.
- Irritated or denuded peristomal skin integrity has healed if stoma is present.
- Client acknowledges the change in body image and expresses positive feelings about self.
- Client has maintained fluid balance.
- Client expresses understanding regarding the need for a urinary diversion and how to maintain it.

> DOCUMENTATION

Narrative Notes

- Document the condition of the stoma if one is present and the peristomal skin if appropriate.
- Note the color, amount, and odor of the urinary drainage.
- Note any mucous plugs or unusual findings.
- If skin care was performed, note what was done and the client's response to the care.
- Record any client teaching performed.

Intake and Output Record

- Note the amount of irrigant instilled and the amount of urine/drainage evacuated.



▼ REAL WORLD ANECDOTES

The home health nurse is visiting Mrs. Hanson, a 63-year-old woman, at home to evaluate her continent urinary diversion. The nurse asks to watch Mrs. Hanson perform a catheterization and the care she would normally use at that time. Agreeing to do so, Mrs. Hanson walks to the kitchen sink, opens a drawer next to the sink, and pulls a red rubber catheter out of the drawer. She then opens up the front of her smock and proceeds to catheterize her urinary stoma, draining the urine into the sink. After the urine has stopped flowing, Mrs. Hanson wipes her stoma and the catheter with a towel and returns it to the kitchen drawer. When asked by the visiting nurse why she does the catheterization this way, Mrs. Hanson explains that she spends most of her time in the kitchen because it is the warmest room in the house. Because it was handy, she decided that the kitchen sink would work just as well as using the colder bathroom down the hall. The home health nurse reviewed the procedure with Mrs. Hanson, emphasizing the need to maintain catheter cleanliness to prevent infection and the proper disposal of bodily fluids.

> CRITICAL THINKING SKILL

Introduction

Look at a scenario in which the client has an Indiana Pouch for treatment of bladder cancer following cystectomy.

Possible Scenario

A 35-year-old male is diagnosed with recurrent bladder cancer and chooses to have an Indiana Pouch as the urinary diversion. His recovery is uneventful and he is discharged home in 7 days. He is able to perform all aspects of self-care within 2 weeks. The client is readmitted to the hospital 1 year following surgery with

recurrence of the cancer. He is admitted to begin receiving chemotherapy.

Possible Outcome

As chemotherapy is administered, the client will need to be hydrated and his urine output monitored. The astute nurse will insert a Foley catheter into the Indiana Pouch and attach the catheter to bedside bag to facilitate accurate recording of urinary output and to reduce the possibility of toxicity.

Prevention

Insertion of a Foley catheter into a neobladder will assure that the client's possible complications to receiving chemotherapy are lessened.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients often have delicate skin and extra care must be taken to prevent peristomal irritation and breakdown.
- Elderly clients may not respond to thirst appropriately and can easily become dehydrated. Be sure an elderly urinary diversion client is getting 64 oz of fluid per day to maintain good urinary function.



Pediatric Variations:

- If the continent stoma requires catheterization, use a catheter of the appropriate size.
- Only insert the catheter until urine flows.
- Teenagers may be embarrassed or have body image and self-esteem problems regarding their urinary diversion. This can lead to noncompliance in caring for the diversion and stoma. Provide a safe, nonjudgmental environment for the teenager to vent any anger and frustration.
- When irrigating a neobladder in children, use smaller amounts of normal saline and irrigate gently.



Home Care Variations:

- Clients in the home care setting may become careless regarding hygiene and catheter care. This increases the risk of urinary tract infections and other complications. Reinforce client teaching regarding diversion care and hygiene.



Long-Term Care Variations:

- Long-term care clients who are unable to care for themselves may be at risk of dehydration. Be sure that all clients with urinary diversion get adequate hydration to prevent urinary complications.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Urine is not flowing when the neobladder is catheterized.

Ask Yourself:

How do I prevent this error?

Prevention:

Slowly rotate catheter in conduit and apply suction using a syringe. Flush neobladder with normal saline to dislodge possible mucous plugs for conduit lumen. Use of gentle suction with syringe will facilitate flow of urine through catheter. Also, encourage client to hydrate self throughout the day.

> NURSING TIPS

- Recognize that all continent urinary diversions are not the same. Each continent urinary diversion must be treated individually, which requires that the nurse assess the stoma (if present), the peristomal skin condition, and ability of client to void (orthotopic neobladder).
- Client teaching is easily incorporated into the care of the continent urinary diversion by encouraging the client to be your assistant during the application process.
- Catheters and irrigation equipment that are easy to use increase the client's comfort level and thereby their participation in self-care activities.

SKILL 6-17

Pouching a Noncontinent Urinary Diversion

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Colon conduit
Ileal conduit
Noncontinent urinary diversion

Urinary diversion
Urostomy



> OVERVIEW OF THE SKILL

Noncontinent urinary diversions are surgical procedures that allow urine to drain from the body. This can be done by creating openings directly from the ureters to the abdominal surface (cutaneous ureterostomy), or by connecting the ureters to an internal pouch formed using a portion of the ileum. The pouch then drains to the abdominal wall. Finally, a continent

urostomy, or Koch's pouch, collects urine inside the body in a pouch made from a portion of the ileum. Urine is periodically drained by inserting a catheter into the pouch via a nipple opening in the abdominal wall. Pouching a noncontinent urinary diversion ensures that the client's peristomal skin remains intact and provides the client with artificial continence.

> ASSESSMENT

1. Inspect the stoma for color and texture. This will allow the nurse to determine the viability and turgor of the stoma.
2. Inspect the condition of the skin surrounding the stoma. Alterations in skin integrity will prohibit a closed drainage system from adhering to the skin.
3. Measure the dimensions of the stoma prior to obtaining an ostomy appliance system from central supply. This will alleviate the problem of obtaining the wrong size equipment.
4. Inspect stents for appropriate placement and drainage. The stents are placed intraoperatively to ensure that urine drains from the kidneys through the edematous ureters. The stents are removed 7 to 21 days post-op (depending on the surgeon's preference).

> DIAGNOSIS

- 1.3.2 Altered Urinary Elimination
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 7.1.1 Body Image Disturbance

> PLANNING

Expected Outcomes:

1. Peristomal skin integrity will remain intact.
2. Irritated or denuded peristomal skin integrity will heal.
3. Client will acknowledge the change in body image.
4. Client will express positive feelings about self.
5. Client will maintain fluid balance.

Equipment Needed (see Figure 6-17-2):

- Clean washcloth or 4 × 4 gauze pads
- Warm tap water
- Appropriate urinary ostomy appliance
- Stoma measuring guide
- Scissors
- Pen or pencil
- Bedside drainage bag (optional)
- Clean gloves
- Gauze to create wick or slender tampon



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Explain care of the ostomy appliance.
2. Provide instruction on how to empty and measure contents of urinary appliance.
3. Provide list of equipment and product numbers.
4. Provide list of retailers where supplies can be purchased.
5. Provide list of reasons and situations to call physician or qualified provider, or enterostomal/ostomy care nurse.
6. Instruct the client to initially change ostomy appliance every 3 days, and after 2 changes to increase

change time by 1 day until client reaches his maximum change time (5 to 7+ days).

7. Instruct client to keep appliance change procedure simple. Do not use pectin paste or powder or skin sealant unless there has been a problem with leakage and skin irritation.
8. Empty urinary appliance every 2–4 hours while awake.
9. Instruct client to attach urinary appliance to a bedside drainage bag at night. This will facilitate a good night's sleep and prevent possible overflow of urine into the pouch and subsequent leakage.
10. Arrange an appointment for follow-up care with the enterostomal/ostomy nurse.



Figure 6-17-2 Gloves, scissors, pen or pencil, and sponges are used when pouching a noncontinent urinary diversion.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Assemble clean urinary pouch and wafer. | 2. Ensures that all equipment is ready to use. |
| 3. Apply clean gloves. | 3. Practices clean technique. |
| 4. Remove current ostomy appliance after emptying pouch of urine, if present (see Figure 6-17-3). | 4. Regular pouch changes help prevent urinary infections. |
| 5. Dispose of appliance and contaminated gloves in appropriate waste container. | 5. Practices infection control. |
| 6. Wash hands. | 6. Reduces the transmission of microorganisms. |
| 7. Apply clean gloves. | 7. Practices clean technique. |



Figure 6-17-3 Remove current ostomy appliance.



Figure 6-17-4 Measure the stoma using a stoma measuring card to ensure the best fit for the ostomy appliance.

8. Cleanse stoma and skin with warm tap water. Pat dry.
 9. Measure stoma using a measuring guide for appropriate length and width of stoma at base (where skin meets stoma) (see Figure 6-17-4).
 10. Place wick of gauze or slender tampon into orifice of stoma to wick urine while you are preparing the wafer and pouch for application.
 11. Trace pattern onto paper backing of wafer.
 12. Cut wafer as traced.
 13. Remove paper backing from wafer and place on skin with stoma centered in opening of wafer.
 14. Remove wick from orifice of stoma.
 15. Attach clean pouch to wafer. Make sure drainage port is closed.
 16. Remove gloves and wash hands.
8. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable.
 9. Correct measurement of the stoma's dimensions ensures a good fit of the ostomy appliance without excess skin at the base of the stoma exposed to urine.
 10. Ensure a good seal of the wafer to the client's skin.
 11. It is important to trace the measurements of the stoma and not "eyeball" the stoma measurements. Inaccurate pattern size will result in either laceration of the stoma by the wafer or maceration of peristomal skin from constant contact with urine.
 12. Accurately cutting the traced pattern will ensure a snug fit.
 13. Paper backing needs to be removed from wafer in order for wafer to adhere to skin.
 14. To allow visualization of the stoma and accurate placement of the wafer.
 15. Saves time and prevents urine from leaking underneath the wafer during application process.
 16. Reduces the transmission of microorganisms.

> EVALUATION

- Peristomal skin integrity remains intact.
- Irritated or denuded peristomal skin integrity healed.
- Client acknowledges the change in body image.
- Client expresses positive feelings about self.
- Client maintains fluid balance.

> DOCUMENTATION

Nurses' Notes

- Document assessment of peristomal skin.
- Document assessment of stoma.
- Document stoma measurements (length, width, height).
- Document color and amount of drainage.
- Document peristomal skin care if alteration in skin integrity was noted.
- Document type of ostomy pouch applied.



▼ REAL WORLD ANECDOTES

A 45-year-old male is diagnosed with bladder cancer and decides to have a noncontinent urinary diversion (ileal conduit) rather than a continent surgical procedure (neobladder) which would require an additional 8 to 10 hours of surgical time. The usual operative time for a total cystectomy and creation of an ileal conduit is 3 to 4 hours. There is no difference in length of hospitalization (7 to 10 days). Clients may make decisions based on different priorities than you might have. In this instance, the client is more concerned about the length of the surgery than the postoperative outcome. It is important to listen to the client's priorities and to make sure he has enough information on which to base a decision.

> CRITICAL THINKING SKILL

Introduction

Look at a scenario in which the client is postoperative from removal of bladder and recreation of an ileal conduit or urostomy.

Possible Scenario

A 60-year-old male is 4 days postoperative for a total cystectomy and creation of an ileal conduit. He complains that his skin is itching under the wafer of his ostomy appliance. Inspection of the ostomy appliance reveals that urine is leaking below the wafer. The nurse removes the current appliance, which has not been changed since the surgery 4 days prior. This would be the client's first learning opportunity. The nurse takes the time to include the client in a learning process as she changes the appliance. An assessment of the peristomal skin reveals mild maceration from constant urine con-

tact. Stoma is viable and measures 1" × 1½" with a height of ½". There are no noted creases or crevices at the base of the stoma.

Possible Outcome

If the astute nurse did not pick up on the clue offered by the client ("My skin itches under this thing."), the appliance would have continued to leak causing further peristomal skin damage.

Prevention

Assessment of a new urinary ostomy appliance should be done every shift until the client is independent in care. Most ostomy appliances should be changed by the third day postoperative to begin client teaching. Also, by this time the stoma has decreased in size because of loss of edema. A change in stoma size results in increased exposure of the peristomal skin to urine.

▼ VARIATIONS



Geriatric Variations:

- *If a client has arthritic hands it is best to use either a one-piece appliance that is precut or a two-piece appliance that is adaptive to decreases in hand dexterity.*
- *Make sure the client can see and hear your teaching instructions. Ask for feedback to assess if the client heard and understood the procedure.*
- *If the client needs assistance, instruct a willing family member or caregiver on the procedure.*

▼ VARIATIONS *continued*



Pediatric Variations:

- *An ostomy located near a child's groin will need an appliance that is very flexible and can bend with the client's movement and play without becoming nonadherent.*



Home Care Variations:

- *Make sure the client has the necessary supplies and facilities to clean and change his or her urinary diversion.*
- *Changes in body image could cause the client to withdraw from social situations or even become housebound. As the home care nurse entering the home, you are in a unique position to assess psychosocial needs and changes resulting from the alterations in body image.*



Long-Term Care Variations:

- *Consider the ongoing cost of supplies, and discuss any concerns with the client. Connect the client with community resources, support groups, or further assessment if needed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The appliance chosen is too small or too large for the stoma's dimensions.

Ask Yourself:

How do I prevent this error?

Prevention:

Measure the dimensions of the stoma prior to obtaining and preparing a pouch for application. If the error occurs, remove the leaking appliance and remeasure the stoma dimensions before reapplying the ostomy appliance.

> NURSING TIPS

- Recognize that all stomas are not the same. Each stoma must be treated individually requiring the nurse to assess the dimensions and location in relation to the client's body movements (e.g., sitting, bending) and the peristomal skin's condition.
- Client teaching is easily incorporated into the care of the ostomy by encouraging the client to be your assistant during the application process.
- Use of an ostomy appliance that is intact, comfortable, and easy to use will increase the client's comfort level and thereby increase participation in self-care activities.
- Costs to the client and the health care institution are reduced when simplistic ostomy care is provided. Simplistic ostomy care excludes the daily use of pectin powder, pectin paste, and skin sealant.

SKILL 6-18

Administering Peritoneal Dialysis

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Dialysate	Intermittent dialysis
Dialysis	Nitrogenous waste products
Continuous ambulatory peritoneal dialysis (CAPD)	Osmosis
Fluid and electrolyte balance	Paracentesis
Hypertonic	Peritoneal membrane
	Peritoneum



> OVERVIEW OF THE SKILL

Peritoneal dialysis is a method of removing waste products of metabolism, excess fluids, drugs, or chemicals from the body and restoring proper fluid and electrolyte balance by diffusion and osmosis through the client's peritoneal membrane. A concentrated dialysate is instilled into the peritoneal cavity by a catheter inserted into the peritoneum through the abdomen. It is left in the abdomen for a prescribed period of time. The fluid is then drained, and the process is repeated. The process is similar to paracentesis, except a catheter is left in place for dialysis. Since this is an invasive procedure, surgical aseptic technique is required to place the catheter.

While the dialysate is in place, products (nitrogenous waste products, chemicals, and electrolytes) in the blood flowing through the rich capillary system of the peritoneal membrane diffuse into the dialysate.

Water also moves from the blood into the fluid. This is accomplished by adding concentrations of glucose in varying degrees to the dialysate, which makes the solution hypertonic and allows osmosis to occur.

Peritoneal dialysis can be used in clients who cannot tolerate hemodialysis or in situations where hemodialysis is not readily available. After the dialysis catheter is placed, the wound requires dressings for approximately 8 weeks until it heals.

There are two main types of peritoneal dialysis: continuous and intermittent. Continuous ambulatory peritoneal dialysis (CAPD) is ongoing. The dialysate remains in the peritoneal cavity between 4 and 8 hours, then the cycle is repeated. During intermittent peritoneal dialysis, the dialysate remains in the abdomen for 20 minutes. Then the cycle is repeated a prescribed number of times or interrupted until the next session.

> ASSESSMENT

1. Assess the client's cardiovascular and respiratory status to establish a baseline for future comparisons to detect increasing shortness of breath, rales, atelectasis, or elevated pulse.
2. Measure the client's abdominal girth to establish a baseline for future comparisons to detect if fluid has been retained (see Figure 6-18-2).
3. Assess the client's abdomen to establish the state of skin integrity prior to the procedure and to look for signs of abdominal distention and infection.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.3.2 Altered Urinary Elimination
- 1.4.1.1 Altered Tissue Perfusion, related to peritoneal dialysis
- 1.4.1.2.1 Potential for Fluid Volume Deficit secondary to peritoneal dialysis
- 1.4.1.2.1 Potential for Fluid Volume Excess secondary to peritoneal dialysis
- 1.6.2.1.2.1 Impaired Skin Integrity
- 9.1.1 Pain secondary to abdominal paracentesis wound

> PLANNING

Expected Outcomes:

1. Client will experience relief of respiratory symptoms related to pressure from fluid on the diaphragm.
2. Client will experience relief of symptoms related to nitrogenous waste products.
3. Client will not suffer from fluid volume overload or deficit.
4. Client will not exhibit any signs or symptoms of infection following the dialysis.
5. The skin at the catheter entry site will remain intact without infection or excoriation.
6. Client will not experience pain or discomfort related to the procedure.



Figure 6-18-2 Measuring the abdominal girth before and after the procedure helps detect if fluid has been retained.

Equipment Needed (see Figure 6-18-3):

- Dialysate
- Sterile drape
- Sterile basin
- Povidone-iodine swabs or sterile 4 × 4 dressings and povidone-iodine liquid
- Sterile gloves
- Masks, if needed
- Biohazard bag
- Clean gloves



Estimated time to complete the skill:
15–30 minutes to infuse the dialysate; 15–30 minutes to drain the dialysate

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of the procedure to the client.
2. Explain the need for the low Fowler's position during the procedure.
3. Teach the client the need for aseptic technique in caring for the catheter and the insertion site. This will reduce the risk of infection in the peritoneal cavity.
4. If the client will be performing this procedure at home, have him return demonstrate the procedure.
5. Clients can participate as much as possible in the procedure, especially if they will be performing it at home.



Figure 6-18-3 Dialysate

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Gather equipment needed at the bedside. Warm the dialysate to body temperature and bring it to the bedside.
2. Wash hands and apply clean gloves.
3. Position the client in a comfortable position, usually semi-Fowler's position (see Figure 6-18-4).



Figure 6-18-4 Position the client in a semi-Fowler's position.

4. Weigh the dialysate.
5. Spike the dialysate bag with the tubing, hang the bag from an IV pole and prime the tubing. Clamp the tubing once it is primed.
6. Establish a sterile field under the end of the peritoneal catheter, using the sterile drape.
7. Open the povidone-iodine swabs using aseptic technique and drop them onto the sterile field. If using sterile 4×4 s, open the sterile basin and, using aseptic technique, pour povidone-iodine into the basin. Taking care not to contaminate the 4×4 s, drop them into the povidone-iodine in the basin.
8. Apply sterile gloves.

1. Smooths the performance of the procedure. Warming the dialysate prevents shock in the client from infusing cold fluid directly into the abdomen.
2. Reduces the transmission of microorganisms.
3. Positioning for comfort allows the patient to tolerate the dialysis for longer periods of time. Semi-Fowler's position ensures that there is room for peritoneal expansion.



Figure 6-18-5 Attach the infusion tubing to the dialysis catheter.

4. Establishes a baseline to compare with returned fluid weight.
5. Prepares the equipment for use as soon as the connector has been cleaned.
6. Provides a sterile surface for cleaning the catheter and reducing the transmission of microorganisms.
7. Provides a sterile bactericide to cleanse the catheter.
8. Prevents contamination of the sterile materials.

9. Using the povidone-iodine swabs or the soaked 4 × 4s, cleanse the proximal end of the catheter. Allow the povidone-iodine to dry prior to connecting the tubing.
10. Attach the infusion tubing and dialysate to the dialysis catheter (see Figure 6-18-5). The dialysate is hung on a pole and administered by gravity. The type and amount of dialysate of each bag will be determined by the client's laboratory results, the purpose of the dialysis, and orders.
11. Unclamp the tubing and allow dialysate to enter the abdomen and stay the appropriate time as ordered. Dialysate takes approximately 5–15 minutes to infuse (see Figure 6-18-6).
9. Povidone-iodine must be allowed to dry to provide a bacteriocidal action.
10. Since peritoneal dialysis is a process of osmosis, concentrations of dialysate are determined by the amount of waste products and amount of fluid desired to be removed by the process of gradients.
11. Dialysate must remain in the abdomen for osmosis to occur and for waste products to be pulled out of the system.

Figure 6-18-6 Allow the dialysate to enter the abdomen and remain the appropriate time.



12. Assess the client for pain or discomfort. Pain sometimes occurs with the procedure, especially while the fluid is being infused. It is very important to assess the pain accurately.
13. When the ordered amount of dialysate has been infused, clamp the dialysis tubing for the ordered amount of dwell time.
14. Wash hands after infusing the dialysate and prior to draining the effluent.
15. After the dialysate has remained in the abdomen a specified time (usually 20 minutes for intermittent dialysis, 4–8 hours for continuous dialysis) and is ready to be drained, remove the empty bag from the pole and place it below the level of the peritoneum. Unclamp the tubing leading to the bag and allow drainage of the effluent into the empty bag.
12. If the pain is accompanied by signs of peritonitis or bleeding, follow up immediately.
13. Allows the dialysate to remain in contact with the peritoneum. If the dwell time of the dialysate will be hours, the client can fold the empty bag and carry it along, tucked into clothing, until it is time to drain the dialysate.
14. Reduces the transmission of microorganisms.
15. The level of the bag must be placed well below the abdomen to facilitate drainage by gravity.

- 16.** Periodically weigh the bag of effluent as the abdomen drains. When the weight of the effluent bag has been stable for 10–15 minutes, clamp the drainage tubing. This usually takes approximately 30 minutes.
 - 17.** Hold the full bag up to the light and inspect the fluid. The color should be light to medium yellow or amber and clear. If it is red-tinged, dark, or cloudy, consult the physician or qualified practitioner and report findings.
 - 18.** Compare the weight of the returned fluid with the preinfusion weight. If there is substantially less fluid returned than was administered, report findings to physician or qualified practitioner.
 - 19.** Ensure that any laboratory tests ordered are performed to track the client's fluid and electrolyte balance. Notify the physician or qualified practitioner of any drastic changes in the laboratory results.
 - 20.** Wash hands after disconnecting the effluent and prior to connecting a new bag of dialysate.
 - 21.** Warm and connect the next bag of dialysate to be exchanged, if ordered, and repeat the process. Use new tubing for each bag of dialysate.
- 16.** When the weight of the bag no longer changes, the abdomen should be fully drained. At this point the bag of effluent should weigh more than it did prior to instillation as it will also contain waste products and wastewater. If the stable weight of the effluent bag is less than the preinfusion weight, unclamp the tubing and reposition the client from side to side to allow any trapped effluent to drain.
 - 17.** Red-tinged, dark, or cloudy effluent could indicate bleeding, infection, or perforation.
 - 18.** The amount of drainage generally exceeds the amount of fluid entering the abdominal cavity since the process of dialysis also removes excess fluid. If the amount of returned fluid is less than the amount instilled, report this finding since this could indicate that the client is retaining dialysate fluid related to dehydration or occlusion of the catheter by tissue or kinking.
 - 19.** Determines how much dialysis is required and what concentrations of dialysate are required.
 - 20.** Reduces the transmission of microorganisms.
 - 21.** Ensures the procedure continues as ordered.

> EVALUATION

- Client experienced relief of respiratory symptoms related to pressure from fluid on the diaphragm.
- Client experienced relief of symptoms related to nitrogenous waste products.
- Client did not suffer from fluid volume overload or deficit.
- Client has not exhibited any signs or symptoms of infection following the dialysis.
- The skin at the catheter entry site remained intact without infection or excoriation.
- Client did not experience pain or discomfort related to the procedure.
- Document the color and clarity of effluent.
- Document any symptoms that may be associated with peritonitis or internal bleeding, including rebound tenderness, cloudy outflow, blood in the outflow, fever, or abdominal rigidity.
- Document the time the procedure was started and how long it took.
- If the procedure was repeated, document how many repetitions were completed.
- If the physician or qualified practitioner was notified, document the time, reason, and any orders that were received.

> DOCUMENTATION

Nurses' Notes

- Document the client's response to dialysis, such as any change in vital signs or general cardiovascular or respiratory symptoms.

Intake and Output Record

- Record the amount of dialysate infused and the amount returned.



▼ REAL WORLD ANECDOTES

Mr. Ybarra was due for three rounds of peritoneal dialysis. As the nurse infused the first bagful of dialysate, Mr. Ybarra complained of abdominal pain. The nurse's assessment did not reveal any other symptoms of infection or internal bleeding, and slowing the dialysate's infusion rate seemed to help ease Mr. Ybarra's pain. Mr. Ybarra tolerated the 30-minute dwell time and the nurse proceeded to drain the dialysate. As the fluid return flowed into the bag, the nurse noticed it was cloudy with sediment in it. The nurse assessed Mr. Ybarra and noted that he had abdominal tenderness and rigidity. His temperature was slightly elevated and his pulse was rapid. The nurse continued to drain the dialysate and notified Mr. Ybarra's physician. The physician determined that Mr. Ybarra had developed peritonitis and instituted antibiotic therapy.

> CRITICAL THINKING SKILL

Introduction

Monitor carefully to detect and intervene in the complications of peritoneal dialysis.

Possible Scenario

Mary is undergoing peritoneal dialysis this morning. The catheter was placed about an hour ago, and this is the end of the outflow segment of her first cycle of dialysis. You note that Mary has peripheral edema. She complained of mild pain during the infusion segment. Now she has dizziness and apprehension and is sweat-

ing. Her pulse is 120, and her respirations are 25 and shallow. She is pale.

Possible Outcome

Your client has developed orthostatic hypotension. Fluid was removed too rapidly. Her intravascular volume is decreased. The physician orders intravenous fluids even though the woman has an extravascular fluid excess.

Prevention

Assess sodium levels prior to dialysis; assess for postural changes in blood pressure prior to procedure.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not tolerate rapid changes in volume.*
- *Elderly clients may have multiple other conditions, such as diabetes, hypertension, or chronic skin conditions. Assess how these conditions, and the medications the client takes for them, may interact with the dialysis.*



Pediatric Variations:

- *While it is important to encourage the child to be as active as possible, discourage activities that involve close physical contact, especially to the abdominal area.*



Home Care Variations:

- *Peritoneal dialysis can be performed in the home setting, by the family, the client, or home-based caregivers. Assess the caregiver for willingness to undertake the commitment to learn and perform the procedure daily.*
- *Assess the home environment to determine if cleanliness and safety can be maintained.*
- *Determine whether a “backup” person is willing to be trained to provide relief to the primary caregiver. The dialysis procedure can be complex to learn. When teaching home care prior to hospital discharge, establish follow-up contacts and emergency contacts so the client or caregiver knows who to call for help with troubleshooting the dialysis routine in the home environment. Scheduling the procedure, preparation, storage and warming of the dialysate, operation of dialysis equipment (if automated equipment is used), comfort, and caregiver burnout are all issues that need to be discussed. Teaching must include information on site care, nutrition, the basics of fluid and electrolyte balance, and signs of infection, bleeding, or perforation.*



Long-Term Care Variations:

- *Long-term fluid restriction and immobility could lead to constipation. Assess the client for signs and symptoms of constipation.*
- *Assess for signs of depression or helplessness related to the long-term need for dialysis and the food, activity, and fluid restrictions involved.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The dialysate is cold and causes pain on inflow.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember to warm the dialysate to body temperature prior to administering the procedure.

Possible Error:

Leaving the dialysate in the abdomen too long.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Set a timer; set your watch alarm if you have one. If the client is alert and cooperative, have the client remind you when the time is up.

> NURSING TIPS

- Carefully assess cardiovascular and respiratory status prior to procedure. Accurate assessment is crucial to detect often subtle changes in the client's status.
- Assess laboratory values prior to procedure. Changes in laboratory values help determine if the procedure is working and can help explain symptoms that occur.
- Be cognizant of systemic symptoms caused by laboratory value changes. Tremors or weakness, for example, can be caused by low levels of potassium.
- Remember that fluid shifts, symptoms, or complications can arise well after the dialysis procedure is completed.

SKILL 6-19

Administering an Enema

Robi Thomas, MS, RN, AOCN

KEY TERMS

Carminative
Cleansing enema
Constipation
Enema
Feces

Flatus
Hypertonic
Hypotonic
Isotonic
Retention enema



> OVERVIEW OF THE SKILL

An enema is a solution inserted into the rectum and sigmoid colon for the purpose of removing feces and/or flatus. Enemas can also be used to instill medications or nutrition. A cleansing enema is probably the most common type of enema. This type of enema stimulates peristalsis via irritation of the colon/rectum and by causing intestinal distention with fluid. The solution used in a cleansing enema must be chosen with care. Some solutions, such as tap-water-based solutions, draw fluid and electrolytes out of the body. They should not be used in clients with preexisting fluid and electrolyte imbalances. There are two general types of cleansing enemas: the large-volume enema and the small-volume enema.

A large-volume enema is designed to clean the colon of as much feces as possible. In a large-volume enema between 500 and 1000 cc of fluid is instilled into the rectum/colon and the client is asked to retain the fluid as long as possible. This allows the fluid to soften and loosen the feces. The large volume of fluid also distends the bowel, stimulating peristalsis. Large-volume enemas are the traditional intervention for constipation. Traditionally soapsuds enemas were used, and many large-volume enema kits still come with a small packet of liquid soap to be dissolved in

the enema solution. Soapsuds enemas are very irritating to the colon and are rarely ordered anymore. Large-volume enemas are often ordered prior to procedures or surgeries that require visualization of the colon. When used for this reason, the physician or qualified practitioner will often order “enemas until clear.” This indicates that large-volume enemas are to be given until the fluid returned is clear of fecal matter. Most institutions have guidelines regarding the maximum number of large-volume enemas that can be administered to a client.

Small-volume enemas are designed to clear the rectum and the sigmoid colon of fecal matter. Small-volume enemas can be delivered with the traditional enema kit using 50 to 200 cc of solution, but most frequently they are administered using a prepackaged disposable enema. There are a number of prepackaged small enemas available. These enemas work by using a hypertonic rectal stimulant that stimulates peristalsis and draws fluid from the intestinal walls to soften the feces. Because these enemas use the body’s own fluid to lubricate the stool, this type of enema is contraindicated in clients who are dehydrated. Prepackaged enemas are easily administered and available over the counter in most drug stores. This makes them ideal for home care use.

There are several types of enemas used for purposes other than cleansing. An oil retention enema is a small-volume enema that instills oil into the rectum. The oil is retained for up to an hour and is designed to soften very hard stool. It is often followed by a large-volume cleansing enema. Medications can be administered by enema as well. A small-volume enema can deliver a medicated solution directly to the rectal mucosa. This method of medication administration is useful when the rectum is the area to be medicated if the client is unable to take oral medications or if rapid absorption of the medication is required. The return-flow enema is used to remove flatus and stimulate peristalsis. It is frequently used following abdominal surgery to reduce intestinal distention and to stimulate the resumption of bowel function.

Many different solutions are used for enemas, including tap water, normal saline, hypertonic solutions, soap solutions, oil, and carminative solutions. Tap water is a hypotonic solution. Because it is a less concentrated solution than the body's cells, it is

drawn into the body and may cause water toxicity, electrolyte imbalance, or circulatory overload. Normal saline is an isotonic solution. It is the same concentration as the body's own fluids and is considered to be a safe enema solution. It is important that children and infants only be given normal saline enemas since their small size predisposes them to fluid imbalances. Prepackaged small-volume enemas use hypertonic solutions to draw fluid from the body to lubricate the stool and distend the rectum. Hypertonic solutions are contraindicated in dehydrated clients and small children. Carminative solutions are used to provide relief from gas. An example of a carminative enema is MGW solution, which is 30 cc of magnesium, 60 cc of glycerin, and 90 cc of water.

Enemas are contraindicated in clients with bowel obstruction, inflammation, or infection of the abdomen or if the client has had recent rectal or anal surgery. If the nurse has any question regarding the advisability of administering an enema, she should consult the client's physician or qualified practitioner.

> ASSESSMENT

1. Identify the type of enema ordered as well as the rationale for the enema. **Allows the nurse to verify the appropriateness of the type of enema ordered.**
2. Assess the physical condition of the client. Determine if the client has bowel sounds. Assess for a history of constipation, hemorrhoids, or diverticulitis. Determine if the client will be able to hold a side-lying or knee-chest position or be able to retain the enema solution. **Allows the nurse to plan the procedure with the client's limitations in mind.**
3. Assess the client's mental state, including ability to understand and cooperate with the procedure, the client's knowledge level regarding the procedure, and any preexisting fears the client may have regarding the procedure. Knowing if the client can comprehend and cooperate with the procedure will help the nurse plan ahead. **Many clients have preexisting fears and beliefs regarding enemas and their administration.**

> DIAGNOSIS

- 1.3.1.1 Constipation
1.4.1.2.2.2 Risk for Fluid Volume Deficit

- 7.1.2 Situational Low Self-Esteem related to embarrassment over exposure and procedures in the rectal area

> PLANNING

Expected Outcomes:

1. The client's rectum will be free of feces and flatus.
2. The client will experience a minimum of trauma and embarrassment from the procedure.

Equipment Needed (see Figure 6-19-2):

Large Volume, Cleansing Enema

- Absorbent pad for the bed
- Disposable gloves
- Bedside commode or bedpan if client will not be able to ambulate to bathroom (see Figure 6-19-3)
- Lubricant
- Enema container
- Tubing with clamp and nozzle
- Thermometer for enema solution
- Toilet tissue
- IV pole
- Washcloth, towel, and basin



Figure 6-19-2 Various types of enema equipment and solutions

Small Volume, Prepackaged Enema (see Figure 6-19-4)

- Prescribed prepackaged enema
- Lubricant if the tip is not prelubricated
- Toilet tissue
- Bedpan or commode if the client cannot use the bathroom
- Absorbent pad for bed
- Gloves

Return-Flow Enema

- Absorbent pad for the bed
- Disposable gloves
- Bedside commode or bedpan if client will not be able to ambulate to bathroom
- Prescribed solution
- Lubricant
- Enema container
- Tubing with clamp and nozzle
- Thermometer
- Toilet tissue



Estimated time to complete the skill:
Depending on the type of enema ordered, approximately 15 minutes to prepare client and administer solution.

> CLIENT EDUCATION NEEDED:

1. Explain rationale for enema (to clear the bowel of feces).
2. Explain the procedure and steps involved.



Figure 6-19-3 Bedpans are used when administering an enema if the client cannot ambulate to the bathroom or use a bedside commode.

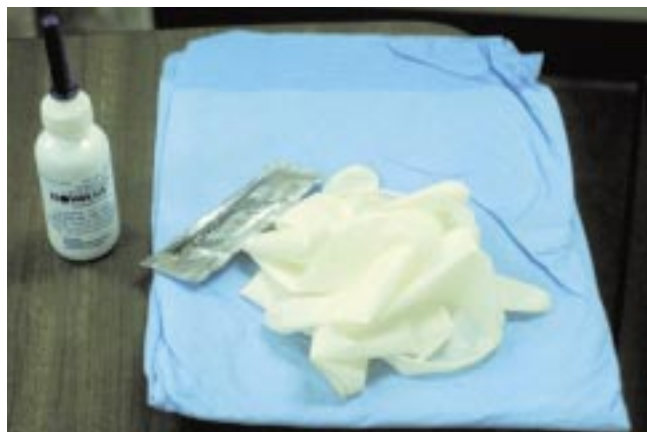


Figure 6-19-4 Small volume prepackaged enema, gloves, protective pad, and lubricant

3. Explain need to retain enema solution for prescribed time period to ensure success.
4. Clients should be taught that enemas should not be used to treat constipation on a routine basis.
5. Clients should be instructed not to flush the toilet until the nurse can observe the contents.
6. Clients who are unfamiliar with enema administration should be warned about the feeling of fullness or need to evacuate as the enema is administered.
7. Clients should be instructed to inform the nurse if cramps or abdominal pain occurs.
8. Clients should be instructed that lying on the back with knees and hips flexed toward the chest may make it easier to self-administer an enema.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Large Volume, Cleansing Enema

1. Wash hands.
2. Assess client's understanding of procedure and provide privacy.
3. Apply gloves.
4. Prepare equipment (see Figure 6-19-5).



Figure 6-19-5 Assemble equipment at the bedside.

1. Reduces the transmission of microorganisms.
2. Prepares client for procedure.
3. Prevents contact with feces.
4. Ensures a smooth procedure.



Figure 6-19-6 Position the client in the left lateral position with the right leg sharply flexed.

5. Place absorbent pad on bed under client. Assist client in attaining left lateral position with right leg flexed as sharply as possible. If there is a question regarding the client's ability to hold the solution, place a bedpan on the bed nearby (see Figure 6-19-6).
6. If specified, heat solution to desired temperature using thermometer to measure. Enemas administered to adults are usually given at 105°–110°F (40.5°–43°C), and those administered to children are usually administered at 100°F (37.7°C). Solution should be at least body temperature to prevent cramping and discomfort.
7. Pour solution into the bag or bucket; add water if needed (see Figure 6-19-7). Open clamp and allow solution to prime tubing. Clamp tubing when primed.
8. Lubricate 5 cm (2 inches) of the rectal tube unless the tube is part of a prelubricated enema set (see Figure 6-19-8).

5. Facilitates flow of solution into the rectum and colon. The flexed leg provides the best exposure of the anus.
6. Enemas work best when solution is warm. If enemas are too hot, damage can be done to the bowel mucosa. If enemas are too cold, spasms may occur.
7. Expels air from the tubing, which could cause intestinal distention and discomfort.
8. Minimizes trauma to the anal sphincter during insertion of the rectal tube.

continues

Large Volume, Cleansing Enema *continued*

Figure 6-19-7 Place solution into the bucket and add water as needed.

9. Holding the enema container level with the rectum, have the client take a deep breath. Slowly and smoothly insert rectal tube into rectum approximately 7–10 cm in an adult. The rectum of an adult is usually 10–20 cm (4–6 inches). The tube should be inserted beyond the internal sphincter. Aim the rectal tube toward the client's umbilicus (see Figure 6-19-9).



Figure 6-19-9 Gently and smoothly insert the rectal tube into the rectum.

10. Raise the container holding the solution and open clamp. (If using an enema set, squeeze the container holding solution). The solution should be 30–45 cm (12–18 inches) above the rectum for an adult, and 7.5 cm (3 inches) above the rectum for an infant. The solution may be placed on an IV pole at the proper height.
11. Slowly administer the fluid.
12. When solution has been completely administered or when the client cannot hold any more



Figure 6-19-8 Lubricate 2 inches of the rectal tube with lubricant.

9. A deep breath helps to relax the sphincter. Insertion of rectal tube toward the umbilicus guides tube along rectum.



Figure 6-19-10 Clean the anal area to remove excess lubricant.

10. Solution should be at a height above rectum that allows gravity flow of solution into the rectum, but does not cause damage to the rectal lining due to a too rapid increase in rectal pressure.
11. Administering enema slowly with momentary pauses decreases the incidence of intestinal spasms and cramps.
12. The urge to defecate indicates that a sufficient amount of fluid has been administered.

fluid, clamp the tubing and remove the rectal tube, disposing of it properly.

13. Clean lubricant, any solution, and any feces from the anus with toilet tissue (see Figure 6-19-10).
 14. Have the client continue to lie on the left side for the prescribed length of time.
 15. When the client has retained the enema for the prescribed amount of time, assist to the bedside commode or toilet or onto the bedpan. If the client is using the bathroom, instruct not to flush the toilet when finished.
 16. When the client is finished expelling the enema, assist to clean the perineal area if needed.
 17. Return the client to a comfortable position. Place a clean, dry protective pad under the client to catch any solution or feces that may continue to be expelled.
 18. Observe feces and document data.
 19. Remove gloves and wash hands.
- Small Volume, Prepackaged Enema**
20. Wash hands.
 21. Remove prepackaged enema from packaging. Be familiar with any special instructions included with the enema. The packaged enema may be stood in a basin of warm water to warm the fluid prior to use (see Figure 6-19-11).

Figure 6-19-11 A commercial enema



22. Apply gloves.
 23. Place absorbent pad on bed under client. Assist client in attaining left lateral position with
13. Minimizes skin irritation.
 14. Certain types of enemas are more effective when retained for a specified amount of time. It is easier for the client to retain the enema in a lying position, where gravity can be resisted.
 15. Client will be prepared to expel fluid and feces.
 16. Prevents skin breakdown and excoriation.
 17. Provides comfort for the client and protects the linen from potential soiling.
 18. Provides a record of the results.
 19. Reduces transmission of microorganisms.
 20. Reduces transmission of microorganisms.
 21. Prepares the enema for use.
 22. Protects hands from exposure to feces.
 23. Facilitates flow of solution into the rectum and colon. The flexed leg provides the best

continues

Small Volume, Prepackaged Enema *continued*

right leg flexed as sharply as possible (see Figure 6-19-12). Or you may use the knee-chest position (see Figure 6-19-13). If there is a question regarding the client's ability to hold the solution, place a bedpan on the bed nearby.



Figure 6-19-12 Position the client in the left lateral position with the right leg sharply flexed.

- 24.** Remove the protective cap from the nozzle and inspect the nozzle for lubrication. If the lubrication is not adequate, add more.
- 25.** Squeeze the container gently to remove any air and prime the nozzle.
- 26.** Have the client take a deep breath. Simultaneously gently insert the enema nozzle into the anus, pointing the nozzle toward the umbilicus.
- 27.** Squeeze the container until all the solution is instilled (see Figure 6-19-14).



Figure 6-19-14 After inserting the nozzle into the anus, squeeze the container until all of the solution is instilled.

- 28.** Remove the nozzle from the anus and dispose of the empty container in a trash receptacle (see Figure 6-19-15).

exposure of the anus. The knee-chest position provides good exposure and allows gravity to aid in retention of the enema.



Figure 6-19-13 Alternately, you may position the client in the knee-chest position.

- 24.** Prevents trauma to the rectal mucosa.
- 25.** Reduces introduction of air into the rectum.
- 26.** Relaxes the rectal sphincter. Pointing the nozzle toward the umbilicus positions the nozzle away from the rectal walls.
- 27.** Allows the client to get the full benefit of the solution.



Figure 6-19-15 Remove the nozzle and container and have the client continue to lie on the left side for the prescribed length of time. Dispose of the empty container in a trash receptacle.

- 28.** Prevents the spread of microorganisms.

- 29. Clean lubricant, any solution, and any feces from the anus with toilet tissue.
 - 30. Have the client continue to lie on the left side for the prescribed length of time.
 - 31. When the client has retained the enema for the prescribed amount of time, assist to the bedside commode or toilet or onto the bedpan. If the client is using the bathroom, instruct not to flush the toilet when finished.
 - 32. When the client is finished expelling the enema, assist to clean the perineal area if needed.
 - 33. Return the client to a comfortable position. Place a clean, dry protective pad under the client to catch any solution or feces that may continue to be expelled (see Figure 6-19-16).
- 29. Minimizes skin irritation.
 - 30. Certain types of enemas are more effective when retained for a specified amount of time. It is easier for the client to retain the enema in a lying position, where gravity can be resisted.
 - 31. Client will be prepared to expel fluid and feces.
 - 32. Prevents skin breakdown and excoriation.
 - 33. Provides comfort for the client and protects the linen from potential soiling.

Figure 6-19-16 Clean up equipment. Place a protective pad under the client and keep a bedpan nearby if needed to catch any solution that may continue to be expelled.



- 34. Observe feces and document data.
 - 35. Remove gloves and wash hands.
- Return-Flow Enema**
- 36. Wash hands.
 - 37. Assess if client understands procedure.
 - 38. Apply gloves.
 - 39. Place absorbent pad on bed under client. Assist client in attaining left lateral position with right leg flexed as sharply as possible.
 - 40. If specified, heat solution to desired temperature using thermometer to measure. Enemas
- 34. Provides a record of the results.
 - 35. Reduces transmission of microorganisms.
 - 36. Practices clean technique.
 - 37. Prepares client for procedure.
 - 38. Prevents contact with feces.
 - 39. Facilitates flow of solution into the rectum and colon. The flexed leg provides the best exposure of the anus.
 - 40. Enemas work best when solution is warm. If enemas are too hot, damage can be done to

Return-Flow Enema *continued*

administered to adults are usually given at 105°–110°F (40.5°–43°C) and those administered to children are usually administered at 100°F (37.7°C). Solution should be at least body temperature to prevent cramping and discomfort.

41. Pour solution into the bag or bucket, open clamp, and allow solution to prime tubing. Clamp tubing when primed.
42. Lubricate 5 cm (2 inches) of the rectal tube unless the tube is part of a prelubricated enema set.
43. Holding the enema container level with the rectum, have the client take a deep breath. Simultaneously, slowly and smoothly insert rectal tube into rectum approximately 7–10 cm in an adult. Insertion of rectal tube toward the umbilicus guides tube along rectum. Rectum of an adult is usually 10–20 cm (4–6 inches). The tube should be inserted beyond the internal sphincter. Aim the rectal tube toward the client's umbilicus.
44. Raise the container holding the solution and open clamp. The solution should be 30–45 cm (12–18 inches) above the rectum for an adult and 7.5 cm (3 inches) above the rectum for an infant (see Figure 6-19-17).



Figure 6-19-17 Raise the container 12–18 inches above the rectum and instill 200 cc of solution.

45. Slowly administer approximately 200 cc of solution.
46. Clamp the tubing and lower the enema container 12–18 inches below the client's rectum. Open the clamp (see Figure 6-19-18).

the bowel mucosa. If enemas are too cold, spasms may occur.

41. Expels air from the tubing that could cause intestinal distention and discomfort.
42. Minimizes trauma to the anal sphincter during insertion of the rectal tube.
43. A deep breath helps to relax the sphincter.
44. Solution should be at a height that allows gravity flow of solution into the rectum, but does not cause damage to the rectal lining due to a too rapid increase in rectal pressure.



Figure 6-19-18 Lower the container 12–18 inches below the client's rectum. Observe for air bubbles as the solution returns.

45. Administering enema slowly with momentary pauses decreases the incidence of intestinal spasms and cramps.
46. Allows the solution to flow back out of the rectum.

- | | |
|---|---|
| <p>47. Observe the solution container for air bubbles as the solution returns. Note any fecal particles that may be returned.</p> <p>48. When no further solution is returned to the container, clamp the tubing and raise the enema container 12–18 inches above the client’s rectum. Open the clamp and instill approximately 200 cc of fluid.</p> <p>49. Repeat raising and lowering the solution container until no further flatus is seen. Most institutions have guidelines regarding the number of returns to perform. A good rule of thumb is not more than three times.</p> <p>50. After the final return of fluid, clamp the tubing and gently remove it from the client’s anus. Clean the anus with tissue to remove any lubricant or solution.</p> <p>51. If the client feels the need to empty his rectum, assist him onto the bedpan or up to the bathroom or commode.</p> <p>52. When the client is finished expelling any retained solution, assist him to clean the perineal area if needed.</p> <p>53. Return the client to a comfortable position. Place a clean, dry protective pad under the client to catch any solution or feces that may continue to be expelled.</p> <p>54. Observe any expelled solution and document the results of the enema.</p> <p>55. Remove gloves and wash hands.</p> | <p>47. Assesses the effectiveness of the procedure. Air bubbles in the container indicate flatus being passed from the rectum.</p> <p>48. Continues to stimulate peristalsis and remove flatus.</p> <p>49. Limiting the number of returns prevents unduly tiring or stressing the client.</p> <p>50. Prevents skin irritation.</p> <p>51. Allows any retained solution to be expelled. Stimulates peristalsis.</p> <p>52. Prevents skin breakdown and excoriation.</p> <p>53. Provides comfort for the client and protects the linen from potential soiling.</p> <p>54. Provides a record of the results.</p> <p>55. Reduces transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- The client’s rectum is free of feces or flatus.
- The client experienced a minimum of trauma and embarrassment from the procedure.

> DOCUMENTATION

Nurses’ Notes

- Record the time and date of the procedure.
- Document the type of enema given, the amount of fluid infused and returned, and the amount and description of the feces expelled.

- Note the client’s tolerance for the procedure and any complaints or unusual findings.

Medication Administration Record (MAR)

- If this is a medicated enema be sure to note it on the MAR.

Intake and Output Record

- If the amount of fluid returned is significantly less than the amount infused, note this on the I&O record.



▼ REAL WORLD ANECDOTES

Scenario 1

Mrs. Delorenzo is a 45-year-old woman who has been complaining of constipation for 5 days. She noted that the constipation had started when she started taking acetaminophen with codeine to ease the pain from recent colorectal cancer surgery. After unsuccessfully attempting to increase peristalsis by administering suppositories, the nurse was preparing Mrs. Delorenzo for a cleansing enema. The nurse was explaining the procedure when Mrs. Delorenzo interrupted her, saying, “Oh, I know all about them. I had lots of enemas before my cancer surgery.” When questioned regarding her cancer surgery, Mrs. Delorenzo explained that she had been discharged from the hospital 5 days earlier after abdominal surgery for colorectal cancer. She was taking the acetaminophen with codeine for pain postoperative pain relief. Upon discovering this, the nurse set aside the prepared enema and called Mrs. Delorenzo’s doctor. The doctor who had ordered the enema was not Mrs. Delorenzo’s regular physician. When he was notified of the recent surgery, he told the nurse not to give the enema and he would be in to see Mrs. Delorenzo and reevaluate her condition. Because her nurse understood the dangers of administering an enema shortly after abdominal surgery, Mrs. Delorenzo was spared a procedure that could have caused serious complications.

Scenario 2

Three days ago Mrs. Faezi had a baby by cesarean section. On this day, her third postoperative day, she was complaining of abdominal pain and bloating. Upon evaluation, the nurse noted that she did not have any bowel sounds and her abdomen was tympanic. Upon reporting this to Mrs. Faezi’s nurse practitioner, a return-flow enema was ordered. When the nurse approached Mrs. Faezi and explained the procedure and the reason for it, Mrs. Faezi became quite distressed and refused to allow the procedure. When the nurse asked Mrs. Faezi why she was upset, Mrs. Faezi explained that she was sure she would not be able to hold all that fluid without soiling herself. She would rather suffer with the distention than be embarrassed by soiling herself. The nurse explained in detail that this would be only a small amount of liquid and the liquid would be drained back out. She explained that Mrs. Faezi would not have to retain any fluid. After the more detailed explanation and assurances by the nurse that the return-flow enema would make her feel much better, Mrs. Faezi agreed to the procedure. Following the return-flow enema, which had returned a large amount of flatus, Mrs. Faezi did indeed feel much better and she thanked the nurse for her kindness and patience.

> CRITICAL THINKING SKILL

Introduction

A client’s preconceptions may obstruct good care. Education is essential when assisting the client with independent care.

Possible Scenario

You are evaluating a new home health client. She is an elderly woman who recently fell and broke her ankle. Because of the injury, she is not as mobile as she was previously. She is complaining of constipation and reports that she has been giving herself prepackaged, small-volume enemas daily to relieve this.

Possible Outcome

The nurse explains that frequent enemas decrease bowel tone rather than increase it, but she is unable to

offer any acceptable alternatives. The client continues to give herself daily enemas. When she is finally able to resume her previous activity level, the client finds that she is unable to stop using the daily enemas due to rebound constipation.

Prevention

The nurse questions the client regarding her need to use enemas daily, explaining that bowel movements every 2 or 3 days is “normal” and daily bowel movements are not required. They discuss the client’s reduced activity level and talk about ways to increase her activity without stressing her ankle. They discuss stool softeners and bulk-producing products as ways to improve her bowel function without the use of enemas. The nurse asks about the nature of the client’s “constipated” stools and discovers that they are soft

and formed. The nurse reassures the client that she is not constipated, but that her reduced activity has reduced the frequency of her bowel movements. The nurse makes a note to herself to follow up with the client regarding her “constipation.” Many people believe that they must have daily bowel movements to be normal. They need to be educated that as long as their stools are soft and formed they are not consti-

pated even if their bowel movements occur every 2 or 3 days. If a client is concerned or truly suffering from occasional constipation, there are lifestyle changes they can make that are far superior to frequent enemas, which can damage the bowel. Some lifestyle changes include drinking at least 8 glasses of water a day, going for daily walks, and increasing the amount of fiber in their diet.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have impaired mobility, thus having difficulty maintaining an acutely flexed right leg as well as having difficulty quickly walking to the bathroom.*
- *The client may need encouragement to maintain the position desired, and a bedside commode or bedpan may be required.*
- *Elderly clients may not be able to hear instructions well, especially if you are facing away from the client or have a soft voice. Make sure to communicate at eye level and allow the client to see your lips as you speak. Establish hand signals prior to the procedure to use if the client cannot hear you while you are administering the enema.*
- *Take extra precautions to protect privacy and dignity if you must speak in a loud voice to communicate with the client.*



Pediatric Variations:

- *The child may be too young to understand why an enema is being administered, which may cause increased anxiety on the child's part.*
- *Have a parent administer the enema if reasonable, or have the parent present to comfort the child and facilitate cooperation.*
- *Care must be taken to ensure that the temperature of the solution is maintained to prevent damaging the child or make the child uncomfortable.*
- *It is important that the enema nozzle be well lubricated and that it is inserted only 7.5 cm (2–3 inches) in children and 2.5–3.75 cm (1–1.5 inches) in infants.*
- *Be aware of the volumes required for different body sizes in infants and children.*
- *Only isotonic solutions should be used in infants and children.*
- *Children who are not toilet trained will not be able to retain the enema solution. Give the enema on an absorbent pad or while the child is on the bedpan.*



Home Care Variations:

- *Clients can be taught to administer the enemas to themselves if needed.*
- *Enema kits are easily available and may be easier for the client to use without assistance.*
- *Clients may find that lying on their backs with their knees flexed and legs raised or using the knee-chest position are easier positions for self-administration of the enema.*
- *Clients should be instructed not to use the same nozzle for douching and enemas. Douche bags often come with an enema tip and the bag can be used for either purpose, but the tips are not interchangeable.*
- *Clients should not use enema/douche bags that hold the solution under pressure and forcefully expel the fluid into the rectum.*

▼ VARIATIONS *continued*



Long-Term Care Variations:

- Constipation is a common concern in the long-term setting. Clients at risk must be monitored regarding their bowel habits.
- Long-term care clients may develop rituals regarding their bowel habits. As long as the rituals are not unhealthy, a client should be allowed to perform any ritual that will help maintain bowel regularity.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Giving a prepackaged enema that is cooler than body temperature.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about what happens when cooler than body temperature fluid is infused into the rectum. Be sure to warm all fluids infused into the rectum. An enema is an unpleasant procedure for most clients, and the cramping caused by fluids that are too cool only increases the client's discomfort. Since many prepackaged enemas are designed to stimulate peristalsis, the client may experience severe cramping from the cool fluid. If this is a medicated enema that the client should retain, the cramping induced by the cool water may cause the client to expel the fluid and the medication.

- Although disposable enema kits may come with prelubricated tips, additional lubricant may be needed (see Figure 6-19-19).
- The enema should be stopped immediately if severe cramping or sudden abdominal pain occurs. In the event this happens, the client should be assessed for possible bowel perforation and bleeding.
- An enema should be used as a last resort for the treatment of constipation. Oral medication, suppositories, increased fluids, and exercise, if appropriate, should be attempted first.
- If the client is unable to retain the enema solution during the procedure, the enema can be given with the client lying on his back on the bedpan. This method is not as effective as retaining the solution, but it may be enough to stimulate peristalsis and flush the stool out of the client's rectum.



Figure 6-19-19 Many prepackaged enemas come with prelubricated tips. Check the enema for this type of tip. Bring additional lubricant to the bedside.

> NURSING TIPS

- Assess the client's room to ensure that there is a clear, easy path to the bathroom.
- The order "Enemas until clear" means that enemas are to be repeated until the client passes fluid that contains no fecal matter, not until the fluid returned is not cloudy.

SKILL 6-20

Digital Removal of Fecal Impaction

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Anorexia	Perianal
Constipation	Peristalsis
Dysrhythmia	Rectal mucosa
Fecal impaction	Vagus nerve
Neurogenic bowel	Vasovagal reaction



> OVERVIEW OF THE SKILL

Sometimes, due to severe constipation from immobility, surgery (see Figure 6-20-2), medications, or neurologic deficit, the feces becomes so hard and large that it will not pass through the anus without tissue damage. When this happens, the nurse is called upon to remove the fecal mass manually. This is done by inserting one or two gloved fingers into the rectum and manually breaking up the fecal impaction. The nurse then removes the hard stool and disposes of it appropriately.

This procedure can be uncomfortable and embarrassing for the client. Manipulating the rectal mucosa can cause local trauma and possibly bleeding. The vagus nerve is easily stimulated rectally and may cause the client's heart rate to slow dangerously. This procedure should be performed with caution in clients with a history of cardiac disease, dysrhythmias, or recent rectal or pelvic surgery.



Figure 6-20-2 Constipation can occur after surgery due to the effects of anesthesia, decreased mobility, decreased peristalsis, and decreased oral intake.

> ASSESSMENT

1. Assess the date and quality of client's last bowel movement to avoid procedure if it is not necessary.
2. Assess the client for signs of fecal impaction. These signs include complaints of nausea or anorexia, abdominal fullness, abdominal pain or cramps, an absence of formed stool for 3 days or longer, a palpable mass in the lower abdomen, and incontinence of liquid stool. This helps to differentiate between the need for manual disimpaction and a cleansing enema.
3. Assess the condition of the client's perianal area. Check for anal irritation, hemorrhoids, fissures, or

breaks in skin integrity. This will allow the nurse to determine if there is a preexisting alteration in skin integrity.

4. Auscultate bowel sounds. This will allow the nurse to determine if the client is experiencing an alteration in gastrointestinal function other than severe constipation.

> DIAGNOSIS

- 1.3.1.1 Constipation
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 8.1.1 Knowledge Deficit, related to elimination
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client's rectum will be free of feces.
2. The client will experience a minimum of discomfort and embarrassment during the procedure.
3. The client will not experience any adverse side effects during or as a result of this procedure.

Equipment Needed (see Figure 6-20-3):

- Disposable absorbent pads
- Bed pan
- Clean gloves
- Water-soluble lubricant
- Washcloth, towel
- Basin of water or perianal cleanser

- Odor eliminator spray (optional to decrease odor, which may increase client embarrassment over procedure)
- Toilet tissue



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client the importance of proper dietary intake and bulk to prevent constipation.
2. Note the importance of exercise in promoting peristalsis.
3. Teach the importance of responding to the urge to defecate when it occurs.
4. Teach the client that drinking plenty of fluids will help reduce the possibility of constipation.



Figure 6-20-3 Bedpan, gloves, lubricant, tissue, and a washcloth are used when removing a fecal impaction.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | ACTION | RATIONALE |
|---|--|
| 1. Wash hands. | 1. Reduces transmission of microorganisms. |
| 2. Assemble equipment. | 2. Assures that all equipment is ready to use. |
| 3. Explain procedure to client. | 3. Decreases client's anxiety in relation to an unnatural process of removing stool from the rectum. |
| 4. Position client in the left lateral position (Sims') with upper leg bent over lower leg (see Figure 6-20-4). | 4. Facilitates easy access to anal canal. |



Figure 6-20-4 Position the client in the left lateral position with the right leg sharply flexed.



Figure 6-20-5 Apply gloves.

5. Place disposable pads (if not available, use towels) underneath client. Position a bedpan near the client.
 6. Use odor eliminator per manufacturer (optional).
 7. Apply gloves (see Figure 6-20-5).
 8. Apply lubricant to a gloved finger.
 9. Insert lubricated finger into rectum to check for fecal impaction.
 10. Gently probe for stool by moving finger upward toward the umbilicus, moving finger back and forth to dislodge stool (see Figure 6-20-6).
 11. Once anus relaxes and opens, several fingers can be inserted into rectal canal to assist in removal of stool. Be sure to lubricate additional fingers.
 12. Manipulate the stool mass with the fingers, breaking it up into small pieces.
 13. Move the stool pieces toward the anus and remove them. Place removed stool into appropriate receptacle.
5. Protects bed linen. Allows for a receptacle to place stool into once removed.
 6. Decreases odor, which may increase client embarrassment over procedure.
 7. Practices universal precautions.
 8. Protects fragile mucosa from injury.
 9. Prevents possible injury to bowel mucosa from a blind entry.
 10. Stimulates peristalsis in lower colon to facilitate removal of stool.
 11. Facilitates easier removal of hard stool.
 12. Allows removal of the stool without traumatizing the anus.
 13. Preserves cleanliness.

Figure 6-20-6 Gently probe for stool and gently move finger to dislodge stool.



priate receptacle (i.e., bedpan or disposable bed pad).

14. Monitor the client for complications such as rectal bleeding or slowed heart rate.
15. With clean gloves, provide pericare (see Figure 6-20-7).

14. Prevents complications from the procedure.

15. Provides client with personal hygiene and protects healthy perianal tissue.



Figure 6-20-7 Change gloves and clean anal area, removing excess lubricant and stool.

16. Dispose of stool in appropriate receptacle.
17. Assist client to use the bedpan or commode if he needs to defecate.
18. Remove gloves and wash hands.

16. Practices infection control standards.

17. Digital stimulation of the rectum can stimulate peristalsis.

18. Reduces transmission of microorganisms.

> EVALUATION

- The client's rectum is free of feces.
- The client experienced a minimum of discomfort and embarrassment during the procedure.
- The client did not experience any adverse side effects during or as a result of the procedure.

> DOCUMENTATION

Narrative Notes

- Document the procedure. Indicate the date and time the procedure was performed.
- Note the client's tolerance of the procedure; indicate if the client had any significant complications from the procedure, such as slowing of heart rate or rectal bleeding.
- Indicate the color, consistency, odor, and amount of stool removed. Note any alterations in perianal skin integrity that were found.



▼ REAL WORLD ANECDOTES

An 80-year-old female with a recent history of cerebrovascular accident (CVA) was admitted to the hospital from a long-term care facility. Her admitting notes indicated that her food and fluid intake had been poor for the last week. When the nurse attempted to perform an abdominal assessment, the client began to moan and grimace. The records that accompanied the client did not indicate when she had last had a bowel movement. During her admission assessment her nurse noted that the client was passing liquid stool. The nurse put on gloves and performed a rectal exam. She found a large mass of hard stool in the client's rectum. The client moaned and was in obvious pain throughout the examination. The nurse reported her findings to the client's physician and a manual removal of the fecal impaction was ordered. When the client's nursing home record finally arrived at the hospital, the nurse noted that her client had not had a recorded bowel movement for 7 days prior to her hospital admission.

> CRITICAL THINKING SKILL

Introduction

Client teaching is an essential part of nursing care.

Possible Scenario

Mr. Jeanperre was admitted to the hospital following an automobile accident. He was in skeletal traction secondary to several fractures. After 2 days of hospitalization Mr. Jeanperre's nurse became concerned that he had not had a bowel movement. She offered him the bedpan but he politely refused. By his fourth day of hospitalization, Mr. Jeanperre's nurse started to insist that he try to use the bedpan. He allowed her to place the bedpan but it was apparent that he would not use it. After 5 days without a bowel movement, Mr. Jeanperre's nurse discussed this issue with his physician. His physician performed a rectal exam and discovered a large hard mass of stool in Mr. Jeanperre's rectum. He noted that it was too large for Mr. Jeanperre to pass without damage to the sphincter so he ordered manual removal of the hardened stool.

Possible Outcome

When the nurse approached Mr. Jeanperre and explained the procedure and the reason it was needed, he

was visibly upset. He explained that he had not used the bedpan earlier due to his intense embarrassment and to have to undergo this procedure would be much more humiliating. The nurse was empathetic and assured Mr. Jeanperre that his privacy would be respected as much as possible, but she was insistent that this was a necessary procedure. Mr. Jeanperre finally consented to the procedure. He tolerated the procedure well despite tightly clenched teeth. After the nurse had finished, he thanked her for her patience and gentleness and noted that in the future he would use the bedpan in a timely manner.

Prevention

Client teaching and timely intervention could have saved Mr. Jeanperre discomfort. If the nurse had discussed the need for regular bowel movements with Mr. Jeanperre when she first became concerned, this incident may have been avoided. She could have offered alternatives that may have been more acceptable to the client. He might have been more comfortable with a male nurse assisting him. He might have accepted a family member assisting him rather than a staff member. The nurse needs to take an active role in problem solving to provide the best care possible for her clients.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have a very fragile rectal mucosa. Be sure to use an adequate amount of lubrication and perform this task gently.*
- *Elderly clients may be confused and unable to understand what you are doing and why.*
- *You may need assistance to safely complete the procedure.*



Pediatric Variations:

- *Do not explain too much in advance to a younger child, as this will only cause needless fear. Explain each step as you start to perform it.*
- *Be aware of the child's smaller anatomy. Break the pieces of stool up very small to prevent trauma to the anal sphincter. Use your little finger to protect small child or infant from injury.*
- *Be aware that a younger child may see this invasive procedure as punishment. Reassure the child that he or she has not done anything wrong, and that this procedure will help him or her feel better.*



Home Care Variations:

- *If fecal impaction is a frequent problem for the home care client, a caregiver or the client may need to be taught the procedure.*
- *Encourage the home care client to develop a bowel routine to prevent fecal impaction. Find out what cues and rituals help stimulate the urge to defecate and encourage to incorporate them into the daily routine.*

continues

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *Long-term care clients are at a high risk for impaction. If their mobility is impaired, impaction may be a frequent problem. Frequent monitoring of the client's bowel status and ongoing client teaching regarding the importance of regular bowel movements are important in this setting.*
- *Long-term care clients may simply resign themselves to having this procedure done on a regular basis rather than try to maintain a regular schedule of bowel movements. Be sure to encourage these clients to develop as "normal" a pattern of elimination as possible.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

Missing the cues of extended period of time without a bowel movement.

Ask Yourself:

How do I prevent this error?

Prevention:

Read the client's medical record if client is unable to provide accurate history of bowel habits.

> NURSING TIPS

- Manual stimulation of rectum may cause excessive vagal nerve stimulation and subsequent cardiac arrhythmia; monitor for signs of vasovagal reaction.
- If the client's anal skin integrity is impaired prior to the procedure, care must be taken not to contaminate the open area with stool.
- This procedure must be done gently. The rectal mucosa is thin and easily damaged. Tearing the rectal mucosa can introduce *Escherichia coli* into the client's bloodstream.
- Use of Xylocaine gel to lubricate fingers will help decrease pain. Beware that it may impair the client's ability to perceive and report injury to the tissues.

SKILL 6-21

Inserting a Rectal Tube

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Abdominal distention	Dyspnea
Abdominal surgery	Flatulence
Diarrhea	Rectal tube



> OVERVIEW OF THE SKILL

The insertion of a rectal tube is done to manage flatulence (gas) following abdominal surgery and/or reduce abdominal distention due to flatulence. It can be used to alleviate dyspnea due to abdominal distention. Finally, it is used to control diarrhea that cannot

be controlled with medical management and/or the use of rectal pouches, pads, or diapers due to extensive skin breakdown. The use of a rectal tube is a short-term solution.

> ASSESSMENT

1. Auscultate bowel sounds. Allows the nurse to determine if the client is experiencing reduced or increased peristalsis and establishes a baseline for comparisons after the procedure.
2. Assess fluid intake and output status. Enables the nurse to determine possible changes in the client's oral intake that need to be addressed.
3. Assess nutritional intake. Enables the nurse to determine possible changes in the client's food intake that need to be addressed.
4. Inspect the perianal skin. Allows the nurse to determine if there is a preexisting alteration in skin integrity.
5. Assess for complaints of cramping, pain, or abdominal distention, which may indicate the presence of gas and reduced peristalsis.

> DIAGNOSIS

- 1.3.1.3 Bowel Incontinence
- 1.6.2.1.2.1 Impaired Skin Integrity

- 1.2.1.1 Risk for Infection
- 9.1.1 Pain
- 1.6.1 Risk for Injury

> PLANNING

Expected Outcomes:

1. Elimination pattern returns to normal.
2. Client's abdominal girth will return to a size within normal limits for client's body type.
3. Client's skin integrity will not be damaged by the procedure.

Equipment Needed (see Figure 6-21-2):

- Rectal tube or catheter, 22 to 30 French
- Water-soluble lubricant
- Bedside drainage bag (optional, if rectal tube used to manage diarrhea)
- Ostomy odor eliminator or similar product (optional)
- Clean gloves
- Disposable pads or towels



Estimated time to complete the skill:
3–5 minutes

> CLIENT EDUCATION NEEDED:

1. Explain rationale regarding need of tube and its short duration of use.



Figure 6-21-2 Rectal tube, drainage bag, lubricant, and gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Assemble equipment.
3. Explain procedure to client.
4. Position client in left lateral position with upper leg bent over lower leg (see Figure 6-21-3).



Figure 6-21-3 Position the client in the left lateral position with the right leg sharply flexed.

5. Place disposable pads (if not available, use towels).
6. Use odor eliminator per manufacturer (optional).
7. Apply gloves.

RATIONALE

1. Reduces transmission of microorganisms.
2. Assures that all equipment is ready to use.
3. Decreases client's anxiety in relation to an unnatural process of removing stool from the rectum.
4. Facilitates easy access to anal canal.



Figure 6-21-4 Gently probe for stool and gently move finger to dislodge stool.

5. Protects bed linen. Allows for a receptacle for diarrhea until rectal tube is inserted.
6. Decreases odor, which may cause client embarrassment over procedure.
7. Practices aseptic technique.

8. Apply lubricant to a gloved finger.
9. Insert lubricated finger into rectum to check for possible obstructions prior to insertion of rectal tube (see Figure 6-21-4).
10. Change gloves if soiled from rectal exam.
11. Lubricate end of catheter (see Figure 6-21-5).



Figure 6-21-5 Lubricate the end of the catheter to facilitate entry into the anal canal.

12. Gently insert catheter into anal canal approximately 10–15 cm (4–6 inches) (see Figure 6-21-6).
13. Attach plastic bag or drainage bag to end of catheter if needed to control odor or stool (see Figure 6-21-7).

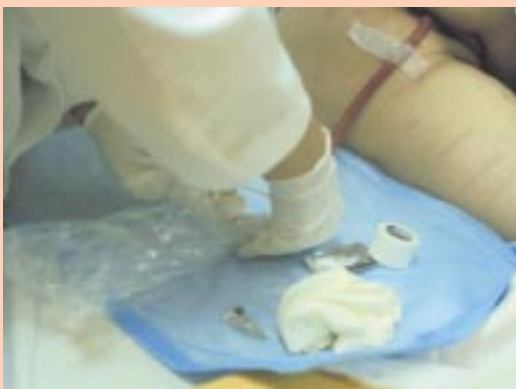


Figure 6-21-7 Attach a plastic bag to the end of the catheter to control odor or contain liquid stool.

14. Inflate balloon of catheter or tape tube to the lower buttock if rectal tube is not to be removed within 30 minutes (see Figure 6-21-8).

8. Protects fragile mucosa from injury.
9. Prevents possible injury to bowel mucosa from a blind entry.
10. Avoids spreading feces to external parts of the tube, the client, and the surrounding area.
11. Facilitates entry of catheter into anal canal.



Figure 6-21-6 Insert the catheter into the anal canal 4–6 inches.

12. Facilitates entry of catheter into anal canal.
13. Controls odor and contains any liquid stool that might be passed through the catheter.



Figure 6-21-8 Tape the tube to the lower buttock.

14. Stabilizes catheter if it is not immediately removed.

15. Dispose of pad. Remove soiled gloves (see Figure 6-21-9) and place in appropriate receptacle.

Figure 6-21-9 Remove soiled gloves.

15. Practices infection control standards.



16. Wash hands.

16. Reduces transmission of microorganisms.

> EVALUATION

- Elimination pattern returned to normal.
- Client's abdominal girth returned to a size within normal limits for client's body type.
- Client's skin was not damaged by the procedure.

> DOCUMENTATION

Nurses' Notes

- Description of bowel sounds
- Abdominal girth
- Insertion and removal of rectal tube
- Color and amount of diarrhea, if present
- Presence of flatus release
- Appearance of perianal skin
- Client tolerance of the procedure



▼ REAL WORLD ANECDOTES

Mr. Goodman was admitted to the intensive care unit with severe pancreatitis. He was NPO for several weeks and was receiving parenteral nutrition. By the time Mr. Goodman was able to tolerate oral feedings, his gag and swallow reflexes had been damaged secondary to prolonged intubation. His physician ordered a feeding tube placed to provide Mr. Goodman with nutrition and fluids. After 2 days of tube feedings Mr. Goodman started to suffer with incontinent liquid diarrhea. His perianal area was becoming excoriated from contact with stool and from frequent cleansing. Mr. Goodman's doctor ordered a rectal tube placed to drain the liquid stool. The rectal tube saved Mr. Goodman from further perianal irritation while allowing his stool to drain.

> CRITICAL THINKING SKILL

Introduction

A client is unable to evacuate flatus in the normal manner due to physiologic disease.

Possible Scenario

A 70-year-old male is 3 days status post repair of ruptured abdominal aortic aneurysm. He complains of increasing respiratory difficulty, and the nursing notes indicated that his abdomen appears distended. He has not passed flatus or stool since 48 hours prior to admission and surgery. Examination of the abdomen reveals diminished bowel sounds.

Possible Outcome

An astute nurse would realize that the client has a possible partial ileus, which could result in retaining flatulence, increased abdominal girth, and possible bowel obstruction. The physician should be immediately informed of the client's condition. Temporary placement of a rectal tube may be indicated.

Prevention

Early ambulating of patient will facilitate peristalsis. The client should be observed frequently and gastrointestinal and respiratory status assessed.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have more friable rectal mucosa. If a balloon is used to hold the rectal tube in place, deflate the balloon and reposition the catheter frequently.*
- *Confused clients may become agitated by the presence of the tube, believing they need to move their bowels.*



Pediatric Variations:

- *Use a tube that is the appropriate size for the child.*
- *Leaving a rectal tube in place may not be appropriate for very small children.*
- *Teenagers may be acutely embarrassed by passing flatus. Be sensitive to their developing body image.*



Home Care Variations:

- *Rectal tubes are not generally used in the home care setting.*



Long-Term Care Variations:

- *Rectal tubes are not generally used in the long-term care setting.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Missing the cues of decreased bowel sounds and increased abdominal distention.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess gastrointestinal system (auscultation of bowel sounds) and include abdominal girth in the case of diminished or absent bowel sounds. Ask client questions appropriate to ascertaining status of gastrointestinal tract (i.e., “Have you passed any gas today or belched?” “Are you having any cramping in your stomach/abdomen?”). Also always do an accurate review of client’s medical record, including assessment of gastrointestinal status.

> NURSING TIPS

- Rectal tube may be reinserted every 2 to 3 hours.
- Deflate balloon of tube every hour for 5 to 10 minutes to decrease possible bowel wall necrosis from compression of microvasculature.
- Discontinue rectal tube when stool is no longer liquid or when gas is relieved.
- Use of an external collection system is preferred, particularly if client’s integument is intact.
- Odor and noise are good ways to determine if flatulence is being removed. Be aware, however, that these may be acutely embarrassing to the client.
- A rectal tube is contraindicated for clients with rectal disease or neutropenia, and for those who are immunocompromised or receiving anticoagulation therapy.

SKILL 6-22

Irrigating and Cleaning a Stoma

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Colostomy
Digitalization of the Stoma
Irrigation

Irrigation cone
Stoma
Turgor
Viability



> OVERVIEW OF THE SKILL

The purpose of a colostomy irrigation is to empty the large colon of stool. The colostomy irrigation can be performed at the bedside or in the bathroom. This process is similar to performing an enema.

This procedure is not commonly done in many facilities. Check with the qualified practitioner, facility procedure manual, or nursing supervisor if you are uncertain.

> ASSESSMENT

1. Inspect the stoma for color and texture. This allows the nurse to determine the viability and turgor of the stoma.
2. Inspect the condition of the skin surrounding the stoma. Alterations in skin integrity prohibit a closed drainage system from adhering to the skin.
3. Determine the direction of the intestine by digitalization of the stoma. This allows the nurse to know the direction of the intestinal tract prior to beginning the irrigation, which will prevent possible perforation of the bowel.
4. Measure the dimensions of the stoma prior to obtaining an ostomy appliance system from central supply. This alleviates the problem of obtaining the wrong size equipment.

- 6.5.4 Toileting Self Care Deficit
7.1.1 Body Image Disturbance

> PLANNING

Expected Outcomes:

1. Client will experience bowel movement after irrigation of colon (colostomy).
2. Client and/or caregiver will demonstrate skill in performing irrigation of colon (colostomy).
3. Peristomal skin integrity will remain intact.
4. Irritated or denuded peristomal skin integrity will heal.
5. Client will acknowledge the change in body image.
6. Client will express positive feelings about self.
7. Client will maintain fluid balance.

Equipment Needed (see Figure 6-22-2):

- Colostomy irrigation kit
- Gauze 4 × 4 or stoma cover

> DIAGNOSIS

- 1.3.1.3 Bowel Incontinence
1.6.2.1.2.2 Risk for Impaired Skin Integrity



Figure 6-22-2 Colostomy irrigation kit

- Tape, if gauze is used
- Clean gloves
- Ostomy odor eliminator
- Bedpan, toilet, or basin



Estimated time to complete the skill:

45 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct the client on the frequency of colostomy irrigation. Most clients irrigate their colostomy every day to every other day.
2. Clients with a normal bowel habit of movements every 2–3 days are more easily regulated with colostomy irrigation than those individuals with 2–3 bowel movements per day.
3. Instruct the client on changes in skin condition or stoma to report to enterostomal/ostomy care nurse.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Apply clean gloves.
3. Assemble irrigation kit: Attach cone or catheter to irrigation bag tubing.
4. Fill irrigation bag with 1000 cc tepid tap water (see Figure 6-22-3).

1. Reduces the transmission of microorganisms.
2. Practices clean technique.
3. Ensures that all equipment is ready to use.
4. The colon is already filled with microorganisms so the use of sterile water is not necessary.

Figure 6-22-3 Colostomy irrigation solution may be administered using a bag or bucket. Fill with tepid tap water.



5. Open clamp and let water from the irrigation bag fill the tubing.

5. This eliminates any air bubbles, which can cause intestinal cramping.

continues

6. Hang bottom of irrigation bag at height of client's shoulder, or 18 inches above the stoma if the client is supine.
7. Check direction of intestine by inserting a gloved finger into orifice of stoma.
8. Place irrigation sleeve over stoma and hold in place with belt (see Figure 6-22-4).



Figure 6-22-4 Place the irrigation sleeve over the stoma.

9. Spray inside of irrigation sleeve and bathroom with odor eliminator (usual dose is two sprays).
10. Cuff end of irrigation sleeve and place into toilet bowl (if client is in bathroom) or bedpan (if client is in bed or chair) (see Figure 6-22-5).
11. Lubricate the cone end of the irrigation tubing (see Figure 6-22-6), and insert into orifice of stoma through the top opening of irrigation sleeve (see Figure 6-22-7).



Figure 6-22-6 Lubricate the cone end of the irrigation tubing.

6. Hanging the irrigation bag too high will cause increased intestinal cramping and hanging the irrigation bag below shoulder level will result in poor results. This height provides resistance of back pressure from flatus.
7. Determining direction of stoma prior to irrigation of colostomy prevents trauma to mucosa and conduit.
8. Irrigant and stool need a vehicle for containment.



Figure 6-22-5 Place the end of the irrigation sleeve into a basin, bedpan, or toilet bowl.

9. Helps to decrease and/or eliminate odor from stool as it is passed from the bowel.
10. Facilitates drainage of water and stool into a suitable container.
11. Prevents cone from causing trauma to intestinal lumen.

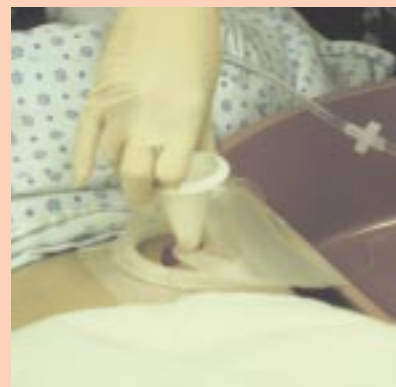


Figure 6-22-7 Insert the cone into the orifice of the stoma.

12. Close top of irrigation sleeve over the tubing.

13. Slowly run water through tubing into colon (see Figure 6-22-8).

Figure 6-22-8 Gently instill 500 to 1000 cc of tepid water



14. Remove cone after all water has emptied out of irrigation bag.

15. Close end of irrigation sleeve by attaching it to the top of the sleeve.

16. Encourage client to ambulate to facilitate emptying of remaining stool from colon.

17. Remove irrigation sleeve after 20–30 minutes or when stool is no longer emptying from colon.

18. Cleanse stoma and skin with warm tap water. Pat dry.

19. Place gauze pad over stoma to absorb mucus from stoma.

20. Secure gauze with hypoallergenic tape.

21. Remove gloves and wash hands.

12. Prevents water and stool from splashing outside of the irrigation sleeve.

13. This will alleviate intestinal cramping. If cramping should start, immediately stop and allow client to rest for a few minutes.

14. Irrigation of colostomy has been completed.

15. This maintains a closed system for any remaining stool and irrigant to empty into.

16. Ambulating influences peristalsis.

17. Practices clean technique.

18. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable.

19. Protects both the client's clothing and the stoma from irritation.

20. Ensures that the gauze remains in place.

21. Reduces the transmission of microorganisms.

> EVALUATION

- Client experiences a bowel movement after irrigation of colon (colostomy).
- Client or caregiver is able to demonstrate skill in performing irrigation of colon (colostomy).
- Peristomal skin integrity remains intact.
- Irritated or denuded peristomal skin integrity is healed.

- Client acknowledges the change in body image.
- Client expresses positive feelings about self.
- Client maintains fluid balance.

> DOCUMENTATION

Nurses' Notes

- Document assessment of peristomal skin.
- Document assessment of stoma.

- Document stoma measurements (length, width, height).
- Document amount of water used for irrigation.
- Document amount of stool flushed from colon.
- Document peristomal skin care if alteration in skin integrity was noted.
- Document type of dressing or ostomy pouch applied following irrigation.



▼ REAL WORLD ANECDOTES

A 78-year-old female has had her colostomy for 20 years because of rectal cancer. Following a short recovery room stay after surgery, she had radiation therapy. She has irrigated her own colostomy for the past 20 years. She is now complaining of severe intestinal cramping that is not relieved by colostomy irrigation and she is having persistent diarrhea. The client continued to irrigate the colostomy until seen by the enterostomy/ostomy nurse who reviewed the basic guidelines for performing colostomy irrigation with the client. The client discontinued irrigation of the colostomy after learning that it is not appropriate to irrigate when experiencing diarrhea.

> CRITICAL THINKING SKILL

Introduction

Look at a scenario in which the client with a colostomy is in need of a colostomy irrigation.

Possible Scenario

A 54-year-old male is recovering from an abdominal perineal resection and is requesting information on colostomy irrigation. He is 5 days postsurgery and is scheduled to begin chemotherapy and radiation therapy within the next 6 weeks.

Possible Outcome

If the client were to begin colostomy irrigation now, there is the possibility that he would become discour-

aged with the process once he began chemotherapy and radiation therapy. It takes approximately 6–12 weeks for the bowel to become acclimated to the irrigation process and this is the time when the client would be receiving his cancer therapies. Both chemotherapy and radiation will cause changes in the bowel, resulting in diarrhea, which is a contraindication to colostomy irrigation.

Prevention

The nurse should provide the client with information on colostomy irrigation and the rationale for waiting to begin the learning process after completion of cancer therapies. A second nursing action is to consult the enterostomal/ostomy care nurse.

▼ VARIATIONS



Geriatric Variations:

- A client who is too old to do the cleaning and maintenance procedures without assistance will need regular help from a caregiver. Instruct the caregiver, and “backup” caregivers if available, how to do the procedure.



Pediatric Variations:

- A client who is too young (less than 5 years old) to do the procedure without assistance will need help from a parent. Instruct the parents how to do the procedure.



Home Care Variations:

- If the client performs the procedure at home, assess the environment for safety. In the event the client feels weak or faint during the procedure, he should know how to stop the procedure and lie down.

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *Make periodic assessments of the condition of the colostomy.*
- *Provide periodic refreshers on the procedures and technique for the cleaning and maintenance of a colostomy.*
- *When reviewing the colostomy procedures with the client, reinforce the need to maintain good hygiene.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

Client complains of severe cramping during irrigation of colostomy.

Ask Yourself:

How do I prevent this error?

Prevention:

Slow infusion of tepid water into colostomy and hang irrigation bag no higher than 12 to 18 inches above the stomach.

> NURSING TIPS

- Client teaching is easily incorporated into the care of the ostomy by encouraging the client to be your assistant during the irrigation process.
- Clients who irrigate their colostomy still need to learn how to apply an ostomy appliance.
- Clients should always be instructed to use the cone adapter for irrigation and not a catheter, so as to avoid possible bowel perforation.

SKILL 6-23

Changing a Bowel Diversion Ostomy Appliance: Pouching a Stoma

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Bowel diversion
Colostomy
Ileostomy
Ileum

Ostomy appliance
Peristomal skin
Pouch
Stoma



> OVERVIEW OF THE SKILL

A colostomy is an opening surgically created from the ascending, transverse, or descending colon to the abdominal wall. An ileostomy is an opening from the ileum to the abdominal wall. Colostomies and ileostomies function to discharge waste (liquids, solids, and gases) to the outside of the body. Pouching a fecal diversion ensures that the client's peristomal

skin remains intact and provides the client with artificial continence.

The purpose of creating ileostomies and colostomies is to improve survival and the quality of life. Anger, grief, body image disturbances, socialization disturbances, depression, and helplessness often accompany these procedures.

> ASSESSMENT

1. Inspect the stoma for color and texture. Allows the nurse to determine the viability and turgor of the stoma.
2. Inspect the condition of the skin surrounding the stoma. Alterations in skin integrity will prohibit a closed drainage system from adhering to the skin.
3. Measure the dimensions of the stoma prior to obtaining an ostomy appliance system from central supply. Alleviates the problem of obtaining the wrong size equipment.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
1.6.2.1.2.1 Impaired Skin Integrity
7.1.1 Body Image Disturbance

> PLANNING

Expected Outcomes:

1. Peristomal skin integrity will remain intact.
2. Irritated or denuded peristomal skin integrity will heal.
3. Client will acknowledge the change in body image.
4. Client will express positive feelings about self.
5. Client will maintain fluid balance.

Equipment Needed (see Figures 6-23-2 to 6-23-4):


- Clean washcloth or 4 × 4 gauze pads
- Warm tap water
- Appropriate drainable ostomy appliance
- Scissors
- Pen or pencil
- Clean gloves



Figure 6-23-2 Ostomy wafer, gloves, scissors, pen or pencil, and sponges are used when pouching a stoma.



Figure 6-23-3 Ostomy skin barriers, also called wafers

 Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct client on pouch application, including frequency of change. Most pouching systems can be maintained for a minimum of 3 days to a maximum of 7 days.
2. Instruct client on changes in skin condition to report to wound/ostomy care nurse (ET nurse).
3. Provide the client with a list of equipment and product numbers as well as a list of retailers where supplies can be purchased.
4. List of reasons and situations on when to call physician and/or qualified practitioner.



Figure 6-23-4 Ostomy drainage bags

IMPLEMENTATION—ACTION/RATIONALE

ACTION	RATIONALE
1. Wash hands.	1. Practices aseptic technique.
2. Assemble drainable pouch and wafer.	2. Assures that all equipment is ready to use.
3. Apply clean gloves.	3. Practices clean technique.
4. Remove current ostomy appliance after emptying pouch of stool, if present.	4. Prevents contamination of surrounding environment if stool accidentally leaks from appliance when removed from client's skin.
5. Dispose of appliance in appropriate waste container.	5. Practices infection control.

continues

6. Remove gloves and wash hands.
7. Apply clean gloves.
8. Cleanse stoma and skin with warm tap water. Pat dry (see Figure 6-23-5).

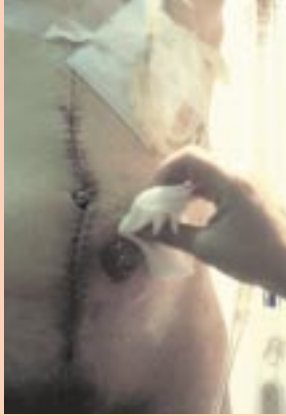


Figure 6-23-5 Cleanse the stoma and surrounding skin with warm tap water.

9. Measure stoma using a measuring guide for appropriate length and width of stoma at base (where skin meets stoma).
10. Place gauze pad over orifice of stoma to wick stool while you are preparing the wafer and pouch for application (see Figure 6-23-6).
11. Trace pattern onto paper backing of wafer.
12. Cut wafer as traced.
13. Attach clean pouch to wafer. Make sure port closure is closed.
14. Remove gauze pad from orifice of stoma.
15. Remove paper backing from wafer (see Figure 6-23-7) and place on skin with stoma centered in cutout opening of wafer (see Figures 6-23-8 and 6-23-9).

6. Practices aseptic technique.
7. Practices clean technique.
8. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable.

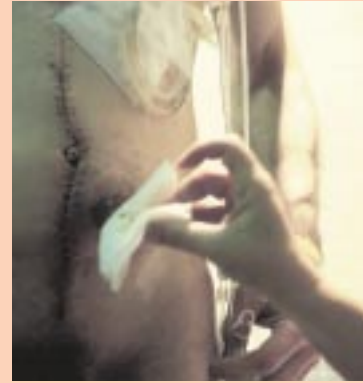


Figure 6-23-6 Place gauze over the stoma to absorb stool while the wafer and pouch are being prepared.

9. Correct measurement of the stoma's dimensions ensures a good fit of the ostomy appliance without excess skin at the base of the stoma exposed to stool.
10. Using something to wick stool away from the skin ensures a good seal of the wafer to the client's skin.
11. It is important to trace the measurements of the stoma and not "eye ball" the stoma measurements. Inaccurate pattern size results in either laceration of the stoma by the wafer or maceration of peristomal skin from constant contact with stool.
12. Accurately cutting the traced pattern ensures a snug fit.
13. Preattaching the pouch to the wafer saves time and prevents stool from leaking underneath the wafer during application process.
14. It is easier to visualize the stoma.
15. Paper backing needs to be removed from wafer in order for wafer to become adherent to skin.

Figure 6-23-7 Remove the paper backing from the wafer. There are many pouching systems available. This pouch is a one-piece system and has a skin barrier already attached. Others are two-piece systems where the skin barrier is attached first and the pouch is attached to the skin barrier.

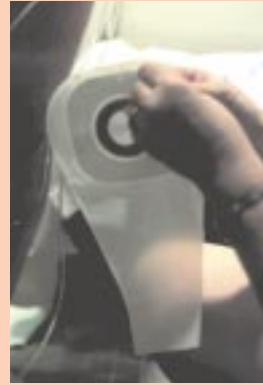


Figure 6-23-8 Place the wafer and pouch with the stoma centered in the cutout opening of the wafer.



Figure 6-23-9 Check to make sure the stoma fits the hole so a minimum of the surrounding skin is exposed to contact with stool.

16. Tape the wafer edges down with hypoallergenic tape (optional).

17. Wash hands.

16. Ensures that the edges of the wafer will not adhere to client's clothing.

17. Reduces transmission of microorganisms.

> EVALUATION

- Peristomal skin integrity remains intact.
- Irritated or denuded peristomal skin integrity is healed.
- Client acknowledges the change in body image.
- Client expresses positive feelings about self.
- Client maintains fluid balance.

> DOCUMENTATION

Nurses' Notes

- Assessment of peristomal skin
- Assessment of stoma
- Stoma measurements (length, width, height)
- Color and amount of drainage
- Peristomal skin care if alteration in skin integrity was noted
- Type of ostomy pouch applied



▼ REAL WORLD ANECDOTES

A 65-year-old female with a history of Crohn's disease was admitted for bowel obstruction. An exploratory laparotomy, a total colectomy with removal of 18 inches of small bowel, and an ileostomy were performed. The client's postoperative course was uneventful. Output from the ileostomy averaged 2000 cc per 24 hours. The client was instructed in ostomy care using a two-piece system. This enabled the client to use a drainable pouch during waking hours and switch to a urinary pouch at night, which could be attached to a bedside drainage bag.

> CRITICAL THINKING SKILL

Introduction

A client is postoperative abdominal perineal surgery with a permanent colostomy for rectal cancer.

Possible Scenario

A 78-year-old male is recovering from an abdominal perineal resection with a permanent colostomy for rectal cancer. He asks his nurse, “When will the surgeon remove this?” pointing to the colostomy. Upon further conversation with the client, the nurse learns that the client had been told an ostomy might not be needed if the surgeon “got everything” during the surgery.

Possible Outcome

The astute nurse will recognize the client’s clue that he is not aware of the permanence of the colostomy given the surgical procedure he recently underwent. It is possible that the client has not fully recovered from the anesthetic agents used during surgery or the client is experiencing some confusion regarding details of the surgery.

Prevention

Review with the client the type of surgery he had and the permanence of the ostomy. Report any of your concerns regarding the client’s understanding of the surgery and ostomy to the physician.

▼ VARIATIONS



Geriatric Variations:

- *If a client has arthritic hands, it is best to use either a one-piece appliance that is precut or a two-piece appliance that is adaptive to decreases in hand dexterity.*



Pediatric Variations:

- *A child’s ostomy bag needs to be very flexible, so it can bend with the client’s movement without becoming nonadherent.*
- *Adolescents need careful assessment and intervention to help them adjust to changes in body images related to the stoma and appliance.*



Home Care Variations:

- *Assess the client’s home for an appropriate setting in which to change the ostomy appliance and proper means to dispose of the contaminated items.*



Long-Term Care Variations:

- *Consider the ongoing stress of a slowly healing colostomy and the potential changes to body image large scars and marks will cause even after they have healed. Connect the client with support groups or further assessment if needed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The appliance chosen is too small for the stoma’s dimensions.

Ask Yourself:

How do I prevent this error?

Prevention:

Measure the dimensions of the stoma prior to obtaining and preparing a pouch for application. If the error has occurred, remove the leaking appliance and remeasure the stoma dimensions before reapplying the ostomy appliance.

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The ostomy pouch is always full of liquid stool and the pouch has come unsnapped from the wafer several times.

Ask Yourself:

How do I prevent this error?

Prevention:

Increase the frequency of checking and emptying the pouch. If increasing the frequency of emptying the pouch is impractical, it is best to change the pouch from a drainable system to a urinary pouch, which can be attached to bedside drainage.

> NURSING TIPS

- Recognize that all stomas are not the same. Each stoma must be treated individually, which requires that the nurse assess the dimensions, the location in relation to the client's body movements (i.e., sitting, bending), and the peristomal skin's condition.
- Client teaching is easily incorporated into the care of the ostomy by encouraging the client to assist the nurse during the application process.
- Use of an ostomy appliance that is intact, comfortable, and easy to use will increase the client's comfort level and thereby their participation in self-care activities and socialization.
- Costs to the client and the health care institution are reduced when simplistic ostomy care is provided. Simplistic ostomy care excludes the daily use of pectin powder, pectin, paste, and skin sealant.

Oxygenation

- Skill 7-1** Administering Oxygen Therapy
- Skill 7-2** Assisting a Client with Controlled Coughing and Deep Breathing
- Skill 7-3** Assisting a Client with an Incentive Spirometer
- Skill 7-4** Administering Pulmonary Therapy and Postural Drainage
- Skill 7-5** Administering Pulse Oximetry
- Skill 7-6** Measuring Peak Expiratory Flow Rates
- Skill 7-7** Administering Intermittent Positive-Pressure Breathing (IPPB)
- Skill 7-8** Assisting with Continuous Positive Airway Pressure (CPAP)
- Skill 7-9** Preparing the Chest Drainage System
- Skill 7-10** Maintaining the Chest Tube and Chest Drainage System
- Skill 7-11** Measuring the Output from a Chest Drainage System
- Skill 7-12** Obtaining a Specimen from a Chest Drainage System
- Skill 7-13** Removing a Chest Tube
- Skill 7-14** Ventilating the Client with an Ambu Bag
- Skill 7-15** Inserting the Pharyngeal Airway
- Skill 7-16** Maintaining Mechanical Ventilation
- Skill 7-17** Suctioning Endotracheal and Tracheal Tubes
- Skill 7-18** Maintaining and Cleaning Endotracheal Tubes
- Skill 7-19** Maintaining and Cleaning the Tracheostomy Tube
- Skill 7-20** Maintaining a Double Cannula Tracheostomy Tube
- Skill 7-21** Plugging the Tracheostomy Tube

SKILL 7-1

Administering Oxygen Therapy

Joan M. Mack, RN, MSN, CS

KEY TERMS

Diffusion	Hypoxic drive
FIO₂ (fraction of inspired air that is oxygen)	Oxygen saturation
Hypercapnia	Room air
Hypoventilation	Ventilation
	Venturi



> OVERVIEW OF THE SKILL

Administration of oxygen must be ordered by the physician or qualified practitioner. Some areas will have protocols that govern oxygen therapy and allow the nurse to begin therapy independently. Oxygen is a drug and so medication administration criteria are followed, in addition to the steps unique to oxygen therapy. Clients unable to maintain adequate PO₂ and O₂ saturation levels on room air are candidates for oxygen therapy. An adequate airway is essential to effectiveness of the treatment. It is best to treat the hypoxia with the lowest oxygen dose possible. Some clients with normal oxygen levels are also

given oxygen if they are at risk for complications related to hypoxia; for example, the myocardial infarction client often receives oxygen therapy to prevent dysrhythmias.

The physician or qualified practitioner will order the oxygen delivery system and flow rate, and the nurse will monitor response to the therapy. The dosage of oxygen may be ordered as a FIO₂ (fraction of inspired oxygen), which is expressed as a percentage or as liters per minute (lpm). Respiratory therapists may be available to assist in the administration and client assessment of oxygen therapy.

> ASSESSMENT

1. Determine client history and acute and chronic health problems. Clients with carbon dioxide retaining chronic obstructive pulmonary disease (COPD) will need lower amounts of oxygen so as not to obliterate their hypoxic respiratory drive. They may also already be on oxygen or need long-term continuous therapy.
2. Assess the client's baseline respiratory signs, including airway, respiratory pattern, rate, depth, and rhythm, noting indications of increased work of breathing. This will help determine the client's need for oxygen as well as response to the therapy.
3. Check the extremities and mucous membranes closely for color. This gives some indication of oxygenation, although problems with circulation and tissue perfusion can alter these factors also.
4. Review arterial blood gas (ABG) and pulse oximetry results. These are the most important determinants of the effectiveness of the pulmonary system and determine the need for therapy as well as changes in therapy.
5. Note lung sounds for rales/crackles. Secretions will interfere with airway patency and diffusion of oxygen and carbon dioxide across the alveolar-capillary bed.

6. Assess the nares, behind the earlobes, cheek, trachea site, or other places where oxygen tubing or equipment is in constant contact with the skin to look for signs of skin irritation or breakdown.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.3 Ineffective Breathing Pattern
- 1.6.1 Risk for Injury
- 1.5.1.2 Ineffective Airway Clearance
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 6.1.1.2 Activity Intolerance

> PLANNING

Expected Outcomes:

1. Oxygen levels will return to normal in blood and tissues as evidenced by oxygen saturation $\geq 95\%$, skin color normal.
2. Respiratory rate, pattern, and depth will be within the normal range.
3. The client will not develop any skin or tissue irritation or breakdown.



Figure 7-1-2A Stethoscope



Figure 7-1-2B In-line oxygen and flow meter

4. Breathing efficiency and activity tolerance will be increased.
5. The client will understand the rationale for the therapy.

Equipment Needed (see Figures 7-1-2A, 7-1-2B, and 7-1-2C):

- Stethoscope
- Oxygen source—portable or in-line
- Oxygen flow meter
- Oxygen delivery device: nasal cannula, mask, tent, or T-tube with adapter for artificial airway
- Oxygen tubing
- Pulse oximetry (optional)
- Humidifier and distilled or sterile water (not needed with low flow rates per nasal cannula)



Estimated time to complete the skill:
6–10 minutes

> CLIENT EDUCATION NEEDED:

1. Clearly explain to the client the reason for oxygen therapy.
2. Help the client understand the importance of leaving the delivery system on.
3. Use pictures to help clients understand the lungs and their airway so that they will be more likely to cooperate with the therapy.
4. Make sure clients know what signs and symptoms to report that indicate therapy is not effective and needs to be changed.
5. Reinforce safety issues—don't make clients overly afraid of a fire, but make sure they understand that oxygen does support combustion.



Figure 7-1-2C Humidifier, reservoir bag, tracheostomy mask, T-tube, and a simple face mask are used when administering oxygen therapy.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Nasal Cannula (see Figure 7-1-3)



Figure 7-1-3 Nasal cannula and oxygen tubing attached to a humidifier



Figure 7-1-4 Oxygen delivered via a nasal cannula

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Verify the physician's or qualified practitioner's order. 3. Explain procedure and hazards to the client. Remind clients who smoke of the reasons for no smoking while O₂ is in use. 4. If using humidity, fill humidifier to fill line with distilled water and close container. 5. Attach humidifier to oxygen flow meter. 6. Insert humidifier and flow meter into oxygen source in wall or portable unit. 7. Attach the oxygen tubing and nasal cannula to the flow meter and turn it on to the prescribed flow rate (1–5 liters/min). Use extension tubing for ambulatory clients so they can get up to go to the bathroom (see Figure 7-1-4). 8. Check for bubbling in the humidifier. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Ensures correct dosage and route. 3. Increases compliance with procedures. Oxygen supports combustion. 4. Prevents drying of the client's airway and thins any secretions. 5. Allows the oxygen to pass through the water and become humidified. 6. For access to oxygen. Many institutions also have compressed air available from outlets very similar in appearance to oxygen outlets. Green always stands for oxygen. Be sure to plug the flow meter into the green outlet. 7. Rates above 6 liters/min are not efficacious and can dry the nasal mucosa. 8. Ensures proper functioning. |
|--|---|

9. Place the nasal prongs in the client's nostrils. Secure the cannula in place by adjusting the tubing around the client's ears and using the slip ring to stabilize it under the client's chin.
10. Check for proper flow rate every 4 hours.
11. Assess client nostrils every 8 hours. If the client complains of dryness or has signs of irritation, use sterile lubricant to keep mucous membranes moist. Add humidifier if not already in place.
12. Monitor vital signs, oxygen saturation, and client condition every 4–8 hours for signs and symptoms of hypoxia.
13. Wean client from oxygen as soon as possible using standard protocols.
9. Keeps delivery system in place so client receives the amount of oxygen ordered.
10. Ensures that client receives proper dose. The nasal cannula is a low flow system because it administers oxygen while the client also inspires room air. The actual dose of oxygen received by the client will vary depending on the client's respiratory pattern.
11. Dry membranes are more prone to breakdown by friction or pressure from nasal cannula.
12. Detects any untoward effects from therapy.
13. Oxygen is not without side effects and should be used only as long as needed. Problems with reimbursement may develop if criteria for therapy are not met.

Mask: Venturi (high flow device), simple mask (low flow), partial rebreather mask, nonrebreather mask, and face tent

Figure 7-1-5 Make sure the mask used is the appropriate size for the client.



14. Wash hands.
15. Repeat Actions 2–6.
16. Attach appropriately sized mask (see Figure 7-1-5) or face tent to oxygen tubing and turn on flow meter to prescribed flow rate. The Venturi mask will have color-coded inserts that list the flow rate necessary to obtain the desired percentage of oxygen. Allow the reservoir bag of the nonbreathing or partial rebreathing mask to fill completely. Figure 7-1-6 shows several types of oxygen masks.
14. Reduces the transmission of microorganisms.
15. See Rationales 2–6.
16. To ensure proper fit, determine the size needed based on the client's size. Checks the oxygen source and primes the tubing and mask or tent.

Figure 7-1-6 Different types of oxygen masks: simple oxygen mask, tracheostomy mask, pediatric mask, and Venturi mask



- | | |
|---|---|
| <p>17. Check for bubbling in the humidifier.</p> <p>18. Place the mask or tent on the client's face, fasten the elastic band around the client's ears, and tighten until the mask fits snugly.</p> <p>19. Check for proper flow rate every 4 hours.</p> <p>20. Ensure that the ports of the Venturi mask are not under covers or impeded by any other source.</p> <p>21. Assess client's face and ears for pressure from the mask and use padding as needed.</p> <p>22. Wean client to nasal cannula and then wean off oxygen per protocol.</p> | <p>17. Ensures proper functioning.</p> <p>18. Prevents loss of oxygen from the sides of the mask.</p> <p>19. Ensures that client is receiving the proper dose.</p> <p>20. Air must be entrained to mix room air and oxygen coming from source to ensure proper oxygen percentage (FIO₂).</p> <p>21. Provides client comfort and prevents skin breakdown.</p> <p>22. Oxygen is not without side effects and should be used only as long as needed. The nasal cannula provides a lower FIO₂ than the mask. Problems with reimbursement may develop if criteria for therapy are not met.</p> |
|---|---|

Oxygen via an Artificial Airway (tracheostomy or endotracheal tube)

- | | |
|---|--|
| <p>23. Wash hands.</p> <p>24. Verify the physician's or qualified practitioner's order.</p> <p>25. Fill the humidifier with water and close the container.</p> <p>26. Attach humidifier and warmer to the oxygen flow meter (see Figure 7-1-7).</p> <p>27. Attach the wide bore oxygen tubing and T-tube adapter or tracheostomy mask to the flow meter and turn the meter to the flow rate needed to achieve the prescribed oxygen concentration. An oxygen analyzer may be used to check the actual oxygen percentage being delivered.</p> | <p>23. Reduces the transmission of microorganisms.</p> <p>24. Ensures correct dosage and time.</p> <p>25. Avoids contamination of the water.</p> <p>26. Humidification and warming of the air is essential with an artificial airway because the upper airway is bypassed by the tube.</p> <p>27. Checks the oxygen source and primes the tubing and adapter.</p> |
|---|--|

28. Check for bubbling in the humidifier and a fine mist from the adapter.

29. Attach the T-piece to the client's artificial airway or place the mask over the client's airway. Be sure the T-piece is firmly attached to the airway (see Figure 7-1-8).



Figure 7-1-7 Oxygen humidifier and warmer

30. Position tubing so that it is not pulling client's airway.

31. Check for proper flow rate and patency of the system every 1–2 hours depending on the acuity of the client. Suction as needed to maintain a patent airway.

32. Monitor airway patency, vital signs, oxygen saturation, and for signs and symptoms of hypoxia every 2 hours. Additionally, monitor breath sounds and tube position every 4 hours.

33. Wean client from therapy as ordered by physician or qualified practitioner. The client will probably receive oxygen via another route once the tube is removed. Some clients have tracheotomies permanently.

28. Ensures proper functioning.

29. Ensures that client will not develop complications related to an interrupted oxygen supply.



Figure 7-1-8 Attach the T-piece to the oxygen tubing.

30. Provides for client comfort and prevents dislodgment of the artificial airway.

31. Ensures that client is receiving proper dose.

32. Detects response to or any untoward effects from therapy. Determines whether tube is in place.

33. Prevents untoward effects of oxygen.

> EVALUATION

- Oxygen levels returned to normal in blood and tissues as evidenced by oxygen saturation $\geq 95\%$, skin color normal.
- Respiratory rate, pattern, and depth are within the normal range.
- The client did not develop any skin or tissue irritation or breakdown.
- Breathing efficiency and activity tolerance are increased.

- The client understands the rationale for the therapy.

> DOCUMENTATION

Nurses' Notes

- Record O_2 rate.
- Note method of oxygen delivery.
- Document client's assessment parameters and response to treatment.



▼ REAL WORLD ANECDOTES

A client came to the unit with an extremely low arterial oxygen level and a slightly high arterial carbon dioxide level. He was at risk for needing mechanical ventilation, but because he had chronic obstructive lung disease and there was a good chance that he would become dependent on the ventilator, the physician elected to treat him with oxygen therapy and bronchodilator aerosol treatments only. An antibiotic was also started until pneumonia could be ruled out. The client was continuously monitored with pulse oximetry, and his oxygen saturation levels slowly rose and stayed around 90%. Everyone was pleased, but as the day went on, the client became less and less responsive. When arterial blood gases were drawn midafternoon, his arterial carbon dioxide levels had risen above 100 mm Hg. The health care team was reminded of two major effects. First of all, pulse oximetry is not the panacea in monitoring. In clients who are prone to CO₂ retention, more frequent ABG analysis is necessary to detect changes before levels get too high. Additionally, the nurse needs to assess other indicators of PCO₂, including decreased sensorium, headache, and flushing. Second, the nurse was reminded of the changes that occur in the ventilatory drive of clients with COPD. Because their respiratory center is “numbed” to elevations in CO₂, it is the hypoxic drive that stimulates respirations. Because the oxygen satisfied his hypoxic drive, the client began to hypoventilate and retain carbon dioxide. COPD clients need low oxygen concentrations, usually 1–2 liters/min or ≤ 24% and astute monitoring of their respiratory rate and sensorium.

> CRITICAL THINKING SKILL

Introduction

Look at an example in which the nurse prevents potential cardiac arrest in a client receiving oxygen via a tracheostomy.

Possible Scenario

The client is receiving oxygen at 40% via a trach mask. The client's respirations are increased with intercostal retractions, tachycardia, and very flushed to cyanotic color. The nurse quickly checks to make sure the oxygen is hooked up to the wall and is connected to the client properly. The oxygen source is attached correctly, but the humidification bottle is dry. There are no visible secretions in the tracheostomy or T-tube adapter. When assessing the client's breath sounds, she notices very diminished sounds, and the client is in

more and more distress. While calling for help, she tries to pass a suction catheter down the tracheostomy. She is unable to pass the catheter or ventilate with a manual resuscitation bag (Ambu bag). Finally the nurse removes the inner cannula and finds a large, solid mucous plug attached to the cannula. The client's respiratory distress subsides and the cannula is cleaned and replaced.

Possible Outcome

Cardiopulmonary arrest and death of the client due to an obstructed airway, could result.

Prevention

Ensure that clients with tracheostomies receive humidification to prevent secretions from thickening and obstructing the airway.

▼ VARIATIONS



Geriatric Variations:

- Clients may pull at tubes; they need frequent reorientation and explanation.



Pediatric Variations:

- Clients may be frightened and pull off the O₂ mask and increase respiratory effort with crying. Try putting the mask on yourself and make a game out of it so the child is less frightened.

▼ VARIATIONS *continued*



Home Care Variations:

- *Oxygen may be provided by a high pressure cylinder, an oxygen concentrator, or a liquid oxygen system. Spare tanks and a backup power source are recommended. Compressed oxygen gas in a cylinder is available in sizes H or K for large stationary tanks and sizes D and E for travel and in the event there is power failure. Portable carts and carrying shoulder cases are also available. The company supplying the equipment will usually have personnel that will help with the setup and specific cleaning needs of the oxygen source.*
- *While any delivery system may be used in the home, nasal cannulas and tracheostomy tents/masks are the most commonly used. Home care clients may receive oxygen via a Spofford Christopher Oxygen Optimizing Prosthesis transtracheal system (SCOOP) catheter placed down into the trachea via a small stoma. It is held in place by a bead chain necklace and needs regular cleaning. Tubing, delivery system, and humidifier container should be washed regularly every 2–7 days with soap and water, disinfected, and dried before reuse, so an alternate setup should be available. Post safety precautions in the home. Oxygen sources should be kept from heating units, walls, drapes, and combustible substances such as hair spray.*



Long-Term Care Variations:

- *Long-term clients are more likely to develop skin irritation and mucous membrane dryness from oxygen therapy. Padding may be needed at friction sites. Humidity may be needed to reduce dryness.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The wrong flow rates are used.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to give the client only the flow rate ordered. Be aware of client history of lung disease. Clients with lung disease cannot tolerate high flow rates of oxygen.

Possible Error:

The wrong delivery system is used.

Ask Yourself:

How do I prevent this error?

Prevention:

Double-check the order. Assess the client's needs. Is the client a mouth breather? Does the client have an artificial airway in place? Does the client need humidified oxygen?

Possible Error:

The wrong client receives treatment.

Ask Yourself:

How do I prevent this error?

Prevention:

Double-check the wristband, or ask the client to tell you her name. Double-check written orders.

> NURSING TIPS

- Recognize which equipment to use; keep a chart on the unit that gives information on flow rates and settings of different devices.
- Promote client comfort by adjusting tubing or padding so that clients are more likely to leave oxygen therapy equipment on.
- Water will often collect in the corrugated tubing used for masks, T-tubes, and tracheostomy tents, creating pulls on the devices and bubbling noises. Try to avoid dependent loops and empty the water from the tubing into the appropriate container. Do not empty water back into the humidifier container because this can cause contamination of the humidifier.

SKILL 7-2

Assisting a Client with Controlled Coughing and Deep Breathing

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Abdominal binder	Fremitis
Atelectasis	Hemoptysis
Bronchospasm	Postoperative breathing
Controlled breathing	Post-tussic
Coughing	Splinting
Deep breathing	



> OVERVIEW OF THE SKILL

Teaching clients controlled, effective coughing techniques is essential in the management of bronchial secretions. It should be taught to all clients undergoing surgery and is essential for the management of excessive respiratory secretions in clients with lung conditions from acute to chronic. Secretions must be removed to prevent atelectasis and pneumonia. Furthermore, immobility causes the pooling

of bronchial secretions in the gravity-dependent areas of the lungs and blocks off small airways, leading to trapping of secretions or closure of these airways. As a result, less surface area of the lung is available for ventilation, which leads to hypercapnia and hypoxemia. Deep, controlled breathing reopens small airways and coughing promotes the removal of secretions.

> ASSESSMENT

1. Identify need for controlled coughing such as thick, tenacious secretions; weak or ineffective cough; abnormal breath sounds; or inability to take a deep breath because these conditions may increase the client's risk for impaired respiratory function.
2. Assess breath sounds by auscultation throughout lung fields, especially in dependent areas so that comparison can be made to baseline assessment after coughing and deep breathing.
3. Assess by percussion, if necessary, to verify auscultatory sounds.
4. Assess by tactile means for fremitus to verify presence of secretions.
5. Assess the client for understanding, ability, and cooperation to perform a controlled cough so the nurse can tailor client education needs.

> DIAGNOSIS

- 1.5.1.2 Ineffective Airway Clearance
- 1.4.1.1 Altered Tissue Perfusion
- 1.5.1.3 Ineffective Breathing Pattern
- 8.1.1 Knowledge Deficit regarding controlled coughing technique

> PLANNING

Expected Outcomes:

1. The client will be able to breathe deeply and clearly.
2. The client will be able to use effective breathing techniques.
3. The client will be able to cough productively if secretions are present on assessment.

4. The lung fields will be clear to auscultation; that is, there is absence of atelectasis, rales/crackles, or rhonchi.
5. The client's respiratory rate will be normal.
6. The client will have good skin color and mentation.

Equipment Needed (see Figure 7-2-2):

- Tissues
- Water pitcher and glass
- Emesis basin
- Stethoscope
- Pillows for splinting the client's chest and abdomen



Figure 7-2-2 Stethoscope, pillow, tissues, and emesis basin are used to assist the client with coughing and deep breathing.



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client the rationale for effective deep breathing and coughing.
2. Show the client how to hold a pillow to the chest to support the chest and abdominal muscles.
3. Instruct the caregiver how to assist the client with coughing and deep breathing.
4. Teach the caregiver how to recognize changes in the client's respiratory pattern.
5. Ask clients to turn their head away from the nurse when coughing.
6. Instruct clients to cover their mouth while coughing.
7. Tell the client to hold the inspiration for 1–2 seconds before coughing in order for it to be effective.
8. Teach clients with lung disease to huff cough to clear central airways. Take a slow, deep breath; hold it for 2 seconds; contract expiratory muscles; and open mouth and say “huff” several times while exhaling.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Assess the client's pain status. | 2. If pain is not controlled in clients with abdominal or thoracic surgery, they will not be able to cooperate. |
| 3. Explain the purpose and importance of the procedure. | 3. Elicits client's cooperation. |
| 4. Help the client sit in a high-Fowler's position if able. | 4. An upright posture allows for maximal lung expansion. |
| 5. Auscultate lungs before procedure (see Figure 7-2-3). | 5. Allows nurse to know which areas of the lungs need more effective coughing, deep breathing, and repositioning. |
| 6. Place the palms of your hands on the client's rib cage. | 6. Assesses effective expansion of chest. |



Figure 7-2-3 Auscultate the lungs prior to beginning the procedure.



Figure 7-2-4 The client holds a pillow over the chest or abdomen while coughing.

7. Use pillow or folded towels to splint the abdomen or chest if client has had surgery (see Figure 7-2-4).
 8. Practice deep breathing with client:
 - Instruct the client to cover the mouth with tissue (use mask, gloves, and gown for staff as needed).
 - Take a deep breath in and exhale slowly and repeat 2–3 times.
 - Repeat 10 times every 1–2 hours as needed.
 9. Reassess lung fields after procedure.
 10. Assist the client to cough as follows:
 - Follow the procedure for deep breathing and have the client hold breath for 1–2 seconds.
 - Contract abdominal muscles, cough forcefully, and expectorate secretions into tissue or basin as nurse splints incision areas as appropriate (see Figure 7-2-5).
 - Splint the client's abdomen and chest as he coughs by pressing on lower chest wall and abdomen with your hands.
7. Decreases pain with deep expansion in post-operative clients and promotes effective deep breathing and coughing.
 8. Promotes loosening of secretions.
 - Repetition is necessary to cough up secretions.
 9. Evaluation of procedure is necessary to know whether procedure should be repeated.
 10. Even though deep inspirations may clear airways of clients with atelectasis, coughing is essential to clear bronchial secretions, especially from lower airways.
 - After a deep inspiration, the force of the air will be behind the mucus and propel it upward. The force of the air after the deep inspiration and the muscle contractions enable more effective coughing.
 - The nurse can also use splinting at this time to help with force of abdominal contraction.

Figure 7-2-5 The client expectorates secretions into a tissue.



- | | |
|---|---|
| <p>11. Repeat as necessary to clear lung fields; however, be aware that excessive coughing can irritate the trachea and bronchial tree. Clients with chronic respiratory problems may need to repeat the procedure at more frequent intervals but with fewer coughs with each procedure. Adjunct therapy may be necessary.</p> <p>12. Observe for dizziness, shortness of breath, or other respiratory problems.</p> <p>13. Dispose of all tissues and wash hands.</p> | <p>11. It is essential to clear airways to prevent atelectasis and pneumonia. If excessive coughing happens, the client may cause irritation and compromise respiratory status.</p> <p>12. May indicate hyperventilation.</p> <p>13. Reduces the transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- The client is able to breathe deeply and clearly.
- The client is able to use effective breathing techniques.
- The client is able to cough productively if secretions are present on assessment.
- The lung fields are clear to auscultation, that is, there is absence of atelectasis, rales/crackles, or rhonchi.
- The client's respiratory rate is normal.
- The client has good skin color and mentation.

> DOCUMENTATION

Nurses' Notes

- Record date and time of procedure.
- Include description of secretions and amount expectorated.
- Record results of auscultation before and after procedure.



▼ REAL WORLD ANECDOTES

Harry had abdominal surgery 2 days ago and had been taught the importance of deep breathing and coughing. While the nurse was helping him take deep breaths and cough, he had a coughing spasm. The nurse held on to the pillow that she used to splint his abdomen until the episode stopped. She offered Harry sips of warm water to help soothe the trachea. He said that his incisional pain was worse so he used his PCA button. The nurse took off her gloves and gown and told Harry to rest for 30 minutes. When she returned, his pain had decreased and he felt ready to try the procedure again. After assessing his lung fields, the nurse held the pillow firmly against Harry's abdomen, and he was able to take deep breaths and cough up a moderate amount of thick, yellowish mucus. When she listened to his lungs again, they were clear where she had heard rhonchi before.

> CRITICAL THINKING SKILL

Introduction

If a client continues to have crackles and decreased breath sounds after controlled breathing and coughing, there may be cardiovascular involvement.

Possible Scenario

A 58-year-old smoker with a history of mild congestive heart failure has a hernia repair. After surgery he continues to have a moist cough and crackles in the lower bases of the lungs.

Possible Outcome

This client's nurse knows that the presence of fluid in the lungs may be related to pulmonary edema. He has

the client cough to determine if post-tussive rales are present. He instructs him to change positions and assesses whether the areas of crackles/rales or rhonchi change. They don't. He checks the client's weight and assesses for edema. He listens for a third heart sound and reviews the intake and output information. Finally, he checks vital signs and notifies the physician of signs and symptoms indicative of congestive heart failure.

Prevention

Monitor fluid status and risk status of client each shift and be cognizant of any early signs of change in cardiac and respiratory status.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not effectively use deep breathing and may need more instruction from the nurse.*
- *The tracheal tissue may be more fragile and at risk for bleeding if coughing is too vigorous.*
- *Elderly clients may need more support during the procedure such as help splinting the chest or abdomen with a pillow.*



Pediatric Variations:

- *Crying may occur with coughing and pain after surgery and may be appropriate in clearing airways of children.*
- *Children may benefit from hugging their favorite stuffed animal instead of a pillow.*
- *Play therapy can be used in performing the procedure so it is like a game.*
- *Children will need to have pain medication 30 minutes before the procedure to help them cooperate.*



Home Care Variations:

- *Long-term immobility will lead to increased secretions.*
- *Ask family members to assist with routine coughing and deep breathing procedures.*
- *Assess the home for ventilation or air conditioning and the client's reaction to the environment.*
- *Provide instruction on the proper disposal of secretions and used tissues to decrease the risk of transmission of microorganisms.*



Long-Term Care Variations:

- *Immobility may lead to increased secretions.*
- *Encourage clients to walk in the halls.*
- *Increasing fluid intake will decrease viscosity of secretions.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client is not able to take a deep breath because you didn't allow enough time for pain control before starting the controlled breathing and coughing procedure.

Ask Yourself:

How do I prevent this error?

Prevention:

Plan the pain medication dose for at least 30 minutes before the time of the procedure. If not enough time was allowed for pain control, stop the breathing exercise and allow the pain medication to take effect. Assess the client for pain. Ask her whether she is ready to do the deep breathing and coughing. When she is ready, proceed.

> NURSING TIPS

- As clients take deep inspirations, breathe with them to help with timing.
- Use gown, gloves, and mask with clients who have copious secretions or clients who expectorate vigorously.
- Abdominal binders may be necessary for clients with major abdominal surgery to avoid dehiscence.
- If clients complain of severe abdominal pain with the procedure, evaluate the wound site and pain status.

SKILL 7-3

Assisting a Client with an Incentive Spirometer

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Atelectasis
Coughing
Deep breathing
Expiration

Incentive spirometer
Inspiration
Pneumonia
Spirometer



> OVERVIEW OF THE SKILL

Incentive spirometers (IS) encourage clients to sustain deep voluntary breathing and maximum inspiration to open airways, encourage coughing, and prevent or reduce atelectasis. Incentive spirometers provide visual feedback to clients and, therefore, enhance deep voluntary breathing and sustained inspiration. Incentive spirometers are used for post-operative clients, chest trauma victims, and clients

with respiratory disorders. Clients who have had abdominal or thoracic surgery and elderly clients are especially at risk for atelectasis and consolidation. Incentive spirometers may be used as adjunct treatment in other high risk clients such as those on long-term bedrest, clients with chronic and restrictive lung diseases, or clients on medications that depress respiration.

> ASSESSMENT

1. Assess need for incentive spirometry. Clients who are post-surgery, or clients with pneumonia or post-chest trauma are at increased risk for respiratory complications.
2. Assess the client's respiratory status by general observation, auscultation of breath sounds, and percussion of thorax to be able to compare future assessments with a baseline evaluation.
3. Review medical record for recent arterial blood gases to determine need for using incentive spirometer.

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern

> PLANNING

Expected Outcomes:

1. The client will have clear breath sounds throughout lung fields, especially at the bases of the lungs.
2. The client will have normal depth and rate of respiration.
3. The inspiratory lung expansion will return to client's pre-event status.
4. The client's arterial blood gases will be normal.
5. There will be an absence of consolidation or atelectasis.
6. Respirations will not be labored.

Equipment Needed (see Figure 7-3-2):

- Stethoscope
- Incentive spirometer with appropriate mouthpiece
 - a. Flow-oriented
 - b. Volume-oriented

- Tissue
- Emesis basin
- Pillow if needed



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client the purpose of IS.
2. Show the client how to seal the mouthpiece and use the spirometer.
3. Teach the client that the goal of sustained inspiration and expansion of the lungs is to prevent atelectasis and consolidation.
4. Tell the client that inspiration must be sustained for the treatment to be effective.
5. Teach the client how to use diaphragmatic breathing.
6. Teach the client how to build up depth of inspiration.
7. Show the client how to use splinting to control incisional pain during IS use.
8. Teach the client to use tissues to dispose of expectorated secretions.



Figure 7-3-2 Stethoscope, tissue, pillow, and emesis basin are all used with the incentive spirometer to open airways and encourage coughing.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Check chart for previous respiratory assessment. | 2. Establishes a baseline for comparison. |
| 3. Gather equipment. | 3. Ensures preparation. |
| 4. Explain procedure to client. | 4. Encourages client's cooperation. |
| 5. Demonstrate deep, sustained inspiration. | 5. Demonstration is a reliable teaching technique. |
| 6. Instruct client to assume a semi-Fowler's or high-Fowler's position. | 6. Promotes optimal lung expansion. |
| 7. Set pointer on IS at appropriate level or point to level where disk or ball should reach. | 7. Encourages client to reach appropriate goal. |
| 8. Use incentive spirometer: <ul style="list-style-type: none"> • Have client breathe in and exhale completely before using IS. • Hold unit upright. • Have client seal lips around mouthpiece and inhale slowly and deeply until desired volume is attained (see Figure 7-3-3). | 8. <ul style="list-style-type: none"> • Promotes clearing of secretions before using the IS. • Prevents ineffective use of the spirometer. • Allows gauge to register effective inspiration. |

continues



Figure 7-3-3 Have the client seal her lips around the mouthpiece.



Figure 7-3-4 Inhale slowly and deeply for at least three seconds.

- Sustain inspiration for at least 3 seconds (see Figure 7-3-4).
 - Exhale slowly.
9. Repeat 10–20 times every 1–2 hours while awake for 72 hours.
 10. Teach client to perform IS every hour and verify that the client is compliant.
 11. Dispose of soiled equipment or tissues and wash hands.
- Allows the alveolar sacs to open and remain open and discourages atelectasis.
9. Ensures airways remain open and prevents atelectasis. May be required longer than 72 hours.
 10. Encourages clients to take responsibility for their health care.
 11. Reduces the transmission of microorganisms.

> EVALUATION

- The client has clear breath sounds throughout lung fields, especially at the base of the lungs.
- The client has normal depth and rate of respiration.
- The inspiratory lung expansion returned to client's pre-event status.
- The client's arterial blood gases are normal.
- There is an absence of consolidation or atelectasis.
- Respirations are not labored.

> DOCUMENTATION

Nurses' Notes

- Record lung volume in cubic centimeters (cc).
- Record respiratory assessment, including auscultation of breath sounds and rate and depth of respiration.
- Note the type and amount of secretions expectorated.



▼ REAL WORLD ANECDOTES

Mrs. Hoang, a 37-year-old Asian woman, was recovering from abdominal surgery. Because she spoke very little English, the nurse showed her how to use the incentive spirometer (IS). She asked Mrs. Hoang's daughter to tell her why she needed to use the IS and she seemed to understand. The nurse demonstrated first and then the client returned the demonstration with a very low volume. The nurse then showed her how hugging a pillow would splint her incision, and the client felt more comfortable attaining larger and larger volumes. She seemed pleased when the nurse applauded her good efforts at reaching the goal volume. Then the nurse showed her the times on the wall clock when she should repeat the procedure. At the appointed hour, the nurse noted that Mrs. Hoang was already preparing to use her IS when she went into her room to check on her.

> CRITICAL THINKING SKILL

Introduction

Nurses must be able to evaluate effectiveness of IS by auscultation of the lung fields.

Possible Scenario

Nate is recovering at home from cardiac-valve replacement surgery. The nurse caring for him is concerned about his postsurgical progress. He states he continues to use IS faithfully every hour and yet his respiratory assessment still demonstrates decreased breath sounds, dull percussion, and increased temperature.

Possible Outcome

The nurse, in a hurry, does not question Nate further about his IS use or his symptoms. Nate has continued atelectasis and develops pneumonia.

Prevention

Assessing that the client is properly using IS and on a regular basis by observing the client is important. Include assessing for tactile fremitus and voice sounds to note the development of consolidation. Report an increase in temperature because it may be a sign of a lung infection.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients with dentures or dry mouth may have difficulty sealing their mouth around the mouthpiece.*
- *Respiratory rates vary with age, and elderly clients may have more difficulty sustaining deep inspirations.*
- *Elderly clients frequently have abdominal, cardiac, or orthopedic surgery that requires IS use.*
- *Elderly clients with chronic respiratory disease or a history of smoking will be at higher risk of respiratory compromise.*



Pediatric Variations:

- *Respiratory rate and volume vary with age.*
- *Younger children have increased activity and crying and may not be cooperative with IS use.*
- *Making a game out of the IS can promote more compliance in young children.*



Home Care Variations:

- *Remind clients to clean the mouthpiece with soap and water every 24 hours.*
- *Ask the client to return demonstrate the correct use of the IS before discharge.*
- *Assess the home for ventilation and air conditioning as well as proper disposal of soiled respiratory material.*
- *Teach family members to hold their hands on the client's chest to watch expansion of the chest.*
- *Tell the caregiver to breathe with the client during the procedure.*



Long-Term Care Variations:

- *Clients with chronic obstructive disease should be taught the pursed-lip technique after deep inspiration and slow exhalation to allow airways to stay open and to avoid air trapping.*
- *Use oral pharyngeal suctioning or ask the client to cough before attempting IS use in clients with chronic bronchitis or those with excessive secretions.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

You note that the client is not sealing his lips around the mouthpiece, so the ball does not rise to the desired level.

Ask Yourself:

How do I prevent this error?

Prevention:

Ask the client to demonstrate the ability to maintain a seal around the mouthpiece before the procedure. If the error does occur, set the IS aside. Ask the client whether he would like to remove his dentures, if applicable. Give the client a drink of water or apply a lip balm to moisten the lips. Ask the client to try making a seal around the mouthpiece. If successful, go ahead with the procedure.

> NURSING TIPS

- Have client practice deep breathing before IS so coughing will clear secretions in upper airways, reducing the risk of secretions entering lower airways.
- Increase depth of inspirations with each use of IS.
- Avoid hyperventilation by allowing pauses between breaths.
- Assess for adequate pain control for clients having undergone abdominal or thoracic surgery so the client can effectively use IS.
- Have tissues available so clients will not cough on staff. Staff may use masks if clients have copious secretions.
- If clients are unable to sit up while using IS, ask them to turn from side to side between the use of IS to hyperinflate all areas of the lung.
- Slowly build up respirations from shallow to deep to prevent clients from vomiting due to excessive coughing during spirometry use.

SKILL 7-4

Administering Pulmonary Therapy and Postural Drainage

Peter C. Meyer, RRT

KEY TERMS

Aspiration
Auscultation
Chest x-ray
CPPD

CPT
Desaturation
Pain control
Positioning



> OVERVIEW OF THE SKILL

Chest pulmonary therapy and postural drainage (CPPD), also known as chest physiotherapy (CPT), may, through proper positioning and chest wall percussion, facilitate airway clearance and be effective in

mobilizing pulmonary secretions in the postoperative client, and those suffering pneumonitis, emphysema, asthma, chronic bronchitis, bronchiectasis, and cystic fibrosis.

> ASSESSMENT

1. Assess the client's breath sounds via auscultation and the ability to clear secretions. **Determines the amount of congestion present.**
2. Determine the client's rhythm, depth of breathing, and rate. **Determines whether the client will tolerate the procedure.**
3. Observe the quality of the secretions. **Humidification therapy may be necessary if secretions are thick and tenacious.**
4. Take note of any complicating conditions. **Look for symptoms or history of congestive heart failure (CHF), cerebral edema, head trauma, abdominal distention, arrhythmias, hypertension, or end-stage COPD.**

> DIAGNOSIS

- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern

> PLANNING

Expected Outcomes:

1. Clearance of pulmonary secretions will be improved.
2. Ventilation will be improved.
3. Potential complications will be minimized.
4. Client will experience an improved sense of well-being.

Equipment Needed:

- Electric or pneumatic percussors, the Th-air-apy Vest, or manual percussion (see Figure 7-4-2)
- Tissues or suction equipment and manual ventilator when appropriate



Estimated time to complete the skill:

Approximately 5 minutes per affected lung field



Figure 7-4-2 Pneumatic percussor

> CLIENT EDUCATION NEEDED:

1. Explain the procedure and rationale to the client.
2. Teach coughing and breathing mechanics.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Auscultate. 3. Confirm presence of appropriate equipment. 4. Turn off tube feeding, if appropriate. 5. Position client properly. 6. Initiate CPT (see Figure 7-4-3). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Establishes baseline and confirms areas of concentration. 3. Ensures thorough and safe therapy. 4. Prevents aspiration. 5. Allows drainage of affected segments. 6. Delivers therapy. |
|---|--|



Figure 7-4-3 Initiate chest pulmonary therapy.

- | | |
|---|--|
| <ol style="list-style-type: none"> 7. Move the percussor around the chest area where CPT has been ordered (see Figures 7-4-4 and 7-4-5). | <ol style="list-style-type: none"> 7. CPT provided to the designated area promotes effective treatment. |
|---|--|



Figure 7-4-4 Slowly move the percussor around the target chest area.



Figure 7-4-5 Cover all parts of the target chest area.

- | | |
|--|--|
| <ul style="list-style-type: none"> 8. Monitor the client during the therapy for signs of discomfort, difficulty breathing, or distress. 9. Auscultate after the therapy is completed. 10. Suction secretions as necessary. 11. Wash hands. | <ul style="list-style-type: none"> 8. Allows early intervention for the effects of the treatment. 9. Check for changes in breath sounds. 10. Keeps the airway clear. 11. Reduces the transmission of microorganisms. |
|--|--|

> EVALUATION

- Clearance of pulmonary secretions was improved.
- Ventilation was improved.
- Potential complications were minimized.
- Client experienced an improved sense of well-being.

> DOCUMENTATION

Nurses' Notes

- Document areas of concentration; duration of treatment; nature of secretions, if any; breath sounds; and client tolerance.



▼ REAL WORLD ANECDOTES

A 57-year-old postoperative female client with a history of COPD presented with low oxygen saturation on a 50% mask and diminished right lower and middle lobe breath sounds. A chest film showed right lower and middle lobe atelectasis. CPT to the right lower and middle lobes every 4 hours was ordered. After the third treatment, the client, through strong coughing, produced a large mucous plug. Breath sounds and oxygen saturation improved, and a subsequent chest x-ray indicated improved ventilation.

> CRITICAL THINKING SKILL

Introduction

A 47-year-old male post-liver transplant client was ordered to receive CPT every 4 hours to both lower lobes. The client was 48 hours post-op, on a nasal cannula, with a nasal feeding tube in place.

Possible Scenario

The client was placed in the Trendelenburg position, and CPT was initiated.

Possible Outcome

The feeding tube could become dislodged, leading to aspiration.

Prevention

Halting flow to the feeding tube prior to positioning the client in that Trendelenburg position will reduce the risk of aspiration.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not be able to assume and hold positions needed for postural drainage. Modifications may be needed.*



Pediatric Variations:

- *Small vibrators are available for neonatal use, or neonatal resuscitation masks may be used for manual percussion.*



Home Care Variations:

Not applicable



Long-Term Care Variations:

Not applicable

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

A variety of tubes and lines may be in place and at risk when positioning the postoperative client, such as endotracheal tubes, chest tubes, IV and arterial lines, Swan-Ganz catheters, and Foley catheters.

Ask Yourself:

How do I prevent this error?

Prevention:

Be aware of placement of tubes. Get assistance if needed.

> NURSING TIPS

- Maintain adequate client oxygenation during the treatment.
- Prevent aspiration.
- Provide adequate pain control.
- Be aware of all client tubes, lines, and catheters.
- Assess effectiveness of CPT.

SKILL 7-5

Administering Pulse Oximetry

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Blood arterial saturation

Oximeter
Oximetry

Oxygen arterial saturation

Oxygenation
Pulse oximeter



> OVERVIEW OF THE SKILL

Pulse oximetry is a quick, easy, noninvasive method to assess the arterial blood oxygen saturation of a client by using an external sensor. There are several types of sensors; however, the most common for adult use is a finger sensor. The finger is placed between a clip. On one side of the clip are light-emitting diodes (a red and an infrared); a photo detector is on the other side. The beam of light goes through the tissue and blood vessels, and the photo detector receives the light and measures the amount of light absorbed by oxygenated and unoxygenated hemoglobin. Unoxygenated hemoglobin absorbs more red light and

oxygenated hemoglobin absorbs more infrared light. The amount of each light and, hence, the arterial blood oxygen saturation (SaO_2) is determined by the spectrum of light. Other types of sensors can be used on the toe, nose, ear, forehead, or around the hand or foot and use this same principle of spectrometry. Special sensors are available for the neonatal hand and pediatric toe. Reusable sensors include two sensor heads that are secured with γ -strip tapes. The center strip aids placement into 25-mm tapes. The appropriate sensor should be determined by the measurement site.

> ASSESSMENT

1. Assess the client's hemoglobin level. Because pulse oximetry measures the percent of SaO_2 , the results of the oxygenation status will be affected. The results may appear normal if the hemoglobin level is low because all hemoglobin available to carry O_2 is completely saturated; therefore, it is important to know the hemoglobin level.
2. Assess the client's color. If the client has vasoconstriction of the extremities, an inaccurate recording may be obtained.
3. Assess the client's mental status because this will assist in general evaluation of oxygen delivery to the brain.
4. Assess the client's pulse rate. The pulse oximeter measures pulse rate. Manually assessing pulse can be used as a cross-reference to indicate functioning of the oximeter.
5. Assess the area where the sensors will be placed to determine whether it is an area with adequate circulation (no scars, thickened nails, or fingernail polish).

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.4.1.1 Decreased Tissue Perfusion
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The SaO₂ will be in a normal range for the client (95%–100% in the absence of chronic respiratory disease).
2. The client will be alert and oriented.
3. The client color will remain normal.
4. The client will tolerate the placement of sensors.
5. There will not be any skin irritation or pressure at area of sensors.

Equipment Needed:

- Pulse oximeter (see Figure 7-5-2)
- Proper sensor
- Alcohol wipe or soap and water
- Nail polish remover if necessary



Estimated time to complete the skill:

5 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of oximetry.
2. Explain selection of site and necessity of clean site.
3. If using oximeter for monitoring purposes, explain the need to keep sensors in place.



Figure 7-5-2 Pulse oximeter

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Select an appropriate sensor. Sensors are commonly used for the fingertips. | <ol style="list-style-type: none"> 2. The sensor should be selected based on the size of the person and the site to be used. |
| <ol style="list-style-type: none"> 3. Select an appropriate site for the sensor. Fingers are most commonly used; however, toes (see Figure 7-5-3), ear lobes, nose, forehead (see Figure 7-5-4), hands, and feet can be used. Assess for capillary refill and proximal pulse. If the client has poor circulation, use an earlobe, forehead, or nasal sensor instead. In children, sensors may be used on the hand, foot, or trunk. If elderly clients have thickened nails, pick another site. | <ol style="list-style-type: none"> 3. Decreased circulation alters the O₂ saturation measurement. |
| <ol style="list-style-type: none"> 4. Clean the site with an alcohol wipe. Remove artificial nails or nail polish if present or select another site. Clean any tape adhesive. Use soap and water if necessary to clean site. | <ol style="list-style-type: none"> 4. Polish and artificial fingernails alter the results. |
| <ol style="list-style-type: none"> 5. Apply the sensor. Make sure the photo detectors are aligned on opposite sides of the selected site (see Figure 7-5-5). | <ol style="list-style-type: none"> 5. Proper application is necessary for accurate results. |

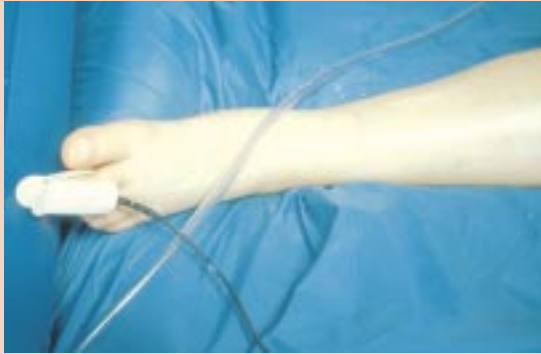


Figure 7-5-3 Pulse oximeter sensor placed on a toe



Figure 7-5-4 Pulse oximeter sensor placed on the forehead



Figure 7-5-5 Apply the sensor to the selected site.



Figure 7-5-6 Follow the manufacturer's instructions when taking an oximetry reading.

6. Connect the sensor to the oximeter with a sensor cable. Turn on the machine. Initially a tone can be heard, followed by an arterial wave-form fluctuation with each arterial pulse. In most oximeters if the battery is low, a low-battery light illuminates when 15 minutes of battery life is remaining. Oximeters should remain plugged in even when not in use (see Figure 7-5-6).
7. Adjust the alarm limits for high and low O₂ saturation levels according to the manufacturer's directions. Pulse rate limits most often can also be set. Adjust volume.
8. If taking a single reading, note the results (see Figure 7-5-7). If the oximeter is being used for constant monitoring, move the site of spring sensors every 2 hours and adhesive sensors every 4 hours.
9. Cover the sensor with a sheet or towel to protect it from exposure to bright light.
6. The tone and wave-form fluctuation indicate that the machine is detecting blood flow with each arterial pulsation.
7. The alarms indicate that the saturation levels or pulse rates are out of the designated levels and alert the nurse of abnormal O₂ saturation levels and pulse rates.
8. Prevents skin breakdown from pressure and skin irritation from the adhesive.
9. Ambient light sources such as sunlight or warming lights may interfere with the sensor and alter the SaO₂ results.



Figure 7-5-7 Note the results on the oximeter.

- 10.** Notify the physician or qualified practitioner of abnormal results.
- 11.** Record the results of O₂ saturation measurements according to physician's or qualified practitioner's order or protocol. Include in the documentation the type of sensor used, the site of application, the hemoglobin levels, and your assessment of the client's skin at the sensor site.
- 10.** Low SaO₂ levels require medical attention because permanent tissue damage may result from low oxygen saturation.
- 11.** Communicates the findings to the other members of the health care team and contributes to the legal record by documenting the care given to the client.

> EVALUATION

- The SaO₂ is in the normal range for the client (95%–100% in the absence of chronic respiratory disease).
- The client is alert and oriented.
- The client's color is normal.
- The client tolerates the placement of sensors.
- There is not any skin irritation or pressure at area of sensors.

> DOCUMENTATION

Nurses' Notes

- Document when pulse oximetry was placed, the location of the sensor, and the baseline readings.

Flowchart

- Document pulse, oxygen, flow rate, and saturation readings.



▼ REAL WORLD ANECDOTES

Scenario 1

Brian is an active 8-year-old who thinks the pulse oximeter sensor is fun to squeeze. He frequently reaches over and squeezes. The nurse comes in with some coloring pens and a coloring book so Brian's mom can distract him. He quickly forgets about the sensor.

Scenario 2

Chin has come to the outpatient clinic for tachycardia. The physician has medicated him but wants him to be monitored for 1 hour before he leaves the clinic. Left in the observation room with nothing to do for an hour, he is afraid to move for fear of setting off one of the many alarms on the EKG, IV, or oximetry machines attached to him. When the nurse returns to check on him, he is extremely anxious and stiff from remaining in one position on the gurney. The nurse needed to show him how to move and how to summon help if he was uncertain.

> CRITICAL THINKING SKILL

Introduction

Things are not always as they appear.

Possible Scenario

In response to an alarm, the nurse enters the room of a client who has an oximetry sensor on her right index finger. The nurse observes a reading of 85 on the pulse oximeter. She immediately summons the nurse practitioner. The practitioner and several staff members come into the room. A nursing student who is working with the nurse practitioner notes that the client has nail polish on her fingers and toes.

Possible Outcome

The nursing student brings in nail polish remover and cleans the fingernail. She reapplies the sensor probe and resets the alarm. Subsequent readings are within normal limits.

Prevention

Improper readings may lead to improper treatment; for example, an order may indicate to keep oxygen satura-

tion between a certain range with the administration of oxygen. The client may receive too little or too much oxygen. This could be harmful in a client with chronic respiratory diseases.

Assess the pulse rate manually and compare with the pulse rate indicated on the oximeter. If you find inaccuracies, use another machine. Keep the oximeter plugged in when it is not in use. Protect sensors from ambient light sources. Properly check the location of the sensor. Improper sensors or improper location or preparation of the site can affect the results. If the client has peripheral vascular disease and poor peripheral circulation, use ear lobes or the nose with the proper sensor. If a signal bar is available, check the signal bar. The signal bar reflects pulsatile signal strength. Strong signals produce a tall bar; a weak signal a short bar. Typical signals are 25% to 75% of signal bar height.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have poor peripheral circulation and require other than finger sensors.*
- *Elderly clients may have thickened nails, which can lead to inaccurate readings if finger sensors are used.*



Pediatric Variations:

- *Finger sensors are generally not sized appropriately for children and hence not intended for neonatal or pediatric use. Adhesive sensors can be used on the hand or feet of children or on the hand of the neonate.*
- *Children may pull off sensors and activate alarms.*



Home Care Variations:

- *Pulse oximeters are available for home health nurses; however, oximeters are expensive and may be used infrequently in home settings. If used, teach the family members how to use the equipment and rotate sensors to avoid skin breakdown.*



Long-Term Care Variations:

- *If a pulse oximeter is available and necessary in the long-term setting, make sure staff, who may be unfamiliar with the equipment, are given a refresher course in how to use it. Make sure they understand how to interpret the results.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Sensor is not protected from ambient light source.

Ask Yourself:

How do I prevent this error?

Prevention:

Place a towel over the sensor to block the light.

Possible Error:

Oximeter is not plugged in between use and battery is low.

Ask Yourself:

How do I prevent this error?

Prevention:

Place the task of checking the oximeter on the list of routine equipment and stocking checks that are done on a regular basis. Make sure the responsibility for checking the oximeter is assigned to a specific person or a specific time of day.

Possible Error:

Poor perfusion in finger or toe leads to an inaccurate reading of systemic saturation.

Ask Yourself:

How do I prevent this error?

Prevention:

Put the sensor somewhere else. Experiment, if necessary, until you find a location that gives accurate readings.

> NURSING TIPS

- Clean nails or skin properly before applying sensors.
- Always plug in the oximeter between uses.
- Do not use oximeter if light indicates low battery.
- Compare previous results and especially compare pulse of oximeter reading with palpable or auditory pulse.
- Use an appropriate site. If there is inadequate perfusion, try another site.

SKILL 7-6

Measuring Peak Expiratory Flow Rates

Eleonor U. de la Pena, CMA, BS

KEY TERMS

Albuterol	Peak flow zone system
Asthma	Personal best
Beta 2 agonists	Pirbuterol
Bronchodilator	Post blow
Corticosteroids	Predicted value
Green zone	Red zone
Peak flow meter	Yellow zone
Peak flow rate	



> OVERVIEW OF THE SKILL

A peak flow meter is a device that measures how well air moves out of the lungs. Peak expiratory flow rate measures the rate of air expired at the beginning of respiration, which correlates with the large airway status. This test can be performed on children as young as 3 to 4 years old; other pulmonary function tests usually require more maturity (i.e., more than 5 years of age). It is a simple measure of the airflow that can tell how well one is breathing. If a client has a breathing problem such as asthma, the physician or qualified practitioner may recommend that the client use a peak flow meter. The physician or qualified practitioner can provide a treatment plan that will tell what actions to take when there is a change in the airflow. A written record (peak flow monitoring chart) should be kept. Reviewing the daily record can help the client and the physician or qualified practitioner check closely on the asthma to provide the best treatment plan.

The peak flow meter should be used for the following:

1. When a client with asthma has an attack, the lungs are blocked and air cannot move easily. Therefore, the peak flow meter will help tell a person with asthma how much the lungs are blocked.
2. The peak flow meter should be used when the client is feeling the symptoms of breathing problems in order to let the physician or qualified practitioner and client know how serious the problem is and how well the asthma treatment is working.
3. The peak flow meter can provide an objective measure of the severity of the disease and response to treatment permits detection of airway obstruction before wheezing can be heard through a stethoscope or symptoms can be felt. Thus, the client can begin treatment of episodes earlier and the likelihood of serious episodes decreases.
4. During an asthma episode, the airways of the lungs begin to narrow slowly. The use of a peak flow meter can help you determine whether there is a narrowing hours before symptoms of asthma appear. By taking the medication(s) early (before the symptoms), the asthma exacerbation can be stopped quickly and a serious episode can be avoided.

> ASSESSMENT

1. Take a complete history from the client, or a reliable informant, about the signs and symptoms of the attack, and the frequency of the attacks. **Evaluates the frequency and severity of the episodes.**
2. Ask about all medications the client takes on a regular basis, or as needed, including over-the-counter drugs. **If the client uses medication frequently, regular measurement with a peak flow meter may be required.**
3. Assess the client's ability to cooperate with testing. **A client who is unable to reliably perform a spirometry or pulmonary function test may not be able to provide an accurate peak flow meter reading.**

> DIAGNOSIS

- 1.5.1.3 Ineffective Breathing Pattern
1.6.1.1 Risk for Suffocation

> PLANNING

Expected Outcomes:

1. The client will use the peak flow monitor to monitor the course of asthma and response to treatment using objective criteria to add or decrease the medication.
2. The client will detect early stages of airway obstruction.
3. The client will have an accurate perception of the severity of her obstruction.
4. The client will accurately determine when emergency medication care is needed.

5. The client will be able to distinguish between airway obstruction (e.g., asthma) and other causes of breathlessness (e.g., hyperventilation).
6. The effectiveness of client communication will be improved by providing objective assessment of asthma severity.

Equipment Needed:

- Peak flow meter with mouthpiece (see Figures 7-6-2A and 7-6-2B)
- Peak flow record or chart
- Calculator



Estimated time to complete the skill:
2–3 minutes

> CLIENT EDUCATION NEEDED:

1. Show the client the peak flow meter. It has a mouthpiece with a needle or pointer that corresponds to a particular number or reading.
2. Describe the advantages of using a peak flow meter.
3. Explain how it works.
4. Demonstrate to the client the correct use of a peak flow meter.
5. Explain the peak flow zone system for using the peak flow meter to manage asthma.
6. Calculate the client's three zones (green/yellow/red) based on predicted values. "Predicted or usual" value is an average peak flow value based on the peak flow reading of a large number of people grouped by height and age. An individual peak flow reading may vary widely and may be consistently higher or lower



Figure 7-6-2A Peak flow meter



Figure 7-6-2B Remember that there are many types of peak flow meters available on the market so you should be familiar with all types.

than such average values. Therefore, each individual will have her own “personal best” value—the peak flow value established by the client during a 2–3 week period in which the client records peak flow measurements at least two times a day. The personal best is the best number a person has ever achieved

with or without medications. Remind the client that many clients may have peak flow scores that are either higher or lower than the predicted value. Emphasize that it is important to find the client’s true personal best in order to develop the best treatment to manage asthma for the individual client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Set up all the equipment needed such as the peak flow meter with mouthpiece, record/chart, and calculator before going to the client’s room.
2. Identify the client and check the height, age, and sex of the client.
3. Explain and demonstrate to the client the procedure.
4. Have the client stand up with her chin slightly up.
5. Show the client how to place the indicator/pointer at the base of the numbered scale.
6. Have the client take a deep breath through the mouth.
7. Teach the client to hold the peak flow meter without touching the pointer or needle.
8. Have the client place the peak flow meter in the mouth and close the lips and teeth around the mouthpiece without putting the tongue inside the tube (see Figure 7-6-3).

RATIONALE

1. Promotes efficiency, thus gains client’s confidence in the nurse.
2. Promotes accuracy in teaching the use of a peak flow meter.
3. Promotes client’s compliance.
4. Expands the lungs to their maximum.
5. Ensures accuracy in the reading.
6. Maximizes expansion of the lungs.
7. Promotes accuracy in the reading.
8. Promotes a good seal and reflects the actual flow.



Figure 7-6-3 Place the flow meter in the client’s mouth and have her close her lips around it.

continues

9. Have the client blow out as hard and as fast as possible over about a second (not a prolonged expiration).
10. Teach the client how to read the number on the meter and where to record the number (see Figure 7-6-4).

Figure 7-6-4 Read and record the number on the meter.



11. Show the client how to slide the pointer down to 0 and have the client repeat Actions 5–10 two more times.
 12. Allow the client to rest between attempts if necessary.
 13. Write down the highest of the three numbers achieved on the client's chart/record.
 14. Use the zone determination to evaluate what course of treatment should be followed.
 - A peak flow reading between 80% and 100% of the predicted value or personal best is the green zone. The client should continue using the regular asthma medications.
 - A peak flow reading between 50% and 80% of the predicted value or personal best is the yellow zone. The client should use the "as needed" medication ordered by the physician or qualified practitioner. The peak flow reading should be checked again 10 minutes after medication usage to evaluate medication effectiveness. If no improvement is observed, the client may call the physician or qualified practitioner, or wait another 4 hours to do another peak flow reading and see whether the value has gone up to the green zone.
9. Reflects the actual flow in the lungs.
 10. Ensures accurate documentation of the results.
 11. Permits choosing the best value among the three tries.
 12. Ensures that each test is the maximum possible value.
 13. The highest number is used to identify the client's best peak expiratory flow rate. Subsequent rates are compared to the client's best rate in order to identify the client's zone.
 14. Zone determination provides an accurate, understandable indicator of the course of treatment to follow.
 - The green zone indicates that the asthma is under control.
 - The yellow zone indicates some increase in inflammation and airway obstruction.

- A peak flow reading of less than 50% of the predicted value or personal best is the red zone. The client should use the “as needed” medication ordered and call the physician or qualified practitioner right away.
- The red zone indicates a severe amount of inflammation and reactivity.

> EVALUATION

- The client uses the peak flow meter to monitor the course of asthma and response to treatment, using objective criteria to increase or decrease the medication.
- The client can detect early stages of airway obstruction.
- The client has an accurate perception of the severity of the obstruction.
- The client accurately determines when emergency medical care is needed.
- The client is able to distinguish between airway obstruction (e.g., asthma) and other causes of breathlessness (e.g., hyperventilation).

- The effectiveness of client communication is improved by providing objective assessment of asthma severity.

> DOCUMENTATION

Peak Flow Meter Record/Chart

- Record the best reading.
- Note any symptoms the client may have.
- Record any interventions required.

Medication Administration Record

- If a client will be given a treatment such as Albuterol, document the amount, dosage, manner, and time the medication was given.



▼ REAL WORLD ANECDOTES

Scenario 1

A mother calls the clinic complaining of her 5-year-old son having shortness of breath and wheezing with a peak flow reading of 68% of the boy's personal best of 200 (yellow zone). Albuterol inhaler was given already but to no avail. The parent wanted advice because her son had never been in the yellow zone before—his asthma was in control most of the time. The parent was advised by the triage nurse to give the client another Albuterol treatment. Assuming that the client's peak flow technique is correct, Albuterol treatment every 4 hours can be given as needed. If the client's numbers/values have been consistently in the yellow zone after a series of 4 treatments during the day or if the parent thinks the client needs a treatment more frequently than every 4 hours, the child may need to be brought in to the clinic or emergency room.

Scenario 2

A 30-year-old female client had been diagnosed as having asthma and was advised to use a peak flow meter at home. She awoke in the middle of the night coughing and having shortness of breath. She checked her peak flow reading, and it was in the yellow zone. She used an Albuterol inhaler, but her numbers were still in the yellow zone. Four hours later, the number on her reading was down to the red zone. She took an Albuterol inhaler and called the physician right away. She was advised to go the clinic immediately where she was given an Albuterol nebulization with oxygen and injectable steroids. Another nebulization was given and then her values increased to the upper limit of the yellow zone. She stabilized, and thus was not sent to the hospital; she was given oral steroids to take home. She was reminded to take her asthma medications on a regular basis. Three days later on a follow-up visit, she was a lot better and the peak flow readings were back to normal in the green zone.

> CRITICAL THINKING

Introduction

It is important that the client understands the necessity of doing peak flow readings and monitoring the results.

Possible Scenario

A mother and a 7-year-old came to the clinic with the latter referred for an evaluation of asthma. The client was taught how to use the inhalers and peak flow meter. The mother was uncooperative and thought that doing the peak flow readings was just a waste of time and plotting the numbers was quite complicated.

Possible Outcome

The client's mother called a week later complaining that her daughter has some chest tightness and coughing. Now the peak flow reading is about 100

(lower limit of the yellow zone). The mother is not sure of the significance of that number and does not know what to do next. She also does not know the client's personal best. The peak flow measurement had only been taken once because they "did not have time to do it."

Prevention

Explain the importance of peak flow monitoring. Demonstrate to the client the correct way of using a peak flow meter and let the client demonstrate it to you. Correct the client's technique if needed. Explain the peak flow zone system to manage asthma. Have a practice and let the client/parent plot the reading/value on the chart. Do a possible scenario, such as giving a value, and then let them decide what to do next by using the asthma action plan.

▼ VARIATIONS



Geriatric Variations:

- Peak expiratory flow rate is based on age, height, and gender. The numbers usually decrease in the geriatric age group compared with adults as a whole because lung capacity decreases as people age.
- When using the peak flow meter, the client should be in a standing position if possible; otherwise, an upright sitting position is preferred.
- Make sure that the client understands how to plot and interpret the numbers and zones.
- Have a sample/practice for better client compliance.
- Enlarged-print versions of charts will let the client see the readings/values more easily.



Pediatric Variations:

- It takes some maturity to use the peak flow meter and usually 3- to 4-year-olds can start doing it.
- Some kids treat it as a game and have an incentive if it is done correctly.
- Some nurses or parents instruct the client to do it just like blowing out birthday candles or use a tissue paper and hold it about a foot away from the client and blow as hard as he can so he can move it.
- The nurse should convey the instruction so that the child can understand it at his own level.
- Use colored graphs (green, yellow, and red) to let the child participate in the task. Remind parents that they need to bring in the child's peak flow meter, including the colored graphs, every time they come in for the recheck appointments.
- As the child grows taller, the predicted values should also increase. Therefore, regular physician's visits should be kept.



Home Care Variations:

- Demonstrate to the client the correct use of a peak flow meter and have the client practice. Correct the client's technique as needed. Write the instructions step by step.
- It is important to keep the peak flow meter clean and dust free. The removable mouthpiece can be cleaned by washing it in warm soapy water and then rinsing it thoroughly.
- Use the predicted peak flow value until the client's personal best value is determined. Explain the difference between the predicted and personal best values as well as the zone system in managing asthma.

▼ VARIATIONS *continued*

- Calculate the client's three zones (green, yellow, and red) based on the predicted value. Develop a schedule to establish the client's true personal best value. Emphasize that identifying the client's personal best peak flow value by filling out the diary for 2–3 weeks will help ensure that the client receives the right amount and type of medication. It may also lead to a reduction in the number and severity of asthma episodes. Instruct the client to take peak flow readings every day for 2–3 weeks, morning and afternoon before medication(s).
- Schedule a follow-up appointment to determine the true personal best score that will be used instead of the predicted value. Remind the client to bring the sheets on the return visit.



Long-Term Care Variations:

- Continue daily monitoring of peak flow if more data is needed to establish a pattern or if the peak flow reading is consistently in the yellow or red zone.
- There are clients who are on daily medications such as inhaled corticosteroids and/or long-acting Beta 2 agonists, and these clients are also advised to check the peak flow rate twice a day before the medications.
- Clients should bring their peak flow meter to the physician's or qualified practitioner's office to check the accuracy of the unit and to review the proper use of the peak flow meter as well as the charts to check client compliance.
- Use the colored peak flow diary to keep track of the peak flow readings.
- Clients should find the personal best peak flow number per instructions of the nurse and follow the asthma control plan on the peak flow zone system as explained previously. A decrease of 20% or greater of the client's personal best may mean the start of an asthma episode. Indicate if any symptoms are present.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client is getting very low values even though client seems to be doing well and is not having symptoms.

Ask Yourself:

How do I prevent this error?

Prevention:

Give proper instructions and demonstration to the client prior to the test and observe and correct the technique to get a reliable and accurate result. Instruct the client not to put her tongue into the tube. She should stand up straight, take a deep breath, and blow as fast and as hard as she can in just 1 second.

Possible Error:

An 8-year-old boy has a 3-year-old peak flow meter and the numbers are always low.

Ask Yourself:

How do I prevent this error?

Prevention:

Change the peak flow meter about once a year. Make sure that the needle or pointer works well. The metallic spring inside the peak flow meter might develop some rust over time, thus, skewing the results. There is a pediatric or low range meter, which goes up to 300, and an adult or standard range meter, which goes up to 800. However, if a client is in the pediatric age group but can blow close to or as high as 300, the standard range peak flow meter should be used.

> NURSING TIPS

- Have all equipment ready before you go to a client's room. This promotes efficiency and gains the client's confidence.
- Demonstrate to the client the technique and explain the purpose of using the peak flow meter. Avoid using technical jargon when teaching the client or the parent.
- Make sure the clients/parents are well informed before you let them go home. Let the client demonstrate to you the technique in using the peak flow meter.
- Practice plotting the numbers on the chart and give a sample scenario to check whether the client understood the instructions. Ask the client what to do based on the peak flow zoning system and asthma action plan.
- Make sure the client's effort is valid and technique correct. The client should stand up straight, take a deep breath, and blow into the mouthpiece very hard and fast. The tongue should not be in the tube while blowing. The nurse should distinguish between coughing and a real blow.
- Be aware of the client's predicted value, which is based on his height, age, and sex. Find out the ranges or zones based on the predicted value. Plot the numbers on the chart.
- The peak flow reading can be repeated 5 to 10 minutes after the treatment is done (post blow) to see whether the reading will go back to the green zone. If the reading is still in the yellow or red zone, the peak flow can be checked again after 4 hours to see whether the numbers have improved (green zone). If not, another Albuterol treatment can be given, followed by another post blow in 5–10 minutes. If the reading continues to be in the yellow or red zone, the physician or qualified practitioner should be consulted.

SKILL 7-7

Administering Intermittent Positive-Pressure Breathing (IPPB)

Peter C. Meyer, RRT

KEY TERMS

Alveolar recruitment	Mouth seal
Aspiration	Pneumothorax
Atelectasis	Pressure limit
Flow rate	Tidal volume
Incentive spirometry	
Maximal inspiratory capacity	



> OVERVIEW OF THE SKILL

Intermittent positive-pressure breathing (IPPB) is a form of intermittent mechanical ventilation that may be used to provide hyperinflation therapy and improve the distribution of ventilation, prevent or treat atelectasis, provide intermittent ventilation for clients with hypoventilation, and improve airway secretion clearance in clients who cannot cough or clear secretions effectively. IPPB may also be used to deliver aerosol medication to clients with muscle weakness affecting the ability to inhale and exhale the medication. IPPB can be used in intubated or nonintubated clients. Indications for IPPB include the following conditions:

- Atelectasis
- Decreased pulmonary function:
 - Vital capacity (VC) of less than 10–15 ml/kg
 - Forced vital capacity (FVC) of less than 70% of predicted rate
 - Forced expiratory volume in 1 second (FEV1) of less than 65% of predicted rate
- Neuromuscular disorders associated with fatigue and decreased lung volumes

- Bronchospasm that has failed to respond to other medication delivery systems

IPPB is effective when an increase in alveolar distending pressure is generated. IPPB creates a positive pressure at the airway (mouth), causing gas to flow into the lungs, with a resultant increase in tidal volume, decreased work of breathing, and increased minute ventilation.

Complications of IPPB therapy include nosocomial infection, gastric distention, overdistended alveoli, pneumothorax, and other changes in oxygenation.

Once a popular mode of therapy, IPPB is infrequently used today. Less expensive and less invasive therapies, such as incentive spirometry, deep breathing, chest physiotherapy, and early mobilization are considered to be more effective in managing the post-operative client. Nebulizers are more effective for delivering medications.

IPPB is given for short time periods, typically 10–20 minutes four times per day, or every 4 hours with daily assessments.

> ASSESSMENT

1. Assess the ability of the client to understand instructions and cooperate with the procedure to determine how to structure the procedure and what type of teaching to provide.
2. Assess the orders for IPPB to make sure the orders are clear and seem appropriate for the client.
3. Assess the equipment being used to review the proper operation of the equipment.

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion
- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.3 Ineffective Breathing Pattern
- 8.1.1 Knowledge Deficit, related to procedure

> PLANNING

Expected Outcomes:

1. The client will have improved tidal breathing, as measured by a tidal volume during IPPB of at least 25% greater than taken in during a regular breath.



Figure 7-7-2A Compressed oxygen source



Figure 7-7-2C Incentive spirometer

2. The client will have a more effective cough.
3. The client will have increased sputum production.
4. The client will have improved breath sounds and an improved chest x-ray.

Equipment Needed (see Figures 7-7-2A–D):

- IPPB device, available from a variety of manufacturers; the most common are made by Bird Products Corporation and Nellcor Puritan Bennett
- Obtain circuit to the IPPB with mouthpiece or appropriate-size face mask
- Nebulizer (usually included with the circuit)
- Compressed gas source
- Mouthpiece, mouth seal, nose clips, mask, or endotracheal tube adapter
- Tissues or container for expectorated sputum
- Suction equipment if the client is intubated or trached
- Spirometer
- Gloves, goggles, gown, and mask as indicated
- Saline or appropriate medication in nebulizer



Figure 7-7-2B Mouthpieces and nose clips are used when administering IPPB therapy.



Figure 7-7-2D Nebulizer and tubing



Estimated time to complete the skill:
15–25 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the procedure to the client, why the client is receiving the therapy, and the expected outcome.
2. Explain technique, for example, initiate the breath and passively allow the IPPB to inflate the lungs until the machine terminates inspiration. Exhalation is through the mouthpiece.
3. Explain the name and purpose of any medication to be nebulized.
4. Remind the client to keep a tight seal with the lips around the mouthpiece.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Review and verify physician or qualified practitioner order.
2. Wash hands. Apply protective clothing as needed (see Figure 7-7-3).

1. Ensure application of appropriate therapy.
2. Reduces the transmission of microorganisms.



Figure 7-7-3 Wear a protective mask and other protective gear as needed when performing IPPB.

3. Explain treatment and technique to client.
4. Set up equipment and connect to gas source.
5. Set parameters on IPPB device: flow setting, trigger sensitivity, and inspiratory pressure.
6. Fill nebulizer with sterile normal saline or medication.
7. Assist the client to an upright sitting position.
8. Assess client's breath sounds, respiratory rate, and pulse and obtain inspiratory capacity.

3. Encourages client cooperation and ensures effective treatment.
4. Prepares mechanics.
5. Parameters must be set to meet orders and meet individual client's requirements.
6. To decrease the drying effect of the gas during the treatment.
7. Optimizes ventilation distribution.
8. Establishes baseline status.

continues

9. Initiate therapy and monitor effectiveness of treatment, measuring exhaled volumes. Use a nose clip if there is air leakage through the nose (see Figure 7-7-4).

9. If exhaled volumes are not greater or equal to inspiratory capacity, incentive spirometry may be of greater therapeutic value.



Figure 7-7-4 Have the client use a nose clip if there is leakage through the nose during treatment.

10. Discontinue treatment when medication is administered or time limit is reached.
 11. Assess breath sounds, respiratory rate, pulse, and inspiratory capacity.
 12. Disconnect IPPB from gas source.
 13. Rinse nebulizer with sterile water or sterile saline and air dry.
 14. Document treatment.
 15. Wash hands.
10. IPPB is given typically for 10–20 minutes.
 11. Determines effectiveness.
 12. Prevents auto-cycling.
 13. Cleans equipment between treatments.
 14. Records client progress.
 15. Reduces the transmission of microorganisms.

> EVALUATION

- The client has improved tidal breathing, as measured by a tidal volume, during IPPB, of at least 25% greater than taken in during a regular breath.
- The client has a more effective cough.
- The client has increased sputum production.
- The client has improved breath sounds and an improved chest x-ray.

> DOCUMENTATION

Nurses' Notes

- Document IPPB device parameters (flow setting and inspiratory pressure).
- Record pretest and posttest breath sounds, tidal volumes, respiratory rate, inspiratory capacity, pulse, and sputum production.

Medication Administration Record

- Document medication administered.
- Record adverse reactions, if any.



▼ REAL WORLD ANECDOTES

A 43-year-old male client with myasthenia gravis developed bilateral lobar atelectasis. Tidal volumes were 250–300 ml. The client had a weak cough and an inspiratory capacity of 500 ml. IPPB was administered every 4 hours over 14 days until the client had significantly regained respiratory

▼ REAL WORLD ANECDOTES *continued*

strength secondary to medical treatment. Lobar atelectasis was adequately reversed to prevent intubation and mechanical ventilation. Weak respiratory muscles would make alternative therapies less effective. This is an example of an IPPB procedure as an effective treatment.

The nurse was able to provide education on the need to clean the equipment with sterile water or saline only.

> CRITICAL THINKING SKILL

Introduction

Monitor the client on IPPB therapy carefully for problems.

Possible Scenario

A 57-year-old male client was given IPPB via face mask when he had difficulty using a mouthpiece.

Possible Outcome

During 10 minutes of IPPB, he suffered gastric distention from air being pushed into his stomach. This caused him to vomit. His panic, confusion, and the tight face mask caused him to aspirate the vomitus.

Prevention

With careful observation of the client, the nurse would have recognized this developing problem. IPPB should be discontinued or not initiated with a client at risk of aspiration.

▼ VARIATIONS



Geriatric Variations:

- A face mask may be appropriate for clients lacking the strength to effect a tight seal around a mouthpiece.



Pediatric Variations:

- Lower pressures may be required.
- Use an appropriately sized face mask.



Home Care Variations:

- Explain the importance of cleaning the equipment with sterile saline or sterile water.
- Review the medication dosage with the client.



Long-Term Care Variations:

- Periodically review techniques for using the equipment.
- Review with the client the importance of cleaning the equipment with sterile saline or sterile water.
- Explain the medication dosage with the client.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The IPPB cycles off before the client is able to obtain adequate breath.

Ask Yourself:

How do I prevent this error?

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

The pressure limit is set too low. You should consult the physician or qualified practitioner, or if you are qualified, increase the pressure setting.

Possible Error:

The client is stopping flow with the tongue or by exhaling prematurely instead of allowing a passive inspiratory phase to occur.

Ask Yourself:

How do I prevent this error?

Prevention:

Instruct the client to allow a passive inflation and automatic cycling of the IPPB device after initiating inspiration.

Possible Error:

The flow rate is set too high, causing a pressure spike and early termination of inspiration.

Ask Yourself:

How do I prevent this error?

Prevention:

Decrease the flow rate.

> NURSING TIPS

- Help the client relax.
- Discuss the treatment before introducing the client to the equipment.
- Adjust flow rate in conjunction with the pressure limit to achieve the best tidal breath.
- Remember contraindications to IPPB use, including increased intracranial pressure (greater than 15 mm Hg); facial, skull, or esophageal surgery; nausea; hiccups; or hemoptysis.

SKILL 7-8

Assisting with Continuous Positive Airway Pressure (CPAP)

Eva Gallagher, RN, BSN

KEY TERMS

Asthma	CPAP
Atelectasis	Cystic fibrosis
Chronic bronchitis	Expiratory pressure
Continuous positive airway pressure	Inspiratory pressure
COPD	Sleep apnea



> OVERVIEW OF THE SKILL

Continuous positive airway pressure (CPAP) is the application of positive pressure to the airways of the spontaneously breathing client throughout the respiratory cycle. During CPAP therapy, the client breathes from pressurized tubing that maintains positive, consistent airway pressures during both inspiration and expiration. CPAP maintains inspiratory and expiratory pressure above atmospheric pressure, which should result in an increased functional residual capacity (FRC), an improvement in static lung compliance, and decreased airway resistance. Because CPAP increases mean airway pressure, the associated FRC

should improve ventilation-perfusion relationships and potentially reduce oxygen requirements.

CPAP is used for respiratory distress syndrome, pulmonary edema, atelectasis, apnea, or recent extubation. There are no absolute contraindications to the use of CPAP therapy; however, clients with the following conditions should be carefully evaluated before the initiation of CPAP therapy: nausea; esophageal surgery; recent facial, oral, or skull surgery or trauma; intracranial pressure greater than 20 mm Hg; hemodynamically unstable; and untreated pneumothorax.

> ASSESSMENT

1. Assess for breath sounds. With effective therapy, breath sounds may clear or the movement of secretions into larger airways may cause an increase in adventitious breath sounds. Improved ease of clearing secretions during and after treatments supports continuation of the treatments.
2. Assess clients for their response to therapy before, during, and after. Feelings of pain, discomfort, shortness of breath, dizziness, and nausea should be considered in modifying and stopping therapy.
3. Assess changes in vital signs. Moderate changes in respiratory rate and/or pulse rate are expected. Bradycardia, tachycardia, increasingly irregular pulse, or a drop or dramatic increase

in blood pressure are indications for stopping therapy.

4. Assess changes in arterial blood gas values or oxygen saturation as per orders if applicable. Normal oxygenation should return as atelectasis or other obstruction resolves.
5. Assess changes in chest x-rays as per orders. Improvement or resolution of atelectasis and localized infiltrates may be slow or dramatic.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.3 Ineffective Breathing Pattern
- 1.4.1.1 Altered Tissue Perfusion

> PLANNING**Expected Outcomes:**

1. The client will have a reduction in the work of breathing as indicated by a decrease in respiratory rate by 30%. The apneic client will have a decrease in the number and duration of apneic episodes.
2. The client will have a decrease in the severity of retractions, grunting, and nasal flaring.
3. The client will have improvement in lung volumes and appearance of lung as indicated by chest x-ray.
4. The client will have increased comfort in breathing as assessed by the nurse.
5. The client will have an improvement in oxygen saturation.

Equipment Needed:

- CPAP machine capable of delivering 5–20 cm of pressure during passive expiration, with one-way valves allowing unobstructed inspiration (see Figure 7-8-2)
- Continuous noninvasive oxygenation monitoring by pulse oximetry
- Transparent mask or mouthpiece
- Tissues and emesis basin for collecting expectorated sputum
- Gloves, goggles, gown, mask if needed



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client the rationale for the use of the CPAP machine.
2. Tell the client what possible side effects there are and what to report to the nurse.
3. Have clients try on a CPAP mask before applying the mask for treatment so they can get used to it and make adjustments.
4. Ask clients to tell you the reason they are having the CPAP treatment.
5. Teach clients the symptoms they should report such as discomfort, dyspnea, headache, rapid pulse or palpitations, and dizziness.



Figure 7-8-2 CPAP machine

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Check orders regarding CPAP administration. 3. Assess breath sounds, vital sounds, and oxygen saturation. 4. Assist client into position of comfort. 5. Secure mask over the nose and/or mouth of the client (see Figure 7-8-3). Check connections. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Ensures CPAP administration is appropriate and the correct settings are used. 3. Determine baseline respiratory assessment. 4. Ensures client is more comfortable during CPAP application. 5. An airtight seal is required for proper functioning of the CPAP machine. |
|---|--|



Figure 7-8-3 Place the mask over the nose.



Figure 7-8-4 Assist the client in continuing the CPAP therapy for the proscribed length of time

6. Turn CPAP machine on and check settings.
 7. Maintain CPAP for prescribed length of time (see Figure 7-8-4).
 8. Assess breath sounds, vital signs, and oxygen saturation.
 9. Observe the client for side effects.
 10. Wash hands.
6. Settings should be checked with each application.
 7. Prevents hyperventilation and fatigue.
 8. Determine changes in respiratory status.
 9. Assess for potential problems related to CPAP administration.
 10. Reduces the transmission of microorganisms.

> EVALUATION

- Evaluate the effectiveness of CPAP administration 20–30 minutes after the treatment.
- The client had a reduction in the work of breathing as indicated by a decrease in respiratory rate by 30%. The apneic client had a decrease in the number and duration of apneic episodes.
- The client had a decrease in the severity of retractions, grunting, and nasal flaring.
- The client had improvement in lung volumes and appearance of the lungs as indicated by chest x-ray.

- The client has increased comfort in breathing as assessed by the nurse.
- The client has an improvement in oxygen saturation.

> DOCUMENTATION

Nurses' Notes

- Record time CPAP applied.
- Record settings.
- Note breath sounds before and after the procedure.
- Record vital signs, oxygen saturation.
- Note client's response to application of CPAP machine.
- Include signature of nurse applying CPAP machine.



▼ REAL WORLD ANECDOTES

After carefully applying Bill's CPAP mask, the nurse turned on the CPAP machine and stood at the side of the bed to observe his response as well as his oxygen saturation. His oxygen saturation started to slowly drop but stabilized at 84%. His nurse, concerned with the drop, began to check all of the connections to the CPAP machine. She discovered that the oxygen source had been disconnected. After reconnecting the oxygen source, Bill's oxygen saturation stabilized at 98%. She was reminded that the connections should be checked before initiating CPAP therapy.

▼ REAL WORLD ANECDOTES *continued*

The nurse entered Bill's room later that shift after noting a decrease in his oxygen saturation from 98% to 90%. She checked all of the connections as well as the seal on the mask over Bill's face and was unable to find anything wrong. She asked Bill to remove the CPAP mask momentarily and noticed that the tubing was almost completely occluded with a mucous plug. She cleaned out the tubing, reapplied the CPAP mask, checked all of the connections, and once again, Bill's oxygen saturation stabilized at 98%.

> CRITICAL THINKING SKILL

Introduction

Because of the airtight seal that must be obtained when applying a CPAP mask, the potential for skin breakdown on the nose, cheeks, and chin is high. It is important that the nurse is aware of this and observes for early signs of breakdown so that she can intervene before the breakdown is significant.

Possible Scenario

Jim is a 44-year-old man who has started on CPAP therapy to aid in mobilization of retained secretions secondary to chronic bronchitis. He is to wear the CPAP mask 2 hours on, 2 hours off while awake, and continuously at night. This is his third day of therapy. His nurse applies the mask and checks for any air leaking around the mask. She then checks all of the connections and settings and turns the CPAP machine on. She monitors Jim for 15 minutes to make sure he is in no distress, then leaves the room.

When his nurse returns to remove the mask after Jim has been on CPAP therapy for 2 hours, she notices areas of redness on his nose and chin. She leaves the mask off for the prescribed 2 hours, then returns at 10:00 PM to apply the mask for the night. Jim notices

that it is uncomfortable when the mask is applied; however, he knows he must have this therapy and does not say anything to the nurse. At 4:00 AM Jim puts his light on and the nurse enters his room to find that he has removed the mask. He tells her that the discomfort became unbearable, so he had to remove the mask. The nurse notices that there are small blisters on his nose and a 1-cm open area on his chin.

Possible Outcome

CPAP therapy must be discontinued because of the skin breakdown on Jim's nose and chin. Other methods must be used to aid in mobilization of Jim's secretions, and he recovers from his chronic bronchitis more slowly than expected.

Prevention

Upon noticing the reddened area on Jim's nose, the nurse could have adjusted the mask, avoiding this area if possible. She may have wanted to decrease the duration of time that he was to wear the mask that night, knowing that skin breakdown was likely. The use of an acceptable skin barrier (no petroleum products or powders, which could be aspirated) when the redness was noted might have helped to prevent further breakdown.

▼ VARIATIONS



Geriatric Variations:

- Skin in the elderly is thinner and more prone to breakdown. Care must be taken to assess the skin frequently to prevent breakdown from occurring.
- Caregivers must be taught the importance of monitoring the client during CPAP treatment.



Pediatric Variations:

- Claustrophobia is common with CPAP therapy in young children. Education about the mask and what CPAP therapy will feel like is important.
- Starting therapy for short intervals and slowly increasing the time can be helpful in overcoming fear and the confinement of the mask.
- Distraction with TV, books, or games may enhance the cooperation of the child when using the CPAP mask.

▼ VARIATIONS *continued*



Home Care Variations:

- *Make sure the client demonstrates proper technique for administration, proper use of equipment, appropriate breathing patterns and cough techniques, and the ability to modify technique in response to adverse reactions.*
- *Teach caregivers in the home to use the CPAP machine and to care for the equipment.*
- *Teach caregivers the signs and symptoms of respiratory infection.*
- *Medicare may reimburse for the CPAP machine used at home.*



Long-Term Care Variations:

- *CPAP equipment needs to be maintained for each client use.*
- *Medicare may not reimburse for the CPAP machine in a long-term care facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The oxygen source is disconnected from the CPAP machine.

Ask Yourself:

How do I prevent this error?

Prevention:

Make sure the connections are secure. Be sure the CPAP machine and the oxygen source are close enough so the connection is not being stressed.

Possible Error:

A mucous plug forms in the tubing of the CPAP machine, occluding it.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess tubing before and after application of the CPAP mask. Clean the tubing or replace it with new tubing prn.

> NURSING TIPS

- Familiarize yourself with the CPAP equipment so you will feel comfortable when using it with a client.
- Determine the policy in your hospital regarding who performs the initial assessment of the client, who administers CPAP therapy, and who is responsible for ongoing assessment and care of stable and unstable clients.
- Claustrophobic or anxious clients will need you to stay at their bedside during the treatment.
- Demonstrating the mask on yourself may allay the fear and anxiety a client may have about the treatment.

SKILL 7-9

Preparing the Chest Drainage System

Stacy Frisch, RN, BSN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Hemothorax
Pleural cavity
Pneumothorax
Suction

Thoracic
Vacuum
Water seal



> OVERVIEW OF THE SKILL

The chest drainage system is a closed system designed to drain air or fluid from the pleural cavity while restoring or maintaining the negative intrapleural pressure needed to keep the lung properly expanded. The space between the lungs and chest wall is called the pleural cavity and it normally contains only a small amount of fluid for lubrication between the lungs and the chest wall. Negative intrapleural pressure between the lungs, chest wall, and diaphragm allows the movement of the chest and diaphragm to expand and contract the lungs.

Large amounts of fluid or air in the pleural cavity impede the expansion of the lungs, causing respiratory distress or “collapse” of the lung. Excess fluid or air can enter the pleural cavity by several means. Thoracic surgery breaks the vacuum seal in the pleural cavity, allowing fluid and air to enter. Trauma to the chest wall can lead to bleeding into the pleural cavity (hemothorax) or air entering the pleural cavity (pneumothorax). Occasionally, spontaneous pneumothorax occurs, without apparent cause.

The chest drainage system is designed to help restore the vacuum seal in the pleural cavity by drain-

ing excess fluid or air while keeping the pleural cavity sealed. Occlusive dressings, water seals, gravity, and additional suction, if necessary, work together to create a sealed system with slight negative pressure to draw fluids away from the chest.

The drainage system uses a water seal to prevent air return into the pleural cavity. Once pleural air passes through the water seal, it cannot return to the chest and is vented to the atmosphere. Occlusive dressings at the puncture site prevent air from entering the pleural space. All connections between the tubing are airtight.

The chest drainage system can be attached to suction to increase the negative pressure between the pleural space and the drainage system, which improves drainage. The amount of suction is controlled by a dial in some chest drainage setups and by the amount of saline added to the suction control container in other setups.

When setting up a chest drainage system, it is important to understand why the system works. Read the manufacturer’s instructions for commercial chest drainage setups.

> ASSESSMENT

1. Assess the physician’s or qualified practitioner’s orders to determine what kind of chest drainage system is required.

2. Assess the available equipment to determine what kind of drainage system setups are available.
3. Assess the client’s environment to determine what kind of equipment will be required and what drainage system would be optimal for the client.

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The chest drainage system will be appropriate for the client as well as consistent with the system ordered by the physician or qualified practitioner.
2. The chest drainage system will be set up in accordance with institutional policy.
3. The chest drainage system will not pose a hazard for infection or loss of air seal to the client.

Equipment Needed:

Disposable Chest Tube Drainage System

- Sterile water or saline
- Disposable chest tube drainage system (see Figure 7-9-2)
- Suction tubing if the drainage system will be connected to suction
- Tape

Reusable Bottle Chest Drainage System

- Sterile glass bottles—1 to 3 depending on the physician's or qualified practitioner's order
- Sterile water or saline
- Glass tubes—2 to 7 depending on the physician's or qualified practitioner's order
- Rubber tubing
- Suction tubing if the drainage system will be connected to suction

- Rubber stoppers with holes the size of the glass tubes to be used on the glass bottles—2 with 2 holes and 1 with 3 holes
- Tape
- Sterile gloves



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client that some bubbling in the water seal container and the suction container is normal.
2. Instruct the client regarding the need to keep the drainage system below the level of the chest tube insertion site.



Figure 7-9-2 Disposable chest tube drainage system

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Disposable Chest Tube Drainage System

1. Gather equipment in a clean area or at the client's bedside.
2. Wash hands.
3. Open the prepackaged disposable chest tube system using aseptic technique (see Figure 7-9-3).

1. Helps maintain sterility while assembling the chest drainage system.
2. Reduces the transmission of microorganisms.
3. Maintains sterility while assembling the chest drainage system. Most prepackaged disposable chest tube systems are basically a three-bottle system packaged in one disposable container.

continues

Disposable Chest Tube Drainage System *continued*



Figure 7-9-3 Open the chest tube system package using aseptic technique.



Figure 7-9-4 Set the unit upright.

4. Set the unit upright (see Figure 7-9-4).
5. If only a water seal has been ordered, pour the measured amount of sterile water or saline into the funnel provided (see Figures 7-9-5 and 7-9-6).



Figure 7-9-5 Fill the appropriate chambers with sterile water or saline.



Figure 7-9-6 Fill the appropriate chamber with the amount of fluid indicated in the manufacturer's instructions.

6. If suction has been ordered, fill the suction control chamber to the ordered level of fluid, usually 10–20 cm of water (see Figures 7-9-7 and 7-9-8).
 7. If suction has been ordered, attach suction tubing to the marked suction port and to the suction source.
 8. Turn the suction up until there is gentle bubbling in the suction control section of the system.
4. Allows the unit to be filled.
 5. This provides a water seal to prevent air from entering the pleural cavity.
 6. This provides extra suction to increase the drainage of fluid or air from the pleural cavity.
 7. Provides suction to the system.
 8. The level of suction is determined by the air flow through the water in the suction chamber. This is indicated by the bubbling of the suction control chamber.



Figure 7-9-7 If suction has been ordered, fill the suction control chamber to the ordered level of fluid.



Figure 7-9-8 Make sure the tubing connections are attached and secure.

9. Set the system up at the client's bedside. Keep the drainage system below the level of the client (see Figure 7-9-9).

Figure 7-9-9 Set the system upright at the bedside below the level of the client.



9. Prevents backflow of air or fluid into the pleural cavity.

10. Wash hands.

10. Reduces the transmission of microorganisms.

Reusable Bottle Chest Drainage System

11. Repeat Actions 1–3.

11. See Rationales 1–3.

12. Apply sterile gloves.

12. Maintains sterility while assembling the chest drainage system.

13. One-bottle water seal:

- Insert a long glass tube through one hole of a two-hole rubber stopper. Insert a short glass tube through the other hole in the stopper.
- Pour sterile saline or sterile water into the glass bottle, filling it to a depth of at least 4 cm.
- Being careful not to contaminate the inside of the rubber stopper or the portion of the glass tubes that will be inside the bottle, put the rubber stopper onto the bottle.

13. This system is generally used only for pneumothorax since one bottle is required to act as a water seal and a drainage bottle.
- The long tube will provide a water seal, and the shorter tube will work as an air vent to prevent the buildup of pressure in the bottle as fluid and air drain out of the pleural cavity and into the bottle.
 - Provides a sterile water seal to prevent air return into the pleural cavity.
 - Maintains sterility while assembling the chest drainage system.

Reusable Bottle Chest Drainage

System *continued*

- Be sure the end of the long glass tube is submerged 2 cm into the water in the bottle. If the tube does not extend deeply enough, add more water to the bottle. Do not fill the bottle more than one-third full.
- Attach rubber tubing to the outside end of the long glass tube for drainage from the client's chest tube.
- Place a measuring guide on the side of the bottle, marking the water level prior to connection to the client.
- Provides a water seal that prevents the return of air into the pleural cavity. The higher water level creates increased resistance to drainage.
- The long glass tube is sealed, providing a sealed drainage system.
- Documents the amount of drainage from the chest tube.

14. Two-bottle drainage and water seal:

- Insert two short glass tubes into a two-hole rubber stopper. Place this rubber stopper onto the drainage bottle.
- Insert one long glass tube and one short glass tube into a second two-hole rubber stopper.
- Pour sterile water or sterile saline into the water seal bottle to a depth of about 4 cm. Do not fill the bottle more than one-third full.
- Place the rubber stopper with the long glass tube onto the water seal bottle, being careful not to contaminate the inside of the bottle or the glass tubes.
- Be sure the end of the long glass tube is submerged 2 cm into the water in the bottle. If the tube does not extend deeply enough, add more water to the bottle. Do not fill the bottle more than one-third full.
- Place a length of rubber tubing between the outer end of one of the short glass tubes on the drainage bottle and the outer end of the long glass tube on the water seal bottle.
- Place a length of rubber tubing on the outer end of the second short glass tube in the drainage bottle. This tube is for connecting to the client for drainage.
- This system is used when gravity drainage is adequate but a separate drainage container is desired for accurate assessment of the drainage and to prevent increased resistance as the drainage bottle fills.
- This allows drainage to flow into the bottle without creating a water seal in this container.
- The long tube will provide a water seal, and the shorter tube will work as an air vent to prevent the buildup of pressure in the bottle as fluid and air drain out of the pleural cavity and into the bottle.
- Provides a sterile water seal to prevent air return into the pleural cavity.
- Maintains sterility while assembling the chest drainage system.
- Provides a water seal that prevents the return of air into the pleural cavity. The higher water level creates increased resistance to drainage.
- The long glass tube is sealed by water, providing a sealed drainage system.
- This will provide a continuous sealed system for drainage without allowing air or fluid to return to the pleural cavity.

- Place a measuring guide on the side of the drainage collection bottle prior to connection to the client.

15. Two-bottle drainage and suction control:

- Insert a long glass tube through one hole of a two-hole rubber stopper. Insert a short glass tube through the other hole in the stopper.
- Insert a long glass tube through the middle hole of a three-hole rubber stopper and short glass tubes through the other two holes in the three-hole stopper.
- Pour sterile saline or sterile water into the water seal/drainage bottle, filling it to a depth of at least 4 cm.
- Pour sterile saline or sterile water into the suction control bottle to the ordered depth, usually 10–20 cm of water.
- Place the two-hole rubber stopper with the long glass tube onto the water seal/drainage bottle, being careful not to contaminate the inside of the bottle or the glass tubes.
- Be sure the end of the long glass tube is submerged 2 cm into the water in the bottle. If the tube does not extend deeply enough, add more water to the bottle. Do not fill the bottle more than one-third full.
- Place the three-hole rubber stopper with the long glass tube and two short glass tubes onto the suction control bottle, being careful not to contaminate the inside of the bottle or the glass tubes.
- Be sure the long glass tube extends well into the water but does not touch the bottom of the bottle.
- Attach a length of rubber tubing to the outer end of the short glass tube in the water seal/drainage bottle and connect it to the outer end of one of the short glass tubes in the suction control bottle.
- Attach the suction tubing to the outer end of the second short glass tube in the suction control bottle.

- Documents the amount of drainage from the client's chest tube.

15. This system is used when additional suction is required to remove air from the pleural cavity. Because the drainage and the water seal occupy the same bottle, it is not desirable for situations in which significant amounts of drainage are expected.

- The long tube will provide a water seal, and the shorter tube will connect to the suction control bottle.
- The long tube will remain open to the air as a vent. The two shorter tubes are connectors to the water seal/drainage bottle and to the suction source.
- Provides a sterile water seal to prevent air return into the pleural cavity.
- Provides a measured amount of suction. The depth of the water controls the amount of suction applied to the pleural cavity.
- Maintains sterility while assembling the chest drainage system.
- Provides a water seal that prevents the return of air into the pleural cavity. The higher water level creates increased resistance to drainage.
- Maintains sterility while assembling the chest drainage system.
- If the long tube touches the bottom of the suction control bottle, it will be unable to vent outside air, and the suction to the pleural cavity will be infinite.
- Connects the water seal/drainage bottle into the suction system.
- Attaches the system to suction.

Reusable Bottle Chest Drainage

System *continued*

- Do not attach any tubing to the outer end of the long glass tube in the suction control bottle.
- Attach the drainage tubing from the client to the outer end of the long glass tube in the water seal/drainage bottle.
- Turn the suction source up until a gentle bubbling is noted in the suction control bottle. To increase the suction, add more water to the suction control bottle. To decrease the suction, remove water from the suction control bottle.
- Place a measuring guide on the side of the water seal/drainage bottle, marking the water level prior to connection to the client.
- Maintains a vent to the air. This allows control of the amount of suction inside the system.
- Completes the closed drainage system and allows drainage, water seal, and suction to work to heal the pleural cavity.
- The amount of suction is controlled by the air being pulled from the outside, through the long glass tube and the water. The amount of water the air has to be pulled through determines the amount of suction in the system.
- Accurately documents the amount of drainage from the pleural cavity.

16. Three-bottle drainage, water seal, and suction control:

- Insert short glass tubes through the holes in one of the two-hole rubber stoppers.
- Insert a long glass tube through one hole of a two-hole rubber stopper. Insert a short glass tube through the other hole in the stopper.
- Insert a long glass tube through the middle hole of a three-hole rubber stopper and short glass tubes through the other two holes in the three-hole stopper.
- Pour sterile saline or sterile water into the water seal bottle, filling it to a depth of at least 4 cm.
- Pour sterile saline or sterile water into the suction control bottle to the ordered depth, usually 10–20 cm of water.
- Being careful not to contaminate the inside of the rubber stopper or the portion of the glass tubes that will be inside the bottle, put the rubber stopper with the two short glass tubes onto the drainage collection bottle.
- Place the two-hole rubber stopper with the long glass tube onto the water seal bottle, being careful not to contaminate the inside of the bottle or the glass tubes.
- Be sure the end of the long glass tube is submerged 2 cm into the water in the bot-
- This method is used when significant amounts of drainage are expected and the client requires suction to the chest tubes.
- Allows drainage to empty into the drainage bottle while keeping the bottle open to the water seal.
- The long tube will provide a water seal, and the shorter tube will connect to the suction control bottle.
- The long tube will remain open to the air as a vent. The two shorter tubes are connectors to the water seal bottle and to the suction source.
- Provides a sterile water seal to prevent air return into the pleural cavity.
- Provides a measured amount of suction. The depth of the water controls the amount of suction applied to the pleural cavity.
- Maintains sterility while assembling the chest drainage system.
- Maintains sterility while assembling the chest drainage system.
- Provides a water seal that prevents the return of air into the pleural cavity. The higher

tle. If the tube does not extend deeply enough, add more water to the bottle. Do not fill the bottle more than one-third full.

- Place the three-hole rubber stopper with the long glass tube and two short glass tubes onto the suction control bottle, being careful not to contaminate the inside of the bottle or the glass tubes.
- Be sure the long glass tube extends well into the water but does not touch the bottom of the bottle.
- Attach rubber tubing to the outside end of one of the short glass tubes extending from the drainage collection bottle to attach to the client's chest tube.
- Attach a length of rubber tubing from the second short glass tube in the drainage collection bottle to the long glass tube in the water seal bottle.
- Attach a length of rubber tubing from the short glass tube in the water seal bottle to one of the short glass tubes in the suction control bottle.
- Attach the suction tubing to the second short glass tube in the suction control bottle and to the suction source.
- Do not attach any tubing to the outer end of the long glass tube in the suction control bottle.
- Turn the suction source up until a gentle bubbling is noted in the suction control bottle. To increase the suction, add more water to the suction control bottle. To decrease the suction, remove water from the suction control bottle.
- Place a measuring guide on the side of the drainage bottle prior to connection to the client.

17. Tape all connections.

18. Dispose of gloves in the proper container.

19. Arrange the drainage system at the client's bedside. Keep the drainage system below the level of the client.

20. Wash hands.

water level creates increased resistance to drainage.

- Maintains sterility while assembling the chest drainage system.
- If the long tube touches the bottom of the suction control bottle, it will be unable to vent outside air, and the suction to the pleural cavity will be infinite.
- Entrains the pleural cavity into the closed drainage system.
- Entrains the drainage collection bottle to the water seal.
- Entrains the water seal to the suction control bottle.
- Entrains the system to suction.
- Maintains a vent to the air. This allows control of the amount of suction inside the system.
- The amount of suction is controlled by the air being pulled from the outside, through the long glass tube and the water. The amount of water the air has to be pulled through determines the amount of suction in the system.
- Accurately documents the amount of drainage from the pleural cavity.

17. Prevents accidental breakage of the sealed system.

18. Maintains standard precautions.

19. Prevents backflow of water or drainage into the pleural cavity.

20. Reduces the transmission of microorganisms.

> EVALUATION

- The chest drainage system is appropriate for the client and consistent with the system ordered by the physician or qualified practitioner.
- The chest drainage system was set up in accordance with institutional policy.
- The chest drainage system did not pose a hazard for infection or loss of air seal to the client.

> DOCUMENTATION

Nurses' Notes

- Indicate the type of chest drainage system used.
- If suction control was ordered, indicate the centimeter level of fluid in the suction control bottle.



▼ REAL WORLD ANECDOTES

Rachel Knik, a temporary registry nurse, was working a 12-hour shift in a small rural hospital. Her client's physician ordered a closed chest drainage system to be ready at the client's bedside when the client returned from surgery. Ms. Knik went to the supply room to look for a pleur-evac to set up. She was unable to find any disposable chest drainage systems and became quite confused about how to proceed. After she had asked several other staff members, one of them took her aside and explained that they didn't use those fancy disposable systems, they used the old reliable three-bottle system. When Ms. Knik admitted that she had never heard of the three-bottle system, the staff nurse showed her how to set it up using three sterile bottles, glass tubes, and rubber tubing.

> CRITICAL THINKING SKILL

Introduction

Understand the physics underlying the chest tube setup.

Possible Scenario

The nurse is assembling the chest tube drainage system using the bottle system. The order is for two bottles, a drainage collection bottle, and a water seal bottle. As she is setting up the system, she remembers that it is important that the system be closed to prevent air leakage back into the pleural cavity. While setting up the water seal bottle, she notices that the short glass tube is open to the air. She is concerned that this will leave the system open, so she plugs the short glass tube in the water seal bottle.

Possible Outcome

The chest tube is placed and hooked up to the drainage system. The physician had expected a large amount of drainage immediately following the chest tube insertion, but there is no drainage. The client's

condition does not improve. The physician is concerned that she might have misplaced the chest tube and orders a chest x-ray. The nurse on hand first checks the chest tube drainage system and notices that the short glass tube is plugged. She unplugs the vent tube in the water seal bottle to equalize with the atmospheric pressure. The nurse notifies the physician and the x-ray is delayed while the client is monitored with the correct setup. There is substantial drainage through the chest tube and the client's condition improves. The x-ray is cancelled.

Prevention

Be aware of the physics involved in the closed chest drainage system. Understand what each chamber of the system is for and how it works. Despite the name, the system requires one port to be open to the air. Knowing where in the system the air vent is placed and why it will prevent serious, if not life-threatening, errors.

▼ VARIATIONS



Geriatric Variations:

- Explain sounds and sensations associated with the chest tube that the elderly client may not be able to see or hear clearly.



Pediatric Variations:

- Keep a demonstration (clean and empty) system to teach the child how it works. Match your explanations to the age of the child.
- Explain the sounds that the child will be hearing.
- If the system is attached to suction, reassure the child that the suction cannot be inadvertently turned up high enough to hurt them.



Home Care Variations:

- Chest tubes are not used in the home care setting.



Long-Term Care Variations:

- Chest tubes are not used in the long-term care setting.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse tries to adjust the amount of suction in the system by turning up the suction at the source.

Ask Yourself:

How do I prevent this error?

Prevention:

Know how the system works. The suction is regulated by the depth of fluid in the suction control chamber, not by the amount of external suction applied. Increasing the suction source only increases the noise level in the suction control chamber, not the amount of suction in the system.

> NURSING TIPS

- Set up the closed drainage system below the level of the chest tube insertion site.
- Keep the closed drainage system on a flat, sturdy surface so it is not tipped over. If the system is knocked over, the water seal may be lost, causing the introduction of air into the client's chest.
- If the water seal container is irretrievably compromised, a stopgap water seal can be devised by placing the end of the chest tube itself about 2 cm deep in sterile water or saline.

SKILL 7-10

Maintaining the Chest Tube and Chest Drainage System

Stacy Frisch, RN, BSN

KEY TERMS

Air leak
Chest tube
Drainage

Pneumothorax
Suction
Water seal



> OVERVIEW OF THE SKILL

This nursing skill involves the care of a client with a chest tube in place. Skills to be assessed include monitoring and maintaining the chest tube and the dis-

posable drainage system; there are also specific safety issues to be aware of when caring for a client with a chest tube in place.

> ASSESSMENT

1. Assess that the chest tube is set to the appropriate amount of suction as ordered by the physician or qualified practitioner. Suction is what draws the air or fluid from the pleural space, and it is essential that the appropriate amount is applied.
2. Assess that the water level in the water seal chamber is maintained at the marked line. If the level drops below the marked level, there is a chance that air could be drawn into the pleural cavity and cause or increase a pneumothorax.
3. Assess for an air leak in the water seal chamber. An air leak indicates a persistent or new pneumothorax.
4. Assess that all connections are taped. The presence of a loose connection could allow air to be drawn into the pleural cavity and cause a pneumothorax.
5. Assess the chest tube dressing and change every 24–48 hours. The dressing provides an occlusive covering to prevent any air from entering the pleural cavity and also prevent infection at the insertion site.
6. Assess the drainage system and note the amount and color of the drainage. The output is closely monitored to note bleeding and also to know when output has decreased enough for the tube to be removed.
7. Assess that the tubing is free of kinks and dependent loops and is not pinned to the bed. The presence of kinks or loops prevents adequate drainage of the chest tube, and pinning the chest tube to the bed increases the risk that the tube could become accidentally dislodged.
8. Ensure that the drainage system has not been tipped over, dropped, or crushed. Any trauma to the collection system could cause damage and increase the risk of air being drawn into the pleural cavity.
9. Identify risk factors for a tension pneumothorax in the client with a chest tube. A tension pneumothorax is a life-threatening condition and prevention is important.

> **DIAGNOSIS**

- 1.5.1.1 Impaired Gas Exchange
- 1.2.1.1 Risk for Infection

> **PLANNING**

Expected Outcomes:

1. Client will have chest tube and drainage system maintained without increase of the pneumothorax.
2. Client will be free of infection related to the chest tube.

3. Chest tube and drainage system will be maintained in a safe manner.

Equipment Needed (see Figure 7-10-2):

- Orders from physician or qualified practitioner
- Sterile water or normal saline
- Silk tape, 1-inch roll
- 3 Packages of 4 × 4 pads
- Vaseline, gauze, 1 package for each chest tube to be dressed
- Foam tape, 2-inch roll



Figure 7-10-2 Clean gloves, dressing, and tape are used to maintain the chest tube.



Estimated time to complete the skill:
10–20 minutes, depending on whether a dressing or drainage unit needs to be changed

> **CLIENT EDUCATION NEEDED:**

1. Explain the rationale for the dressing change or drainage system change.
2. Explain the rationale for the assessment of an air leak.
3. Teach the client to be aware of the drainage system and to avoid tipping or kicking it over.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Assess that the drainage system is set to the ordered amount of suction. This is achieved by filling the suction chamber with sterile water to the level of suction ordered, usually 20 cm, and maintaining that level of water at all times. Bubbling in the suction chamber needs to be maintained at a gentle bubbling; vigorous bubbling does not increase the amount of suction being provided. Vigorous bubbling only increases the rate of evaporation of the water in the suction chamber.
2. Assess that the water seal chamber is filled to the marked level.

1. Suction is removing air and fluid from the pleural cavity and resolving the pneumothorax.
2. The water seal chamber prevents air from returning to the pleural cavity; if it is not maintained to the marked level, air could be drawn into the cavity.

continues

3. Assess for an air leak by watching for bubbling in the water seal chamber and having the client take a deep breath and cough.
 4. If there is a new air leak, the physician or qualified practitioner may have you assess whether the air leak is from within the client or from the chest tube or drainage system. This can be done by briefly clamping the chest tube at the entrance site and assessing again for the air leak; if it is no longer present, it came from the client, and if it is still present, it is coming from the chest tube or the system. This same procedure should be continued down the length of the tube and tubing until the air leak is no longer present. If the leak is still present at the end, the entire drainage chamber should be changed.
 5. Assess that all connections at site are spiral-wrapped with silk tape.
 6. Assess the chest tube dressing every shift (see Figure 7-10-3) and change the dressing every 24–48 hours (see Figure 7-10-4). Record the date and time of the last dressing change directly on the dressing (see Figure 7-10-5).
3. An air leak can indicate a new or persistent pneumothorax.
 4. An air leak from the system indicates that it is not functioning properly and therefore appropriate suction may not be provided.
 5. The spiral taping prevents the tubing from pulling apart, and the silk tape is a strong adhesive.
 6. The dressing provides an occlusive seal to the site, preventing air from being drawn in. Changing the dressing every 24–48 hours will prevent infection at the site.



Figure 7-10-3 Assess the chest tube dressing at least once a shift. If the chest tube dressing has become saturated, it needs to be replaced.



Figure 7-10-4 Change the dressing every 24 to 48 hours, more frequently if needed.



Figure 7-10-5 Write the date and time of the dressing change directly on the dressing.



Figure 7-10-6 Assess the color and amount of drainage from the chest tube at least once a shift, or as ordered.

7. Assess every 1–8 hours, depending upon the orders, the drainage output from the chest tube, noting the color and amount (see Figure 7-10-6).
8. Assess that the drainage system is safely on the floor, lower than the client, or hung off the end of the bed to prevent tipping of the system (see Figure 7-10-7).



Figure 7-10-7 The drainage system must be lower than the client.

7. The amount and color of the drainage will indicate any bleeding, and monitoring overall output will indicate when the chest tube may be removed.
8. The drainage system needs to be lower than the client to ensure adequate drainage, and the system needs to be safe from tipping to prevent a disruption in the amount of suction provided.



Figure 7-10-8 Check the tubing between the chest tube and the drainage system to make sure it is not pinched or kinked.

9. Assess that the tubing is free from kinks and dependent loops and is not pinned to the bed linens (see Figure 7-10-8).
10. Ensure that a bottle of sterile water or saline is at the client's bedside (see Figure 7-10-9).

9. Any kinks or dependent loops interfere with the drainage of the chest tube. To prevent accidental dislodging of the chest tube, the tube should never be pinned to the bedding.
10. The bottle of sterile water/saline can be used to refill the water seal and suction chambers as needed, and if the chest tube becomes disconnected from the drainage system, the end of the chest tube should be placed in the bottle of water, creating a temporary water seal until a new drainage system is set up. A chest tube should never be clamped, except on orders from a physician or qualified practitioner.



Figure 7-10-9 Keep replacement fluid at the bedside to refill water seal and/or suction chambers if needed.

11. Ensure that an occlusive dressing is applied in the event that the chest tube accidentally falls out or is accidentally pulled out.

12. Ensure that the chest tube is never milked or stripped to maintain patency.

11. An occlusive dressing can decrease the risk of pneumothorax.

12. Milking or stripping can cause an increase of pressures up to 400 cm/H₂O, which can cause damage to lung tissue and vasculature. If a chest tube is clotted, the physician or qualified practitioner should be notified and other methods used.

> EVALUATION

- Client has a chest tube and drainage system maintained without increase of the pneumothorax.
- Client is free of infection related to the chest tube.
- Chest tube and drainage system are maintained in a safe manner.

> DOCUMENTATION

Nurses' Notes

- Document chest tube to suction at ordered amount.
- Note presence or absence of air leak.
- Note state of the dressing and when it was changed.
- If there was a disconnection or dislodgment of the tube, note client condition, physician or qualified practitioner notified, and actions taken.
- Record chest tube drainage amount and color.



▼ REAL WORLD ANECDOTES

Scenario 1

An RN is performing her assessment on a client who had a chest tube placed 2 days ago because of a spontaneous pneumothorax. The client has been without an air leak for 24 hours, but the RN notices in her assessment that there is now an air leak. After ensuring that the client is not compromised, the RN completes her assessment of the drainage system and finds that the water seal level is well below the marked line. She adds sterile water to the water seal chamber and then notifies the physicians, who request a portable chest x-ray to assess for a pneumothorax. This RN was reminded of the importance of maintaining the water level and assessing the drainage system every shift.

Scenario 2

A client with a chest tube was being transferred from stretcher to bed, and the drainage system was placed on the floor. When the client's bed was returned to a low position, the drainage system was caught beneath the bed, and although there was no visible damage to the drainage system, the RN replaced the drainage system to prevent any potential adverse effects.

> CRITICAL THINKING SKILL

Introduction

Look at an example of the importance of noting the amount and color of chest tube drainage.

Possible Scenario

A client has just been admitted from the E.R. with a chest tube for a hemothorax after a fall from a ladder.

On initial assessment, the nurse fails to mark the drainage container at the level of the output and notes the color as a red to dark red bloody drainage. The nurse does no further follow-up on the drainage output until 3 hours later, when “from what she can remember,” the client has now had an additional 400 cc of dark red, bloody drainage.

Possible Outcomes

This client is probably just draining the blood that collected from the injury, but because the nurse did not mark the level of the drainage from the E.R., it is very hard to accurately assess the amount of output and to assess for continued bleeding.

Prevention

The drainage container should be marked and dated and the time indicated each time it is assessed. The color of the output should be documented in the nurses' notes.

▼ VARIATIONS**Geriatric Variations:**

- *It is important to maintain mobility, especially in the elderly client. Make sure the client is not afraid to move about, sit in the chair, or ambulate with the chest tube system.*
- *Explain to the client that the 6 feet of tubing is to allow movement. Explain how the tube is anchored, and how the dressings are secured. Encourage the client to move about and change positions in bed or in the chair.*

**Pediatric Variations:**

- *Secure airtight connections with tape and assess the dressing frequently if the child is moving around in bed.*
- *Assist the parent who wishes to hold or rock the child with the chest tube drainage system in place.*
- *Teach parents about the system, showing them normal movement and bubbling in the system.*

**Home Care Variations:**

- *Chest tubes are not used in the home care setting.*

**Long-Term Care Variations:**

- *Chest tubes are not used in the long-term care setting.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

The suction is not at the ordered amount.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check your orders for the correct suction level and always assess that the suction is being delivered at the ordered amount.

Possible Error:

The water seal chamber is not full.

Ask Yourself:

How do I prevent this error?

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Always assess your water level and refill as needed with sterile water.

Possible Error:

The chest tube becomes disconnected.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check that the connections are spiral-taped.

> NURSING TIPS

- If your client has a large and persistent air leak, your water seal level will evaporate quickly and need to be assessed frequently.
- If there is concern that the chest tube has become clotted, the physician or qualified practitioner can suction the chest tube out using a small suction catheter.
- If you are not working with a “wet” drainage system, the way to assess the amount of suction being applied is to check the suction dial to see that it is set to the amount ordered, and then to check that the suction indicator is present consistently, indicating that the appropriate amount of suction is being applied.
- Evaluate chest tube drainage system and tubing for safe positioning.
- Determine that emergency items are available if the chest tube becomes dislodged or disconnected.

SKILL 7-11

Measuring the Output from a Chest Drainage System

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Chest tube

Chest tube drainage

Collection port

Pleur-evac

Suction

Water seal



> OVERVIEW OF THE SKILL

The chest drainage system is a closed system designed to drain air or fluid from the pleural cavity while restoring or maintaining intrapleural pressure by creating a vacuum seal. The goal of the chest drainage system is to allow the lung to reexpand after surgery or trauma.

One or more chest tubes are inserted and covered with airtight dressings. These tubes are attached to approximately 6 feet of rubber tubing, which terminates in a water seal drainage collection system attached to wall suction. The system draws fluid and air away from the intrapleural space. While the escaping air is not measured, the fluid drained through the chest tube is considered to be output and must be

measured at regular intervals. The amount is then added to the intake and output totals.

Because the chest drainage system is a closed system, the drainage is not emptied from the system when the output measurement is taken. The drainage level is marked on the outside of the drainage container at each measurement, and the amount of fluid between the previous mark and the current mark is calculated for the output measurement. Disposable plastic chest drainage systems may have three columns for drainage. If the drainage container has been tipped or moved, the drainage may have run into the other columns, requiring marking and calculating the drainage in all of the columns.

> ASSESSMENT

1. Assess the chest drainage system to determine how the drainage will be measured.
2. Assess the drainage to determine its color, consistency, and amount.

> DIAGNOSIS

1.4.1.2.2.2 Risk for Fluid Volume Deficit

> PLANNING

Expected Outcomes:

The amount of drainage from the chest drainage system will be accurately determined and recorded.

Equipment Needed:

- Intake and output record
- Marker or pen



Estimated time to complete the skill:

5 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need for accurate intake and output measurements.

2. Explain to the client the importance of leaving the drainage system below the level of the chest.
3. Tell the client to be careful not to tip over the drainage system or set it on the bedside table.
4. Explain to the client that movement of the drainage in the tube is normal.
5. Explain to the client that, unlike urine and other drains, it is normal not to empty and discard the drainage container regularly.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Determine which bottle or chamber of the chest drainage system contains the drainage (see Figure 7-11-2).



Figure 7-11-2 Check the chest tube drainage system and measure the correct fluid level.

3. With the fluid meniscus as close to eye level as possible, note the level of the drainage.
4. Use the pen or marker to mark the current fluid level. Indicate the time and date of the measurement and mark it with your initials.
5. Note the level of drainage marked just prior to this measurement. Subtract the previous drainage total from your current drainage total to obtain an accurate determination of the amount of drainage during that time period.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Measures the correct fluid level. If the drainage system is a plastic, disposable system, there may be more than one drainage collection column to measure.



Figure 7-11-3 Record the drainage on the Input and Output Record.

3. For as accurate a reading as possible.
4. For continuity of care, so the next nurse will know where and when the last measurement was taken.
5. By subtracting the total amount of previous drainage from the total amount of current drainage, the difference will indicate the amount of drainage since the last measurement.

6. Note the amount of drainage since the last measurement on the intake and output record (see Figure 7-11-3). If the drainage is more than 100 cc per hour, notify the physician or qualified practitioner.

7. Wash hands.

6. Provides an accurate record of the client's output.

7. Reduces the transmission of microorganisms.

> EVALUATION

- The amount of drainage from the chest drainage system was accurately determined and recorded.

> DOCUMENTATION

Input and Output Record

- Note the amount of drainage in the intake and output record. If the amount is significantly different from previous readings, indicate this.



▼ REAL WORLD ANECDOTES

While assisting Mrs. Rios from the bed to the commode, the nurse accidentally knocked over the plastic chest drainage unit. The water seal was intact and Mrs. Rios denied any shortness of breath or distress. When righting the unit, the nurse noted that the drainage that had been present only in the first column of the drainage chamber had spilled into the other two columns. As a result, the previous shift's drainage mark was no longer accurate. The nurse didn't know how she would determine the next output reading from Mrs. Rios's chest tube. Rather than take the time and trouble to mark all of the columns, add the amounts up from each column, and then subtract the previous total, the nurse estimated the amount of drainage based on the drainage from the previous shift. Because she hadn't marked all of the columns, the nurse caring for Mrs. Rios next was unable to obtain an accurate drainage measurement. As a result, it was almost 24 hours before it was discovered that Mrs. Rios had had almost no drainage from her chest tube since the incident when the chest drainage container was tipped over. When the lack of drainage was finally discovered, Mrs. Rios's doctor stripped the chest tube, dislodging a clot. After passing the clot, the chest tube almost immediately drained a large amount of serosanguineous fluid.

> CRITICAL THINKING SKILL

Introduction

Subtracting the old drainage total from the new drainage total to get the amount of drainage for the shift.

Possible Scenario

You are calculating the intake and output totals at the end of the shift for your client, Mr. Miles. As you check his chest tube drainage, you note that there is no mark for the previous shift's measurement.

Possible Outcome

Without any notation for the previous shift's output, you note the last mark on the drainage container. It was applied 16 hours earlier. As an estimate of the shift output, you divide the amount of drainage following the mark 16 hours earlier in half, estimating that the drainage was

probably approximately equal the last two shifts. When you return to duty the next day, you hear in report that Mr. Miles developed a hemothorax in the night due to a clot in his chest tube. The clot and lack of drainage went unnoticed for a prolonged period of time because of the incorrect chest tube output you recorded the day before.

Prevention

You mark the current drainage level and note the last marked measurement. You then check the chest tube output recorded in the client's chart by the previous shift. By subtracting the amount of recorded drainage from the amount of current, unmarked drainage you can obtain an accurate reading for the chest tube drainage on your shift. If the previous shift did not record the amount of drainage in the client's chart you should record the total unmarked amount and note that this is a 16-hour total.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may be at increased risk of dehydration secondary to large amounts of chest tube drainage. Monitor the elderly client's intake and output closely.*



Pediatric Variations:

- *Children are susceptible to dehydration with much smaller fluid losses than adults. Chest tube drainage should be monitored very closely to be sure the volume of drainage is within acceptable fluid loss limits.*



Home Care Variations:

- *Chest tubes are not generally left in place in the home care setting.*



Long-Term Care Variations:

- *Chest tubes are not generally left in place for long-term care.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

If the water seal bottle is also the drainage bottle, the baseline amount is not subtracted, resulting in an inaccurate reading.

Ask Yourself:

How do I prevent this error?

Prevention:

If the water seal bottle will also collect drainage, mark the water level when the chest drainage system is first set up to provide a baseline for drainage calculations.

> NURSING TIPS

- Measure the output at the meniscus.
- If the drainage amount seems to be very different from that of the previous shift, investigate possible reasons.
- While measuring the drainage, check lung sounds and assess the wound site.
- Document your findings.

SKILL 7-12

Obtaining a Specimen from a Chest Drainage System

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Access port

Air seal

Drainage collection chamber

Specimen

Tension

pneumothorax



> OVERVIEW OF THE SKILL

The chest drainage system is a closed system designed to drain air or fluid from the pleural cavity and help restore its vacuum seal. Occasionally the drainage will need to be sampled. If the client has signs of infection

or if the drainage is copious or an unusual color, a specimen can be obtained for analysis. Because the chest drainage system is closed, the specimen must be obtained using a closed technique.

> ASSESSMENT

1. Assess the physician's or qualified practitioner's orders to determine what kind of specimen is required.
2. Assess the available equipment to determine what kind of equipment will be needed for the specimen retrieval.

- Syringe with needle (syringe size determined by the amount of drainage needed for the specimen)
- Specimen container
- Label for specimen container
- Lab slip

> DIAGNOSIS

1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

The chest drainage specimen will be obtained without increasing the client's risk of infection or loss of air seal.

Equipment Needed (see Figure 7-12-2):

- Alcohol swabs
- Betadine swabs



Figure 7-12-2 Two types of sterile specimen containers



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

Explain to the client the reason for collecting the specimen.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Determine if there is drainage in the tubing. If not, curl the tubing on the bed.
3. Apply clean gloves.
4. If an access port is present in the tubing, cleanse it with Betadine or alcohol swabs (see Figure 7-12-3). If there is no access port, cleanse the rubber tubing, near the drainage pool, with Betadine or alcohol swabs (see Figure 7-12-4).



Figure 7-12-3 Use an alcohol swab to clean the access ports in the chest tube tubing.

5. Puncture the access port or the rubber tubing with the syringe and needle. Puncture at a 45-degree angle (see Figure 7-12-5).
6. Gently withdraw the needed amount of drainage from the tubing.
7. Remove the needle from the port or tubing and place the drainage specimen into a laboratory specimen container.
8. Dispose of the syringe and needle in the appropriate container.

1. Reduces the transmission of microorganisms.
2. Obtains fresh drainage for a specimen.
3. Prevents contact with bodily fluids.
4. Prevents the introduction of microorganisms into the closed system.



Figure 7-12-4 If there is no access port, clean the rubber tubing itself and puncture with a syringe and needle.

5. Withdraws the drainage specimen without opening the system. Use a 45-degree angle to reduce the possibility of puncturing the opposite side of the tubing and to increase the “seal” of the rubber after the needle has been removed.
6. Obtains a sterile specimen. Use gentle suction to avoid increasing the suction in the client’s chest to dangerous levels.
7. Allows proper testing of the specimen and prevents possible contamination in the laboratory.
8. Observes standard precautions.



Figure 7-12-5 Puncture the access port at a 45-degree angle.

9. Label the specimen container with the client's name, room number, the date, and the time the specimen was collected.
10. Remove gloves and dispose of in the proper container.
11. Wash hands.
9. Allows proper identification of the specimen and reduces the opportunity for laboratory error.
10. Observes standard precautions.
11. Reduces the transmission of microorganisms.

> EVALUATION

- The chest drainage specimen was obtained without increasing the client's risk of infection or loss of air seal.

> DOCUMENTATION

Nurses' Notes

- Indicate the date and time the specimen was collected. Keep a copy of the lab slip in the chart if the lab slip has a chart copy.

Intake and Output Record

- If the client's chest tube drainage is being monitored closely, indicate the amount of drainage removed.



▼ REAL WORLD ANECDOTES

When a chest drainage specimen was ordered by Mrs. Ipsen's physician, her nurse hastened to comply. It was getting close to the end of her shift and she wanted to get this order taken care of quickly. When the nurse arrived at Mrs. Ipsen's bedside, she noted that there was no drainage in the tubing. She didn't want to wait for more drainage to collect, so she gently lifted the drainage collector up level with the client and poured some of the collected drainage back into the tubing. She then aspirated the drainage to send to the lab.

When the lab results returned, they indicated a large growth of several pathogens. Luckily, Mrs. Ipsen's physician noted that Mrs. Ipsen's condition did not match the seriousness of the lab results. He personally collected a drainage specimen and had a heated discussion with the charge nurse regarding the proper collection of specimens.

> CRITICAL THINKING SKILL

Introduction

Understand the physics underlying the chest tube setup.

Possible Scenario

Mr. Rosario's physician ordered a chest tube drainage specimen collected. The nurse assigned to care for Mr.

Rosario collected the necessary equipment and brought it to Mr. Rosario's bedside. There was no drainage in the tubing when the nurse checked Mr. Rosario's tubing. Thinking she would use the same technique as collecting a urine specimen from a closed system, the nurse clamped the chest tube to allow a drainage specimen to collect.

Possible Outcome

Within 15 minutes Mr. Rosario was in severe respiratory distress. He turned on his call light and started to call for help. His nurse ran to his bedside. As she assessed his condition, she realized that his distress must somehow be related to the clamped chest tube and she quickly unclamped the tube. Within minutes Mr. Rosario's condition stabilized. When the nurse checked the tubing, she noted that there was still no drainage in the tube.

Prevention

If the nurse had understood the physics underlying the chest tube system, she would have realized that clamping the chest tube would block drainage from the chest because the suction was blocked. Also by blocking the suction she had prevented the chest drainage system from reinflating the client's lung, potentially causing a tension pneumothorax. If there is no drainage in the tubing, the nurse should create a dependent loop in the tubing that would collect future drainage that could be used for a specimen.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may be hard of hearing or confused. Be sure they can hear and understand your instructions.*



Pediatric Variations:

- *Tell the child that obtaining a specimen will not hurt. Remind the child that the needle will not be going into her. Let the child watch if possible while you collect the specimen. Answer questions about the chest drainage system and how it works.*



Home Care Variations:

Not applicable



Long-Term Care Variations:

Not applicable

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The needle is inserted at a 90-degree angle into the port or rubber tubing.

Ask Yourself:

How do I prevent this error?

Prevention:

Insert the needle at a 45-degree angle to help the rubber "heal" itself and to prevent the needle from piercing the far side of the tubing.

> NURSING TIPS

- Use gentle suction when withdrawing the specimen to avoid increasing the suction level in the pleural cavity.
- Insert the needle at a 45-degree angle to decrease the chance of puncturing the far side of the tubing as well as to provide a better seal after withdrawing the needle.
- While obtaining a sample, check for leaks in the system and check that connections are secure.
- While obtaining a sample, check for other signs of infection.

SKILL 7-13

Removing a Chest Tube

Stacy Frisch, RN, BSN

KEY TERMS

Chest pain
Chest tube
Chest x-ray
Hemothorax

Pneumothorax
Premedicate
Shortness of breath
Vaseline gauze



> OVERVIEW OF THE SKILL

Chest tubes are removed by the physician or qualified practitioner, with the assistance of the nurse. Generally, a chest tube has been placed during thoracic surgery to remove a collection of fluid or air (a hemothorax or pneumothorax) between the parietal pleura and the visceral pleura, or after cardiac surgery to prevent a collection of fluid or

blood in the mediastinum, which could lead to cardiac tamponade. Chest tubes are also placed in the case of spontaneous pneumothorax. The chest tube is removed once the lung has reexpanded and there is minimal drainage, or the risk of fluid collection in the mediastinum is diminished post-cardiac surgery.

> ASSESSMENT

1. Assess whether the client has a new or larger air leak present prior to chest tube removal and notify the physician or qualified practitioner. A new air leak or a larger air leak may indicate a new or enlarging pneumothorax, and removal may need to be postponed.
2. Ensure that the client has had a chest x-ray prior to the removal of the chest tube. This assesses whether the lung is expanded prior to chest tube removal.
3. Check that your client has received pain medication prior to chest tube removal. Although it is a brief procedure, it can be uncomfortable.
4. Assess the anxiety level of the client regarding the chest tube removal procedure to determine what education, support, and/or medication might be needed.
5. Assess that the client has tolerated the absence of chest tube suction for 1–2 days prior to chest tube removal to confirm the appropriate time to remove the tube.
6. Check when the physician or qualified practitioner is planning to remove the tube to allow time to gather supplies and prepare the client.
7. Assess that the client can assist with the chest tube removal by performing the Valsalva's maneuver at the appropriate time to prevent air from being pulled back into the pleural space at the moment of chest tube removal.

> DIAGNOSIS

- 9.1.1 Pain, related to chest tube removal
 1.5.1.3 Ineffective Breathing Pattern

> PLANNING

Expected Outcomes:

1. Client will have the chest tube removed without complication.
2. The nurse will assist with the procedure while avoiding exposure to bodily fluids.
3. Client will not experience undue pain or anxiety during the chest tube removal.

Equipment Needed (see Figures 7-13-2A and 7-13-2B):

- Sterile gloves (gowns and goggles if needed)
- Vaseline gauze (1 package for each chest tube to be removed)
- Sterile 4 × 4 pads (2 packages for each chest tube to be removed)
- Foam tape, preferably a 2-inch roll
- Disposable waterproof absorbing pads
- Sutures, if requested by physician or qualified practitioner
- Suture removal kit or sterile scissors, if requested by physician or qualified practitioner
- Chest tube clamps

- Pain medication to premedicate the client 15–30 minutes prior to chest tube removal, if possible
- Requisition for chest x-ray post-chest tube removal



Estimated time to complete the skill:
15–20 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the rationale for the removal of the chest tube.
2. Explain the rationale for taking the pain medication.
3. Explain to clients that they will be asked to help during the removal of the chest tube by taking a deep breath and holding it while bearing down slightly (as if to have a bowel movement). Explain to clients that this exercise will help to prevent them from recollecting air in their lung space.
4. Explain to clients that the dressing over the site of the chest tube will need to remain in place for 24 hours.
5. Teach clients the signs and symptoms of pneumothorax (shortness of breath, chest pain, or pain with inspiration) and instruct clients to notify the nurse if they have any of the symptoms.



Figure 7-13-2A Vaseline gauze, dressings, rubber gloves, and tape are used when removing a chest tube.



Figure 7-13-2B Chest tube clamp

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Gather all equipment in the client's room (see Figure 7-13-3).



Figure 7-13-3 Gather equipment at the bedside.

2. Wash hands.
3. Premedicate the client.
4. Assist the client into bed and place in accessible and comfortable position for chest tube removal.
5. Reassure client, and explain what you are doing as you proceed.
6. Assess for effects of premedication on respiratory status.
7. Apply gloves.
8. Assist physician or qualified practitioner as directed.
9. Once the tube is out and the dressing is applied, check that the dressing is secure and airtight. The dressing should not be removed for 24 hours; if drainage is soaking through, reinforce with 4 × 4 pads and foam tape. (See Figure 7-13-4.)
10. Check that the post-chest tube removal x-ray has been ordered.

RATIONALE

1. Ensures that everything is available for the physician or qualified practitioner and does not prolong the procedure.



Figure 7-13-4 The dressing applied immediately after the drainage tube is removed should not be changed for at least 24 hours. Mark the current date and time on the dressing.

2. Reduces the transmission of microorganisms.
3. Decreases the discomfort of chest tube removal.
4. Ensures safe and comfortable position for chest tube removal.
5. Decreases anxiety and alleviates fears.
6. Monitors for possible respiratory depression.
7. Decreases risk of exposure to bodily fluids.
8. Facilitates safe removal of the chest tube.
9. Reduces risk of pneumothorax post-chest tube removal.
10. Determines whether a pneumothorax is present post-chest tube removal.

continues

- | | |
|---|---|
| <p>11. Check that the physician or qualified practitioner has properly disposed of the drainage system in the biohazards waste can.</p> <p>12. Dispose of gloves and wash hands.</p> <p>13. Assess client in 30 minutes, watching for signs and symptoms of a pneumothorax: increased shortness of breath, decreased oxygen saturation, chest pain, or pain with inspiration. Assess the dressing. Be sure it is dry and intact.</p> | <p>11. Ensures correct handling of biohazards and decreases risk of exposure.</p> <p>12. Reduces the transmission of microorganisms.</p> <p>13. Ensures early recognition of a post-chest tube removal pneumothorax.</p> |
|---|---|

> EVALUATION

- Client had the chest tube removed without complication.
- The nurse assisted with the procedure while avoiding exposure to bodily fluids.
- Client did not experience undue pain or anxiety during the chest tube removal.

> DOCUMENTATION

Nurses' Notes

- Document chest tube removal procedure.
- Note the physician or qualified practitioner performing the procedure.

- Indicate client was premedicated.
- Note client's response to the medication.
- Document outcome of the procedure.
- Note the status of the dressing.
- Document completion of the chest x-ray.
- Document assessment of the client post-chest tube removal.
- Record time procedure was completed.

Medication Administration Record

- Indicate client was premedicated.
- Document client's response to the medication.



▼ REAL WORLD ANECDOTES

A nurse was assisting a physician with the removal of a chest tube in a client who did not hold her breath and bear down. While the chest tube was being removed, both the nurse and physician heard a “sucking” sound. Immediately, both the nurse and physician were concerned about a pneumothorax. A stat chest x-ray was done and revealed a small pneumothorax. The client was monitored frequently to assess for respiratory compromise and a repeat chest x-ray was done in 2 hours to evaluate the pneumothorax. It was a reminder of the importance of having the client practice taking a deep breath and bearing down before the actual removal of the chest tube.

> CRITICAL THINKING SKILL

Introduction

It is important to reassess the client post-chest tube removal and be able to recognize signs and symptoms of a pneumothorax.

Possible Scenario

A physician removed a pleural chest tube from a client 30 minutes ago. The nurse has just returned to reassess the client and finds the client extremely anxious and in respiratory distress. Upon further assessment, the nurse

finds that the airtight dressing has peeled loose, and the chest tube site is exposed.

Possible Outcome

The nurse immediately replaced the airtight dressing to stop more air from being pulled back into the pleural space. He notified the doctor immediately. A new chest tube was re-inserted and attached to suction. If the nurse had not returned promptly to reassess the client this setback could have evolved to respiratory failure and/or arrest.

Prevention

It is essential to check that the dressing is intact and airtight after a chest tube has been removed. The nurse

needed to instruct the client to call for assistance immediately if she felt any shortness of breath or if the dressings loosened.

▼ VARIATIONS



Geriatric Variations:

- Older clients may not hear well, so it is important to assess if they have heard and understood the instructions for breathing during the removal of the chest tube. Allow time to practice the Valsalva's maneuver.



Pediatric Variations:

- Younger clients may not understand the instructions for breathing or they may not be mature enough to coordinate the breathing. It is important that this is assessed prior to the removal. Allow extra time to teach the child what will be happening and what special kinds of breathing the child will be doing. Practice.
- Use special hand signals to assist the child, or have a parent in the room do the breathing along with the child. For example, fingers held over the lips indicate it is time to hold the breath.
- A younger client may be less anxious with a parent in the room to provide support and distraction during the procedure.



Home Care Variations:

- Chest tubes are generally not used in the home care setting.



Long-Term Care Variations:

- Chest tubes are generally not used in the long-term care setting.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The dressing is not intact.

Ask Yourself:

How do I prevent this error?

Prevention:

Always assess that the dressing is secure before leaving the client.

Possible Error:

The drainage system is disposed of in the wrong waste can.

Ask Yourself:

How do I prevent this error?

Prevention:

Check that the physician or qualified practitioner has disposed of the system in the biohazards waste.

> NURSING TIPS

- If your client has a tape allergy or has skin breakdown, duoderm can be used around the tube site, and the foam tape can be applied to this surface rather than the skin.
- Use water absorbent pads beneath the client on the side the tube is to be removed. This will absorb any drainage that may leak and prevent a complete bed change.
- Supply the physician or qualified practitioner with two packets of 4 × 4 pads in addition to the Vaseline packet for each chest tube site that is to be dressed. This will allow for enough absorption as this dressing should remain in place for 24 hours.

SKILL 7-14

Ventilating the Client with an Ambu Bag

Susan Randolph, RN, MSN, CS, and
Catherine H. Kelley, RN, MSN, OCN

KEY TERMS

Acidosis	Hypocapnia (low PaCO₂)
Alkalosis	Hypoxia
Ambu bag	Intracranial pressure (ICP)
Apnea	Nasogastric tube
Cardiopulmonary arrest	Oropharyngeal airway
Endotracheal tube	Tracheostomy tube
Hypercapnia (elevated PaCO₂)	



> OVERVIEW OF THE SKILL

An Ambu bag is an “air mask bag unit” that is used in numerous situations that require manual ventilation. Common uses of the Ambu bag include manual ventilation before and after suctioning an endotracheal or tracheostomy tube, emergency resuscitation in the event of respiratory or cardiopulmonary arrest, hyperventilation of the client with increased intracranial pressure (ICP), and maintenance of respiratory support during the transfer of ventilator-dependent clients between care locations.

The Ambu bag is manufactured in infant, child, and adult models capable of delivering inspiratory volumes of 240–2,000 ml per breath. It is made up of five basic components: a mask, an adapter for endotracheal or tracheostomy tubes, the bag (also referred

to as a reservoir), an air control flow system, and an oxygen adapter. Reservoir tubing may also be used to increase oxygen levels.

Operation of the Ambu bag is simple; however, incorrect technique may significantly compromise the client’s respiratory status. To use the Ambu bag, the mask is either placed over the client’s nose and mouth, making a seal between the mask and the skin, or is connected to the endotracheal or tracheostomy tube using the adapter. Additional oxygen may be added to the air in the reservoir. The bag, or reservoir, is then compressed with one or two hands, forcing the air into the client’s lungs. Once released, the bag automatically reinflates and additional breaths can be delivered as needed.

> ASSESSMENT

1. Determine the need to use manual ventilation. There are many situations that require the use of manual ventilation. Some situations are planned such as client transfer or suctioning, while others are unexpected emergencies.
2. Identify signs and symptoms that may indicate the need to provide manual ventilation. It is imperative that a nurse assess the client for skin color

that is dusky or cyanotic in appearance and decreased or absent (apnea) respirations/pulse, which indicate cardiopulmonary arrest. Laboratory results such as arterial blood gas may indicate elevated CO₂ and decreased O₂ levels; client monitoring equipment such as pulse oximetry may alarm with decreasing O₂ saturation; and intracranial pressure monitors may become elevated with increasing CO₂.

3. Review medical history to identify factors that could affect respiratory status. This includes a history of central nervous system insult (such as trauma, central nervous system tumor, seizures), alcohol or drug overdose, altered level of consciousness, and respiratory alkalosis or acidosis. It also can occur with pulmonary injury or inability of the thoracic cage to generate pressure gradients needed for ventilation trauma (chest trauma, diaphragmatic hernia, motor vehicle accident).
4. In assessment of the alert client (such as a ventilator-dependent client requiring transfer to another room), assess the client's knowledge and ability to cooperate with the procedure. Clients may become anxious when suctioned or moved. It is important to provide an explanation of the planned procedure, length of time, and activities the client can do to assist in a smooth process. Additionally, some alert clients have been ventilator dependent for a long time and have caregivers that have been trained to assist in this process.

> DIAGNOSIS

- 9.3.1 Anxiety, related to the procedure
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation

> PLANNING

Expected Outcomes:

1. The client will have spontaneous respirations or will be maintained on mechanical ventilation with stable vital signs.
2. Laboratory tests and client monitoring equipment will indicate appropriate CO₂ and O₂ levels.
3. Intracranial pressure will be within normal limits.
4. The client will be able to maintain effective ventilation during transportation.
5. The client will have improved airway clearance as evidence by removal of secretions and/or mucous plugs from the endotracheal/tracheostomy tube.
6. The client/caregiver will report minimal anxiety related to the procedure.

Equipment Needed (see Figure 7-14-2):

- Disposable gloves
- Ambu bag (appropriate reservoir for client size)

- Appropriate-size mask or endotracheal/tracheostomy tube adapter
- Oxygen source (if indicated)
- Oxygen connecting tubing (if indicated)
- Face shield, goggles, or other eye protection
- Suctioning equipment
- Oropharyngeal airway (unconscious client in cardiopulmonary arrest)



Estimated time to complete the skill:

1. In the event of cardiopulmonary arrest, manual ventilation is continued until either spontaneous respiration has returned or the client is placed on mechanical ventilation.
2. If a ventilator-dependent client is being transferred between care locations, the length of manual ventilation will correspond to the time required to transfer the client between mechanical ventilation support systems.
3. Estimated time to provide hyperinflation prior to and following suctioning is 5 minutes.

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of the procedure.
2. Describe the procedure and length of time.
3. Show the client the Ambu bag and other associated equipment.



Figure 7-14-2 Manual resuscitator, reservoir bag, tubing, and mask

4. Explain the sensations the client may feel, for example, during suctioning.
5. Explain how the client can help with the procedure.
6. Go over basic messages that the client might need to communicate during the procedure, and assign hand signals.
7. Instruct the alert client to try to breathe with the Ambu bag.
8. Teaching relaxation techniques can sometimes minimize the anxiety or restlessness the client may experience during suctioning or transfer.
9. Provide opportunities for a caregiver to practice with the Ambu bag on a dummy prior to initial experience on the client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <p>1. Obtain baseline assessment of client, including vital signs.</p> | <p>1. Provides a baseline for comparison after procedure to assess tolerance and improvement in clinical status.</p> |
| <p>2. Prepare, connect, and check functioning of necessary equipment:</p> <ul style="list-style-type: none"> • Oxygen supply/tubing • Suction equipment/supplies • Correct-size adapter or mask | <p>2. Provides a safe, organized approach to the procedure.</p> |
| <p>3. Raise or lower bed, table, or transport cart to a comfortable working height.</p> | <p>3. Maintains good body mechanics for the nurse throughout the procedure.</p> |
| <p>4. Wash hands, apply gloves and face shield.</p> | <p>4. Practices universal precautions and reduces the transmission of microorganisms.</p> |
| <p>5. For the client with an existing endotracheal or tracheostomy tube requiring suctioning or transfer:</p> <ul style="list-style-type: none"> • Remove the current mechanical ventilation system. • For transfer, attach Ambu bag to endotracheal or tracheostomy tube and compress bag to administer one breath every 3–5 seconds. Compress the reservoir 20 times per minute to mimic a normal breathing pattern. • Adjust the flow meter to ensure adequate inspiratory volume. • The Ambu bag may be compressed with two hands if the existing airway tube is stable and the client is not fighting the procedure; otherwise, the nurse may have to use the dominant hand to compress the Ambu bag while stabilizing the airway tube during the procedure. • For suction, instill normal saline as per agency protocol (approximately 5–10 ml depending on size of client and physician or qualified practitioner order). | <p>5.</p> <ul style="list-style-type: none"> • Opens airway for Ambu bag use. • Provides hyperinflation and increases O₂ levels, preventing hypoxia, and decreases CO₂ levels prior to suctioning. • Adequate air flow is necessary to fully inflate the lungs. • Maintenance of artificial airway is of paramount importance with the use of an Ambu bag. • Normal saline is used to loosen secretions and mucous plugs as well as stimulate cough. |

- Suction the client, reattach the Ambu bag, and repeat the three preceding steps.
- End the procedure with administration of several breaths before reconnecting client to mechanical ventilatory support
- The chest is assessed to verify air flow.

6. For the client who is unconscious and not intubated:

- Assess appropriateness of use of Ambu bag and need for mask or immediate intervention with intubation.
- Clear oral cavity of vomit, mucus, or other debris.
- Insert an oropharyngeal airway.
- Position client using either the head-tilt/chin-lift method, or in the case of suspected or potential cervical spine injury, use the modified jaw thrust maneuver.
- Position Ambu bag over the client's nose and mouth using the nondominant hand. The thumb and index finger are used to stabilize the seal between the mask and the client's face, while the remaining fingers maintain head position.
- The dominant hand is used to deliver breaths to the client. Breath rate is administered according to cardiopulmonary resuscitation protocol.
- The chest is assessed to verify adequate inspiratory flow.
- Assess for the need to insert a nasogastric tube.

- Suction as necessary.

7. Ongoing assessment to determine need to discontinue procedure as evidenced by:

- Endotracheal or tracheostomy secretions minimal and artificial airway patent
- Client no longer coughing or "bucking" ventilation
- Stable vital signs
- Client no longer dusky or cyanotic

- Removes secretions and mucous plugs, and maintains patency of artificial airway.
- Replaces O₂ and prevents atelectasis.
- Verification of adequate inspiratory effort.

6.

- Some clients presenting with facial injuries will not be appropriate for use of Ambu bag with mask, and an endotracheal tube must be placed.
- Opens airway; helps prevent aspiration into lungs.
- Assists in maintaining airway patency and preventing the tongue from falling back into the oropharynx.
- The modified jaw thrust maneuver maintains the head in a neutral position if a cervical spine injury is suspected.
- A proper seal ensures adequate ventilation.

- Provides adequate oxygenation per cardiopulmonary resuscitation protocol.

- Verifies patent airway and adequacy of manual ventilatory support.
- Manual ventilation may force air into the stomach and the client may vomit and aspirate secretions. A nasogastric tube decompresses the air in the stomach.
- Suctioning maintains a patent airway and prepares the oropharyngeal cavity for intubation if necessary.

7. Ongoing assessment is critical in determining improvement or deterioration in the client's clinical status.

- Provides information on tolerance of the procedure.

- Return of spontaneous respirations
 - Decreased intracranial pressure
8. Remove Ambu bag and reattach client to mechanical ventilation system.
 9. Discontinue oxygen flow to the Ambu bag.
 10. Reposition client and return bed and guard rails to original position.
 11. Clean supplies per institution protocol (i.e., endotracheal tube adapter).
 12. Dispose of gloves and face shield and disposable supplies used during procedure.
 13. Document tolerance of procedure.
8. Maintains ventilatory and oxygen support. Additionally, an unconscious client who required cardiopulmonary resuscitation will probably be intubated and placed on mechanical ventilatory support.
 9. Promotes client and staff safety by preventing hyperoxygenation of the room atmosphere.
 10. Promotes client comfort and safety.
 11. Assists in the prevention of infection transmission.
 12. Promotes adherence to universal precautions.
 13. Provides information on airway patency and client knowledge and comfort with procedure.

> EVALUATION

- The client has spontaneous respirations or is maintained on mechanical ventilation with stable vital signs.
- Laboratory tests and client monitoring equipment indicate appropriate CO₂ and O₂ levels.
- Intracranial pressure is within normal limits.
- The client is able to maintain effective ventilation during transportation.
- The client has improved airway clearance as evidenced by removal of secretions, or mucous plugs, from the endotracheal/tracheostomy tube.

- The client experiences minimal anxiety related to the procedure.

> DOCUMENTATION

Nurses' Notes

- Document preassessments and postassessments, including vital signs and other physiological parameters such as ICP.
- Note length of and tolerance to procedure.
- Record rate of respirations, volume, and amount of supplemental O₂ utilized.
- Describe secretions, including amount and quality.



▼ REAL WORLD ANECDOTES

Scenario 1

The nurse went into Mr. McBride's room and prepared to suction his endotracheal tube. She began the procedure, utilizing an Ambu bag to provide hyperinflation and supplemental oxygen to the client during the procedure. While suctioning the client, he became cyanotic and his pulse oximetry suddenly dropped. She began to increase the rate and volume of breaths delivered to the client with no change in his condition. Another nurse who came to the bedside to assist her noted that she had failed to check the oxygen tubing connection, which was disconnected, and the client was not receiving oxygen. The nurse was reminded to double-check all equipment prior to starting the procedure.

▼ REAL WORLD ANECDOTES *continued*

Scenario 2

An apneic infant is admitted to the emergency room. The nurse grabbed the first Ambu bag she saw and attempted to ventilate the client. It was immediately apparent that she had grabbed the child-size Ambu bag and not the infant bag. She was unable to make an adequate seal to provide sufficient ventilatory support with the incorrect bag size. Another nurse brought the correct size Ambu bag. The infant Ambu bag provided the proper equipment for resuscitation.

> CRITICAL THINKING SKILL

Introduction

The use of an Ambu bag requires attention to details and continual assessment of the client. Failure to properly assess the client can result in significant adverse outcomes such as loss of airway patency, cardiopulmonary arrest, or paralysis.

Possible Scenario

A ventilator-dependent client, Mr. Ying, needed to be transferred from the intensive care unit to CT scan. This was a multiple trauma client with increased intracranial pressure. The intracranial pressure level was stable and the client was prepared for transfer; however, the endotracheal tube was not suctioned and portable suction was not taken during the transfer.

Possible Outcome

Failure to ensure that the endotracheal tube was patent and free of secretions prior to transfer of a critically ill, ventilator-dependent client could have resulted in hypoxia, hypercapnia, and increased ICP if the tube became occluded. If portable suction was not available during the transfer, the client could have experienced a prolonged period of insufficient oxygenation and ventilation.

Prevention

Clients who are ventilator dependent and require transfer should have the patency of their artificial airway assessed and be suctioned prior to transfer. In addition, appropriate support supplies should be taken during transfer to help maintain the efficiency of manual ventilation with an Ambu bag.

▼ VARIATIONS



Geriatric Variations:

- Older adults must be assessed for dentures, which need to be removed prior to manual ventilation.
- It may be difficult to obtain an occlusive seal in debilitated elderly individuals, and assistance may be necessary to ventilate these clients.



Pediatric Variations:

- Appropriate-size (infant or child) Ambu bags are essential to provide an occlusive seal and effective air volume. An adult Ambu bag mask is never appropriate for use in an infant or child. Many emergency kits or facilities have a single Ambu bag with child and infant face mask adapters. Practice quickly removing the adult mask and attaching the child mask.
- It is essential to remember that the rate and depth of respirations in children depend on the child's age and correlated lung capacity. Compress the bag only partially with each breath, and deliver breaths more frequently according to the age of the child.



Home Care Variations:

- Teach the client (when appropriate) and the caregiver to recognize signs and symptoms of ineffective airway clearance, hypoxia, and abnormal breathing patterns. Because the hand placement is tricky, the caregiver should be given opportunities to practice manual ventilation first with a

continues

▼ VARIATIONS *continued*

dummy and then gradually on the client with ample opportunity for return demonstration. Home ventilator-dependent clients or their caregivers are often aware of procedures for suction and care/reinsertion of the tracheostomy tube.



Long-Term Care Variations:

- Ventilator-dependent clients maintained in long-term care facilities usually have a tracheostomy tube in place as their artificial airway. Care providers need to be aware not only of the use of an Ambu bag necessary for suctioning and client transfer but also of the skills needed to maintain a tracheostomy tube.
- Additionally, many of the high-tech physiological assessment tools such as pulse oximetry and arterial blood gases will not be routine practice in long-term care facilities. Careful assessment of airway breathing patterns, lung auscultation, client color, and vital signs will be of tremendous importance in the care of these clients using an Ambu bag.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse does not use universal precautions (gloves and face shield) during an emergency situation (cardiopulmonary arrest).

Ask Yourself:

How do I prevent this error?

Prevention:

Remember that universal precautions can help to prevent life-threatening infections to both the nurse and client, and are just as important in an emergency as in nonemergency procedures. Practice universal precautions in every aspect of client care. If the error has already been made, stop and take time to put on gloves and face shield and begin manual ventilation per protocol.

Possible Error:

The correct head position is not used in a client with a potential cervical spine injury.

Ask Yourself:

How do I prevent this error?

Prevention:

Gather a history regarding the events that preceded the onset of respiratory arrest. Assess the client fully before intervention with manual ventilation and utilize the appropriate head position in the event of potential cervical spine injury.

> NURSING TIPS

- Check all supplies (oxygen, tubing, and so on) to be sure you are prepared to suction, transfer, or resuscitate a client with functioning equipment.
- Monitor baseline vital signs and maintain continued client assessment throughout the procedure.
- The client should be in a comfortable, relaxed position at a level that is appropriate for the nurse or caregiver to perform manual ventilation.
- The nurse should approach the client with confidence because this will reduce the client's anxiety level.
- Another nurse should be aware of the procedure in progress, and the nurse performing the procedure should be able to obtain assistance in the event of an unexpected outcome.
- Provide comfort measures (e.g., blanket, toy) to the alert child to help reduce anxiety.

SKILL 7-15

Inserting the Pharyngeal Airway

Eva Gallagher, RN, BSN

KEY TERMS

Airway

Airway obstruction

Airway patency

Intubation

Nasopharynx

Oropharynx

Oxygenation

Pharynx

Respiration



> OVERVIEW OF THE SKILL

The pharynx has three anatomic divisions: the nasal pharynx, the oral pharynx, and the laryngeal pharynx. The pharynx functions as a passageway for air into the lungs and for food into the esophagus. It is also involved in filtering, warming, and humidifying the inhaled air. Nasopharyngeal and oropharyngeal artificial airways are used for short-term airway maintenance. They function to hold the tongue forward, away from the posterior wall of the pharynx, and provide an open passageway past the lips and teeth. They are designed to allow airflow around or through them, and they easily accommodate the passage of a suction catheter into the laryngopharynx. These tubes are also used to prevent biting of the endotracheal tube. When properly placed, these airways relieve the rescuer of the necessity for providing continuous chin-lift or jaw-thrust maneuvers. However, even with the airway in place, the head should remain

tilted slightly backward. The oropharyngeal tube should be used only in unconscious clients because it may cause gagging, vomiting, or laryngospasm in the client with intact airway reflexes. Nasal airways are more readily tolerated by the semiconscious or stuporous victim and are easier to place. It is important that the nasopharyngeal airway that is used is the correct size. The larger the internal diameter (ID), the longer the tube (see Table 7-15-1).

Table 7-15-1 Nasopharyngeal Airway Sizes

NASOPHARYNGEAL	OROPHARYNGEAL
Large adult: 8.0–9.0 ID	100 mm
Medium adult: 7.0–8.0 ID	90 mm
Small adult: 6.0–7.0 ID	80 mm

> ASSESSMENT

1. Assess need for pharyngeal intubation. Indications include apnea or inadequate spontaneous respiratory rate or effort. Client must not have an intact gag reflex.
2. Assess the age and size of the client to help select the correct size of pharyngeal tube needed.
3. Assess response to pharyngeal tube placement. Monitor for gagging, regurgitation, and need for suctioning.

> **DIAGNOSIS**

- 1.5.1.1 Impaired Gas Exchange
- 1.6.1.3 Risk for Trauma
- 1.5.1.2 Ineffective Airway Clearance

> **PLANNING**

Expected Outcomes:

1. Airway patency will be established and maintained.
2. Suctioning equipment can be passed into the pharyngeal area as needed.



Figure 7-15-2 Resuscitator bag with reservoir, oxygen tubing, face mask, and pharyngeal airways

3. The client will not bite the suctioning equipment or the endotracheal tube, if used.

Equipment Needed (see Figure 7-15-2):

- Pharyngeal airway if needed
 - a. Large adult—100 mm
 - b. Medium adult—90 mm
 - c. Small adult—80 mm
- Nasopharyngeal airway if needed—adult size 6.0–9.0 ID
- Suction equipment
- Stethoscope
- Oxygen source
- Water-soluble lubricant



Estimated time to complete the skill:
5–10 minutes

> **CLIENT EDUCATION NEEDED:**

1. Explain to the client how the tube will feel when placed and that it may produce gagging or regurgitation.
2. Oropharyngeal airway placement is usually performed on the unconscious client, so teaching is not possible.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Apply clean gloves. Put on mask, eyewear, and gown if there is the risk of vomiting or contact with blood or emesis.
3. Ensure that the mouth and pharynx are cleared of secretions, blood, or vomit using a suctioning catheter.
4. Nasopharyngeal airway insertion (see Figure 7-15-3):
 - Lubricate the nasopharyngeal airway with water-soluble lubricant.
 - Gently insert nasopharyngeal airway close to the midline of the nostril along the floor into the posterior pharynx behind the tongue. Rotate the tube slightly if resistance is encountered.

1. Reduces the transmission of microorganisms.
2. Universal precautions when in contact with bodily fluids.
3. Reduces the potential for aspiration.
4.
 - Ensures smooth introduction of airway past tissues.
 - Ensures proper placement and minimal trauma to pharynx and surrounding structures.



Figure 7-15-3 Nasopharyngeal airway



Figure 7-15-4 Turn the oropharyngeal airway upside down and gently slide it into the mouth.

5. Oropharyngeal airway insertion:
 - Gently insert oropharyngeal airway by turning it upside down (into a U shape) and sliding it into the mouth (see Figure 7-15-4).
 - As you continue to insert the airway, rotate it so the ends of the U turn downward into an arch shape after it transverses the oral cavity and approaches the posterior wall of the pharynx (see Figure 7-15-5).

Figure 7-15-5 Rotate the airway until it turns downward and slides into place.



6. Maintain head slightly tilted back with chin elevated.
 7. Ensure that the airway is in proper position by visually inspecting the mouth and auscultating the lungs.
 8. Dispose of all soiled material and wash hands.
5. Ensures proper placement and minimal trauma to pharynx and surrounding structures.
 6. Ensures the airway remains patent.
 7. The external part of the airway should be at the entrance to the mouth. The airway should curve over the tongue in alignment with the tongue, in the center of the mouth. Clear breath sounds should be heard on auscultation.
 8. Reduces the transmission of microorganisms.

> EVALUATION

- Airway patency was established and maintained.
- Suctioning equipment was passed into the pharyngeal area as needed.
- The client did not bite the suctioning equipment, or the endotracheal tube, if used.

> DOCUMENTATION

Nurses' Notes

- Note date and time the airway was inserted.
- Indicate size of pharyngeal airway.
- Document assessment of secretions present and number of times suctioning required.
- Record breath sounds, vital signs, and oxygen saturation.
- Describe client's response to airway placement.
- Include signature of nurse performing this activity.



▼ REAL WORLD ANECDOTES

Scenario 1

John is an 88-year-old man admitted to the hospital yesterday for pneumonia. He has had copious secretions and has needed oropharyngeal suctioning occasionally. He is on the medical-surgical floor. His nurse for the day shift enters his room and sees him lying in bed, unresponsive. She attempts to open his airway by lifting his chin and tilting his head, but this is unsuccessful. She decides that she needs to insert a pharyngeal airway and uses a 100-mm tube. After insertion, the airway remains obstructed. A second nurse enters the room and decides that a smaller airway should be inserted (90 mm). The 100-mm airway is removed and replaced with the smaller one. The client is now able to move air into and out of his lungs and the nurse suctioned the airway. The nurse learns that if the airway is too long, it may press the epiglottis against the entrance of the larynx, producing complete airway obstruction.

Scenario 2

Miguel needed to have an airway placed to help with suctioning of secretions. The nurse set up the suction equipment and gathered the oropharyngeal airway and other supplies needed. Upon insertion of the oropharyngeal airway, Miguel began to gag and then vomited. The nurse was reminded that an oropharyngeal airway should be placed only in clients who are unconscious. She removed the airway and inserted a nasopharyngeal airway instead. She was able to successfully suction Miguel's secretions through the nasopharyngeal airway.

> CRITICAL THINKING SKILL

Introduction

It is necessary to insert a nasopharyngeal airway into a semiconscious client who is having difficulty clearing secretions and achieving adequate ventilation.

Possible Scenario

The nurse doesn't have much time to assess a client with increased secretions, so she chooses a 90-mm tube and inserts it into the nasal passage.

Possible Outcome

Minutes later, the client experiences hypoventilation. The nurse realizes that the nasopharyngeal tube she chose was too long and it entered the esophagus. She removes the tube and inserts a 70-mm tube instead. The client was successfully suctioned and breath sounds were normal bilaterally.

Prevention

The size of a nasopharyngeal airway is important to assess before insertion. The larger the internal diameter (ID), the longer the tube.

▼ VARIATIONS



Geriatric Variations:

- Tissues of elderly clients may be more fragile, so they have increased risk of trauma to the oropharynx or nasopharynx.



Pediatric Variations:

- Adult pharyngeal airways are contraindicated in people less than 16 years of age and those under 5 feet tall. Child-size airways are available. Make sure you have the right size airway for the size of the child to reduce the damage to the tissues and to make sure the airway is effective.

▼ VARIATIONS *continued***Home Care Variations:**

Not applicable

**Long-Term Care Variations:**

Not applicable

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

A water-soluble lubricant was not used when inserting the nasopharyngeal airway.

Ask Yourself:

How do I prevent this error?

Prevention:

Always use a lubricant when inserting a nasopharyngeal airway.

Possible Error:

Proper head position was not obtained when inserting the pharyngeal airway with head tilted backward; therefore, it was difficult to insert the airway.

Ask Yourself:

How do I prevent this error?

Prevention:

Always tilt the head backward when inserting an oropharyngeal or nasopharyngeal airway and when suctioning the client. Ask for help from an assistant if available. If unable to insert pharyngeal airway, put head in proper position and attempt reinsertion of pharyngeal airway.

> NURSING TIPS

- Mouth and pharynx should be cleared of secretions, blood, and vomit before pharyngeal airway is inserted.
- A tongue depressor may be useful to move the tongue out of the way when inserting the pharyngeal airway.
- A water-soluble lubricant or anesthetic jelly is helpful when inserting the pharyngeal airway through the nostril.

SKILL 7-16

Maintaining Mechanical Ventilation

Robi Thomas, MS, RN, AOCN

KEY TERMS

Ambu bag
Humidification
Mechanical ventilation

Respiratory distress
Respiratory failure
Ventilator



> OVERVIEW OF THE SKILL

Mechanical ventilation is used for clients who are in respiratory failure or have chronic obstructive pulmonary disease (COPD), respiratory muscle paralysis, infections involving the pulmonary system such as pneumonia, and neuromuscular diseases. Traditionally, clients requiring mechanical ventilation were managed in the intensive care unit. However, many hospitals care for medically stable ventilator clients on medical-surgical floors and/or stepdown units, as well as in the home. There are also facilities that specialize in caring for long-term ventilator clients.

Mechanical ventilation is available in two types of ventilators: positive pressure and negative pressure. Clients who require negative-pressure ventilation are typically those whose illnesses affect respiratory muscle function, such as clients with multiple sclerosis or muscular dystrophy. These clients do not usually need a tracheostomy but are fitted with a shell (or poncho) that is connected to the ventilator. The client is forced to inhale when air is removed from between the interior wall of the shell and the client's chest wall.

Positive-pressure ventilation inflates the lungs using positive pressure. Clients in respiratory failure

usually require positive-pressure ventilation. They may require a tracheostomy or may have an endotracheal tube. There are two kinds of positive-pressure ventilators: pressure-cycled ventilators and volume-cycled ventilators. A pressure-cycled ventilator supplies a specified amount of pressure to the client. Clients using pressure-cycled ventilators are at risk for pneumothorax, decreased cardiac output, and hypotension. A volume-cycled ventilator delivers a specified tidal volume to the client. Volume-cycled ventilators are more sensitive to lung compliance and are used more frequently in the acute care clinical setting.

There are many modes of ventilation. These include assist control, control, intermittent mandatory ventilation (IMV), pressure support, and synchronized intermittent mandatory ventilation (SIMV). Positive end expiratory pressure (PEEP) increases oxygenation by allowing more time for gas exchange.

It is essential that the nurses caring for a client on mechanical ventilation have a thorough understanding of the ventilator settings, type of ventilation the client is on, and how to troubleshoot ventilator problems.

> ASSESSMENT

1. Understand the rationale for the need for mechanical support for the client, as well as know the ordered settings for the ventilator. This allows the nurse to compare the ordered settings with the actual settings and also provides the nurse with the information necessary to make accurate nursing judgments about the client.
2. Assess the client's vital signs, including the most recent arterial blood gas (ABG) results. Also observe for a patent airway. This provides the foundation information needed for the nurse to note any change. Also, a patent airway is necessary for the client to receive sufficient oxygenation. Altered vital signs could be an indication of hypoxia.
3. Assess the client's level of comfort. Mechanical ventilatory support usually causes some discomfort, and often pain, as well as anxiety. The client should be receiving medication to reduce pain as well as anxiety, particularly if the client is in a drug-induced paralysis, which is often required to assist ventilation.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing
- 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation
- 8.1.1 Knowledge Deficit, related to mechanical ventilation
- 9.3.1 Anxiety

> PLANNING

Expected Outcomes:

1. Client's pain and anxiety will be controlled.
2. Client's ABGs and O₂ saturation levels will be within normal limits, showing adequate oxygen delivery.
3. Client (and family) will understand the need for mechanical oxygenation.

Equipment Needed (see Figure 7-16-2):

- Mechanical ventilator
- Oxygen source

- Humidifier systems
- Gloves
- Ambu bag with oxygen connecting tubing
- Tape for supporting endotracheal tube



Estimated time to complete the skill:
Maintaining mechanical ventilation is an ongoing process.

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of the ventilation to the client and health care provider/family member.
2. Explain and identify the equipment used in the room because it will be foreign to the client and may alarm the client.
3. Provide the client with descriptions and explanations of the noises, especially the alarms, the ventilator will emit.
4. Provide the client with an explanation of the health care setting, and a description of the immediate environment the client is in (especially if the client is in intensive care or was unconscious prior to the intubation and placement on mechanical ventilation).
5. Provide constant explanation of what procedures the health care team members are doing as they care for the client.
6. Explain to the client where the nurse is when she is out of eyesight, and give explanations/reassurance of how the client is monitored. Assure the client that assistance is immediately available at all times.



Figure 7-16-2 Mechanical ventilator and tubing

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and apply gloves.
2. Attach the mechanical ventilator to the endotracheal tube (or tracheostomy tube) once the tube is secured.
3. Compare ventilator settings with ordered settings, and observe ventilator as it functions (see Figures 7-16-3 and 7-16-4).



Figure 7-16-3 Check ventilator settings.

1. Reduces the transmission of microorganisms.
2. Provides mechanical ventilation.
3. Ensures equipment is working and that client is receiving oxygen as ordered.



Figure 7-16-4 Observe the ventilator and the client as the ventilator functions.

4. Monitor vital signs; observe client for distress and lack of comfort (see Figure 7-16-5).



Figure 7-16-5 Observe the client for distress and discomfort.

4. Altered vital signs may indicate that mechanical ventilator settings need to be adjusted. Client may need medication for pain and/or anxiety.



Figure 7-16-6 Periodically empty the accumulated water from the tubing to prevent a reduction of airflow.

5. Set up suction equipment.
6. Draw ABGs or assist if the physician or qualified practitioner draws ABGs.

5. Suctioning will be required for caring for the client and ensuring the airway is clear.
6. Obtains blood sample to verify that adequate oxygenation is being supplied to the client.

- | | |
|---|--|
| <p>7. Remove gloves and wash hands.</p> <p>8. Periodically empty accumulated water from tubing (see Figure 7-16-6). Make sure there is no water in the tubing prior to turning the client.</p> <p>9. Periodically verify that the Ambu bag is at hand where you expect to find it in an emergency.</p> <p>10. As needed, provide oral care to client, after washing hands and applying gloves.</p> <p>11. As needed, provide skin care to client, after washing hands and applying gloves.</p> <p>12. Document interventions.</p> | <p>7. Reduces the transmission of microorganisms.</p> <p>8. Prevents a reduction of airflow. Prevents water from moving from the tubing into the lungs.</p> <p>9. Prevents loss of time searching for manual equipment to maintain airway should the ventilator fail or an emergency arise.</p> <p>10. Client with endotracheal tubes will not have oral intake. Clients with tracheostomy tubes can eat and drink. Oral care will be needed to decrease risk of oral cavity infections and dental caries.</p> <p>11. For clients with endotracheal tubes, the tape on the endotracheal tube will need changing periodically, per institutional policy. Clients with tracheostomy tubes will need skin care around the tube. Overall skin care is especially important with clients on mechanical ventilation because they will most likely be sedated or not able to provide self-care.</p> <p>12. Provides continuity of care and a record of actions.</p> |
|---|--|

> EVALUATION

- Client's pain and anxiety are controlled.
- Client's ABGs and O₂ saturation levels are within normal limits, showing adequate oxygen delivery.
- Client (and family) understand the need for mechanical oxygenation.

> DOCUMENTATION

Nurses' Notes

- Document the ventilator settings at the beginning and end of shift, as well as any changes in them throughout the shift.
- Document client responses to the interventions.
- Document vital signs of the client, as well as results of ABGs and any labs drawn, as well as interventions done in a response to the results.



▼ REAL WORLD ANECDOTES

Sarah, a 45-year-old woman, had a diagnosis of leukemia. During her admission for induction chemotherapy, she developed a fever of 102°F and became hypotensive and tachycardic. Although she was receiving broad-spectrum antibiotics, after 4 days she was still febrile. Her nurses noted that her respiratory rate was 42 and she was using her accessory muscles to assist in breathing. A chest x-ray showed bilateral patchy infiltrates, and ABGs showed that she was in metabolic acidosis. Sarah was intubated, transferred to the intensive care unit, and put on mechanical ventilation with PEEP. She was also started on dopamine to maintain her blood pressure, as well as a morphine drip at 2 mg/hour for pain. The antibiotics were adjusted, and eventually the infiltrates on the chest x-ray disappeared. After a week, Sarah was weaned off the ventilator and returned to the oncology unit.

> CRITICAL THINKING SKILL

Introduction

Rapid assessment by a nurse familiar with the equipment and possible equipment errors allowed a timely intervention.

Possible Scenario

The client had been on mechanical ventilation for 48 hours secondary to respiratory failure. His ABGs had improved, and the physician decided to start weaning him from the ventilator. However, the nurse noted that the client had become increasingly agitated and restless.

Possible Outcome

The nurse checked the client's blood vital signs and noted that his blood pressure and heart rate were both elevated. She spoke to the client, trying to ascertain if he was in pain, and when he shook his head to answer no, she started checking the ventilator settings. The alarm button on the ventilator had been pushed to silence the alarm but was flashing, indicating that something was

malfunctioning. The nurse noted that the tubing connecting the ventilator to the endotracheal tube had become loosened, probably when the client had been repositioned a few minutes before. She quickly reconnected the tubing and soothed the client. She also increased the FIO₂ for a few seconds to administer an added amount of oxygen to the client until he stabilized, before changing the setting back to the ordered amount. The client's blood pressure and pulse stabilized, and the client calmed down. The nurse explained to the client what had happened and added that she was going to tape the connections so that it would not happen again.

Prevention

Taping the connections could have prevented this from happening. Also, lifting the tubing away from the client and arranging it so that the tension was eased may have eliminated the loosening of the connections. Having another nurse assist with the repositioning of a client helps—one nurse can ensure that there is enough slack in the tubing without it separating, while the other can be away from the ventilator moving the client.

▼ VARIATIONS



Geriatric Variations:

- Geriatric clients may have less flexibility in the lungs because they have had extra years to develop pulmonary damage and changes due to aging. Care must be taken to ensure that an older client does not develop a pneumothorax.
- Geriatric clients are often on a wide variety of medications that may interact with each other, potentially making the client hemodynamically unstable.
- It will be important to orient the geriatric client to the intensive care unit and assist the client in communication because the environment can cause anxiety and confusion.



Pediatric Variations:

- It will be important to include the family in caring for the child, especially if the child is in the intensive care unit.
- Research has shown that although children respond to pain the same way that adults do, they are often undermedicated. It will be important to assess the child for pain and discomfort and medicate accordingly.
- The pediatric client will need to have a means of communicating. If the client is too young to read and write, possibly a board with symbols can be used to assist in communication.



Home Care Variations:

- If the client is stable, very often he will be discharged to home on a ventilator.
- Extensive planning and education is required for this to be successful and a teaching plan should be established. The client as well as a caregiver needs to be taught how to use the ventilator, as well as how to provide oxygen via the Ambu bag if the ventilator breaks down.

▼ VARIATIONS *continued*

- *It is important that a home care nurse establish a relationship with the client and family and assess the client and caregiver's knowledge level and ability to use the ventilator.*
- *Make sure the home caregiver and any professional staff in the home know who to call for emergencies or if the ventilator breaks down.*



Long-Term Care Variations:

- *If a client is to be on mechanical ventilation for a long period of time and is unable to be at home, possibly a facility that specializes in this type of client would be beneficial.*
- *If the client is to be on a positive-pressure mechanical ventilator for long term, a tracheostomy should be performed.*
- *If the client is to be on negative-pressure mechanical ventilation, the client should be encouraged to care for the ventilator herself.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Water in the tubing is not emptied before turning the client, thus it enters the client's airway as the client is repositioned.

Ask Yourself:

How do I prevent this error?

Prevention:

Check tubing carefully before moving a client.

Possible Error:

The high pressure alarm is not audible or is not functioning.

Ask Yourself:

How do I prevent this error?

Prevention:

The alarm is often triggered when the client needs to be suctioned. Do not ever disable the alarm.

> NURSING TIPS

- Medicate the client for pain before changing the tape on the endotracheal tube and/or repositioning the client.
- Make sure there is no water in the tubing before turning the client.
- Forewarn the family about the equipment and many intravenous lines and monitors before they visit the client. Their alarm can frighten the client.
- Help the family and client develop a communication system.
- Don't forget that the client cannot talk but can hear what is being said.
- It should become a habit to check the settings on the ventilator at the beginning and ending of each shift, as well as after any manipulation of the ventilator.
- Make sure you understand what each alarm means, how to respond to it, and how to reset the alarm. Request additional education and instruction if you are not familiar with the equipment. Know who to call if additional assistance is needed.

SKILL 7-17

Suctioning Endotracheal and Tracheal Tubes

Barbara Sigler, RN, MNEd, CORLN

KEY TERMS

Endotracheal
Hypoxia
Negative pressure

Oxygenate
Suction catheter
Tracheostomy



> OVERVIEW OF THE SKILL

Suctioning secretions is necessary to maintain the airway of a client who is unable to clear his own secretions by coughing. Some clients may be able to cough but not effectively enough to expel the secretions. Suctioning the client's airway is considered to be a sterile procedure. Using sterile technique prevents the introduction of contagion into the client's airway and lungs.

Suctioning is performed as often as necessary to remove excess secretions. The procedure may be per-

formed as often as every 5 minutes or as infrequently as every few hours, depending on the amount of secretions the client is generating and the client's ability to clear his airway on his own. The nurse must evaluate the client's airway and oxygenation to determine the need for suctioning. For an adult, wall suction should be set at 100–120 mm Hg (millimeters of mercury); for portable suction use 8–15 mm Hg. There are variations for children and infants. See Table 7-17-1.

Table 7-17-1 Amount of Negative Pressure Necessary for Suctioning

	PORTABLE SUCTION MACHINE	WALL SUCTION UNIT
Adult	8–15 mm Hg	100–120 mm Hg
Children	5–8 mm Hg	50–100 mm Hg
Infants	3–5 mm Hg	40–60 mm Hg

> ASSESSMENT


1. Assess respirations for rate, rhythm, and depth to evaluate airway.
2. Auscultate lung fields to evaluate airway and determine need for suctioning.
3. Monitor arterial blood gas and/or pulse oximetry values to determine oxygen levels and adequate air exchange.
4. Assess passage of air through the tracheostomy tube to determine air exchange and obstruction of the tube.
5. Monitor tracheal secretions for amount, color, consistency, and odor to assess for evidence of bleeding or signs of infection and need for suctioning.
6. Assess for anxiety and restlessness. Anxiety and restlessness may be signs of airway distress and/or hypoxia.

7. Assess the client's understanding of the suctioning procedure to decrease the client's anxiety.

> **DIAGNOSIS**

- 1.5.1.1 Impaired Gas Exchange, related to increased tracheal secretions
- 9.3.1 Anxiety
- 1.5.1.2 Ineffective Airway Clearance
- 1.2.1.1 Risk for Infection

- Source of negative pressure (suction machine or wall suction)
- Sterile suction catheter
- Oxygen or Ambu bag
- Equipment for tracheostomy care or tracheostomy care tray



Estimated time to complete the skill:
10–15 minutes

> **PLANNING**

Expected Outcomes:

1. The client will have no crackles or wheezes in large airways and the absence of cyanosis.
2. The client will report breathing comfortably and will have no apparent anxiety or restlessness.
3. The client will have minimal amount of thin, normal-colored secretions.
4. The client will maintain a patent airway.

Equipment Needed (see Figures 7-17-2A and B):

- Sterile gloves
- Mask, eye protection, and gown if appropriate



Figure 7-17-2A Protective gear, dressing, and a tracheostomy care tray



Figure 7-17-2B Protective gear and suction equipment

> **CLIENT EDUCATION NEEDED:**

1. Explain procedure to client, including rationale for performing the procedure.
2. Instruct the client in good hand washing technique.
3. Encourage coughing and deep breathing to decrease the need for suctioning.
4. Teach client and family how to suction.
5. Provide multimedia instructions for the client learning how to suction the tracheostomy tube (videotape, written instructions).

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Suctioning Tracheal Tube

1. Assess depth and rate of respirations; auscultate breath sounds (see Figure 7-17-3).
2. Assemble supplies on bedside table.

1. Determines need for suctioning.
2. Organizes work.

continues

Suctioning Tracheal Tube *continued*

Figure 7-17-3 Assess respirations and auscultate breath sounds.



Figure 7-17-4 Remove the inner cannula.

3. Wash hands.
 4. Connect suction tube to source of negative pressure.
 5. Administer oxygen or use Ambu bag before beginning procedure.
 6. Remove inner cannula and place in basin of hydrogen peroxide to loosen secretions, if reusable, or set aside if disposable (see Figure 7-17-4). Do not dispose of disposable cannula until new inner cannula is securely in place.
 7. Apply sterile glove to your dominant hand.
 8. Open sterile suction catheter or use the reusable closed system catheter. The sterile suction catheter is removed from the package with your dominant, sterile hand. Wrap the catheter tubing around your hand from the tip of the catheter down to the port end. Attach catheter to suction.
 9. Insert the catheter into the trachea without suction.
 10. Apply suction intermittently while gently rotating the catheter and removing it.
 - In a disposable catheter, suction is applied by placing the thumb of your dominant hand over the open port of the catheter connector.
 - In a closed system catheter, suction is applied by depressing the white button at the connector end of the catheter.
3. Reduces the transmission of microorganisms.
 4. Prepares for suctioning procedure.
 5. Hyperoxygenates client and prevents hypoxia during suctioning.
 6. Suctioning should be performed after inner cannula has been removed to allow easier passage of the suction catheter. Retain the old cannula until you are sure the new cannula fits correctly.
 7. For sterile technique.
 8. This maintains catheter sterility and prevents accidental contamination.
 9. Minimizes removal of oxygen and trauma to the tracheal mucosa.
 10. Increases removal of mucus while minimizing irritation to tracheal mucosa.

- | | |
|--|---|
| <p>11. Wrap the disposable suction catheter around your sterile, dominant hand while withdrawing it from the endotracheal tube.</p> <p>12. Suction for no more than 10 seconds.</p> <p>13. Administer oxygen using the sigh function on the ventilator or using an Ambu bag.</p> <p>14. Assess airway and repeat suctioning as necessary.</p> <p>15. Clean inner cannula using tracheostomy brush and rinse well in sterile water or sterile saline. Dry (or open new disposable inner cannula).</p> <p>16. Reinsert inner cannula and lock into place.</p> <p>17. Apply humidified oxygen or compressed air (see Figure 7-17-5).</p> | <p>11. This prevents accidental contamination of the catheter.</p> <p>12. Prevents hypoxia.</p> <p>13. Reoxygenates the client.</p> <p>14. Determines need to continue suctioning.</p> <p>15. Removes secretions and maintains patent inner cannula.</p> <p>16. Prevents secretions from obstructing outer cannula.</p> <p>17. Thins secretions.</p> |
|--|---|



Figure 7-17-5 Attach oxygen.

- | | |
|--|--|
| <p>18. Remove gloves and discard.</p> <p>19. Wash hands.</p> <p>20. Record the procedure and client's tolerance of the procedure, including amount and consistency of secretions.</p> | <p>18. Prevents transmission of microorganisms to other clients.</p> <p>19. Reduces the transmission of microorganisms.</p> <p>20. Provides documentation of the procedure.</p> |
|--|--|

Suctioning an Endotracheal Tube

- | | |
|---|--|
| <p>21. Repeat Actions 1–14 (see Figures 7-17-6 and 7-17-7).</p> <p>22. Remove gloves and discard.</p> <p>23. Wash hands.</p> | <p>21. See Rationales 1–14.</p> <p>22. Prevents transmission of microorganisms to other clients.</p> <p>23. Reduces the transmission of microorganisms.</p> |
|---|--|

continues

Suctioning an Endotracheal Tube *continued*

Figure 7-17-6 Assess for respiratory rate and lung sounds. Repeat suctioning if needed.



Figure 7-17-7 Endotracheal suctioning. Apply suction while gently rotating the catheter and removing it. Do not suction for more than 10 seconds.

24. Record the procedure and client's tolerance of the procedure, including amount and consistency of secretions.

24. Provides documentation of the procedure.

> EVALUATION

- Ask client whether her breathing is easier.
- Evaluate breath sounds for a patent airway.
- Evaluate arterial blood gas and/or pulse oximetry results.
- Evaluate client for signs of dyspnea.
- Evaluate consistency, color, amount, and odor of secretions.

> DOCUMENTATION**Nurses' Notes**

- Note date and time of suctioning procedure.
- Describe client's tolerance of the suctioning procedure.
- Note amount, consistency, color, and odor of secretions.
- Record arterial blood gas and/or pulse oximetry readings.

**▼ REAL WORLD ANECDOTES**

Tina, 6 years old, had a tracheostomy performed after a near drowning. She is recovering but still unable to breathe on her own. She has copious secretions from the infection that developed within the first week of admission. Tina hates to be suctioned. Early in her stay at the hospital, the nurses would simply hold Tina down while they suctioned her. Because this was traumatic to both Tina and the nurses, the staff and Tina's family worked on a way to help Tina deal with the suctioning. After talking to Tina's family, the nurses placed a tracheostomy tube into Tina's teddy bear, Harvey. They showed Tina how to suction using Harvey as a model and gave Tina a suction catheter to keep. Periodically, Tina suctions Harvey's tracheostomy tube and she insists on holding Harvey whenever she is suctioned. However, she is more cooperative with the procedure now and sometimes she tries to assist with it.

> CRITICAL THINKING SKILL**Introduction**

The suctioning procedure removes oxygen as well as mucus.

Possible Scenario

You are suctioning Mr. Halunen, who was intubated following cardiac arrest. He has copious secretions

and requires frequent, vigorous suctioning. After the third time you try to clear his airway, he becomes cyanotic and his oximeter indicates a low oxygen saturation.

Possible Outcome

You decide that Mr. Halunen's poor oxygenation is due to a mucous plug and redouble your efforts at suction-

ing. His oxygen saturation does not improve and his heart rhythm begins to deteriorate. Within moments Mr. Halunen is in full respiratory and cardiac arrest and a code is called.

Prevention

The client should be given supplemental oxygen prior to suctioning and between suction attempts to minimize the incidence of hypoxia and resulting respiratory arrest.

▼ VARIATIONS



Geriatric Variations:

- *The tissues of the trachea and bronchi may be more fragile and need special care when suctioning.*
- *Older clients with decreased levels of consciousness, impaired gag reflex, stroke, chronic obstructive pulmonary disease, congestive heart failure, and pulmonary edema may be at greater risk for retained secretions.*
- *Elderly clients may have lost some properties of elastic recoil and gas exchange.*



Pediatric Variations:

- *In infants and young children, airways have smaller diameters, the glottis is higher, the thorax is smaller, and the diaphragm is higher. Be sure to use a suction catheter with the proper diameter, and be sure not to insert it too deeply.*
- *The amount of negative pressure necessary for suctioning an infant or child is much less than the pressure needed for an adult. Refer to Table 7-17-1.*
- *The infant's or child's head should be turned to the right or left to facilitate bronchial suctioning on that side.*
- *The size of the suction catheter used depends upon the age of the client and size of the tracheostomy tube.*
- *The suction catheter should be of a diameter equal to or less than one-half the inside diameter of the tracheostomy tube.*



Home Care Variations:

- *All self-care instructions need to be reinforced before the client leaves the hospital.*
- *Durable medical equipment must be available in the home prior to hospital discharge.*
- *Specific instructions related to durable medical equipment need to be given to the client and/or family before and after discharge.*



Long-Term Care Variations:

- *A source of humidity and oxygen is needed for clients in long-term care.*
- *Promoting adequate fluid intake may help decrease the client's risk for thick secretions.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

An elderly client needs frequent suctioning. After the second time in 30 minutes, the client begins to cough vigorously and you notice blood-tinged mucus in the catheter.

Ask Yourself:

How do I prevent this error?

Prevention:

Be very gentle when inserting and withdrawing the catheter. Ask the client to try to relax; take slow, easy breaths; and not cough too strenuously.

> NURSING TIPS

- Assemble all equipment prior to beginning the procedure.
- If the client will be discharged with a tracheostomy tube in place, self-care teaching should begin once the client is awake and alert.
- Suctioning is a sterile technique when performed by professional nursing staff. However, once the procedure is taught to the client, a clean technique can be used by the client in the home setting.
- Normal saline (5–10 ml) may be instilled before suctioning to loosen secretions per agency policy. It may also stimulate coughing.
- Closed system catheters may be left in place and changed every 24 hours.
- In closed system catheters, be sure the tip of the suction catheter is completely pulled back past the ventilator airway when suctioning is finished (see Figure 7-17-8). Leaving the tip of the suction catheter in the air pathway can decrease the air available to the client.
- Unplug a closed system catheter from the suction source to prevent accidental initiation of the suction (see Figure 7-17-9).
- In a closed system catheter, lock the suction button when you are finished suctioning to prevent accidental suctioning (see Figure 7-17-10).



Figure 7-17-8 When suction is finished, be sure the tip of the suction catheter is completely retracted past the ventilator airway.



Figure 7-17-9 It is critical to lock the suction button or unplug the suction source to prevent accidental initiation of the suction.



Figure 7-17-10 Locking suction button on a closed system catheter

SKILL 7-18

Maintaining and Cleaning Endotracheal Tubes

Eva Gallagher, RN, BSN

KEY TERMS

Cardiac arrest
Cuff pressure
Endotracheal cuff
Endotracheal intubation
Endotracheal tube

Laryngoscopy
Oxygenation
Oxygen saturation
Respiratory arrest
Tidal volume



> OVERVIEW OF THE SKILL

Tracheal intubation is the preferred method for advanced airway control. Oxygenation and ventilation of the lungs by exhaled air methods usually precede attempts at endotracheal intubation. However, in the absence of a protected airway, gastric distention can result due to the generation of pharyngeal pressure. This can increase the potential for aspiration of gastric contents into the lungs. Therefore, the trachea should

be intubated as soon as possible during a resuscitative effort. Endotracheal intubation isolates the airway, keeps it patent, reduces the risk of aspiration, permits suctioning of the trachea, ensures delivery of a high concentration of oxygen, provides a route for administration of certain drugs, and ensures delivery of a selected tidal volume to maintain adequate lung inflation. The selected tidal volume is 10–15 ml/kg.

> ASSESSMENT

1. Assess the need for endotracheal intubation. Indications include cardiac arrest with ongoing chest compressions, inability of a conscious client to ventilate adequately, inability of the client to protect the airway, and the inability of the rescuer to ventilate the conscious client with conventional methods.
2. Assess placement of the endotracheal tube. Ideally, the tip of the endotracheal tube should be about 3 cm above the carina. In the average adult, the position of the tube usually results in the depth marking on the side of the tube lying between the 19- and 23-cm mark at the front of the teeth. Delivery of the first manual breath by auscultating the epigastrium while observing the chest wall for evidence of thoracic inflation confirms tube placement. If stomach gurgling occurs and chest wall expansion is not evident, inadvertent esophageal intubation should be assumed and no further breaths delivered. Once inserted, the position of the endotracheal tube should be changed from side to side in the mouth every 8 hours to relieve pressure on the lips and tongue.
3. Assess response to endotracheal tube placement. During the initial phases after arrest, 12–15 breaths per minute should be provided. Each breath should be delivered to the lungs over a 2-second period using 100% oxygen. Monitor oxygen saturation, blood gases, and exhaled carbon dioxide level.
4. Assess cuff pressure. Cuff pressure should be evaluated every 4–8 hours to minimize tracheal damage. Check your individual facility's policy regarding frequency of deflating the cuff.

> DIAGNOSIS

- 1.5.1.1 Impaired Gas Exchange
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
- 1.5.1.3.1 Inability to Sustain Spontaneous Ventilation
- 1.6.1.3 Risk for Trauma to trachea and surrounding structures
- 2.1.1.1 Impaired Verbal Communication
- 9.3.1 Anxiety, related to breathing

> PLANNING

Expected Outcomes:

1. Client will have adequate oxygenation of tissues as evidenced by oxygen saturation level.
2. Cuff will be inflated and deflated at designated intervals to minimize trauma to the trachea. Endotracheal tube will be rotated side to side at regular intervals in an effort to avoid trauma to lips and tongue.
3. Client will be sedated as needed and will be made comfortable while undergoing tracheal intubation.

Equipment Needed (see Figures 7-18-2A and B):

- Tape
- Suction equipment



Figure 7-18-2A Protective gear and suction equipment

- Normal saline
- Gauze
- Flashlight
- 10-ml syringe to deflate cuff



Estimated time to complete the skill:

10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Alert client that you will be cleaning his endotracheal tube, rotating it to the other side, and deflating then inflating the cuff.
2. Establish a system of communication so that the client can give a signal if he becomes short of breath or needs a break during this procedure (such as raising his hand).
3. Thoughtful instructions to the client about what you are doing and what to expect will also help to reduce anxiety.
4. Tell the client that he may experience some coughing during this procedure.
5. Teaching the client distraction or imagery techniques can also be helpful to reduce anxiety.



Figure 7-18-2B Endotracheal tube ties

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Prepare appropriate amount of tape to be placed when endotracheal tube is rotated to the other side.

RATIONALE

1. Reduces the transmission of microorganisms.
2. This should be done ahead of time to minimize the chance that the endotracheal tube could become dislodged during the cleaning process.

3. Apply gloves.
4. Using normal saline and gauze, clean any secretions from the endotracheal tube (see Figure 7-18-3). Remove old tape (see Figures 7-18-4 and 7-18-5).



Figure 7-18-3 Clean secretions from the endotracheal tube.

3. Decreases the transmission of microorganisms.
4. Decreases risk of infection.



Figure 7-18-4 Remove tape. The nurse is carefully using scissors to remove the tape. Note how the position of the nurse's fingers protects the tube itself from being cut.



Figure 7-18-5 Remove tape.



Figure 7-18-6 Gently move the tube to the opposite side of the client's mouth.

5. Gently bring the endotracheal tube to the other side of the client's mouth (see Figure 7-18-6) and secure with tape (see Figure 7-18-7). Assess inside and outside of mouth for breakdown.

5. Rotating the endotracheal tube will ensure that tongue and lips remain intact. The tube should be securely taped because body movements could lead to accidental extubation.



Figure 7-18-7 Secure the tube with tape.

- Suction oral cavity as needed (see Figure 7-18-8). Deflate the cuff.



Figure 7-18-8 Suction the oral cavity, if needed.

- Inflate the cuff to a maximum pressure of 15–20 mm Hg (10–20 ml of air) as measured by connecting the balloon port to a manometer (see Figure 7-18-9).
- Remove gloves.
- Monitor client for adverse effects; place the call light within easy reach.
- Wash hands.
- Document the procedure.

- Suctioning is important to avoid aspiration.



Figure 7-18-9 Carefully inflate the cuff to the ordered pressure. Do not overinflate.

- This low pressure is important to ensure that tracheal damage is avoided. Damage occurs when pressure exerted by the inflated cuff against the tracheal walls exceeds the tracheal capillary pressure (about 25 mm Hg).
- Decreases the transmission of microorganisms.
- Decreases the risk of complications.
- Reduces the transmission of microorganisms.
- Records events in the permanent record.

> EVALUATION

- Client has adequate oxygenation of tissues as evidenced by oxygen saturation level.
- Cuff is inflated and deflated at designated intervals to minimize trauma to the trachea. Endotracheal tube is rotated side to side at regular intervals in an effort to avoid trauma to lips and tongue.
- Client is sedated as needed and was made comfortable while undergoing endotracheal care.

> DOCUMENTATION

Nurses' Notes

- Indicate time endotracheal tube cleaned and rotated, and cuff deflated.
- Detail assessment of oral cavity, noting any areas of breakdown.
- Document breath sounds, vital signs, oxygen saturation.
- Describe client's response to manipulation of endotracheal tube.
- Include signature of nurse performing this activity.



▼ REAL WORLD ANECDOTES

Scenario 1

Bill underwent endotracheal intubation 2 days ago and his nurse enters the room to rotate the tube and deflate the cuff. She removes the old tape and gently slides the endotracheal tube to the other side of Bill's mouth. Realizing that she did not prepare her tape ahead of time, she attempts to hold the

▼ REAL WORLD ANECDOTES *continued*

tube and tear off the tape at the same time. Bill's body jerks and he accidentally extubates himself. The nurse was reminded to prepare her supplies before beginning this procedure and to have someone else in the room when possible.

Scenario 2

John underwent endotracheal intubation 1 week ago after experiencing respiratory distress. It was decided that John would be extubated at 1:00 PM and John's physician removed the endotracheal tube. After extubation, John's oxygen saturation level remained 98% and he experienced no distress. John did admit that his throat was sore and his voice was very hoarse. After discussing these symptoms with a colleague, John's nurse was reminded that sore throat and hoarseness are commonly experienced by clients postextubation. However, if these symptoms persist for a week or longer, cord ulcerations, polyps, or granulomas must be suspected. John's nurse was reminded that teaching the client about signs and symptoms, both normal and abnormal, is an important part of endotracheal intubation.

> CRITICAL THINKING SKILL

Introduction

The endotracheal tube must remain unplugged and un-kinked to ensure that the patient receives adequate oxygenation. It is important to check the endotracheal tube for patency every 2–4 hours and prn. When a client has large amounts of secretions, it becomes even more critical to monitor the tube to ensure that it does not become clogged.

Possible Scenario

Jim has been in the intensive care unit and intubated for about 1 week. Jim's oxygen saturation alarm begins to ring—it is 78% and dropping. The nurse enters Jim's room to find him agitated and restless. She is unable to see his chest rise and fall. She quickly

checks the connections to his endotracheal tube and finds none dislodged. She then assesses the endotracheal tube and discovers there is a mucous plug obstructing it.

Possible Outcome

The nurse quickly sets up the suction equipment and clears the mucous plug. She is reminded that frequent assessment of the endotracheal tube is necessary to maintain patency.

Prevention

Assess the client for the likelihood of a mucous plug formation (large amounts of thick and copious secretions). Carefully assess the endotracheal tube every 2–4 hours and prn to ensure that it remains clear.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have dry mouth, teeth in poor condition, or alterations in taste or oral sensations. Check for these conditions when performing an oral assessment. Perform oral care every 2 hours for comfort and to reduce the risk of mucosa breakdown.



Pediatric Variations:

- Make sure the parent and the child have a way to communicate. Have the parent use touch to reassure the child.
- Monitor or restrain the child if needed to keep the child from pulling on the tube and dislodging it.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- Endotracheal tubes are used to manage the airway of clients needing short-term interventions. In the case of the client needing more long-term airway assistance, another type of airway would be chosen.



Long-Term Care Variations:

- Endotracheal tubes are used to manage the airway of clients needing short-term interventions. In the case of the client needing more long-term airway assistance, another type of airway would be chosen.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client is not suctioned orally before deflating the endotracheal tube, causing aspiration of mucus.

Ask Yourself:

How do I prevent this error?

Prevention:

Always suction the area above the cuff before deflating it.

Possible Error:

The endotracheal tube causes trauma to the tongue and cheeks.

Ask Yourself:

How do I prevent this error?

Prevention:

Rotate the endotracheal tube at regular intervals to avoid skin breakdown. Remove old tape from the endotracheal tube, gently rotate the endotracheal tube to the other side of the client's mouth, assess for skin breakdown, and apply new tape.

> NURSING TIPS

- Having someone to assist, if available, in the rotation of the endotracheal tube can be helpful to ensure that the tube does not become dislodged.
- Premedication of the client may be needed before an endotracheal tube rotation to ensure adequate client comfort.
- Suctioning before deflation of the cuff is critical to avoid aspiration.
- Bend over 2 cm of the ends of the tape to function as tabs that will later assist in removal of the tape. If available, use adhesive remover when removing old tape.
- Try to anticipate client concerns and questions so you can provide information. Fears about communicating, choking, not being able to attract the nurse's attention, and having the air supply "cut off" are common concerns.

SKILL 7-19

Maintaining and Cleaning the Tracheostomy Tube

Barbara Sigler, RN, MNEd, CORLN

KEY TERMS

Decannulation
Neck plate
Rales
Rhonchi

Trachea
Tracheostomy ties
Tracheostomy tube



> OVERVIEW OF THE SKILL

A tracheostomy is an incision made into the trachea with insertion of a cannula for airway management. A tracheostomy is performed for the client with potential or present airway obstruction, for ventilatory assistance, to provide pulmonary hygiene, to decrease the anatomic dead space in the client with chronic obstructive pulmonary disease, to avoid prolonged endotracheal intubation, and to provide an airway for the client with severe obstructive sleep apnea syndrome. The tracheostomy is performed below the level of the vocal cords, allowing air to enter and exit the tracheostomy

rather than entering and exiting through the upper airway. The tracheostomy tube can be plugged to evaluate the client's ability to tolerate removal of the tracheostomy tube (decannulation) and to provide verbal speech to the client with a tracheostomy. During the acute phase after a tracheostomy has been performed, all care must be performed using sterile technique. Once care of the tracheostomy tube becomes a client procedure, a clean technique is used. The tracheostomy becomes a part of the client's body, and hygiene is important to prevent infection and odors.

> ASSESSMENT

1. Assess respirations for rate, rhythm, and depth to evaluate airway.
2. Auscultate lung fields to evaluate airway and determine need for suctioning.
3. Monitor arterial blood gas and/or pulse oximetry values to determine oxygen levels and adequate air exchange.
4. Assess passage of air through tracheostomy tube to determine adequate air exchange and obstruction of the tube.
5. Evaluate amount and color of tracheal secretions to assess for evidence of bleeding or infection and need for suctioning.
6. Assess anxiety, restlessness, and fear because anxiety and restlessness may be symptoms of airway

distress and hypoxia. Anxiety and restlessness can also occur because of the fear associated with the new procedure.

7. Assess the client's understanding of the tracheostomy procedure to determine the need for additional education in order for the client to participate in self-care.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.5.1.2 Ineffective Airway Clearance
- 9.3.1 Anxiety
- 1.5.1.1 Impaired Gas Exchange
- 8.1.1 Knowledge Deficit, related to tracheostomy tube care

> **PLANNING**

Expected Outcomes:

1. The tracheostomy site will heal with minimal drainage and erythema.
2. There will be no evidence of infection.
3. The client will maintain a patent airway.
4. The client will have inner and outer cannulas free of secretions, and clean, secure ties.

Equipment Needed (see Figure 7-19-2):

- Gloves
- Hydrogen peroxide



Figure 7-19-2 Tracheostomy care tray, hydrogen peroxide, tape, dressing, and clean gloves

- Sterile water or saline
- Cotton-tip applicators
- Tracheostomy dressing (4 × 4 gauze *without* cotton lining)
- Tracheostomy ties (twill tape, intravenous tubing, or commercially available Velcro ties)



Estimated time to complete the skill:
15–20 minutes

> **CLIENT EDUCATION NEEDED:**

1. Explain each step of the procedure to the client as it is being performed.
2. Explain rationale of procedure to the client (to clean the surgical site in order to prevent infection, skin irritation, and odor).
3. Allow the client to observe the procedure in a mirror while the procedure is being performed.
4. Review with the client ways of obtaining durable medical equipment for this procedure.
5. Ask the client to demonstrate the ability to perform the procedure.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Cleaning Trach Tube Site

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands and apply gloves. 2. Remove soiled dressing and discard (see Figure 7-19-3). 3. Cleanse neck plate of tracheostomy tube with cotton applicators moistened with hydrogen peroxide. 4. Rinse neck plate of tracheostomy tube with applicators moistened with sterile water or saline. 5. Cleanse skin under neck plate of tube with cotton applicator moistened with hydrogen peroxide (see Figure 7-19-4). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Prevents contamination of other areas. 3. Removes crusted secretions from neck plate of tracheostomy tube. 4. Removes hydrogen peroxide. 5. Removes dried and crusted secretions from under neck plate of tracheostomy tube. |
|---|--|



Figure 7-19-3 Remove old dressings and discard.



Figure 7-19-4 Cleanse skin under the neck plate with a cotton applicator moistened with hydrogen peroxide.
Note: The towel placed over the client's face is for privacy and is not required for the procedure.

6. Rinse skin under neck plate with applicators moistened with sterile water or saline.
7. Dry skin under neck plate with cotton applicators.

One-Person Technique of Changing Tracheostomy Ties

8. Prepare clean tracheostomy ties.
 - Cut a length of twill tape that will fit around the client's neck plus 6 inches. Cut the ends of the twill tape on the diagonal.
 - Open Velcro ties on continuous neck band.
9. Leaving the old tracheostomy ties in place, insert one end of the new tracheostomy tie through the hole in the tracheostomy neck plate from back to front. Pull the ends even, and slide both ends of the tape around the back of the head to the other side.
10. Insert one end of tape through the opening on the other side of the tracheostomy tube neck plate from back to front.
11. Tie the two ends of the new tape with a square knot at side of neck. Keep two fingers under the tape as the knot is tied. Without putting pressure on the neckplate or the tape, pull on the knot to make sure it will stay tied.
12. Cut and remove old tracheostomy tapes and discard. Hold the neck plate firmly with one hand while cutting the old tapes.

6. Removes hydrogen peroxide.
7. Removes moisture, which can result in skin irritation.

8. To have all equipment prepared prior to beginning procedure. A diagonal cut will make the tape easier to thread.
9. Maintains tube security while tapes are changed.

10. Secures tracheostomy tube.
11. Secures tracheostomy tube. Fingers under tape prevent the tape from being tied too tightly.
12. Old tapes can be removed once the tracheostomy tube has been secured. Holding the plate firmly prevents dislodgment if the new tie is accidentally cut.

One-Person Technique of Changing Tracheostomy Ties *continued*

13. Place one finger under tracheostomy ties.

Two-Person Technique of Changing Tracheostomy Ties

14. Cut two pieces of twill tape about 12–14 inches in length.

15. Make a fold about 1 inch below the end of each piece of twill tape and cut a half-inch slit lengthwise in the center of the fold.

16. Have a second person gently hold the tracheostomy tube in place with fingers on both sides of the neck plate.

17. Cut old tracheostomy ties and discard.

18. Insert the split end of the tracheostomy tape through the opening on one side of the tracheostomy tube neck plate. Pull the distal end of the tracheostomy tie through the cut end and pull tightly.

19. Repeat procedure with second piece of twill tape.

20. Tie tracheostomy tapes with a double knot at the side of the neck.

21. Insert one finger under tracheostomy tapes.

22. Insert tracheostomy gauze under neck plate of tube (see Figure 7-19-5).

13. Checks for tightness and security.

14. Prepares equipment prior to beginning procedure.

15. Prepares tape for insertion.

16. Prevents accidental movement of the tracheostomy tube resulting in coughing and accidental decannulation.

17. Removes tracheostomy ties.

18. Secures tracheostomy tie within neck plate.

19. Secures tracheostomy tube.

20. Secures tracheostomy tube.

21. Ensures that tube has been tied securely.

22. Prevents irritation of skin from secretions and rubbing of tracheostomy tube.



Figure 7-19-5 Insert gauze under neck plate of the tracheostomy tube.

23. Discard all used materials and wash hands.

23. Reduces the transmission of microorganisms.

> EVALUATION

- The tracheostomy site healed with minimal drainage and erythema.
- There is no evidence of infection.
- The client maintains a patent airway.
- The client has inner and outer cannulas free of secretions, and clean, secured ties.

> DOCUMENTATION**Nurses' Notes**

- Record date and time of procedure.
- Note size and type of tracheostomy tube in place.
- Describe client's tolerance of the procedure.
- Record amount and consistency of any secretions.
- Document condition of the client's skin.

**▼ REAL WORLD ANECDOTES**

Mr. Sampson has a long history of smoking and has copious secretions that he coughs through his tracheostomy tube. Because of this, the tracheostomy dressing and ties are always soiled and wet and must be changed frequently. In this situation, intravenous tubing may be used as tracheostomy ties. The tubing can be moved slightly to dry the area under the ties and the tubing will not absorb secretions and become soiled. Although intravenous tubing is more difficult to insert into the openings of the neck plate while the tube is in the client, it is more appropriate for use with a client with increased secretions or for the client at home who cannot change the ties as often.

> CRITICAL THINKING SKILL**Introduction**

A new tracheostomy or a client with increased secretions may be at higher risk of skin irritation because of moisture under the dressing or ties.

Possible Scenario

Thelma had a tracheostomy performed because of upper airway obstruction. When the nurse enters the room, she notices the client coughing copious amounts of secretions. Upon evaluating the client's tracheostomy tube site and skin, she notices the tracheostomy ties and dressing are wet and soiled.

Possible Outcome

Moistened and soiled tracheostomy gauze and ties may result in skin irritation and excoriation under the tracheostomy tube and ties. In addition, moistened wet ties may result in stretching of the material, thus decreasing the security of the tracheostomy tube.

Prevention

To prevent skin irritation, excoriation, and/or infection under the tracheostomy tube and possible accidental decannulation, the nurse should frequently change the tracheostomy gauze. In addition, tracheostomy ties should be assessed at least once per shift to ensure their tightness.

▼ VARIATIONS**Geriatric Variations:**

- *Care of the skin at the tracheostomy site is crucial because the integrity of the skin may be impaired.*

**Pediatric Variations:**

- *Pediatric clients may need two people to clean the tracheostomy tube and change the ties because they may be less cooperative or restless, thus increasing the risk of decannulation.*

**Home Care Variations:**

- *The procedure is a clean technique in a home care setting.*
- *Good hand washing technique should be stressed.*
- *Use tap water for rinsing the inner cannula.*

continues

▼ VARIATIONS *continued*

- *Inner cannula care should be performed on a routine basis.*
- *Normal saline can be made by adding 2 teaspoons of table salt to 1 quart of boiled water.*
- *Store normal saline in a quart or pint jar that has been sterilized.*



Long-Term Care Variations:

- *Care of the tracheostomy tube may be done by the nursing personnel or the client.*
- *It is a “sterile” procedure if done by the nurse and a “clean” technique if done by the client.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You use gauze with cotton filling under the tracheostomy tube.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about why you should avoid using regular gauze under a tracheostomy tube. Gauze with cotton fibers may result in aspiration of the fibers through the tracheostomy opening. Always use specialized tracheostomy gauze dressing or gauze without cotton fibers.

> NURSING TIPS

- Assemble all equipment prior to beginning the procedure.
- Obtain the assistance of a second person to help with tracheostomy tie changes. If a second nurse is not available, review the procedure for a single person changing tracheostomy ties or delay the procedure until a second nurse is available to assist.
- Use sterile equipment and careful technique while performing the procedure to prevent microorganisms from contaminating a new trach wound.

SKILL 7-20

Maintaining a Double Cannula Tracheostomy Tube

Barbara Sigler, RN, MNEd, CORLN

KEY TERMS

Double cannula tracheostomy tube
Dyspnea

Inner cannula
Tracheostomy
Tracheotomy



> OVERVIEW OF THE SKILL

A tracheotomy is an incision made into the trachea with insertion of a cannula for airway management. Tracheostomy is the creation of an opening into the trachea through the neck. The two terms can be used interchangeably. The term tracheostomy will be used in this skill. A tracheostomy is performed for the client with potential or present airway obstruction, for ventilatory assistance, to provide pulmonary hygiene, to decrease the anatomic dead space in the client with chronic obstructive pulmonary disease, to avoid prolonged endotracheal intubation, and to provide an

airway for clients with severe obstructive sleep apnea syndrome. A tracheostomy is usually performed between the second, third, and fourth tracheal rings. The tracheostomy tube can have a single or double cannula. The determination of the tube design used is based on the needs of the client. Many of the longer tracheostomy tubes are single cannula due to the curvature of the tube. The double cannula tube allows for the tube to be cleaned to prevent obstruction caused by dried secretions.

> ASSESSMENT

1. Assess respirations for rate, rhythm, and depth to evaluate the airway.
2. Assess the client's lung sounds to determine the need for suctioning.
3. Assess the client's arterial blood gases and/or pulse oximetry values to evaluate air exchange and blood oxygen levels.
4. Assess the movement of air through the tracheostomy tube to evaluate the air exchange through the tube and determine whether there is any obstruction.

5. Assess the amount and color of tracheal secretions to evaluate for bleeding, infection, and the need for suctioning.
6. Assess the client's level of consciousness. Anxiety and restlessness could be symptoms of hypoxia.
7. Assess the client's understanding of the procedure to determine client education and support needed.

> DIAGNOSIS

- 1.5.1.2 Ineffective Airway Clearance
- 1.2.1.1 Risk for Infection

- 1.6.1.1 Risk for Suffocation
- 1.6.2.1.2.1 Impaired Skin Integrity
- 2.1.1.1 Impaired Verbal Communication
- 8.1.1 Knowledge Deficit, related to maintaining the double cannula tracheostomy
- 9.3.1 Anxiety

> **PLANNING**

Expected Outcomes:

1. The client’s airway will be free of obstruction.
2. The procedure will be performed with a minimum of client anxiety.
3. The client’s skin will remain intact and free of redness and excoriation.
4. The client will remain free of signs and symptoms of infection.

Equipment Needed:

Cleaning the Inner Cannula (see Figure 7-20-2)

- Sterile gloves
- Disposable inner cannula (if available)
- Tracheostomy care kit: 2 basins, tracheostomy brush, tracheostomy ties
- Hydrogen peroxide
- Sterile water or sterile saline



Estimated time to complete the skill:
5–10 minutes

> **CLIENT EDUCATION NEEDED:**

1. Explain to the client that cleaning the inner cannula will promote breathing.

2. Inform the client that the procedure may cause coughing.
3. After performing the procedure and explaining each step to the client, the nurse should supervise the client in self-care. Make a list of the steps the client should follow when performing the procedure.
4. Allow the client to observe the procedure in a mirror. The mirror should be placed at a comfortable level and in a setting similar to that used by the client once discharged from the hospital.
5. Suggest alternative types of equipment. For example, if tracheostomy brushes cannot be purchased once the client is discharged from the hospital, a small percolator brush, gauze, or pipe cleaners can be used to remove crusted secretions.



Figure 7-20-2 Tracheostomy care tray, hydrogen peroxide, tape, dressing, and clean gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.

1. Reduces the transmission of microorganisms.

Conventional/Reusable Inner Cannula

2. Open tracheostomy care set.
3. Place hydrogen peroxide solution in one basin and sterile water or saline in a second basin.

2. Provides sterile equipment for use in the procedure.
3. Prepare solutions prior to applying gloves.

4. Apply sterile gloves.
5. Remove inner cannula.
6. Place inner cannula in basin of hydrogen peroxide.
7. Clean the area under the neck plate of the tracheostomy tube using a cotton applicator moistened with hydrogen peroxide (see Figure 7-20-3). Dip the applicator in the basin of hydrogen peroxide before the cannula is added to the basin to prevent contamination of the applicator.
4. Uses aseptic technique.
5. To clean tracheostomy double cannula tube.
6. Loosens secretions.
7. Decreases microorganisms and removes crusting.



Figure 7-20-3 Clean the area under the neck plate with a cotton applicator moistened with hydrogen peroxide.



Figure 7-20-4 Use a sterile cotton-tipped applicator to clean the inner cannula area and remove crusted secretions.

8. Rinse area under neck plate with cotton applicator moistened with sterile water or saline.
9. Dry skin under neck plate with cotton-tip applicator.
10. Apply tracheostomy gauze under neck plate of tube.
Note: If using tracheostomy gauze under the neck plate of the tracheostomy tube, change gauze frequently to prevent skin excoriation and infection from a moist environment.
11. Use a tracheostomy brush or sterile cotton-tip applicator to clean inner cannula (see Figure 7-20-4).
12. Rinse inner cannula with sterile water or sterile saline (see Figure 7-20-5).
13. Dry inner cannula.
8. Removes hydrogen peroxide from the skin.
9. Prevents skin excoriation from moisture.
10. Prevents irritation of skin from secretions and rubbing of tracheostomy tube.
11. Removes crusted secretions.
12. Removes hydrogen peroxide from inner cannula.
13. Prevents introduction of solutions into the trachea.

continues

Conventional/Reusable Inner Cannula *continued*

Figure 7-20-5 Rinse inner cannula thoroughly with sterile water or sterile saline.



14. Reinsert inner cannula and lock it into place (see Figures 7-20-6 and 7-20-7).



Figure 7-20-6 Carefully reinsert inner cannula.

14. Prevents accidental removal of the inner cannula during coughing.



Figure 7-20-7 Lock inner cannula into place.

15. Remove gloves and discard.

15. Prevents transmission of microorganisms to other clients.

16. Wash hands.

16. Reduces the transmission of microorganisms.

17. Record the procedure and client's tolerance of the procedure, including amount and consistency of secretions.

17. Provides documentation of the procedure.

Disposable Inner Cannula

18. Wash hands. Open disposable cannula container without touching cannula.

18. Reduces the transmission of microorganisms.

19. Apply sterile gloves.

19. Uses aseptic technique.

20. Remove inner cannula and discard.

20. Do not reuse disposable inner cannulas.

21. Replace inner cannula with new disposable cannula.

21. Provides an open cannula.

22. Remove gloves and discard.

22. Prevents transmission of microorganisms to other clients.

23. Wash hands.

24. Record the procedure and client's tolerance of the procedure, including amount and consistency of secretions.

23. Reduces the transmission of microorganisms.

24. Provides documentation of the procedure.

> EVALUATION

- The client's airway is free of obstruction.
- The procedure was performed with a minimum of client anxiety.
- The client's skin remains intact and free of redness and excoriation.
- The client remains free of signs and symptoms of infection.

> DOCUMENTATION

Nurses' Notes

- Document what procedure was done and the client's tolerance of the procedure.
- Indicate the amount and consistency of any secretions that were noted in the inner cannula.
- Document client teaching and participation.



▼ REAL WORLD ANECDOTES

A student nurse was assigned to care for Mr. Sidik. He had recently had a double cannula tracheostomy tube placed secondary to sleep apnea. The student was unsure how to clean the inner cannula of the tracheostomy. She asked several staff members, but everyone was too busy to do more than tell her to remove the inner cannula, clean it, and soak it in disinfectant. Her instructor was not on the floor at the time and Mr. Sidik had not performed the procedure before and was not yet aware of how it was done. The student decided to give it a try on her own. She removed the inner cannula and placed it in the sink for cleaning. She did not know what was normally used to disinfect the cannula, but there was a bottle of Betadine sitting on the sink. Thinking that this must be what was used, she poured the Betadine over the cannula while she industriously cleaned it. As she was scrubbing at the sink, Mr. Sidik's nurse entered the room. Seeing the student pouring Betadine over the inner cannula, she immediately informed the student that Betadine was not used for tracheostomy cleaning and discarded the now contaminated inner cannula. The nurse ordered a new inner cannula for Mr. Sidik and cleaned and redressed his tracheostomy site while waiting for the new inner cannula. The student was reminded not to try to bluff her way through things she didn't truly understand.

> CRITICAL THINKING SKILL

Possible Scenario

Mr. Jinwon had a tracheostomy performed following surgery in the oral cavity. During routine cleaning of the inner cannula, the nurse removed the inner cannula and placed it in hydrogen peroxide to loosen secretions. During this time, she was called away from the client's bedside.

Possible Outcome

Becoming involved in another procedure, the nurse did not return to Mr. Jinwon's bedside to complete the procedure until several hours later. After cleaning the inner cannula, the nurse found she could not reinsert it. The outer cannula of the tracheostomy was encrusted with dried secretions and the inner cannula could not be

reinserted. The entire tracheostomy tube had to be changed to restore the client's airway.

Prevention

Double cannula tracheostomy tubes are used to provide a removable cannula for cleaning. In a double cannula tracheostomy tube, an inner cannula can be removed, cleaned, and replaced. In the anecdote, the double cannula tube became a single cannula tube. Secretions that can normally be removed by removing the inner cannula accumulated in the lumen of the outer cannula, obstructing the airway. In a situation where a single cannula tube is used or in the case study just discussed, supplemental humidification should be applied to the tracheostomy site to moisten secretions and prevent drying, which would result in obstruction.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients often have thin, fragile skin that is at increased risk of irritation and excoriation. Keep the area around the tracheostomy clean and dry.*



Pediatric Variations:

- *Pediatric tracheostomy tubes are generally single cannula tubes.*
- *Because of the small internal diameter of the lumen of a pediatric tracheostomy tube, double cannula tubes are usually not available in pediatric sizes.*



Home Care Variations:

- *It is essential that the procedure be taught to the client.*
- *Routine cleaning of the inner cannula of a double cannula tracheostomy tube will prevent obstruction and airway distress.*



Long-Term Care Variations:

- *Once a client is discharged from the hospital, the procedure is converted from a sterile technique to a clean technique.*
- *When the client is doing self-care, good hand washing technique and clean procedures should be stressed. Instead of using sterile water or sterile saline, tap water can be used for rinsing the inner cannula.*
- *In a home care or long-term care setting, inner cannula care should be performed on a routine basis. It must be remembered that the tracheostomy is the client's only airway. Once obstruction occurs, hypoxia and respiratory arrest can occur quickly.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

There is alteration in aseptic technique.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about what steps you must follow to prevent contaminating the inner cannula during this procedure. Review the procedure. Arrange your equipment and open the tracheostomy care kit before applying sterile gloves.

Possible Error:

The equipment is inadvertently contaminated.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about why this procedure is performed sterilely and what will happen to the client if it is not done that way. The procedure is performed sterilely in the hospital setting for several reasons. The client is generally ill and therefore the client's immune system is compromised. The tracheostomy is a direct route to the lungs with no intervening nose and sinuses to filter out bacteria. Hospitals are a breeding ground for germs and disease. Compromising sterile technique endangers your client's health and possibly his life.

> NURSING TIPS

- Assemble equipment prior to beginning the procedure. If all the equipment is within reach once sterile gloves are applied, the procedure can proceed with little difficulty.
- While assembling the equipment and performing the procedure, the nurse should use this time to instruct the client. The need to clean the inner cannula will continue as long as the tracheostomy tube is in use. Inner cannula care is one of the first procedures that can be taught to the client in preparation for hospital discharge.

SKILL 7-21

Plugging the Tracheostomy Tube

Barbara Sigler, RN, MNEd, CORLN

KEY TERMS

Aspiration
Cuff deflation
Decannulation

Plugged inner
cannula
Single cannula tube



> OVERVIEW OF THE SKILL

A tracheostomy is an incision made into the trachea with insertion of a cannula for airway management. A tracheostomy is performed for the client with potential or present airway obstruction, for ventilatory assistance, to provide pulmonary hygiene, to decrease the anatomic dead space in the client with chronic obstructive pulmonary disease, to avoid prolonged endotracheal intubation, and to provide an airway for the client

with severe obstructive sleep apnea syndrome. The tracheostomy is performed below the level of the vocal cords, allowing air to enter and exit the tracheostomy rather than entering and exiting through the upper airway. The tracheostomy tube can be plugged to evaluate the client's ability to tolerate removal of the tracheostomy tube (decannulation) and to provide verbal speech to the client with a tracheostomy.

> ASSESSMENT

1. Assess respirations for rate, rhythm, and depth, to evaluate airway.
2. Assess the client's ability to speak, to determine if air is passing around the tracheostomy tube, vibrating the vocal cords.

> DIAGNOSIS

- 2.1.1.1 Impaired Verbal Communication
- 7.1.1 Body Image Disturbance
- 7.3.2 Powerlessness

> PLANNING

Expected Outcomes:

The client will tolerate plugging of the tracheostomy tube while maintaining an adequate airway.

Equipment Needed (see Figure 7-21-2):

- Syringe to deflate cuff of tracheostomy tube
- Smaller uncuffed tracheostomy tube
- Capped inner cannula of tracheostomy tube currently in use

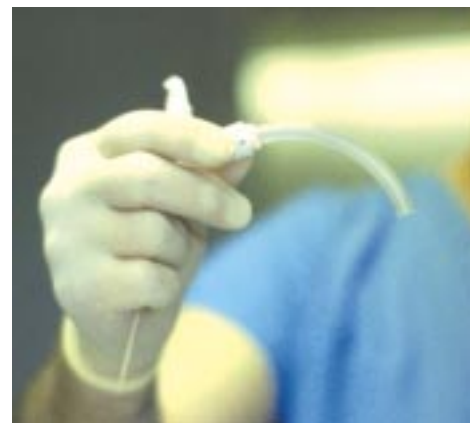


Figure 7-21-2 Capped inner cannula



Estimated time to complete the skill:

5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the procedure to the client.
2. Reinforce descriptions of airway anatomy using illustrations.
3. Inform the client that capped inner cannula can be removed within seconds if the client exhibits difficulty breathing.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Deflate the cuff on a cuffed tracheostomy tube.
2. Change the tracheostomy tube to a smaller uncuffed tube.
3. Replace the inner cannula with a capped inner cannula.

RATIONALE

1. Determined the client's ability to handle secretions without aspiration.
2. Determines the client's ability to breathe around the tube and through the nose and mouth.
3. Occludes the opening of the tracheostomy tube and evaluates the client's ability to breathe.

> EVALUATION

- The client tolerated plugging of the tracheostomy tube while maintaining an adequate airway.

> DOCUMENTATION

Nurses' Notes

Document the client's tolerance of:

- Cuff deflation
- Ability to breathe through a smaller tube
- Ability to breathe with a plugged tracheostomy tube



▼ REAL WORLD ANECDOTES

Mr. Jacobson has had a tracheostomy for several days. On rounds it was discussed that decannulation can begin. The cuff of Mr. Jacobson's tracheostomy tube is deflated. As you enter Mr. Jacobson's room later in the day, you notice that he appears to be depressed. While talking to Mr. Jacobson, you learn that he is afraid he will never speak again. By using a gloved finger (or teaching the client to use his finger), you can briefly occlude the opening of the tracheostomy tube. The client can attempt to speak because the air will now exit through the upper airway, causing the vocal cords to vibrate.

> CRITICAL THINKING SKILL

Introduction

Careful assessment is crucial to good care.

Possible Scenario

Mr. Sinclair had a tracheostomy performed at the time of head and neck surgery. Healing has progressed and an order is written to begin decannulation. The first step in the decannulation procedure is

to determine the client's ability to handle secretions without aspiration. This is performed by deflating the tracheostomy cuff.

Possible Outcome

During the next 5–10 minutes, the client continuously coughs, expectorating large amounts of mucus through the tracheostomy tube. The nurse determines that the client is probably aspirating secretions and is unable

to tolerate the deflation of the cuff. Because the cuff cannot be deflated, the tracheostomy tube cannot be plugged.

Prevention

Better assessment of the client's airway, presence of secretions, and frequency of coughing and suctioning may have indicated the client is not ready for decannulation (see Figure 7-21-3).

Figure 7-21-3 The client is using his finger to cover the opening of the tracheostomy tube so he can speak.



▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may lack the manual dexterity to place and remove the tracheostomy plug.*



Pediatric Variations:

- *Pediatric tracheostomy tubes are generally single cannula tubes. Because of the small internal diameter of the lumen of the pediatric tracheostomy tube, an inner cannula is usually not available. For short periods of time, a finger can be placed over the opening of the tracheostomy tube, allowing the client to speak. However, pediatric tubes are usually not plugged.*



Home Care Variations:

- *Teach the client or caregiver the signs and symptoms of respiratory distress caused by the plugged tracheostomy tube, and how to respond to these signs and symptoms.*



Long-Term Care Variations:

- *Teach the client or caregiver the proper care and handling of the tracheostomy plug. Because it is inserted into the tracheostomy, it must be handled cleanly.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

A plugged tracheostomy tube is inserted in a client with an inflated cuff.

Ask Yourself:

How do I prevent this error?

Prevention:

Think about why you can never use a capped tracheostomy inner cannula in a client with an inflated cuff. Once the plugged inner cannula is used, the client will breathe around the tracheostomy through the upper airway. If the cuff is inflated, the client will be unable to pass air around the tube, resulting in an inability to breathe.

> NURSING TIPS

- Assemble all equipment prior to beginning procedure.
- Explain the procedure to the client to avoid anxiety.
- Review with the client the procedure to remove the inner cannula.
- Suction the client orally to remove any secretions that may have pooled on top of the cuff to prevent aspiration when the cuff is deflated.

Circulatory

- Skill 8-1** Performing Venipuncture (Blood Drawing)
- Skill 8-2** Starting an IV
- Skill 8-3** Inserting a Butterfly Needle
- Skill 8-4** Preparing the IV bag and Tubing
- Skill 8-5** Setting the IV Flow Rate
- Skill 8-6** Assessing and Maintaining an IV Insertion Site
- Skill 8-7** Changing the IV Solution
- Skill 8-8** Discontinuing the IV and Changing to a Heparin Lock
- Skill 8-9** Administering a Blood Transfusion
- Skill 8-10** Assessing and Responding to Transfusion Reactions
- Skill 8-11** Assisting with the Insertion of a Central Venous Catheter
- Skill 8-12** Changing the Central Venous Dressing
- Skill 8-13** Changing the Central Venous Tubing
- Skill 8-14** Flushing a Central Venous Catheter
- Skill 8-15** Measuring Central Venous Pressure (CVP)
- Skill 8-16** Drawing Blood from a Central Venous Catheter
- Skill 8-17** Infusing Total Parenteral Nutrition (TPN) and Fat Emulsion through a Central Venous Catheter
- Skill 8-18** Removing the Central Venous Catheter
- Skill 8-19** Inserting a Peripherally Inserted Central Catheter (PICC)
- Skill 8-20** Administering Peripheral Vein Total Parenteral Nutrition
- Skill 8-21** Hemodialysis Site Care
- Skill 8-22** Using an Implantable Venous Access Device
- Skill 8-23** Caring for an Implanted Venous Access Device
- Skill 8-24** Obtaining an Arterial Blood Gas Specimen
- Skill 8-25** Assisting with the Insertion and Maintenance of an Epidural Catheter

SKILL 8-1

Performing Venipuncture (Blood Drawing)

by Catherine H. Kelley, RN, MSN, OCN, and
Susan Randolph, RN, MSN, CS

KEY TERMS

Blood draw
Hematoma
Needle stick
Palpation

Specimen collection
Tourniquet
Vacutainer
Venipuncture



> OVERVIEW OF THE SKILL

Obtaining a sample of blood through venipuncture is a commonly used procedure for many diagnostic tests. Blood test results are a source of valuable information to screen clients for disease, to evaluate the progress of therapy, and to monitor the well-being of the client. The nurse is often required to obtain a variety of specimens. Since some specimens require special handling, it is important for the nurse to be familiar with the particular test that is ordered.

There are three primary methods of obtaining blood specimens: venipuncture, skin puncture, and arterial stick. Venipuncture is the most common

method and involves inserting a large-bore needle into a vein. The nurse attaches either a syringe or a vacutainer tube for the collection of the blood specimen. Skin puncture is the easiest way to obtain a small specimen from the finger, toe, or heel. A lancet is used for the puncture and a drop of blood is collected through a capillary tube. An arterial stick is the most complicated and requires special assessment skills and techniques.

As with any procedure, it is important that nurses review their employer's policies and procedures as well as their state's nurse practice act.

> ASSESSMENT

1. Determine which test(s) is ordered and be familiar with any special conditions associated with the timing of the collection or the handling of the specimen. Many specimens may be collected at very specific times, that is, prior or after administration of a drug, while the patient is NPO, or after fasting. Other specimens may require special handling; that is, ice is used to transport ammonia levels; heparinized collection containers are needed for platelet counts; and so on. Using a damaged vein may cause further in-

jury to the vein. A compromised site may not provide an adequate amount of blood for the specimen leading to another venipuncture for the client.

2. Assess the integrity of the veins that may be used in the procedure. Identify any conditions that may contraindicate venipuncture. Avoid veins injured by infiltration or phlebitis or compromised by surgery (i.e., modified radical mastectomy). In addition, drawing samples from sites near IV infusion solutions may alter the composition of the blood sample.

3. Review the client's medical history to determine if there are any expected complications from the venipuncture. Clients with a history of abnormal clotting disorders, low platelets, or related disorders (hemophilia) may be at risk of increased bleeding at the site or hematoma formation.
4. Determine the client's ability to cooperate with the procedure. Many clients are fearful of needles—especially children—and additional help may be needed. Very young children may need to have the extremity restrained during the procedure.
5. Review the physician's or qualified practitioner's order. Check for appropriateness of the test as well as the frequency of the test. Critically ill clients may require frequent blood tests and venipuncture. Combining tests and carefully evaluating frequency may reduce unnecessary blood loss for the client.

> DIAGNOSIS

- 8.1.1 Knowledge Deficit, related to the purpose of the blood sample and the procedure
- 1.2.1.1 Risk for Infection
- 1.6.2.1 Impaired Tissue Integrity—risk of bleeding and hematoma at the site
- 9.3.1 Anxiety related to the procedure

> PLANNING

Expected Outcomes:

1. Venipuncture site will show no evidence of continued bleeding or hematoma.
2. The venipuncture site will show no evidence of signs and symptoms of infection.
3. The laboratory test will be properly acquired and appropriately handled after collection.
4. The client will be able to discuss the purpose of the test and describe the procedure.
5. The client will report minimal anxiety associated with the procedure.

Equipment Needed (see Figure 8-1-2):

- Disposable gloves
- Alcohol swabs
- Rubber tourniquet
- Sterile 2 × 2 gauze pads
- Band-Aid or adhesive tape (precut)
- Appropriate blood collection tubes
- Labels for each collection tube with the appropriate client information included
- Completed laboratory requisition forms

- Needle/equipment disposal container
- Small pillow or folded towel to support the extremity if needed
- Syringe method: sterile needles (20–21 gauge for adults, 23–25 gauge butterfly for older adults, 23–25 gauge butterfly for children)
- Vacutainer method: Vacutainer tube with needle holder; sterile double needles (20–21 gauge for adults, 23–25 gauge for children)



Estimated time to complete the skill:
Approximately 10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the purpose of the test.
2. Describe the procedure for collection. Show the client the equipment.
3. Explain the sensations the client will experience with the tourniquet placement, alcohol swab, and needle stick.
4. Explain when the client may expect results from the diagnostic tests.
5. Instruct the client to apply direct pressure to the venipuncture site postprocedure for 3–5 minutes. Clients with bleeding disorders should be instructed to alert health professionals of those specifics prior to any procedures. They should also expect to apply pressure to the site for at least 5 minutes.
6. Teach the client deep-breathing techniques for relaxation prior to any procedure. This will provide the client with some “control” in the situation and



Figure 8-1-2 Nonsterile gloves, sponges, povidone-iodine, alcohol swabs, blood collection tubes, vacutainer tube, vacutainer needle, and rubber tourniquet

also provide the client with some distraction during the procedure.

7. Teach the young child how to “draw blood” on a toy before performing the procedure on the child. Play therapy is commonly used in pediatrics as a way to help reduce anxiety in the child. Including a favorite toy into the action helps the child see what the procedure involves.
8. Explain to the client the site may be slightly sore for a day or two following the stick. Encourage the client to report any symptoms that may be of concern.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Greet client by name and validate client's identification. 2. Explain the procedure to the client (see Client Education Needed). 3. Wash hands. 4. Bring equipment to bedside or client exam room. Transfer client to the procedure room, especially for small children, since it is important to keep their hospital room a “safe haven.” 5. Close curtain or door. 6. Raise or lower bed/table to comfortable working height. 7. Position client's arm; extend arm to form a straight line from shoulder to wrist. Place pillow or towel under upper arm to enhance extension. Client should be in a supine or semi-Fowler's position. 8. Apply disposable gloves. 9. Apply the tourniquet 3–4 inches above the venipuncture site. Most often the antecubital fossa site is used. The tourniquet should be able to be removed by pulling the end with a single motion. 10. Check for the distal pulse. If there is no pulse felt, then the tourniquet is applied too tightly and must be reapplied more loosely. | <ol style="list-style-type: none"> 1. Proper client identification ensures safety for the client and the nurse. 2. Client rights dictate that any action be explained to the client. The client always has the right to refuse a procedure. Information decreases anxiety. 3. Reduce transmission of microorganisms. 4. Provides an organized approach to the procedure. 5. Provides privacy. 6. Maintains good body mechanics for the nurse during the procedure. 7. Helps stabilize the arm. The bed should support the client's body (when possible) in case client should feel faint during the procedure. 8. Reduces the risk of infection to both the client and the nurse (universal precautions). 9. Tourniquet provides improved visibility of the veins as they dilate in response to decreased venous return of blood flow from the extremity to the heart. 10. If the pressure is too tight, it may impede arterial flow to the extremity. |
|--|--|

11. Have client open and close fist several times, leaving fist clenched prior to venipuncture.
 12. Maintain tourniquet only for 1–2 minutes.
 13. Identify the best venipuncture site through palpation; the ideal site is a straight prominent vein that feels firm and slightly rebounds when palpated. Palpate potential site.
 14. Select the vein for venipuncture. (If the tourniquet has been on too long, release it and let the client rest for 1–2 minutes before reapplying the tourniquet.)
 15. Prepare to obtain the blood sample. Technique varies depending on equipment used:
 - Syringe method: Have syringe with appropriate needle attached.
 - Vacutainer method: Attach double-ended needle to Vacutainer tube and have the proper blood specimen tube resting inside the vacutainer. Do not puncture the rubber stopper yet.
 16. Cleanse the venipuncture site with alcohol swab using a circular method at the site and extending the motion 2 inches beyond the site (see Figure 8-1-3). Allow the alcohol to dry.
 17. Remove the needle cover and warn that client will feel the needle stick for a few seconds.
11. Increases the venous distension and enhances visibility of the vein. Vigorous motion, however, may result in hemoconcentration of the specimen.
 12. Prolonged time may increase client discomfort and alter some laboratory results (i.e., falsely elevated serum potassium).
 13. Straight, intact veins are easier to puncture. A thrombosed vein is rigid, or rolls easily, and is difficult to stick.
 14. Allowing the client to rest increases client comfort and ensures accurate laboratory results.
 15.
 - A needle with a very small bore can damage the red cells as the blood is drawn, leading to inaccurate test results.
 - The long end of the needle is used to puncture the vein and the short end enters the blood tube.
 16. The alcohol and mechanical cleaning motion cleans the skin surface of bacteria that may cause infection at the site. Allowing the alcohol to dry reduces the stinging sensation that the client may experience.
 17. Clients will be better able to control their reaction if they know what to expect.

Figure 8-1-3 After applying the tourniquet, cleanse the skin at the venipuncture site. Do not let the tourniquet stay on longer than 2 minutes. If you need more time, remove the tourniquet for a couple of minutes to allow the client to rest, and begin again.



continues

18. Place the thumb or forefinger of the nondominant hand 1 inch below the site and pull the skin taut.
19. Hold syringe needle or vacutainer at 15–30° angle from the skin with the bevel up.
20. Slowly insert needle/vacutainer (see Figure 8-1-4).



Figure 8-1-4 Hold the vacutainer and needle assembly securely and press the specimen tube into the holder. The needle inside the holder will pierce the specimen tube and blood should begin to flow into the tube.

21. Technique varies depending on equipment used:
 - Syringe method: Gently pull back on syringe plunger and look for blood return. Obtain desired amount of blood into the syringe.
 - Vacutainer method: Hold vacutainer securely and advance specimen tube into needle of holder. Be careful not to advance the needle into the vein. The blood should flow into the collection tube. After the collection tube is full, grasp the vacutainer firmly, remove the tube, and insert additional specimen collection tubes as indicated. (See Figures 8-1-4 and 8-1-5).
22. After the specimen collection is completed, release the tourniquet.
23. Apply 2 × 2 gauze over the puncture site without applying pressure and quickly withdraw the needle from the vein.
24. Immediately apply pressure over the venipuncture site with the gauze for 2–3 minutes or until the bleeding has stopped. Tape the

18. Helps stabilize the vein during insertion.
19. This angle reduces the chance of penetrating through the vein during insertion. The needle causes less trauma to the skin and vein when the bevel is up during insertion.
20. Prevents puncture through the other side of the vein.



Figure 8-1-5 Allow the tube to fill with blood. When it is full, remove the tube and insert additional tubes if needed.

21.
 - If blood does not appear, the needle is not in the vein.
 - Pushing the needle through the stopper breaks the vacuum and causes the flow of blood into the collection tube. Failure of blood to appear in the collection tube indicates the vacuum in the tube has been lost or the needle is not in the vein.
22. Reduces bleeding from pressure when the needle is removed.
23. Positions the gauze for removal and helps to gently prevent the skin from pulling with the needle removal.
24. Direct pressure stops the bleeding and minimizes formation of a hematoma.

gauze dressing over the site (or apply the Band-Aid).

25. Syringe method:

- Using one hand, insert the syringe needle into the appropriate collection tube and allow vacuum to fill. You may also remove the stopper from each vacutainer collection tube, remove the needle from the syringe, fill the tube, and replace the stopper.

26. If any of the blood tubes contain additives, gently rotate back and forth 8–10 times.

27. Inspect the client's puncture site for bleeding. Reapply clean gauze and tape if necessary.

28. Assist client into a comfortable position. Return bed into low position with guard rails up if appropriate.

29. Check tubes for any external blood and decontaminate with alcohol as appropriate.

30. Check tubes for proper labeling. Place tubes into appropriate bags/containers for transport to the laboratory.

31. Dispose of needles, syringe, and soiled equipment into proper container.

32. Remove and dispose of gloves.

33. Wash hands after the procedure.

34. Send specimens to the laboratory.

25. Using a one-handed method to fill the syringe helps reduce the chance of needlestick injury.

- The alternative method allows you to control the speed and amount of fill in the collection tubes.

26. Ensures that the additive is properly mixed throughout the specimen.

27. Keeps site clean and dry.

28. Provides comfort and safety for the client.

29. Prevents contamination to other equipment and personnel.

30. Ensures the specimens are properly identified.

31. Prevents spread of disease and needlestick injury.

32. Reduces transmission of microorganisms.

33. Reduces transmission of microorganisms.

34. Facilitates timely handling of specimens and accurate results.

> EVALUATION

- Venipuncture site shows no evidence of continued bleeding or hematoma.
- The venipuncture site shows no signs or symptoms of infection.
- The laboratory test is properly acquired and appropriately handled after collection.
- The client is able to discuss the purpose of the test and describe the procedure.
- The client reports minimal anxiety associated with the procedure.

> DOCUMENTATION

Nurses' Notes

- Record the date and time of the venipuncture, the site used for the procedure, any complications, the tests obtained, and the disposition of the specimens.
- Note the client's reaction to the procedure and the condition in which the client was left (i.e., bed lowered with side rails up).



▼ REAL WORLD ANECDOTES

Scenario 1

The nurse went into Mrs. Smith's room, introduced herself, and proceeded to draw a CBC and platelet count. After completing the procedure, the nurse went out to the nurse's station and processed the specimens. When the nurse went to cross the orders off of the unit laboratory sheet, she noticed that there was another client by the name of Smith down the hall. Unfortunately for the client, the nurse had not checked the patient's ID band and had obtained the specimen from the wrong client. This could have resulted in the wrong information being posted in the client's record, and inappropriate treatment based on those results.

Scenario 2

A nurse was helping out a busy colleague and offered to draw a specimen of blood from Mr. Van Hook. The client was properly identified and the procedure went very smoothly. The nurse processed the specimens and went back to recheck the venipuncture site on Mr. Van Hook. He reported some tenderness and the nurse noted a large hematoma at the site. The nurse had failed to check the medical record and did not realize that Mr. Van Hook was on heparin therapy. The venipuncture site for Mr. Van Hook would have required direct pressure for at least 5 minutes.

> CRITICAL THINKING SKILL

Introduction

Understanding the specific requirements for collection of blood specimens is crucial. Failure to do so may result in inaccurate results, which can lead to errors in treatment of the client or a repeat of the venipuncture test.

Possible Scenario

The home care nurse received orders to draw a cyclosporine level on Mr. Jones. Mr. Jones was day 42 post-allogeneic blood cell transplant and receiving infusions of cyclosporine every 12 hours for the prevention of graft-versus-host disease. Mr. Jones was independent with his infusion administration and had scheduled nursing visits for laboratory draws twice a week. The nurse scheduled a visit to draw the blood for 11 AM. The drug level was collected and the specimen dropped off to the transplant center for processing.

Possible Outcome

The home care nurse received the cyclosporine level results the following day and called Mr. Jones's physician with the results. Upon receiving the results, the physician was alarmed that the cyclosporine level was so high and concerned that Mr. Jones may have symptoms of toxicity. During further discussion with the nurse, it was determined that the cyclosporine level was drawn 2 hours after Mr. Jones had completed his morning infusion.

Prevention

Cyclosporine levels are drawn *prior* to the next dose. As with many drug levels, the timing of the blood sample in relation to the dose is essential for accurate results. In this case, the home care nurse should have instructed Mr. Jones to hold his morning dose of cyclosporine until after the blood sample. The home care nurse would then schedule the visit in accordance to the scheduled timing of the dose.

▼ VARIATIONS



Geriatric Variations:

- Older clients often have very fragile veins or veins that roll. Vein integrity is very important to access and veins need to be secured carefully before venipuncture.
- These clients may also need direct pressure post-needle-stick for a longer period of time since they are prone to bruising and hematoma development.

▼ VARIATIONS *continued*



Pediatric Variations:

- Dorsal surfaces of the hands and feet are the most frequently selected venipuncture sites in children.
- Select a site that requires the least amount of restraint for the child/infant.
- Have another nurse (not the parent) assist you with restraint of the child during the procedure as necessary.
- Scalp veins may be used for neonates or infants, but this site is often the least desired site by the parent.
- Use topical transdermal numbing medications at least 30 minutes prior to the needle stick.



Home Care Variations:

- Teach the client/caregiver to recognize signs and symptoms of infection or phlebitis and to report pain, redness, or significant bruising.
- Home care clients who have been on infusion therapy for a long period of time will often provide the nurse with information related to which veins are the “best” to use for venipuncture. Evaluate the sites carefully, including the client’s preferences when possible.



Long-Term Care Variations:

- These clients may be scheduled for venipuncture on a regular basis and may also have vein preference or poor venous access at some sites. Consider the client’s suggestions carefully and listen to what the client tells you; often an experienced client is right.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Piercing through the other side of the vein during venipuncture.

Ask Yourself:

How do I prevent this error?

Prevention:

Hold the syringe and needle at a 15–30° angle from the client’s arm with the bevel up. This position should reduce the chance of penetrating both sides of the vein.

Possible Error:

Sample results diluted from IV fluids near the site of venipuncture.

Ask Yourself:

How do I prevent this error?

Prevention:

Select a site away from the IV infusion site. Alternative may be to stop the infusion during the venipuncture procedure (depending on the therapy and the venous access used).

> NURSING TIPS

- Apply warm packs (wet compresses or dry chemical packs) for 10–15 minutes to the site, allowing for venous distension and easier visual location of the site.
- Neonates and infants may need to be wrapped in a warm blanket or under an infant warming light for 10–15 minutes before attempting venipuncture to facilitate visual location of sites.
- The client should be in a comfortable, relaxed position.
- The nurse should approach the client with confidence, as this will reduce the client’s anxiety level.
- For obese clients with difficult veins to locate, create a visual image of venous anatomy and use palpation to guide you through venipuncture.
- With experience the nurse will feel the vein “pop” as the needle enters.
- Avoid any site that pulsates with palpation as this indicates the site is an artery.
- To avoid prolonged use of the tourniquet, release it as you prepare the site and then reapply it before the actual venipuncture.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the type of therapy planned to **determine the optimal needle size and type to use.**
2. Review information regarding the insertion of the IV in order to insert the catheter safely.
3. Know the agency's policy regarding who may start an IV since many agencies require that nurses have special training before they can perform this procedure.
4. Assess the client's veins to optimize planning of the IV site.
5. Check the client's fluid, electrolyte, and nutritional status to provide baseline data for comparison with the client's response to IV therapy.
6. Assess the client's understanding of the purpose of the procedure so that client teaching can be used to decrease anxiety.

> DIAGNOSIS

- 8.1.1 Knowledge Deficit, related to the need for IV therapy
- 1.2.1.1 Risk for Infection
- 1.4.1.2.1 Fluid Volume Excess
- 1.4.1.2.2.1 Fluid Volume Deficit
- 1.6.2.1.2.1 Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The IV will be inserted into the vein without complications and will remain patent.
2. Fluid and electrolyte balance will be restored to the client.
3. Nutrition will be restored or maintained.
4. The IV site will remain free of swelling and inflammation.

Equipment Needed (see Figure 8-2-3):

- Appropriate needle or catheter for venipuncture
- Tourniquet
- Povidone-iodine swabs (three)
- Alcohol swab sticks (three)
- Disposable gloves
- Arm board, if needed

- Towel or absorbent drape
- Povidone-iodine ointment (not used in all agencies)
- Gauze dressing
- Tape
- Scissors
- IV tubing and solution



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be given oral and written instructions about the insertion of an IV.
2. The client should be taught to report any signs of inflammation, clotting, leaking, or breaking.
3. The client should be taught how to bathe without getting the dressing wet.
4. The client should be instructed how to prevent the IV from becoming dislodged.
5. Instruct the client how to properly position the arm to maintain IV flow if the IV is positional.
6. Teach the client how to walk with an IV pole.
7. Suggest client wear clothes with wide sleeves.
8. Discuss with the client what activities they engage in to be sure they are safe and will not cause damage to the IV.



Figure 8-2-3 Povidone-iodine, alcohol, various IV needles, tourniquet, tape, and transparent dressings

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check physician's or qualified practitioner's order for an IV, and identify client.
2. Wash hands and put on mask and gown if needed.
3. Organize all equipment at bedside.
4. Explain procedure and reason the catheter is being inserted.
5. Inspect potential veins to be used:
 - Place a tourniquet around the upper arm close to the axilla.
 - Examine the veins as they dilate.
 - Palpate the vein to test for firmness (see Figure 8-2-4).
 - Release the tourniquet.



Figure 8-2-4 Inspect the site for potential veins to use, and palpate to further locate a vein and test for firmness.

6. Select vein for venipuncture:
 - Use most distal part of the vein first.
 - Avoid bony prominences.
 - Avoid client's wrist or hand.
 - Avoid client's dominant hand and arm.
 - Avoid an extremity with decreased sensation.
 - Avoid an area of skin affected by a rash or infection.
7. Select appropriate IV needle or catheter.

1. Ensures accurate insertion of catheter.
2. Reduces the number of microorganisms.
3. Ensures smooth procedure without accidents or contamination.
4. Information decreases anxiety.
5. Promotes ease of placement of catheter.
 - Distends vein to allow visual and tactile examination.
 - To evaluate the viability of the vein.
 - To determine the best site for venipuncture and IV placement.
 - Prevents engorgement of vein



Figure 8-2-5 After scrubbing the insertion site with alcohol and povidone-iodine, allow it to dry. *Note:* The tourniquet is released while the site is drying.

6.
 - If the vein is later damaged, the proximal part can be used.
 - Increases client comfort.
 - Bending of the wrist or hand increases the risk of infiltration or phlebitis.
 - Allows freedom of movement.
 - Promotes earlier detection of infiltration.
 - Decreases risk of infection.
7. Necessary to puncture vein.

- 8. Prepare supplies:**
 - Place towel or drape on table for supplies.
 - Place supplies on towel.
 - Open needle adapter end of IV tubing set.
- 9. Clip hair on skin at site if necessary.**
- 10. Ask client to rest arm in a dependent position, if possible.**
- 11. Put on disposable gloves.**
- 12. Prepare insertion site (see Figure 8-2-5):**
 - Place absorbent drape under the arm.
 - Scrub the insertion site with three alcohol swabs then three povidone-iodine swabs.

 - Allow the povidone-iodine to dry.
- 13. Apply tourniquet 5–6 inches above the insertion site.**
 - Secure it tightly enough to occlude venous flow, not arterial flow.
 - Check presence of distal pulse.
- 14. Perform the venipuncture:**
 - Anchor the vein by placing thumb over vein and stretching the skin against the direction of insertion 2–3 inches distal to the site.
 - Insert the stylet needle at a 20–30° angle with the bevel up (see Figure 8-2-6).
 - Watch for a quick blood return through the flashback chamber of the ONC.
 - Verify needle placement in a vein, not artery.

 - Advance ONC $\frac{1}{4}$ inch into the vein while it is parallel to the skin.
 - Loosen stylet and advance catheter into vein until hub rests at venipuncture site (see Figure 8-2-7).
- 8. Provides a clean working surface for an efficiently performed procedure.**
- 9. Ensures adherence of dressing and that removal is less painful. Shaving should be avoided since it causes small abrasions that increase the risk of infection.**
- 10. Allows better venous dilation and visibility.**
- 11. Reduces transmission of microorganisms.**
- 12.**
 - Reduces transmission of microorganisms.
 - Alcohol removes fat on the skin and vigorous scrubbing in circular motion with povidone-iodine removes bacteria. Using a separate swab and starting in the middle of the site working outward prevents bacteria from being reintroduced to the site.
 - Povidone-iodine must be dry to be effective.
- 13. Tourniquet is needed to allow the vein to engorge for easier venipuncture.**
 - Decreased arterial flow prevents venous filling.
 - Ensures arterial flow is present.
- 14.**
 - Stabilizes the vein for ease of venipuncture.

 - Prevents puncture of posterior wall of vein.

 - Venous pressure from tourniquet causes backflow of blood into catheter or tubing.
 - Some veins are close to an artery. Arterial blood is bright red and pulses.
 - Ensures the catheter is in the vein.

 - Ensures proper placement of the catheter.



Figure 8-2-6 Insert the needle with the beveled side up. Keep the angle low, 20–30°.

- Do not reinsert stylet.
- Release the tourniquet.

15. Attach IV tubing to ONC.

- Stabilize the catheter with one hand.
- Remove the stylet from ONC.
- Quickly connect needle adapter of IV set to hub of ONC.
- Begin infusion at slow rate to keep vein open (see Figure 8-2-8).

Figure 8-2-8 Begin the infusion at a slow rate to keep the vein open while you secure the catheter and dress the site.

16. Secure catheter in place:

- Place tape over the hub of the catheter.
- Place 2 × 2 gauze pads over insertion site and secure with tape or transparent dressing.

17. Remove gloves and dispose with all used materials.

18. Place label with date and time of insertion and size and gauge of catheter on the dressing.

19. Wash hands.

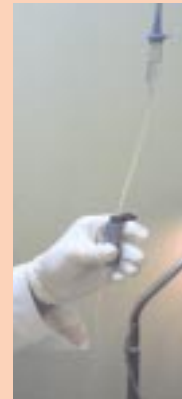


Figure 8-2-7 Loosen the stylet and advance the catheter into the vein until the hub rests on the skin at the venipuncture site.

- Prevents the catheter from being punctured by the stylet.
- Reestablishes venous blood flow.

15.

- Maintains catheter placement.
- Provides entry portal for IV fluids.
- Reduces blood loss.
- Prompt initiation of infusion maintains patency of IV.



16.

- Ensures catheter's safe position.
- Controls bleeding and prevents infection.

17. Reduces transmission of microorganisms.

18. Provides information to schedule next dressing change.

19. Reduces transmission of microorganisms.

> EVALUATION

- The IV was inserted into the vein without complications, and remains patent.
- Fluid and electrolyte balance were restored to the client.
- Nutrition was restored or maintained.
- The IV site remains free of swelling and inflammation.

> DOCUMENTATION

Nurses' Notes

- Note date and time the IV was inserted.
- Document type and gauge of catheter.
- Record date of dressing placement.
- Describe client's reaction to the procedure.



▼ REAL WORLD ANECDOTES

Mrs. Kindzia was scheduled for surgery to have a medication pump replaced. The pump had been placed to provide Mrs. Kindzia with a steady dose of muscle relaxant medication to control severe muscle spasticity secondary to her multiple sclerosis. In the surgery preparation area the nurse attempted to start an IV for venous access during surgery. The nurse was unable to start the IV despite several attempts. He reported this to the anesthesiologist. The anesthesiologist refused to participate in the surgery if Mrs. Kindzia did not have venous access. The nurse tried to start the IV multiple times, without success. Finally, in order to perform the surgery safely, the anesthesiologist placed an access catheter in Mrs. Kindzia's jugular vein. In all, the staff had attempted to start an IV 12 times before deciding on the jugular access. Due to her multiple sclerosis, Mrs. Kindzia was not able to protest the number of needle pokes she received. Long before she had been poked so many times her nurse should have stepped into the role of client advocate and discussed alternatives rather than continuing to traumatize the client.

> CRITICAL THINKING SKILL

Introduction

When an IV infiltrates, it damages the vein and tissue surrounding it. Some clients require multiple venipunctures to maintain a patent IV. It is necessary to preserve the veins that are remaining for future use.

Possible Scenario

An elderly gentleman was admitted to the cardiac intensive care unit after complaining of chest pains. The nurse noted that the IV inserted in the emergency room was placed in the large vein in the antecubital space. A large-bore needle was used in case emergency medications were needed. However, the site appeared to be slightly swollen after the client had been moving his arm around during transport.

Possible Outcome

The nurse assessed the IV site and determined that the IV was still patent. Since the site was already punctured and a large-bore needle was used, she decided to place the client's arm on an arm board to prevent further trauma and continue to use this site. Shortly afterward,

the client's blood pressure started to drop and his physician ordered dopamine to be started immediately. When the nurse started to hang the dopamine and reassess the IV site, she noted that the site was definitely swollen and infiltrated. This was the client's only venous access site, and with his low blood pressure, obtaining a new venous access site was difficult and time consuming. The nurse was able, finally, to secure a new IV site and the dopamine infusion was started. The client's blood pressure was stabilized but his life was unnecessarily jeopardized by the lack of patent venous access.

Prevention

The nurse looked for another vein more distal on the opposite arm after asking the client which was his dominant arm. She was successful in starting a large-bore IV that was in a much more comfortable site and preserved the proximal sites for later use if needed. She then removed the IV that would soon be infiltrated.

In emergency situations, it is not always possible to select a comfortable site; however, planning for short-term IV therapy should be done whenever possible.

▼ VARIATIONS



Geriatric Variations:

- *The veins of elderly clients may be more fragile. Be aware of this when assessing IV sites for continued patency.*
- *Be careful to use only minimal pressure of the tourniquet due to fragile skin and veins.*
- *Use a 5–15° angle when inserting the needle since the elderly client's veins are more superficial.*
- *Elderly clients develop fluid imbalances more rapidly due to a larger extracellular fluid volume.*
- *Some elderly clients may have cardiac or renal failure that requires specialized IV therapy due to increases in vascular volume or inability to eliminate extracellular fluid.*



Pediatric Variations:

- *In neonates, veins of the scalp and feet can be used.*
- *Use the smallest gauge needle possible according to the IV therapy needed.*
- *Special precautions are needed to maintain an intact IV in very young clients.*
- *Allow older children to help in the selection of the IV site in order to increase cooperation and decrease anxiety.*
- *Teenagers and young adults often have thicker, tougher skin than a middle-aged client. The nurse should bear this in mind when starting an IV on someone this age.*



Home Care Variations:

- *A more secure dressing may be necessary if the client is active.*
- *Ensure that containers for proper disposal of equipment are in place.*
- *Arrange for delivery of IV supplies.*



Long-Term Care Variations:

- *Clients in the long-term care setting may have more contact with nurses' aides than with nurses. The aides must be taught to recognize and report IV infiltrations or other problems.*
- *Be sure to assess the IV site often and to change the IV site every 3 days or according to the policies of the institution.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The catheter is noted to be pulled out 1 inch at the time of the dressing change.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to secure the catheter with tape. Advise the client to be careful of the catheter during activity. If the catheter is pulled out, do not push catheter back into vein. Check for patency of the catheter. If it is patent, it may continue to be used when properly secured. If it is not patent, it will need to be replaced.

> NURSING TIPS

- Methods to promote venous dilatation are:
 - Stroking the extremity from distal to proximal below the proposed venipuncture site
 - Opening and closing the fist
 - Light tapping with two or three fingers over the vein
 - Applying a warm washcloth or other heat to the extremity
- Be sensitive to the client's dominant arm and need for some movement.
- Use 18-gauge or larger needle if the infusion of blood products is anticipated.
- Always insert the IV needle/catheter in the direction of venous return (toward the heart) to avoid damaging the venous valve.

SKILL 8-3

Inserting a Butterfly Needle

Kathryn Lilleby, RN

KEY TERMS

Butterfly needle
Gauge
Infiltration

Intravenous
Phlebitis
Venous catheter



> OVERVIEW OF THE SKILL

Performing a venipuncture in order to establish a venous access is a priority for clients with fluid and electrolyte disturbances, clients who are critically ill, clients who are NPO after surgery, or clients who for other reasons are not able to take fluids or food by mouth. Venous access can be used for infusions of IV fluids, emergency medications, parenteral nutrition, blood products, and routine IV medications.

There are a variety of IV needles and catheters. They vary in gauge from small bore to large bore. A 20- to 22-gauge flexible catheter is used for adults while a 22- to 24-gauge catheter is used for pediatric clients. If large volumes of fluid or blood products are expected to be given, a larger bore (18 or 19 gauge) is recommended.

A butterfly needle is commonly used for short-term venous access or for pediatric clients. It is called a

butterfly due to the flexible wings on either side of a short needle and 2- to 3-inch tubing that ends with a hub. This design makes it easy for the nurse to guide the needle into a vein to draw blood or to infuse medication or fluid. Unlike the flexible catheters commonly used for IVs, the butterfly needle uses a rigid, sharp needle as the venous access port. Because the sharp tip remains in the vein during the IV infusion, infiltration of the IV is more common than with the flexible catheter. Butterfly needles are not commonly used for long-term IV therapy, although they may still be used in clients who have very small veins or in areas where a larger catheter cannot be advanced into the vein. Butterfly needles may be used when venous access is only required for short-term IV therapy. When a butterfly needle has been used for IV access, the nurse must check the IV site frequently for infiltration.

> ASSESSMENT

1. Assess the purpose of the IV. Butterfly needles are more often used in short-term IV therapy.
2. Assess the client's veins. A butterfly needle may be necessary if the client's veins are small or the vein is in a difficult position to access.
3. Check the client's fluid, electrolyte, and nutritional status to provide baseline data for comparison with the client's response to IV therapy.
4. Assess the client's understanding of the purpose of the procedure so that client teaching can be used to decrease anxiety.

> DIAGNOSIS

- 1.2.1.1 Knowledge Deficit
- 1.4.1.2.1 Fluid Volume Excess

- 1.4.1.2.2.1 Fluid Volume Deficit
- 8.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.6.1 Risk for Injury

> **PLANNING**

Expected Outcomes:

1. The IV will be inserted into the vein without complications and will remain patent.
2. The IV site will be without signs or symptoms of infiltration.
3. The IV will be started and will infuse with a minimum of trauma and discomfort to the client.

Equipment Needed (see Figure 8-3-2A and B):

- Appropriate gauge butterfly needle for venipuncture
- Tourniquet
- Povidone-iodine swabs (three)
- Alcohol swab sticks (three)
- Disposable gloves
- Arm board, if necessary
- Towel or absorbent drape
- Povidone-iodine ointment



Figure 8-3-2A Needleless system, syringe, and extension tubing

- Gauze dressing or transparent dressing
- Tape
- Scissors
- IV tubing and solution



Estimated time to complete the skill:
15 minutes

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught to report any signs of inflammation or swelling.
2. The client should be taught how to bathe without getting the dressing wet.
3. The client should be instructed how to prevent the IV from becoming dislodged.
4. Provide written and oral instructions about the care of an IV.
5. Instruct the client how to properly position the arm to maintain IV flow if the IV is positional.
6. Teach the client how to walk with an IV pole.
7. Discuss with the client what activities they engage in to be sure they are safe and will not cause damage to the IV.



Figure 8-3-2B Transparent dressing, gauze, tape, extension tubing, povidone-iodine, alcohol pad, and sterile saline

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check physician's or qualified practitioner's order for an IV, and identify client.
2. Wash hands; put on mask and gown, if needed.
3. Organize all equipment at bedside.

1. Ensures accurate insertion of IV needle.
2. Reduces the number of microorganisms.
3. Ensures smooth procedure without accidents or contamination.

4. Explain procedure and reason the IV needle is being inserted.

5. Inspect potential veins to be used (see Figure 8-3-3):

- Place a tourniquet around the upper arm close to the axilla.
- Examine the veins as they dilate.
- Palpate the vein to test for firmness.
- Release the tourniquet.

Figure 8-3-3 Inspect the veins and select the vein to be used.

4. Information decreases anxiety.

5. Promotes ease of placement of IV needle.

- Distends vein to allow visual and tactile examination.
- To assess blood return in veins.
- To assess fragility of veins.
- Prevents engorgement of blood.



6. Select vein for venipuncture:

- Use most distal part of the vein first.
- Avoid bony prominences.
- Avoid client's wrist or hand.
- Avoid client's dominant hand and arm.
- Avoid an extremity with decreased sensation.
- Avoid an area of skin affected by a rash or infection.

7. Select appropriate gauge butterfly needle.

8. Prepare supplies:

- Place towel on table for supplies.
- Place supplies on towel.
- Open needle adapter end of IV tubing set.

9. Clip hair on skin at site if necessary.

10. Ask client to rest arm in a dependent position, if possible.

11. Put on disposable gloves.

6.

- If the vein is later damaged, the proximal part can be used.
- Increases client comfort.
- Bending of the wrist or hand increases the risk of infiltration or phlebitis.
- Allows freedom of movement.
- Promotes earlier detection of infiltration.
- Decreases risk of infection.

7. Chooses needle necessary to puncture vein.

8. Provides a clean working surface for an efficiently performed procedure.

9. Ensures adherence of dressing and that removal is less painful. Shaving should be avoided since it causes microscopic abrasions that increase the risk of infection.

10. Allows better venous dilation and visibility.

11. Reduces transmission of microorganisms.

continues

12. Prepare insertion site:

- Place towel or absorbent drape under the arm.
- Scrub the insertion site with three alcohol swabs then three povidone-iodine swabs (see Figure 8-3-4).
- Allow the povidone-iodine to dry.



Figure 8-3-4 Scrub the insertion site with alcohol, then repeat with three povidone-iodine swabs.

13. Apply tourniquet 5–6 inches above the insertion site.

- Secure it tightly enough to occlude venous flow, not arterial flow.
- Check presence of distal pulse.

14. Perform the venipuncture:

- Anchor the vein by placing thumb over vein and stretching the skin against the direction of insertion 2–3 inches distal to the site.
- Grasp the wings of the butterfly needle and insert the butterfly needle at a 20–30° angle with the bevel up slightly distal to the venipuncture site (see Figure 8-3-5).
- Watch for a blood return through the tubing of the butterfly needle.
- Verify needle placement in a vein, not an artery.
- Advance the butterfly needle into the vein until the hub rests at the venipuncture site (see Figures 8-3-6 and 8-3-7).
- Release the tourniquet.

15. Attach IV tubing to butterfly needle.

- Stabilize the needle with one hand.
- Connect needle adapter of IV set to hub of butterfly needle tubing.

12.

- Reduces transmission of microorganisms.
- Alcohol removes fat on the skin and vigorous scrubbing in circular motion with povidone-iodine removes bacteria. Using a separate swab and starting in the middle of the site working outward prevents bacteria from being reintroduced to the site.
- Povidone-iodine must be dry to be effective.



Figure 8-3-5 Insert the needle at a 20–30° angle with bevel up.

13. Tourniquet is needed to allow the vein to engorge for easier venipuncture.

- Decreased arterial flow prevents venous filling.
- Ensures arterial flow is present.

14.

- Stabilizes the vein for ease of venipuncture.
- Prevents puncture of posterior wall of vein.
- Venous pressure from tourniquet causes backflow of blood into tubing.
- Some veins are close to an artery. Arterial blood is bright red and pulses.
- Ensures the IV needle is in the vein and proper placement of the IV needle.
- Reestablishes venous blood flow.

15.

- Maintains IV needle placement.
- Reduces blood loss.



Figure 8-3-6 Still holding the butterfly wing, advance the needle into the arm.

- Begin infusion at slow rate to keep vein open.

16. Secure needle in place (see Figure 8-3-8):

- Place tape over the wings of the butterfly needle.
- Place 2 × 2 gauze pads over insertion site and secure with tape or place transparent dressing over insertion site.

Figure 8-3-8 Attach the IV tubing to the needle and secure the needle in place.

- 17.** Remove gloves and dispose of all used materials.

- 18.** Place label with date and time of insertion and size and gauge of needle on the dressing.

- 19.** Wash hands.



Figure 8-3-7 Stop when the hub rests at the venipuncture site. Note the blood return in the butterfly needle tubing.

- Prompt initiation of infusion maintains patency of IV.

16.

- Ensures needle's safe position.
- Controls bleeding and prevents infection.



- 17.** Reduces transmission of microorganisms.

- 18.** Provides information to schedule next dressing change.

- 19.** Reduces transmission of microorganisms.

> EVALUATION

- The IV was inserted into the vein without complications and remains patent.
- The IV site is without signs or symptoms of infiltration.
- The IV was started and is infusing with a minimum of trauma and discomfort to the client.

> DOCUMENTATION

Nurses' Notes

- Date and time IV was started
- Type and gauge of needle used
- Insertion site
- Type of dressing placed over site
- Any unusual occurrences during the IV insertion



▼ REAL WORLD ANECDOTES

Scenario 1

Jason, 2 years old, was admitted to the day surgery unit for placement of tubes in his ears after repeated ear infections. Since his need for an IV was short term and his veins were small, the nurse selected a 23-gauge butterfly needle. As Jason's mother held him in her lap, the nurse explained what she was going to do and reassured him that when he woke up after his ears were fixed the needle would be taken out. The nurse demonstrated how she would put the needle into a vein using a teddy bear that Jason held. The demonstration with the teddy bear helped to reassure Jason, and with the help of his mother, Jason only whimpered when the needle was actually inserted. He chose a Band-Aid with Mickey Mouse to put over the insertion site.

Scenario 2

Andrea, a 23-year-old with a history of IV drug use, was admitted to the emergency room with a suspected overdose. While trying to start an IV, the nurse noted that most of Andrea's veins were badly scarred. The nurse was unable to find a suitable IV site in either of Andrea's arms or the backs of her hands. The nurse was finally able to start an IV using a 21-gauge butterfly needle in the back of Andrea's right thumb. The nurse used a tongue blade as a splint to prevent movement of the site and carefully taped the site to prevent movement but allow inspection of the insertion point.

> CRITICAL THINKING SKILL

Introduction

Clients with small veins may require a small-gauge needle. Using a butterfly needle gives the nurse more control as she guides it into a vein. The needle is also shorter so it may be less frightening to pediatric clients or people from another culture.

Possible Scenario

Mrs. Nguyen was admitted to the emergency room with complaints of abdominal pain. The emergency room physician ordered a complete blood count (CBC) and chemistry panel and then ordered an abdominal computerized tomography (CT) scan. The nurse noted that the woman's veins were quite small and delicate.

Possible Outcome

The nurse caring for Mrs. Nguyen felt that butterfly needles were never appropriate to use due to the frequency of venous trauma and infiltration. She attempted to gain IV access using a 21-gauge venous catheter. When she inserted the venous catheter, there was a blood flashback. However, when she attempted

to advance the venous catheter, the vein tore and bled into the surrounding tissue. The nurse made three attempts at starting the IV using a 21-gauge venous catheter without success. Mrs. Nguyen became increasingly upset and agitated with each failure. Finally the nurse asked another staff member to try to start the IV.

The nurse chose a 21-gauge butterfly needle. She used it to draw the blood samples and then connected it to an IV solution of normal saline and set it at a rate to keep the vein open. When the client was sent for a CT scan, she had a vein open to be used for contrast dye.

Prevention

Keep in mind the reason for the IV, when choosing an insertion site and infusion equipment. When the nurse realized that the client's veins were too fragile to sustain the passage of an over-the-needle catheter, she should have reevaluated the client's needs and her approach. Recognizing that the IV access was only required for a short time, the nurse could have saved the client undue trauma by changing to a butterfly needle sooner.

▼ VARIATIONS



Geriatric Variations:

- *The veins of elderly clients may be more fragile so care must be taken not to traumatize them with the tip of the needle.*
- *Be careful to use only minimal pressure of the tourniquet due to fragile skin and veins.*
- *Use a 5–15° angle when inserting the needle since the elderly client's veins are more superficial.*



Pediatric Variations:

- *In neonates, veins of the scalp and feet can be used.*
- *Use the smallest gauge needle possible according to the IV therapy needed.*
- *Special precautions are needed to maintain an IV intact in very young clients. Restraints may be required to immobilize the IV site.*
- *Allow older children to select the IV site in order to increase cooperation and control.*



Home Care Variations:

- *The butterfly needle can be inserted in the home by a nurse.*
- *A more secure dressing may be necessary if the client is active.*
- *Ensure that containers for proper disposal of equipment are in place.*



Long-Term Care Variations:

- *Butterfly needles are not generally used for long-term IV therapy.*
- *If a butterfly needle is placed for a long-term IV, the site should be inspected frequently for infiltration.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Blood is noted in the tubing of the butterfly set after the venipuncture, but when the needle is advanced, a resistance is felt and no more blood flows into the tubing.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to advance the needle carefully at a 20–30° angle so it does not puncture through the vein. If this error does occur, pull back on the needle. If a brisk blood return in the tubing is seen, secure the needle to the skin. If no blood return is seen, the IV may need to be restarted in another site.

> NURSING TIPS

- Methods to promote venous dilatation are:
 - Stroking the extremity from distal to proximal below the proposed venipuncture site.
 - Opening and closing the fist.
 - Light tapping with two or three fingers over the vein.
 - Applying a warm washcloth or other heat to the extremity.
- Be sensitive to the client's dominant arm and need for some movement.
- Use the smallest gauge possible for pediatric and elderly clients with fragile veins.
- Always insert the IV needle in the direction of venous return (toward the heart) to avoid damaging the venous valves.

SKILL 8-4

Preparing the IV Bag and Tubing

Kathryn Lilleby, RN

KEY TERMS

Heparin lock
Infection
Injection port

Intravenous
IV catheter
IV tubing



> OVERVIEW OF THE SKILL

An IV solution is a method of correcting or preventing a fluid and electrolyte disturbance. Clients who are acutely ill, are NPO after surgery, or have severe burns are examples of those who require IV therapy.

The solution in an IV bag is ordered by the physician or qualified practitioner according to the client's needs and is changed at least every 24 hours. The tubing is used to connect the solution in the IV bag with the client's IV catheter or needle. The IV tubing should be changed every 48 hours and when the IV catheter is changed. These changes in solution and tubing are recommended to decrease the risk of infection.

There are many brands and types of IV tubing available. It is important to be familiar with the types you will be using most often. Some tubing is specific to some IV controllers, some can only be used without a controller. Some tubing is designed to be used for blood transfusions, and some is designed only to be used with solutions of one type of drug. Different types of tubing deliver different-sized drops of solution. The drops can vary in size from macrodrops to microdrops. The nurse must be aware of the drop size in order to accurately calculate the IV flow rate.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the IV to be infused and rate of flow to ensure accurate administration.
2. Review information regarding the solution and nursing implications in order to administer the solution safely.
3. Check all additives in the solution and other medications so that there will be no incompatibilities with the solution.
4. Assess the patency of the IV to ensure that the solution will enter the vein and not the surrounding tissue.

5. Assess the skin at the IV site so that the solution will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
6. Assess the client's understanding of the purpose of the IV infusion so that teaching can be tailored to client's needs.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection
- 8.1.1 Knowledge Deficit regarding the IV infusion

> **PLANNING**

Expected Outcomes:

1. The IV tubing will be replaced without compromising the sterility of the system.
2. The new IV tubing will infuse the new solution without leaks or air bubbles.
3. The new IV solution will infuse at the prescribed rate.
4. The client will be able to discuss the purpose of the IV therapy.

Equipment Needed (see Figure 8-4-2):

- Disposable gloves
- IV solution in a bag
- IV tubing as ordered
- Sterile 2 × 2 gauze



Estimated time to complete the skill:
5–10 minutes



Figure 8-4-2 Gloves, alcohol swab, IV solution, and tubing

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for the IV therapy.
2. The client should be taught the type of solution and additives he is receiving.
3. Clients should be instructed to report any swelling or pain at the IV site.
4. The client should know the rationale for changing the tubing.
5. The client should be instructed to notify the nurse if any leaking from the tubing occurs.

IMPLEMENTATION—ACTION/RATIONALE

ACTION	RATIONALE
1. Check physician’s or qualified practitioner’s order for the IV solution.	1. Ensures accurate administration of the solution.
2. Wash hands.	2. Reduces transmission of microorganisms.
3. Check client’s identification bracelet.	3. Ensures medication is given to the correct client.
4. Prepare new bag by removing protective cover from bag or bottle. Check the expiration date on the bag and assess the bag for cloudiness or leakage.	4. Allows for quick, smooth preparation. Ensures that the solution is sterile.
5. Open new infusion set. Unroll tubing and close roller clamp.	5. Prevents fluid from leaking after IV bag is spiked.
6. Spike bag with tip of new tubing and compress drip chamber to fill halfway (see Figures 8-4-3 to 8-4-5).	6. Promotes rapid flow of solution through new tubing without air bubbles.

continues



Figure 8-4-3 Remove the protective cap from the end of the IV tubing.



Figure 8-4-4 Spike the bag with the sharp tip of the new tubing.



Figure 8-4-5 Compress the drip chamber and allow it to fill halfway with fluid.

7. Open roller clamp, remove protective cap from the end of the tubing, and flush the tubing with solution.
 8. Close roller clamp and replace cap protector.
 9. Apply clean gloves.
 10. Remove old tubing and replace with new tubing:
 - Place sterile 2×2 gauze under IV catheter or heparin lock.
 - Stabilize hub of catheter or needle and gently pull out old tubing.
 - Quickly insert new tubing into hub of catheter or needle.
 - Open roller clamp to establish flow of IV solution.
 - Reestablish drip rate (see Figure 8-4-6).
 - Apply new dressing to IV site.
7. Removes air from tubing. Prevents entry of air into the venous system, a cause of air embolus.
 8. Prevents fluid from leaking and maintains sterility of tubing.
 9. Reduces the transmission of microorganisms.
 10.
 - Absorbs fluids that may drip during the procedure, preventing contamination of surrounding areas.
 - Prevents accidental dislodging of catheter or needle.
 - Prevents backflow of blood or the entrance of air into the vein.
 - Prevents catheter occlusion and maintains IV flow at prescribed rate.
 - Maintains IV flow at prescribed rate.
 - Provides protection from infection and accidental dislodgement.



Figure 8-4-6 Establish the drip rate.

- | | |
|---|---|
| <p>11. Discard old tubing and IV bag.</p> <p>12. Remove gloves and dispose with all used materials.</p> <p>13. Apply a label with date and time of change to tubing.</p> <p>14. Wash hands.</p> | <p>11. Prevents accidental transmission of microorganisms.</p> <p>12. Reduces transmission of microorganisms.</p> <p>13. Allows for planning of next change.</p> <p>14. Reduces transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- The IV tubing was replaced without compromising the sterility of the system.
- The new IV tubing is infusing the new solution without leaks or air bubbles.
- The new IV solution is infusing at the prescribed rate.
- The client is able to discuss the purpose of the IV therapy.

> DOCUMENTATION

Parenteral Flow Sheet

- Date, time, and name of IV solution started
- Date and time IV tubing was changed

Intake and Output Record

- Note how much fluid was left in the bottle/bag to determine the amount of intake.



▼ REAL WORLD ANECDOTES

Mr. Hahn presented to the emergency room complaining of severe chest pain that radiated down his left arm. He was pale and clammy. His blood pressure was 108/64 and his EKG indicated that he was in the acute phase of a myocardial infarction. As the emergency room staff geared up to care for Mr. Hahn, his room quickly filled with people and equipment. Despite sublingual nitroglycerin, Mr. Hahn continued to have chest pain. The emergency room doctor ordered nitroglycerin IV to try to stop the chest pain. The emergency room nurse prepared the IV solution of nitroglycerin, spiked the bottle, and primed the tubing. She put the tubing into an IV pump for accurate control of the infusion and, using a needle in one of the ports of the existing tubing, she added the nitroglycerin into Mr. Hahn's IV. The emergency room doctor ordered the IV nitroglycerin rate to be increased until Mr. Hahn no longer had pain or until his blood pressure was too low to tolerate the nitroglycerin. The nurse started to increase the nitroglycerin infusion rate, slowly at first, but as the medication seemed to have no effect on Mr. Hahn, she increased it more aggressively. By the time the cardiologist arrived to see Mr. Hahn, the nurse had titrated the nitroglycerin drip beyond safe limits without any apparent effect on the client. She reported that she had checked the IV site and it was patent and she had checked the insertion site of the nitroglycerin tubing and it was intact. The nurse knew that something was wrong but did not know what it could be. In the meantime, Mr. Hahn continued to suffer with severe chest pain. The cardiologist took one look at the nitroglycerin bottle and tubing and noted that the nurse had mixed the nitroglycerin in a plastic IV bag and had used standard IV tubing. She was not aware that nitroglycerin is absorbed by most plastics and must be mixed in a glass bottle and infused with special tubing. Mr. Hahn had not been receiving any medication at all. When the nurse mixed a new bottle of nitroglycerin using a glass bottle and special tubing, Mr. Hahn quickly received relief from his chest pain. Unfortunately, the delay in providing the appropriate treatment resulted in increased cardiac damage to Mr. Hahn and a longer hospital stay and home recovery period.

> CRITICAL THINKING SKILL

Introduction

The IV tubing should be changed every 48 hours in order to decrease the risk of infection. It should also be changed after infusion of blood products since it can become occluded with the viscous solutions.

Possible Scenario

A client has an IV of D₅W infusing at 75 ml/hr when the physician orders two units of packed red blood cells.

Possible Outcome

The nurse prepares the blood bag by spiking it with new tubing, filling the tubing, and piggybacking it into the current IV. She shuts the D₅W off and runs the blood in through the current IV tubing. Because the nurse was not aware that blood products are not compatible with dextrose solutions, the red cells are damaged as they flow through the tubing, which previously contained

D₅W, thus rendering the transfusion worthless or potentially harmful.

Prevention

The nurse prepares the blood with tubing designed for blood transfusions. She checks the hospital policy regarding blood transfusions and realizes that normal saline should be used to prime the blood tubing and to flush it following the transfusion. She carefully prepares the new tubing, double checks the blood bag with a second nurse, and changes from the D₅W tubing to the blood tubing. Since the previous IV will resume after the transfusion of blood is completed, the nurse obtains a sterile cap to cover the end of the D₅W tubing to maintain its sterility when she attaches the blood tubing.

The nurse needs to know which solutions are compatible with other medications or blood products and if an IV solution will be used later in order to prevent contamination.

▼ VARIATIONS



Geriatric Variations:

- Older clients and clients with heart failure or renal failure develop fluid imbalances more quickly. Accurate rates of infusion are crucial to prevent fluid overload or dehydration.



Pediatric Variations:

- Small children may develop fluid imbalances more quickly due to a larger extracellular fluid volume. Accurate infusion rates are essential in small children to prevent dehydration or fluid overload.
- Intravenous fluid rates are often prescribed for children based on their body weight. Most formulas used to calculate children's IV flow rates are based on the child's weight in kilograms. Most American institutions report weights in pounds. Be aware of the need to convert or report all weights in kilograms.
- The IV tubing connections should be very secure. Even sick children are active and may inadvertently disconnect tubing.



Home Care Variations:

- An approved receptacle needs to be provided for used IV tubing.
- Assess the home care setting. Teach the client or the caregiver to prepare the new IV bottle and tubing in a clean area to reduce the risk of contamination.



Long-Term Care Variations:

- If the long-term care client will be cared for primarily by aides, the aides must be taught how to respond to incidents involving the IV site and infusion set. They need to know what to do if the IV tubing should come apart, if the solution bag becomes contaminated or is empty, and even what to look for to assess if something is not right with the IV infusion.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The tubing is contaminated by a needle piercing through it during an IV piggyback injection.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to identify the port for the IV piggyback injection and carefully puncture only the port and not puncture the tubing. If the error does occur, stop the IV piggyback administration of the medication. Remove the needle and replace the cap over the needle to maintain sterility. Stop the IV flow. Obtain new tubing for the IV solution and change it using sterile technique. Discard the contaminated tubing, place fresh IV solution and tubing, and proceed to administer the IV piggyback medication.

> NURSING TIPS

- Be sure the tape at the IV site is loosened so it is easier to change the tubing.
- Place a towel under the arm of the IV site where the tubing will be changed in order to keep the linen clean in case of blood leaking from the needle during IV tubing change.
- A special gown with snaps at the seams makes changing tubing easier.

SKILL 8-5

Setting the IV Flow Rate

Kathryn Lilleby, RN

KEY TERMS

Drip chamber
Infusion pump
IV controller
IV tubing

Macrodrop
Microdrop
Volume control
device



> OVERVIEW OF THE SKILL

Setting the rate of an IV infusion according to the physician's or qualified practitioner's order is the responsibility of the nurse after she has established a patent IV. The flow rate can be controlled by the roller clamp on the IV tubing or by an infusion pump. It is important for the rate to be accurate to prevent complications in fluid balance. A rate that is too fast can result in fluid overload, which is potentially serious in clients with cardiovascular, renal, or neurologic impairment as well as in the very young or very old clients. If an infusion is set too slow, the vein may clot off or a more serious complication could be circulatory collapse in a dehydrated or severely injured client who required large volumes of fluid.

Sudden changes in the rate of infusion may be accidental or positional. A confused client may loosen the roller clamp or get tangled in his IV tubing. A client who gets up to walk may experience an increase in the IV rate. Changes in flow rate can occur with tubing and a roller clamp or infusion devices.

An infusion pump is an electronic device used to deliver a prescribed amount of fluid over a period

of time in milliliters per hour. Pumps may have a drop sensor that counts each drop of fluid and sounds an alarm if the flow rate differs from what is programmed. An alarm sounds when the bottle or bag is empty or when pressure increases in the system, as in the case of an infiltrated IV.

An IV controller delivers fluid by gravity so the bag or bottle must be at least 36 inches above the IV site. The number of drops per minute as well as the IV tubing size and viscosity of the fluid are necessary to calculate the actual volume delivered per hour. The controller cannot force fluid into the vein like a pump so infiltrations are detected more quickly. However, the sensitivity of the pump system increases the number of alarms due to client movement.

A volume control device is a calibrated chamber placed between the IV bag or bottle and the drip chamber so that a small volume of IV fluid (<200 ml) can flow into the chamber and then infuse without danger that the whole bag will be infused into the client.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the IV to be infused and rate of flow to ensure accurate administration.
2. Review information regarding the solution and nursing implications in order to administer the solution safely.

3. Assess the patency of the IV to ensure that the solution will enter the vein and not the surrounding tissue.
4. Assess the skin at the IV site so that the solution will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
5. Assess the client's understanding of the purpose of the IV infusion so that client teaching can be tailored to his needs.

> DIAGNOSIS

- 1.4.1.2.1 Fluid Volume Excess
- 1.4.1.2.2 Risk for Fluid Volume Deficit
- 8.1.1 Knowledge Deficit, related to the IV infusion

> PLANNING

Expected Outcomes:

1. The fluid will be infused into the vein without complications.
2. The IV catheter will remain patent.
3. The fluid and electrolyte balance will return to normal.
4. The client will be able to discuss the purpose of the IV therapy.

Equipment Needed:

- Watch with a second hand
- IV solution in a bag
- IV tubing
- IV infusion pump (optional) (see Figure 8-5-2A)
- Volume control device (optional) (see Figures 8-5-2B and 8-5-2C)
- Paper and pencil



Figure 8-5-2B IV tubing and drip chamber with Dial-a-flow



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the IV therapy.
2. The client should be taught the hourly flow rate of the fluid.
3. The client should know the significance of the alarm if an infusion device is used.
4. The client and caregiver can be taught to count the drops per minute.
5. Clients should be instructed to report any swelling or pain at the IV site.



Figure 8-5-2A There are many types of IV pumps available.



Figure 8-5-2C Volume control infusion chamber

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check physician's or qualified practitioner's order for the IV solution and rate of infusion.

2. Wash hands.

3. Check client's identification bracelet.

4. Prepare to set flow rate:

- Have paper and pencil ready to calculate flow rate.
- Review calibration in drops per milliliter (gtt/ml) of each infusion set.

5. Determine hourly rate by dividing total volume by total hours.

Example 1:

The order reads 1000 ml D₅W with 20 mEq KCl over 8 hours:

$$\frac{1000 \text{ ml}}{8 \text{ hr}} = 125 \text{ ml/hr}$$

Example 2:

Three liters are ordered for 24 hours:

$$\frac{3000 \text{ ml}}{24 \text{ hr}} = 125 \text{ ml/hr}$$

6. Mark a length of tape placed on the IV bag or bottle with the hourly time periods according to the rate.

7. Calculate the minute rate based on the drop factor of the infusion set:

$$\text{Drop factor} \times \text{ml/min} = \text{gtt/min}$$

$$\frac{\text{ml/hr} \times \text{drop factor}}{60 \text{ min}} = \text{gtt/min}$$

$$\frac{\text{hourly rate} \times \text{drop factor}}{\text{infusion time in minutes}} = \text{gtt/min}$$

- Microdrip example:

$$\frac{125 \text{ ml} \times 60 \text{ gtt/ml}}{60 \text{ min}} = \frac{7500 \text{ gtt}}{60 \text{ min}} = 125 \text{ gtt/min}$$

1. Ensures accurate administration of the solution.

2. Reduces the transmission of microorganisms.

3. Ensures medication is given to the correct client.

4.

- A nurse unfamiliar with IV fluid rates should calculate the rate at first.
- Drops per milliliter vary with manufacturer and tubing type. Macrodrop tubing varies from 10–15 gtt/ml. Microdrip tubing generally delivers 60 gtt/ml.

5. Provides a prescribed hourly rate with no sudden increases or decreases. The formula for calculation is:

$$\frac{\text{ml/hr}}{60 \text{ min}} = \text{ml/min}$$

6. Provides a visual check of the fluid infused to be sure the rate is correct.

7. Allows nurse to use these formulas to make the calculations.

- Macro drip example:

$$\frac{125 \text{ ml} \times 15 \text{ gtt/ml}}{60 \text{ min}} = 31 \text{ to } 32 \text{ gtt/min}$$

8. Set flow rate:

- For regular tubing without a device: Count drops in drip chamber for 1 minute while watching second hand of watch and adjust the roller clamp as necessary (see Figure 8-5-3).
- For an infusion pump: Insert the tubing into the flow control chamber, select the desired rate (generally calibrated in cc's per minute), open the roller clamp, and push start button.
- For a controller: Place IV bag 36 inches above the IV site, select the desired drops per minute, open the roller clamp and count drops for 1 minute to verify rate.
- For volume control device: Place device between IV bag and insertion spike of IV tubing, fill with 1–2 hours amount of IV fluid, and count drops for 1 minute (see Figure 8-5-4).



Figure 8-5-3 Count the drips in the drip chamber for 1 minute.

9. Monitor infusion rates and IV site for infiltration.

10. Assess infusion when alarm sounds.

11. Wash hands.

8.

- Ensures that infusion is administered as ordered.
- Pumps the solution through the tubing at the rate set.
- The controller works by gravity.
- The amount of fluid in the volume control chamber depends on the amount of fluid to be infused per hour:

$$50 \text{ cc/hour} = 50\text{--}100 \text{ cc of fluid}$$

$$100 \text{ cc/hour} = 100\text{--}200 \text{ cc of fluid}$$



Figure 8-5-4 The controller is placed between the IV bag and the client. It is filled with 1–2 hours worth of IV fluid.

9. Infusion devices may fail.

- ### 10. Alarms on infusion devices signal when a drip has not been sensed. It can be due to an empty IV bag, a kink in the tubing, a clotted needle, and infiltrated IV, or another malfunction of the device.

11. Reduces the transmission of microorganisms.

> EVALUATION

- The fluid is infusing into the vein without complications.
- The IV catheter remains patent.
- The fluid and electrolyte balance returned to normal.
- The client is able to discuss the purpose of IV therapy.

> DOCUMENTATION

Parenteral Flow Sheet

- Date and time IV solution was started
- Rate of infusion in drops per minute and milliliters per hour
- Any changes in the IV rate

Nurses' Notes

- Client's response to the IV therapy
- Changes in condition due to a complication in the IV infusion



▼ REAL WORLD ANECDOTES

Anne, 3 years old, was hospitalized for meningitis. She was receiving IV antibiotics and fluids. She was usually somnolent but occasionally was restless. Her physician ordered IV fluids at 15 ml/hr and cautioned the nurse to be vigilant that she receive no more due to possible increased intracranial pressure. The nurse had already obtained a volume control set to attach to the IV tubing before spiking the IV bag. She filled the chamber with 15 ml of the IV fluid and timed the drips. She checked the infusion frequently, and when the level of the fluid reached 5 ml and it was 20 minutes before the hour, she filled the chamber up to the 15-ml mark so that it would not run dry.

> CRITICAL THINKING SKILL

Introduction

Setting an IV infusion rate is part of delivering the prescribed fluid to the client. Knowledge of the size of tubing, the formulas used for calculating the number of drips per minute, and assessment of the client are all vital in successful administration of IV fluid.

Possible Scenario

A nurse reads the physician's order "D₅1/2NS 1000 ml over 12 hours" and calculates a rate of 83 ml/hr and marks the tape on the IV bag accordingly. She selects an IV set and calculates the rate to be 13 to 14 gtt/min. When she counts the drops watching the second hand, she sets the roller clamp to match the drops. However,

when she returns an hour later, 120 ml has infused instead of 83 ml.

Possible Outcome

The difference of 40 ml has not made a difference in the client's assessment, but the nurse must explore the reason why more IV fluid has infused than she wanted. When she looked more closely at the IV tubing, she realized that the set delivered 15 gtt/ml instead of 10 gtt/ml. So her calculation was correct but the tubing was wrong.

Prevention

The nurse must look carefully at the product she is using for an IV infusion in order to make the correct calculation.

▼ VARIATIONS



Geriatric Variations:

- Older clients and clients with heart failure or renal failure are at greater risk for fluid overload.



Pediatric Variations:

- Small children may develop fluid imbalances more quickly due to a larger extracellular fluid volume.
- A volume control device is recommended for small children.

▼ VARIATIONS *continued*



Home Care Variations:

- *Clients and caregivers can be taught to control the rate of an IV infusion.*
- *The nurse should be in the home to teach the client and caregiver how to use an infusion device after she has checked the equipment.*
- *Be sure electronic equipment is properly grounded.*



Long-Term Care Variations:

- *Infusion devices can be used in the long-term care facility. Be sure health care workers know how to use and care for the infusion pump.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The infusion cassette is not snapped completely into place in the infusion pump. The alarm sounds whenever the pump is turned on and no fluid is infused.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the correct tubing for the infusion pump is placed according to the manufacturer's instructions. Infusion devices and tubing vary widely and if the tubing is improperly loaded, the infusion device will not work correctly and will continue to sound the alarm.

> NURSING TIPS

- Have the tape ready to mark the hours of infusion on the IV bag.
- Anticipate the client's need for IV fluid so the next bag is ready to hang before the current one is finished.
- Watch for kinks in the IV tubing or other impediments to the infusion of the fluid.
- Remember not to depend entirely on an infusion pump or controller since they can fail.
- Always check IV infusions with a watch and monitor the tape on the IV bag to ensure the correct rate is being delivered.
- Do not write directly on the plastic IV bag. Some ink may migrate through the plastic, contaminating the IV fluid.

SKILL 8-6

Assessing and Maintaining an IV Insertion Site

Susan B. Rives, RN, BSN, OCN

KEY TERMS

**Assessing IV site
Infiltration**

**Phlebitis
Vein inflammation**



> OVERVIEW OF THE SKILL

Assessing a vein for an IV insertion requires knowledge of the anatomy of the veins of the upper extremities to determine the appropriate vein for the therapy ordered. It also requires the assessment knowledge of a healthy vein. A healthy vein is one that is round, firm, elastic, and engorged, without hardened, bumpy, or flattened areas. For most adults the first option for IV placement is in the hand or the large veins of the forearm, preferably in the nondominant hand. Appropriate veins would include the metacarpal, cephalic, basilic, and median veins using the most distal portion of the vein first. Areas to avoid when placing the IV include arms that have had previous mastectomy, edema, superior vena cava (SVC) syndrome, cerebrovascular accidents (CVAs), infections, previ-

ous phlebitis, invading neoplasms, hematomas, sites distal to recent venipunctures, and areas of flexion and bony prominence, such as the wrist and antecubital fossa. Knowledge of both the IV solution and medications to be given and their potential side effects on the veins should be included in the assessment. Intravenous solutions with electrolytes and medications can have irritant properties that would require more frequent IV monitoring. Assessing an established IV site requires knowledge about the length of time since the insertion, the condition of the dressing, and the site itself. The site should be without redness, swelling, pain, or discharge. When palpating the vein, it should have the characteristics of a healthy vein without signs of infection or phlebitis.

> ASSESSMENT

1. Review the order for IV therapy: Identify potential side effects from medication actions, and fluid rate. Consult drug reference books or pharmacists for information. **Decreases the risk of medication errors.**
2. Identify potential risk factors for your client's condition that might indicate fluid and electrolyte imbalances. **Allows targeted assessment and monitoring.**
3. Assess for dehydration: sunken eyes, dry skin, mucous membranes, flattened neck veins, vital sign changes, inelastic skin turgor, decreased urine output, behavior changes, and confusion. **Allows intervention to increase fluids and reduce dehydration.**
4. Assess for fluid overload: periorbital edema, distended neck veins, auscultation of crackles or rhonchi in lungs, changes in vital signs, and level of consciousness. **Allows intervention to decrease fluids.**
5. Determine the client's risk for developing complications from IV therapy: very young or very old, heart or renal failure. **Allows the procedure to be modified if needed and promotes targeted**

assessment to look for signs of risk-related problems.

6. Observe IV site for complications, that is, signs of infection, phlebitis, or infiltration: redness, swelling, pallor or warmth at the IV site and surrounding tissue, and bleeding or drainage. **Allows interventions to reduce further damage.**
7. Observe IV site for patency by briefly compressing the IV cannulated vein above the site. Note slowing or momentary cessation of IV rate with a positive blood return. **Provides on-going assessment of current patency status. Allows early detection of changes.**
8. Assess the client's knowledge regarding the need for the IV therapy. **Allows for teaching, including information and education regarding medications, fluid needs, and signs of IV site irritation or phlebitis.**

> DIAGNOSIS

- 1.6.2.1 Impaired Tissue Integrity. Risk for inflammation due to indwelling peripheral IV site
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.2.1.1 Risk for Infection due to indwelling peripheral IV site
- 1.4.1.2.1 Fluid Volume Excess
- 1.4.1.2.2.1 Fluid Volume Deficit

> PLANNING

Expected Outcomes:

1. The client will have a patent IV, without signs of infection or inflammation.
2. The client's fluid and electrolyte imbalances will return to normal and will be maintained.
3. The client will be able to report signs of inflammation or infiltration.

4. The client's IV rate will be administered and maintained per order.
5. The client's IV dressing will remain intact, clean, and dry.

Equipment Needed (see Figure 8-6-2):

- Clean gloves
- Gauze dressing
- Tape
- Nursing documentation record



Estimated time to complete the skill:
5–15 minutes based on the nurse's knowledge of the IV therapy and the client's site assessment

> CLIENT EDUCATION NEEDED:

1. Explain to clients the reason they need IV fluids or medications.
2. Describe to the client the signs of inflammation or infiltration of IV.
3. Advise client to use nurse call light for assistance when getting out of bed.



Figure 8-6-2 Transparent dressing, nonsterile gloves, tape, gauze sponges, and topical iodine ointment

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Review physician's or qualified practitioner's order for IV therapy.
2. Review client's history for medical conditions or allergies.

RATIONALE

1. Ensures accuracy in the administration of IV therapy.
2. Decreases risk of fluid overload and allergic reactions.

continues

3. Review client's IV site record and intake and output record.
4. Wash hands.
5. Obtain client's vital signs.
6. Check IV fluid for correct fluid, additives, rate, and volume at the beginning of your shift (see Figure 8-6-3).



Figure 8-6-3 Check the IV fluid rate, volume, tubing, and additives at the beginning of the shift.

7. Check IV tubing for tight connections every 4 hours.
8. Check gauze IV dressing hourly to be sure it is dry and intact (see Figure 8-6-4).
9. If the gauze is not dry and intact, remove the dressing and observe site for redness, swelling, or drainage.
10. If an occlusive dressing is used, do not remove the dressing when assessing the site.
11. Observe vein track for redness, swelling, warmth, or pain hourly.
12. Document IV site findings in the nursing record or IV flow sheet.
13. Wash hands.

3. Assesses for potential problems with fragile IV sites and fluid balance.
4. Decreases transmission of microorganisms.
5. Assesses for changes in cardiovascular system.
6. Ensures client is receiving correct therapy.



Figure 8-6-4 Check the IV dressing site every hour.

7. Ensures that no fluid leaks from tubing and connections.
8. Ensures there is no sign of infiltration or infection at IV insertion site.
9. Ensures there is no sign of inflammation or infection at IV site.
10. Ensures there is no sign of inflammation or infection at IV site.
11. These are early signs of phlebitis or infiltration.
12. Provides documentation of frequent IV site observation.
13. Decreases transmission of microorganisms.

> EVALUATION

- Nurse should observe the IV site on an hourly basis to avoid complications of phlebitis and infiltration.
- Have the client report signs and symptoms of redness, swelling, and pain to the nurse.

> DOCUMENTATION

IV Flow Sheet

- Name of IV solution with additives
- Hourly rate of fluids
- IV site condition
- Time checked
- Initials/signature of nurse



▼ REAL WORLD ANECDOTES

A nurse enters a client's room to assess the client at the beginning of her shift. The client is sleeping comfortably with the IV site hidden under the bed covers. The nurse hesitates and does not want to wake the client. The nurse uses all of her observational skills: First she checks the IV solution, additives, and rate against the physician's order. Then the nurse reviews the previous nurse's documentation, noting when the IV site was last changed and checked, reviewing for any indication of problems. The previous nurse last checked the IV 2 hours previously and stated the site was clean, dry, and intact, without redness or swelling. The IV rate had slowed down from an hourly rate of 200 ml/hr to about 100 ml/hr over the past hour during shift change. The nurse tries to adjust the rate without success. The nurse gently follows the IV tubing to the client's arm and finds the tubing kinked. When the tubing is straightened, the IV flow returns to the normal rate of 200 ml/hr. The client begins to arouse, and the nurse introduces herself and finishes the IV site inspection, which is intact and unchanged. The client's vital signs are completed and the client is reminded to call for assistance when getting out of bed and to be careful of becoming tangled in the IV tubing when turning in bed.

> CRITICAL THINKING SKILL

Introduction

Look at the example of how a nurse prevents a large infiltration of an IV by thoroughly assessing the site and the surrounding tissue.

Possible Scenario

A dehydrated client came into an outpatient infusion setting to receive IV fluids for nausea and vomiting for the past 36 hours following a chemotherapy treatment. The physician ordered 1 liter of normal saline (NS) to be given over 2 hours and repeated if the client's blood pressure and pulse showed postural changes after the first liter. Compazine 10 mg IV was also ordered for nausea. An IV site was placed on the distal forearm of the client's nondominant left arm on the second attempt. The nurse noted the client's veins to be flat and fragile from previous IV treatments and/or dehydration. The nurse initiated the NS IV drip at 500 ml/hr and went to obtain the Compazine injection to help the client's nausea. The nurse drew up the Compazine in a syringe and then diluted the medication with 10 cc of NS because she knew Compazine to be irritating to veins. The nurse administered the medication slow IV push and asked the client to report any symptoms or burning or pain at the site. The nurse completed the administration of the medication and checked for a blood return in the IV. The blood return was present, however,

not as brisk as when the IV fluids were started. The nurse turned off the IV for a moment to see if a spontaneous blood return would appear after such rapid fluid rate. There was a blood-tinged solution present at the IV site. The nurse left the IV clamped and began to assess the tissue proximally from the site. The IV was in a small vein on the backside of the forearm where there tends to be more fleshy tissue surrounding the veins. The vein did not look swollen; however, the tissue felt cool and had lost color. On closer examination there was a slight thickness to the skin that was not present previously. The IV was discontinued and the nurse asked a colleague to assist her in starting a new IV site because she had already attempted 2 IVs on this client.

Possible Outcome

If the nurse had not persisted in the evaluation of the IV site and had recognized the subtle changes in the client's IV rate and site, the client would likely have received a large infiltration due to the rapid rate the fluids were infusing. This would have eliminated the left arm extremity for possible IV sites on a client who did not have many easily accessible IV sites.

Prevention

The nurse prevented the infiltration by closely monitoring the IV rate and site as well as diluting a medication known to be irritating to the veins.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients have more fragile veins and need extra careful assessment for signs of infiltration.
- Veins in elderly clients tend to “blow” much easier than those of younger clients.
- When you tape an IV on an elderly person, try not to use too much tape. Use the least abrasive tape you have available to reduce the irritation to the skin.
- Be careful when removing tape as you may pull the skin off.



Pediatric Variations:

- Play therapy can be used with a child to help them understand the IV therapy. Play with the child as the child tapes and maintains an IV (without needles) on a doll or teddybear. As you do, explain what is happening in simple terms appropriate for the child's age. Remind the child that this is one of the things nurses do to help sick people get better.



Home Care Variations:

- Educate the caregiver to recognize signs and symptoms of infiltration or phlebitis in any IV therapy. Make sure they know who to call, day and night, for assistance and that they are comfortable calling as soon as symptoms appear.
- Make sure the caregiver can see well enough to recognize subtle skin changes. You may wish to enroll a second caregiver to specifically check the IV site.



Long-Term Care Variations:

- A peripheral IV insertion site is not frequently chosen for long-term IV therapy.
- In clients who must have short-term IV infusions repeated over many months or years, assess for anticipatory anxiety, fear, or body image disturbances. Be especially aware of how these psychosocial factors develop over time secondary to pain, anxiety, and restricted mobility from IV therapy.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not seeing the IV site clearly when assessing for irritation or infiltration.

Ask Yourself:

How do I prevent this error?

Prevention:

Use enough light when assessing the IV site and vein path.

Possible Error:

Not catching an irritation or infiltration early.

Ask Yourself:

How do I prevent this error?

Prevention:

If you question the IV site, increase frequency of assessment.

> NURSING TIPS

- Be organized. Review the orders before examining the client's IV so you do not have to go back and check.
- Bring supplies with you for the assessment: gauze, tape, scissors, gloves.
- As you complete your assessment of the client's IV, incorporate teaching the signs and symptoms to report with their IV.
- Document every hour how the IV site looks and how the IV is functioning.

SKILL 8-7

Changing the IV Solution

Kathryn Lilleby, RN

KEY TERMS

Electrolytes
Intravenous
IV solution

Parenteral
Patent
Venous access



> OVERVIEW OF THE SKILL

An IV solution is a method of replacing fluids or correcting an electrolyte imbalance. Clients who are acutely ill, are NPO after surgery, or have severe burns are examples of those who require IV therapy. Other clients require an IV solution infused slowly to keep the vein open (KVO) so that an IV medication can be administered every 4, 6, or 8 hours or venous access can be maintained.

The type of solution in an IV bag is ordered by a physician or qualified practitioner according to the client's needs. Changes in solution are ordered when the client's condition changes. To maintain sterility of the IV solution, the bag or bottle of solution is changed at least every 24 hours. Some solutions need to be changed more frequently due to the instability of some of the additives.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the IV to be infused, rate of flow, and any medications to be given to **ensure accurate administration.**
2. Review information regarding the solution and nursing implications **in order to administer the solution safely.**
3. Check all additives in the solution and other medications **so that there will be no incompatibilities within the solution.**
4. Assess the patency of the IV **to ensure that the solution will enter the vein and not the surrounding tissue.**
5. Assess the skin at the IV site **so that the solution will not be administered into an inflamed or edematous site, which could cause injury to the tissue.**

6. Assess the client's understanding of the purpose of the IV infusion **so that client teaching can be tailored to his needs.**

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection
- 8.1.1 Knowledge Deficit related to the IV infusion

> PLANNING

Expected Outcomes:

1. The ordered solution will be infused into the client's veins without complications.
2. The IV catheter will remain patent.

3. The client will be able to discuss the purpose of the IV therapy.
4. The solution infused will not harm the client due to additive incompatibilities or additive decomposition.

Equipment Needed (see Figure 8-7-2):

- Disposable gloves
- IV solution in a bag
- Additives as ordered
- IV tubing
- Alcohol swab (if needed)

2. The client should be taught the type of solution and additives he or she is receiving.
3. The client should be instructed to report any leakage of the bag of IV solution.
4. The client should be instructed to report if the solution is at a low level.



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the IV therapy and need to change the solution.



Figure 8-7-2 Gloves, alcohol swab, additive, IV solution, and tubing

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check physician’s or qualified practitioner’s order for the IV solution.
2. Wash hands and put on clean gloves.
3. Check client’s identification bracelet.
4. Prepare new bag with additives as ordered by physician or qualified practitioner.
 - Plan for new bag to be hung at least 1 hour before it is needed.
 - Change solution when an hour’s infusion of solution remains in the IV bag or bottle (see Figure 8-7-3).

1. Ensures accurate administration of the solution.
2. Reduces the number of microorganisms.
3. Ensures IV solution is given to the correct client.
4. Laboratory tests may reveal a need for potassium, insulin, or magnesium.
 - Reduces clot formation in vein caused by empty IV bag.
 - Prevents air from entering tubing and vein from clotting from lack of flow of fluid.



Figure 8-7-3 The IV bag needs to be replaced when an hour’s infusion remains in the bag.

5. Be sure drip chamber is at least half full (see Figure 8-7-4).

Figure 8-7-4 Make sure the drip chamber is at least half full of fluid.

5. Prevents entry of air into IV tubing while bag is being changed.



6. Change IV solution:

- Move roller clamp to stop flow of fluid.
- Remove old IV bag or bottle from IV pole and hang new bag.
- Spike new bag or bottle with tubing (see Figure 8-7-5).
- Reestablish prescribed flow rate.



Figure 8-7-5 Spike the new bag with the sharp end of the tubing.

- 6.

- Prevents fluid in drip chamber from emptying while changing solutions.
- Prepares equipment.
- Maintains sterility of solution.
- Prevents clotting of vein.



Figure 8-7-6 If there is a large amount of air in the tubing, insert a syringe into a port between the air and the client.

7. Check for air in tubing.

- If air bubbles are present, close the roller clamp. While stretching the tubing, flick the tubing with the finger and watch the bubbles rise to the drip chamber.
- If a large amount of air is in the tubing, insert a needle with an empty syringe into a port below the air (see Figure 8-7-6) and allow the air to enter the syringe as it flows to the client (see Figure 8-7-7).

7. Reduces risk of air embolus.

8. Empty remaining fluid from old IV if needed (see Figure 8-7-8).

8. Disposes of excess fluid. Reduces risk of spilling large amounts of fluid in waste can.



Figure 8-7-7 Allow the air to flow into the syringe.



Figure 8-7-8 Drain the remaining fluid from the old IV bag.

9. Remove gloves and dispose of all used materials.
10. Apply a label with date, time, and type of solution.
11. Wash hands.

9. Reduces transmission of microorganisms.
10. Allows for planning of next change.
11. Reduces transmission of microorganisms.

> EVALUATION

- The ordered solution infused into the client's vein without complications.
- The IV catheter remained patent.
- The client is able to discuss the purpose of the IV therapy.
- The solution infused did not harm the client due to additive incompatibilities or additive decomposition.

> DOCUMENTATION

Parenteral Flow Sheet

- Date and time new IV solution was started
- Initials of nurse changing solution

Intake and Output Record

- Amount of fluid infused from old solution
- Amount of new solution hung

Nurses' Notes

- Any unusual findings or client teaching



▼ REAL WORLD ANECDOTES

Paul, a recently diagnosed diabetic, had been admitted to a medical unit with hyperglycemia. His blood glucose was very labile and his electrolytes were also out of control. His physician ordered IV insulin to control Paul's blood glucose level. Paul's blood glucose was checked hourly, and his IV insulin rate was adjusted according to the results. Because the first bottle of IV solution was being used quickly, the nurse decided to mix the next IV insulin solution in a 500-cc bag of fluid instead of a 250-cc bag of fluid to lengthen the time between IV bag changes. While mixing the new bag of solution, however, the nurse failed to double the amount of insulin since the amount of diluent was doubled. As a result, Paul's blood sugar once again soared out of control. Because the nurse did not recognize her error, Paul's physician was at a loss to explain why the insulin was no longer controlling Paul's blood sugar levels. The head nurse, however, noted that Paul's blood sugar levels had gone out of control at about the same time the new solution had been hung. The head nurse made up a new bag of solution and hung it herself. Paul's blood glucose levels once again were controlled and the head nurse had a long discussion with Paul's nurse.

> CRITICAL THINKING SKILL

Introduction

Most IV solutions are commercially made or prepared by the pharmacist. It is the nurse's responsibility to hang them at the correct time.

Possible Scenario

On a busy surgical unit, the nurse had several postoperative clients to admit. One client, a young man who did not speak English, took longer than usual to assess and get settled. When she returned to the first client, she noticed that the IV bag was empty and the fluid was halfway down the tubing. There was a small amount of blood at the hub of the IV needle.

Possible Outcome

As the nurse spiked the new bag she had previously brought into the room and hung it from the IV pole, she watched for the fluid to start to flow through the tubing. When this did not happen right away, she

checked the client's IV insertion site. As she was inspecting the IV insertion site, she did not notice that the IV had started to infuse. The tubing was still half full of air. The nurse glanced up in time to see the air infusing into her client. Unsure of what to do, she removed the IV bag from the pole and held it below the level of the IV insertion site. Unfortunately, by the time she had accomplished this, the air had already infused into the client. Luckily there was not enough air in the tubing to cause an air embolism and the client was fine.

Prevention

As the nurse was inspecting the IV site, she noticed the air start to infuse through the venous catheter. She immediately pinched off the IV tubing and closed the roller clamp to prevent any further air from infusing into the client. She then used a syringe inserted into the lowest injection port to aspirate the air in the tubing. The nurse was reminded to always keep the roller clamp closed when the patency of an IV site is in question.

▼ VARIATIONS



Geriatric Variations:

- Pay special attention to assessing the IV insertion site. A good time for that extra check is when you are changing the solution.



Pediatric Variations:

- Intravenous pump alarms can cause both anxiety and fear in younger and older children. Changing the IV solution is a good opportunity to teach children about the alarms. Remind that the alarm going off is not an emergency and does not mean that they are in danger or becoming sicker.



Home Care Variations:

- An approved receptacle needs to be provided for used IV bags and tubing.
- The client or caregiver must be taught how to mix the IV solution if additives are required.
- The client or caregiver must be taught how to assess the new IV solution for breaks in sterility or contaminants.



Long-Term Care Variations:

- Monitor the client's laboratory results, so that adjustments to the IV solution can be made if needed.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The IV solution is not ready when the nurse needs it for a client.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

The nurse should anticipate when she will need the new IV solution and be sure it is ordered from the pharmacy. If this error does occur, slow the IV drip rate so that the IV bag will not run dry, following agency protocol. Obtain the new bag when ready and proceed to hang the IV solution.

> NURSING TIPS

- Anticipate the need for the next bag of IV solution to avoid the risk of an IV clotting due to the solution running out.
- Keep in mind the client's laboratory results and need for fluid to be sure the correct solution is given.

SKILL 8-8

Discontinuing the IV and Changing to a Heparin Lock

Kathryn Lilleby, RN

KEY TERMS

Emergency medications
Heparin flush
Heparin lock

Intravenous IV push
Saline flush



> OVERVIEW OF THE SKILL

A heparin lock, also known as an intermittent infusion device, is a small plastic device with a resealing rubber entry that is screwed onto the hub of the existing IV catheter or butterfly needle tubing. It is used to “cap” the IV to maintain patent access to the vein without the necessity of running IV fluids into the body. Heparin locks are regularly flushed with a heparin solution or normal saline (depending on hospital policy) to prevent clotting. They come in both needle and needleless styles, depending on the system used in the institution.

Heparin locks are generally placed in two circumstances. First, when the client’s need for continuous infusion of fluid or frequent medication changes, the IV

line can be discontinued and plugged with a heparin lock without losing access to the vein. Second, heparin lock IV access sites are placed to provide access to the vein in situations where the client requires IV medications, but does not need continuous fluid infusions.

Heparin locks are used to deliver IV medications into the vein. Heparin locks can be quickly reattached to IV tubing in emergency situations when IV solutions or larger volumes of medication are required. Finally, heparin locks are kept for emergency cases when quick administration of medications into the vein can be life saving. Changing to a heparin lock, when possible, helps improve client mobility, as they can walk and move without the IV stand, pump, and tubing.

> ASSESSMENT

1. Check the physician’s or qualified practitioner’s order for the discontinuation of the IV or the insertion of the heparin lock to ensure appropriate placement of the heparin lock.
2. For existing IVs, assess the patency of the IV to ensure that the heparin will enter the vein.
3. For existing IVs, assess the skin at the IV site so that the heparin will not be administered into an inflamed or edematous site, which could cause injury to the tissue.
4. Check the client’s drug allergy history since an allergic reaction could occur rapidly and be fatal.

5. Assess the client’s understanding of the purpose of the heparin lock so that client teaching can be tailored to his needs.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit related to the use and care of a heparin lock

> **PLANNING**

Expected Outcomes:

1. The IV is discontinued and heparin lock placed without complications.
2. The IV site remains patent and free of swelling and inflammation.
3. The IV will be changed to a heparin lock with a minimum of trauma and discomfort to the client.
4. For new sites, the IV needle is inserted into the vein and the heparin lock is attached with a minimum of trauma and discomfort to the client.

Equipment Needed:

- Disposable gloves
- Syringe, 3–5 ml
- Sterile needles, 25 gauge
- Antiseptic swab
- Syringe with heparin flush solution (check agency policy for heparin solution use)
- Syringe with saline flush solution
- Heparin lock (see Figure 8-8-2)
- Transparent dressing, if required



...Estimated time to complete the skill:

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for maintaining the IV patent with a heparin lock.
2. The client should be taught to report any changes at the IV site, bleeding, or displacement of heparin lock.



Figure 8-8-2 Heparin lock

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Check physician's or qualified practitioner's order to discontinue IV and to insert a heparin lock. 2. Wash hands and put on clean gloves. 3. Check client's identification bracelet. 4. Explain procedure and reason for discontinuing IV to client. 5. Prepare supplies at bedside: <ul style="list-style-type: none"> • Syringe with saline • Syringe with heparin • Heparin lock 6. If inserting a new heparin lock: Prime the extension tubing with saline and place the heparin lock on it. Follow the procedures for starting an IV, including assessing and preparing the site, inserting the over-the-needle-catheter (ONC) (see Figure 8-8-3) or butterfly | <ol style="list-style-type: none"> 1. Ensures accurate placement of heparin lock. 2. Reduces the number of microorganisms. 3. Ensures correct procedure is performed for the client. 4. Information decreases anxiety. 5. Ensures smooth procedure. 6. Priming the extension tubing prevents air from being forced into the vein. |
|--|---|



Figure 8-8-3 Insert an over-the-needle catheter.



Figure 8-8-4 Cover the site with a transparent dressing.

needle, and obtaining a blood return. Do not attach the needle to the IV tubing. Instead, attach the needle to the extension tubing. Dress the site (see Figure 8-8-4).

7. If discontinuing an IV and converting to a heparin lock: Stop IV infusion.
 - For IV tubing, roll clamp to close IV tubing.
 - For infusion pump, turn switch to off.
8. Place heparin lock:
 - Open sterile package with heparin lock.
 - For existing IV, loosen IV tubing and remove.
 - Screw heparin lock into hub of tubing (see Figure 8-8-5).



Figure 8-8-5 Screw the heparin lock onto the hub of the extension tubing.

7. Stops the flow of the fluid in the IV tubing.
8. Places the heparin lock.



Figure 8-8-6 Inject saline slowly into the lock and extension tubing.

9. Check for patency of IV:
 - Clean heparin lock with antiseptic solution.
 - Insert saline syringe with 25-gauge needle into center of diaphragm.
 - Pull back gently on syringe and watch for blood return.
 - Inject saline slowly into lock (see Figure 8-8-6).
10. Keep lock patent with heparin or normal saline. Every 8 hours:
 - Clean the rubber diaphragm with an antiseptic swab.

9. Ensures the IV is patent so that the heparin lock will function. Flushing with saline clears the needle and the lock.
10. Ensures patency of heparin lock.

- Insert the syringe with heparin or saline into the diaphragm.
- Inject heparin or saline slowly into lock (see Figure 8-8-7).



Figure 8-8-7 Maintain the heparin lock by injecting saline slowly into the lock, every 8 hours.



Figure 8-8-8 Assess the site for leakage, irritation, inflammation, or infection. Clean up and dispose of all materials.

11. Remove the syringe from the diaphragm and swab it with an antiseptic swab.
12. Assess the site for any signs of leakage, irritation, or infiltration (see Figure 8-8-8).
13. Remove gloves and dispose with all used materials.
14. Wash hands.

11. Reduces transmission of microorganisms.
12. Detects problems with the site that need additional assessment and intervention.
13. Reduces transmission of microorganisms.
14. Reduces transmission of microorganisms.

> EVALUATION

- The IV is discontinued and the heparin lock placed without complications.
- The IV site remains patent and free of swelling and inflammation.
- The IV was changed to a heparin lock with a minimum of trauma and discomfort to the client.

> DOCUMENTATION

Nurses' Notes

- Date and time IV was discontinued and heparin lock was placed
- Any unusual findings at insertion site

Medication Record/IV Flow Sheet

- Date and time IV was discontinued

MAR Medication

- Chart heparin flush infused every time heparin lock is flushed.

Intake and Output Record

- Record the amount of IV solution left in the bag when the IV was changed.



▼ REAL WORLD ANECDOTES

Paul was transferred from the coronary care unit to a medical floor with telemetry monitoring of his heart after having a myocardial infarction. He had recovered well and had been off a lidocaine drip for cardiac arrhythmias for 48 hours. His doctor wrote in the chart that his IV fluids could be discontinued and a heparin lock placed for emergency use. During the second night Paul was being monitored on telemetry; the monitor technician noted that Paul's rhythm was shifting between sinus rhythm and ventricular tachycardia. The monitor technician notified Paul's nurse and Paul was

▼ REAL WORLD ANECDOTES *continued*

given a bolus of lidocaine via heparin lock. Paul's doctor was notified and Paul was restarted on a lidocaine infusion and returned to coronary care. If Paul had not had the emergency venous access of the heparin lock, precious minutes might have been lost trying to establish access while Paul's heart was throbbing in a life-threatening rhythm.

> CRITICAL THINKING SKILL

Introduction

A heparin lock needs to be checked for patency just as much as an IV catheter that has fluid infusing. If it is not patent, it has no value to the client.

Possible Scenario

A client has had a heparin lock for 24 hours after his IV fluids were discontinued. The routine flushing of the heparin lock has proven it to be patent; however, the last time it was flushed, the nurse felt some resistance. When she pulled back on the syringe to check for blood, there was only a small amount of pinkish fluid that returned.

Possible Outcome

The nurse reasoned that the heparin lock flushed without obvious signs of infiltration and the client was not getting any medication via his heparin lock. She decided to check the heparin lock again later and perhaps restart it then. As her shift ended and she was giving report to the oncoming shift, she remembered about the heparin lock.

She reported her concerns to the oncoming nurse. The nurse who assumed this client's care assessed the heparin lock prior to flushing it and noticed that the entire insertion site was red and swollen. The site was hot to the touch and the client was complaining of pain at the site. The nurse changed the heparin lock site and placed a warm, moist compress on the reddened area. She noted the inflamed area in her narrative notes and reported it to the next shift for continued observation.

The nurse realized that the heparin lock was not fully patent and would not function well if a medication needed to be administered. She checked with the physician, who advised her to start a new IV since the client still needed a patent venous access.

Prevention

If the nurse to first question the patency of the heparin lock had dealt with the problem right away, the client would have been saved unneeded pain. The nurse must always check the patency of IV access when a heparin lock is used or it has no value for IV administration of medications or IV fluids.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may need special skin care and tape if a heparin lock is used for an extended time.
- The veins of elderly clients may be more fragile and need more frequent changes of an IV with a heparin lock.



Pediatric Variations:

- Giving a medication to a child through an established IV with a heparin lock may be less traumatic than an IM or subcutaneous injection.
- Special precautions need to be taken to maintain a heparin lock intact in very young clients.



Home Care Variations:

- The client or caregiver must be taught how to use and maintain a heparin lock.
- Equipment for disposing of IV materials needs to be established.



Long-Term Care Variations:

- Heparin locks are not usually appropriate for long-term IV access. A permanent central line is often more appropriate in these circumstances.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

When flushing a heparin lock, there is swelling around the needle.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to assess the IV for patency before flushing the heparin lock. If swelling does occur, stop pushing the heparin lock. Pull back on the plunger to check for a blood return. If there is none, remove the needle and heparin lock and start an IV in another site. When sure the needle is in the vein, attach a new heparin lock and flush with heparin.

> NURSING TIPS

- Sometimes no blood will return from a heparin lock even though it is patent. Removing the screw-on cap, using sterile technique, may result in a blood return if the heparin lock is patent. If in doubt, restart the heparin lock at a new site.
- Be sure the IV site is visible and free of tape or dressing while checking for patency.
- Remember, a heparin flush must inject enough heparinized saline to fill the entire set from the injection port to the needle tip.
- Replace the heparinized solution each time the heparin lock is used.
- If the drug to be administered through the heparin lock is incompatible with heparin, flush the entire heparin lock set with normal saline before and after the medication is administered; then flush with heparin. Some institutions no longer flush heparin locks with a heparin solution. Some studies suggest that flushing with normal saline alone will maintain the patency of a heparin lock.

SKILL 8-9

Administering a Blood Transfusion

Jeane Erickson, RN, MSN, AOCN, and Kathryn Lilleby, RN

KEY TERMS

Blood pump	Plasma
Blood type	Platelets
Blood warmer	Transfusion
Hemolysis	Transfusion reaction
Normal saline	Whole blood
Packed red blood cells	Y-tubing



> OVERVIEW OF THE SKILL

A blood transfusion is the IV administration of a component of blood or whole blood. Red blood cells are given as whole blood or packed red blood cells; they may be modified by leukocyte reducing them to prevent antibody formation or irradiating them to prevent graft-versus-host disease in immunocompromised clients. Components used for clients with alterations in coagulation are fresh frozen plasma (FFP), cryoprecipitate, factors VIII and IX concentrates, and platelets. Components to enhance the immune system are granulocytes and immune serum globulin (IgG). Colloid components to treat hypoproteinemia or hypovolemia are plasma protein fraction and albumin. The most commonly used blood components are packed red blood cells, platelets, or FFP.

A client may require a transfusion for the following reasons: to increase blood volume after surgery, trauma, or hemorrhage; to increase the number of red blood cells in a client with severe chronic anemia; to provide platelets to clients with low platelet counts due to treatment with chemotherapy; to provide clotting factors in plasma for patients with hemophilia or disseminated intravascular coagulopathy (DIC); or to replace plasma proteins such as albumin.

The nurse should know why the physician or qualified practitioner has ordered a specific blood product to be given and the policies and procedures for giving that product. The nurse must know how to give the blood product and what adverse reactions to monitor for in the client.

> ASSESSMENT

1. Assess the client for the indication of the blood product to be given, that is, low hematocrit or platelet count. This will enable more specific evaluation of response to the transfusion.
2. Verify the physician's or qualified practitioner's order for the type of blood product to be given. Only he or she may order blood products due to legal regulations.
3. Review the client's transfusion history, especially any reactions or pretransfusion medications to be given. If prior reaction has occurred, premedications can be given to prevent a subsequent reaction.
4. Review the baseline vital signs in the client's medical record in order to compare with vital signs during the transfusion. Changes in baseline may indicate a transfusion reaction.

5. Assess the type, integrity, and patency of the venous access in place so that the transfusion will be completed without infiltration of the IV.
6. Verify that a large-bore catheter (18- or 19-gauge) is to be used. This prevents hemolysis since red blood cells are large and will not flow through a small-bore needle.
7. Review hospital policy and procedure for the administration of blood products. Each hospital has its own policies to ensure safe administration of blood products.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.4.1.2.1 Potential for Fluid Volume Excess related to volume of transfused blood product
- 1.5.1.1 Impaired Gas Exchange related to anemia
- 1.6.1 Risk for Injury: Bleeding related to bleeding disorders
- 8.1.1 Knowledge Deficit related to transfusion procedures
- 9.1.1 Pain related to transfusion reaction

> PLANNING

Expected Outcomes:

1. The client receives the blood component transfusion without any adverse reactions or has adverse reactions successfully managed.
2. The client demonstrates desired benefit from transfusion as evidenced by relief of symptoms or improvement in specific hematologic values.
3. The client describes the purpose and procedure for transfusion of a blood component.
4. The client describes the possible complications of a blood transfusion.

Equipment Needed (see Figure 8-9-2):

- Blood administration set and filter
- Intravenous solution of 0.9% sodium chloride (normal saline)
- Disposable gloves
- Infusion pump if compatible with the specific blood product
- Tape
- Leukocyte-depleting filter, if ordered

- Pressure bag, if needed
- Blood warmer, if needed



Estimated time to complete the skill:

It will take approximately 15 minutes to initiate the infusion, 30 minutes to 2 hours to monitor the client during the infusion, and 10 minutes to discontinue the infusion and complete documentation. Infusion rates vary depending on the blood component to be transfused (see Table 8-9-1).

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the blood transfusion, the anticipated length of the transfusion, and the need for frequent vital sign monitoring while the transfusion is running.
2. The client should be instructed to notify the nurse if they experience any signs of reaction such as itching, swelling, dizziness, dyspnea, chest pain, or infiltration of the IV.
3. The client and caregiver should be taught about the signs and symptoms of long-term reactions, such as delayed hemolysis and the need to report them to the physician or qualified practitioner immediately.



Figure 8-9-2 Blood and 0.9% sodium chloride

Table 8-9-1 Blood Component Infusion Rates

PRODUCT	INFUSION RATE
Red blood cells	1 unit over 2–3 hours (< 4 hours)
Platelets	30–60 min or more slowly (< 4 hours)
Fresh frozen plasma	200 ml/hr or more slowly
Cryoprecipitate	1–2 ml/min

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Verify the physician's or qualified practitioner's order for the transfusion. 2. If a venipuncture is necessary, refer to Skill 8-1. 3. Explain procedure to the client. 4. Review side effects (dyspnea, chills, headache, chest pain, itching) with client and ask them to report to the nurse. 5. Have the client sign consent forms. 6. Obtain baseline vital signs. 7. Obtain the blood product from the blood bank within 30 minutes of initiation. 8. Verify and record the blood product and identify the client with another nurse (see Figure 8-9-3): <ul style="list-style-type: none"> • Client's name, blood group, Rh type • Cross-match compatibility • Donor blood group and Rh type • Unit and hospital number • Expiration date and time on blood bag • Type of blood product compared with physician's or qualified practitioner's order • Presence of clots in blood | <ol style="list-style-type: none"> 1. Blood must be ordered by a physician or qualified practitioner. 2. Ensures a patent and adequate IV for infusion of blood. 3. Ensures that client understands procedure and decreases anxiety. 4. Prompt reporting of a side effect will lead to earlier discontinuation of transfusion and minimize the reaction. 5. Some hospitals or agencies require the client to sign a consent form. 6. Allows detection of a reaction by any change in vital signs during the transfusion. 7. Prevents bacterial growth and destruction of red blood cells. 8. Strict verification procedures will reduce the risk of administering blood products to the wrong client. If there is an error during this procedure, notify the blood bank and do not administer the product. |
|--|--|

**Figure 8-9-3** Verify the blood product with another nurse.*continues*

9. Instruct client to empty the bladder.
10. Wash hands and put on gloves.
11. Open blood administration kit and move roller clamps to “off” position.
12. For Y-tubing set:
 - Spike the normal saline bag and open the roller clamp on the Y-tubing connected to the bag and the roller clamp on the unused inlet tube until tubing from the normal saline bag is filled. Close clamp on unused tubing.
 - Squeeze sides of drip chamber and allow filter to partially fill (see Figure 8-9-4).
 - Open lower roller clamp and allow tubing to fill with normal saline to the hub.
 - Close lower clamp.
 - Invert blood bag once or twice. Spike blood bag, open clamps on inlet tube to allow blood to cover the filter completely (see Figure 8-9-5).
 - Close lower clamp.
9. A urine specimen after initiation of the transfusion will be needed if a transfusion reaction occurs.
10. Reduces risk of transmission of human immunodeficiency virus (HIV), hepatitis, or blood-borne bacteria.
11. Closed roller clamps prevents accidental spilling of blood.
12.
 - The Y-tubing allows the nurse to switch from infusing normal saline to blood. This is especially helpful when multiple transfusions are given. Follow institutional guidelines for the number of units that can be given before tubing needs to be changed. Dextrose solutions are not used with blood transfusions since they can clot the donor blood.
 - A correctly filled drip chamber enables an accurate drip count.
 - Removes all air from tubing system.
 - Prevents waste of IV fluid.
 - Equal distribution of cells prevents clumping, which can lead to clotting of cells. Fragile blood cells may be damaged if they drop on an uncovered filter.
 - Prevents blood from flowing until tubing is attached to venous catheter.



Figure 8-9-4 Close the roller clamp on the administration set and priming drip chamber.



Figure 8-9-5 Close the saline roller clamp and open the blood roller clamp.

13. For single-tubing set:
 - Spike blood unit.
 - Squeeze drip chamber and allow the filter to fill with blood (see Figure 8-9-6).
13.
 - Attaches tubing to blood unit.
 - A correctly filled drip chamber enables an accurate drip count.



Figure 8-9-6 Allow the filter to fill with blood.

- Open roller clamp and allow tubing to fill with blood to the hub.
 - Prime another IV tubing with normal saline and piggyback it to the blood administration set with a needle and secure all connections with tape.
- 14.** Attach tubing to venous catheter using sterile precautions and open lower clamp.
 - 15.** Infuse the blood at a rate of 2–5 ml/min according to the physician’s or qualified practitioner’s order.
 - 16.** Remain with client for first 15–30 minutes, monitoring vital signs every 5 minutes for 15 minutes, then every 15 minutes for 1 hour, then hourly until 1 hour after the infusion is completed.
 - 17.** After blood has infused, allow the tubing to clear with normal saline.
 - 18.** Appropriately dispose of bag, tubing, and gloves. Wash hands.
 - 19.** Document the procedure.
- Prevents air from being forced into the vein.
 - The blood product should not be piggybacked into the normal saline line to avoid forcing blood cells through both a needle and a venous catheter.
- 14.** Allows the blood product to be infused into the client’s vein.
 - 15.** Packed red blood cells usually run over 1½–2 hours; whole blood runs over 2–3 hours.
 - 16.** If a reaction occurs, it generally happens during the first 15–30 minutes. Changes in vital signs can warn of a transfusion reaction.
 - 17.** The client will receive all of the blood that is left in the tubing.
 - 18.** Reduces transmission of microorganisms.
 - 19.** Ensures accurate records.

> EVALUATION

- Observe for signs of transfusion reaction.
- Observe client and laboratory values to determine response to transfusion.

> DOCUMENTATION

- Record patient name, ID number, blood component and component number, names of individuals verifying blood component, name of individual starting

and ending transfusion, start and end times, volume transfused, and reaction, if any.

Intake and Output Record

- Record volume of blood component transfused and urine output, if appropriate.

Intravenous Fluid Record

- Record date, time, type and amount of the blood product administered.

Nurses' Notes

- Document the condition of the venous access site and patency of the IV.
- Describe client's response to transfusion, including change in laboratory values and improvement of symptoms.

Medication Administration Record

- Record additional medications given to prevent or manage transfusion complications; for example, acetaminophen, diphenhydramine, furosemide.
- Document diagnosis and treatment of any transfusion reactions.



▼ REAL WORLD ANECDOTES

Scenario 1

One day after abdominal surgery, Marge's hematocrit was 26%, so her physician ordered two units of packed red blood cells (RBCs). When the nurse noted the order and called the blood bank, she was told that only one unit was available of the type ordered due to a multivictim accident that had just occurred. The nurse knew that 26% was a low hematocrit but not life threatening since the client showed no signs of active bleeding. She started the unit and then called the physician to report that the second unit was not available.

Scenario 2

Mr. Dobbs is a 70-year-old male currently receiving treatment for acute myelogenous leukemia (AML). He also has a history of congestive heart failure (CHF). He has symptoms of anemia, such as fatigue and mild dyspnea on exertion. The nurse recently noticed the onset of bilateral pedal edema, although his exam was negative for other signs of CHF, such as pulmonary rales. Today, Mr. Dobbs's laboratory values showed a hematocrit of 27%, and he reported more shortness of breath after taking a shower. The physician prescribed a transfusion of two units of packed RBCs over a total of 4 hours.

The nurse was aware of the potential for fluid overload in this elderly gentleman with a history of CHF. She contacted the physician and suggested a slower transfusion rate of 3 hours per unit. The nurse and physician also decided to administer furosemide 20 mg IV between the two units of packed RBCs to prevent fluid overload.

> CRITICAL THINKING SKILL

Introduction

Some clients require more than one unit of packed RBCs and more than one type of blood component.

Possible Scenario

Two units of packed RBCs, one unit of single donor platelets, and four units of FFP are ordered for an immunocompromised client who is actively bleeding. The client's hematocrit is 24%, and he is bleeding from his nose and upper gastrointestinal tract. Which blood product should be given first and in what order since all

of the products ordered need to be given so that the bleeding will slow down or stop and the laboratory values will return to normal.

Prevention

The nurse will need to plan the schedule of the blood products in order of importance and according to the physician's orders. Since the platelets and the FFP take a shorter time to infuse and will help correct the coagulation problem, it may be beneficial to give them first. The packed RBCs each take 2 hours to infuse so they can be given later.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may require longer infusion time due to decreased cardiac function in order to avoid fluid overload.*
- *Geriatric clients with a history of heart disease or hypertension may have an increased risk of fluid overload related to the transfusion.*

▼ VARIATIONS *continued*

- *Elderly clients may have more fragile veins. Venous access may be more difficult, and these clients may be at a higher risk for IV infiltration.*



Pediatric Variations:

- *The first 50 ml of blood should be given slowly over 30 minutes. If no reaction occurs, the rate can be increased.*
- *A newborn's blood is cross matched with the mother's serum since it may have more antibodies than the newborn's. This will make an incompatibility more apparent.*
- *Pediatric infusion doses and rates are calculated by body weight. Volume of blood products may be divided into several units containing small volumes.*



Home Care Variations:

- *The blood component should be transported in an insulated container with ice according to the blood bank guidelines. The transfusion should be started as quickly as possible after leaving the blood bank.*
- *If the nurse is alone, she should be meticulous in cross-checking the unit of blood with the client to ensure correct administration of the product.*
- *The nurse must plan to have trained personnel available to monitor the client during the entire transfusion and for 1 hour after the transfusion in order to assess for a transfusion reaction.*
- *Assessing a client's eligibility to have a transfusion administered at home include no previous transfusion reactions, no angina or CHF, and being alert and oriented in order to report any symptoms of a reaction.*
- *Policies of the home health agency regarding administration of blood products in the home include preparation of the nurse, client eligibility, location of client in relation to the blood bank, blood transport and storage, disposal of biohazardous materials, and emergency procedures.*
- *Blood component transfusions may be carried out in a home setting. Nurses in this setting should be knowledgeable and prepared to treat acute transfusion reactions with standing orders to avoid the delay of contacting a physician or qualified practitioner or transporting the client for treatment.*



Long-Term Care Variations:

- *Personnel working in long-term care settings where blood is not frequently administered may need to review blood transfusion policies and procedures prior to the transfusion.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The IV infiltrates halfway through the transfusion.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the gauge of the IV and its patency before starting the transfusion. If this error does occur, stop the transfusion. Start a new IV in a different extremity if possible. Restart the transfusion, observing the client for a transfusion reaction.

Possible Error:

Blood backs up into the bag of normal saline.

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Clamp the normal saline bag before spiking the blood bag. If this error does occur, clamp the tubing to the normal saline bag and the blood bag. Obtain a new bag of normal saline. Remove the normal saline bag with the blood in it, and spike the new bag of normal saline. Open the clamp to allow the blood to flow out of the tubing and the normal saline to flow.

> NURSING TIPS

- Have all equipment prepared before ordering the blood from the blood bank.
- Use a blood warmer if multiple units of blood are to be given.
- Use a pressure bag to increase the flow rate if a client is bleeding.
- Maintain another IV line if other fluids or medications are needed during the transfusion.
- Rotate the bag to prevent clumping of cells.
- A transfusion of packed RBCs requires planning and scheduling. A current type and cross specimen must be processed, the physician or qualified practitioner must obtain informed consent, IV access must be established, and premedication must be administered, if appropriate. Unless emergent, a planning process of several hours should be anticipated.
- Medications should never be added to a blood product. If the client is receiving multiple IV medications on a strict schedule (e.g., antibiotics), consider starting a second IV line for a lengthy blood transfusion.
- Blood products should not be transfused simultaneously or immediately preceding or following medications also capable of causing allergic-type reactions. Distinguishing the etiology of the reaction could be difficult.
- Electromechanical infusion devices should be used for blood products only if they have been tested and approved for blood component infusion by the manufacturer.
- External pressure infusion cuffs may help speed a slow transfusion drip. However, do not exceed 300 torr when pressure transfusing an RBC product. Check with the manufacturer of specific venous access devices to determine how much pressure can be applied to a transfusion through the device.
- To avoid bacterial growth, do not leave a blood filter hanging for more than 4 hours.

SKILL 8-10

Assessing and Responding to Transfusion Reactions

Kathryn Lilleby, RN

KEY TERMS

ABO type
Anaphylaxis
Compatibility
Cross-match
Disseminated intravascular coagulation

Nonhemolytic reaction
Plasma
Platelets
Reaction
Septic shock
Transfusion



> OVERVIEW OF THE SKILL

A transfusion reaction can be caused by blood that is incompatible, blood that is contaminated, or a blood component that is infused too rapidly. It can also be caused by an allergic sensitivity to the leukocytes, the platelets, or the plasma protein components of the blood or the potassium or citrate preservative in the blood.

The types of reactions range from symptoms that appear within the first 15 minutes, such as fever, chills, and skin rash, that could progress to hypotension and shock to a delayed reaction that may occur several days or weeks later.

The first type of transfusion reaction is an acute hemolytic reaction due to an ABO incompatibility in which an antigen-antibody of the recipient responds to blood of the donor that has a different antigen. This may be related to the client's ABO blood type or the Rh factor. For example, people with type A blood cells produce anti-B antibodies in their plasma, so administering a unit of type B blood would cause the body to reject it with their anti-B antibodies. In the same manner, the Rh factor is an antigenic substance in the red blood cells (RBCs) of most people; thus they are Rh positive. If Rh-positive blood is given to an Rh-negative person, the Rh-negative antibodies will hemolyze or destroy the transfused RBCs. Intravascular hemolysis releases hemoglobin leading to hemoglobinemia or hemoglobin-

uria. The RBCs that are destroyed can damage the kidneys and may progress to renal failure. The coagulation system is also stimulated so the clotting cascade causes small clots to form in the circulating blood, which sets disseminated intravascular coagulation (DIC) in motion. A hemolytic reaction can be delayed for weeks or months and is still due to antibodies reacting with their corresponding antigens other than the ABO system.

The second type of transfusion reaction is a febrile nonhemolytic reaction caused by the recipient's antibodies reacting with the transfused white blood cells, platelets, or plasma proteins.

The third type is an allergic reaction caused by a reaction to one or more donor plasma proteins.

The fourth type of reaction is a reaction to citrate. Citrate is an anticoagulant used as a preservative in blood products. When combined with serum calcium in the recipient, it produces hypocalcemia, which causes tingling in the mild reaction to muscle spasms in a severe reaction.

The fifth type is rare, an anaphylactic reaction. It may occur when immunoglobulin A (IgA) proteins are given to an IgA-deficient recipient who has developed IgA antibodies.

Other reactions can be septic shock caused by a blood product that is contaminated by bacteria or an endotoxin. The risk of acquiring a blood-borne

infection is minimal since all blood products are tested by serology before being distributed for use. Infections that can be transmitted through blood products and not produce symptoms until weeks later are malaria, hepatitis, and human immunodeficiency virus (HIV). Hepatitis, for instance, has an incubation period of 1 to 6 months.

> ASSESSMENT

1. Assess for symptoms of an acute hemolytic reaction, including fever with or without chills, chest and lumbar pain, hypotension, dyspnea, oliguria or anuria, and abnormal bleeding. Early detection allows for implementation of appropriate treatments.
2. Assess for a nonhemolytic reaction, which includes symptoms of fever, chills, flushing, headache, muscle pain, anxiety. Early detection allows for implementation of appropriate treatments.
3. Assess for an allergic reaction: flushing, hives, or itching or an anaphylactic reaction in which symptoms of respiratory distress, chest pain, hypotension, abdominal cramps, vomiting and diarrhea, shock, loss of consciousness, or cardiopulmonary arrest will be present. Early detection allows for implementation of appropriate treatments.
4. Assess for a citrate reaction, including circumoral tingling, hypotension, nausea, vomiting, or cardiac dysrhythmias. Early detection allows for implementation of appropriate treatments.
5. Assess for sepsis, which includes symptoms of chills, fever, vomiting, diarrhea, hypotension, and shock. Early detection allows for implementation of appropriate treatments.
6. Assess for circulatory overload, noting dyspnea, cyanosis, severe headache, elevated systolic blood pressure, tachycardia, jugular vein distention, crackles, elevated central venous pressure. Assess for hypothermia and cardiac dysrhythmias due to cold blood cooling the right ventricle and affecting the conduction system. Early detection allows for implementation of appropriate treatments.
7. Assess for GVHD in the immunocompromised client who may present with fever, skin rash, diarrhea, bone marrow suppression, and liver dysfunction. Continued assessment is important to detect reactions and begin appropriate treatment.

Graft-versus-host disease (GVHD) occurs in an immunocompromised recipient when donor lymphocytes recognize the recipient's cells as foreign and attack them. Blood products for these clients are usually irradiated to kill the lymphocytes and prevent this reaction.

8. Assess for a delayed hemolytic reaction: *continued anemia despite receiving a transfusion or hepatitis that may present weeks after the transfusion with weakness, fatigue, nausea, and jaundice.* Continued assessment is important to detect reactions and begin appropriate treatment.

> DIAGNOSIS

- 1.4.2.1 Decreased Cardiac Output
 - 1.4.1.2.1 Fluid Volume Excess
- 1.2.1.1 Risk for Infection
- 1.2.2.2 Hypothermia
- 9.1.1 Pain
- 1.3.1.2 Diarrhea
- 1.5.1.1 Impaired Gas Exchange
- 1.6.2.1.2.1 Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client will have a normal temperature and no chills.
2. The client will have normal tissue perfusion and cardiac output.
3. The client will be calm and comfortable.
4. The client will show no signs of infection.

Equipment Needed (see Figure 8-10-2):

- Disposable gloves
- IV tubing
- Stethoscope
- Sphygmomanometer
- Thermometer



Estimated time to complete the skill:
One to several hours; until client is stable.

> CLIENT EDUCATION NEEDED:

1. The client is instructed on which symptoms should be reported to the nurse immediately.
2. The client is asked to verbalize his previous experience with transfusions.
3. The client is assured of the measures taken to ensure safe blood products.
4. The client is reassured that they are being carefully monitored for a possible reaction.



Figure 8-10-2 Thermometers

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Apply gloves. 3. Stop the transfusion. 4. Remove tubing with blood and replace with new tubing. 5. Maintain a patent IV with normal saline. 6. Remove gloves and wash hands. 7. Notify physician or qualified practitioner of client's transfusion reaction. 8. Monitor client's vital signs at least every 15 minutes (see Figure 8-10-3). | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Maintains aseptic technique. 3. Reduces risk of further reaction. 4. Prevents blood in the tubing from being infused. 5. Ensures fluids or medications can be given in the event of anaphylaxis. 6. Maintains aseptic technique. 7. Transfusion reactions need prompt medical attention. 8. Assesses client's cardiopulmonary status. |
|--|--|

Figure 8-10-3 Monitor vital signs every 15 minutes.



- | | |
|--|--|
| <ol style="list-style-type: none"> 9. Administer medications as prescribed: <ul style="list-style-type: none"> • Diphenhydramine • Epinephrine | <ol style="list-style-type: none"> 9. <ul style="list-style-type: none"> • Antihistamine given IV counteracts some allergic responses. • Stimulates alpha receptors and beta receptors in the sympathetic nervous system and decreases respiratory distress in anaphylactic reactions. |
|--|--|

continues

- Broad-spectrum antibiotics
- Intravenous fluids

10. Start cardiopulmonary resuscitation if indicated.

11. Obtain two blood samples from arm opposite transfusion (see Figure 8-10-4).

Figure 8-10-4 Obtain two blood samples from the arm opposite the transfusion.

12. Return the remaining blood and tubing to blood bank.

13. Obtain first voided urine (within 1 hour of reaction).

- Given when bacterial sepsis is suspected.
- Counteracts symptoms of septic shock.

10. Prompt resuscitation may reverse cardiopulmonary arrest.

11. First sample to be cross-matched to be sure the correct ABO matched blood was given. In the second sample, the serum is tested for free hemoglobin, which indicates hemolysis.



12. A sample of the blood will be cross-matched with the client's samples before and after the transfusion to check for an error in cross-matching.

13. Hemoglobinuria occurs with hemolysis so the urine may be red or black. Renal damage requires prompt treatment to promote diuresis and prevent renal tubular damage.

> EVALUATION

- Observe the client's response to discontinuing the transfusion and their reaction to medications or other treatment administered.
- Observe for worsening of symptoms that could lead to a severe reaction and cardiopulmonary arrest.

> DOCUMENTATION

Nurses' Notes

- Date, time, and type of reaction that occurred
- Time the charge nurse and physician or qualified practitioner were notified

- Response of the client after discontinuing the transfusion
- Response to the treatment given for the reaction
- Time the blood and urine specimens were sent to the blood bank

Medication/IV Flow Sheet

- Medications and intravenous fluids given for the reaction



▼ REAL WORLD ANECDOTES

Scenario 1

Don was recovering from an abdominal aneurysm repair. His morning blood test showed a low hematocrit so his surgeon ordered two units of packed RBCs to be given. After checking the first bag of RBCs with another nurse, his nurse started the transfusion slowly to assess for a reaction. After

▼ REAL WORLD ANECDOTES *continued*

taking his vital signs 5 minutes into the transfusion, he appeared to be tolerating it well. However, a few minutes later, Don felt some pain in his chest so he pushed his patient-controlled-analgesia (PCA) pump. When the nurse returned to take his vital signs, he told her he was having difficulty breathing. She immediately stopped the transfusion and then took his temperature, which was 38.8°C, and his blood pressure, which was 90/58, lower than his usual 124/78. She called his surgeon and checked the unit of blood with the client's medical record again. The blood and urine tests sent to the laboratory showed an error in cross-matching the client with the donor blood.

Scenario 2

Trisha came to the outpatient department for her weekly platelet transfusion while she was recovering from her last cycle of chemotherapy for acute lymphocytic leukemia. She had a history of reacting to platelet transfusions so her nurse gave her medications to prevent a reaction before starting the transfusion. These medications included diphenhydramine, acetaminophen, and hydrocortisone. The volume of the platelet transfusion was also reduced since she weighed only 26 kilograms. The nurse started the transfusion slowly, and when Trisha appeared to tolerate it, the rate was increased. After 10 minutes, Trisha started feeling warm and restless. When her nurse took her temperature, it registered 38.4°C, and Trisha began shaking with chills. The nurse slowed the transfusion, called the physician, and gave her a dose of meperidine to calm the chills.

> CRITICAL THINKING SKILL

Introduction

The occurrence of a hemolytic reaction is life threatening. Every precaution should be taken both in the laboratory where the type and cross-matching of the donor blood with the client's blood is done and while initiating the transfusion to ensure that the client and blood unit are identified correctly.

Possible Scenario

The client was scheduled to have two units of packed RBCs. The first one was completed without complications. The second unit was identified slightly differently than the first. Specifically, the last name was spelled "Smith" on the unit of blood and "Smythe" on the medical record and the client's wristband identification. The

nurse started the transfusion since the other numbers and names were spelled correctly. Seven minutes after starting the second unit the client complained of pain in his back and feeling warm and weak.

Possible Outcome

The hemolytic reaction could progress and result in oliguria and renal failure. Hemolysis could lead to DIC and uncontrolled hemorrhage.

Prevention

If there is any variation in spelling of names, client identification numbers, or type of blood including Rh factor of blood, it must be returned to the blood bank. Only accurately identified cross-matched units of blood are safe to give a client.

▼ VARIATIONS



Geriatric Variations:

- Sodium citrate reactions can occur in clients with inadequate bone stores of calcium, clients with osteoporosis or bony tumors, or clients whose mobility is limited.
- In clients with poor cardiac function, the rate of a blood transfusion is critical in preventing cardiac overload.



Pediatric Variations:

- Children may react quickly to fluid overload unless the IV rate is carefully controlled.
- Citrate reactions can occur in infants receiving exchange transfusions.

▼ VARIATIONS *continued*



Home Care Variations:

- Nurses working in the home setting must be meticulous in transporting, preparing, and verifying that the correct blood is on hand prior to administering it to the client.
- The nurse in the home setting must know the signs and symptoms of transfusion reactions, and closely watch for any symptoms that could signal the onset of a transfusion reaction. The nurse must know the proper steps to obtain help for the patient, or transport, if necessary, should a transfusion reaction occur.
- Nurses working in the home setting must follow policies and procedures of the home health agency regarding administration of blood products.



Long-Term Care Variations:

- Personnel working in long-term care settings, where blood is not frequently administered, should review common symptoms of transfusion reactions prior to administering blood or blood products.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The nurse did not give the patient premedications because she did not look for a history of transfusion reactions in the medical record.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the medical record and ask the client about their experience with transfusions before preparing the transfusion.

Possible Error:

The name on the blood bag is different from the medical record.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the correct spelling of the client's name on the medical record. If this error does occur, do not give the blood. Call the blood bank to report the error in the spelling of the name and follow the hospital policy for returning the bag for correction.

> NURSING TIPS

- Organize your time so that you can remain with the client for the first 15 minutes of the transfusion.
- Have emergency medications at the bedside.
- Remember that anaphylactic reactions have two distinct features: the reaction occurs after only a few millimeters of blood or plasma has been infused and there is no fever.
- Review emergency measures such as cardio-pulmonary resuscitation before starting a transfusion.

SKILL 8-11

Assisting with the Insertion of a Central Venous Catheter

Eva Gallagher, RN, BSN

KEY TERMS

Central venous catheter

Central venous catheter insertion

Central venous pressure

Chemotherapy administration

Dialysis

Peripheral stem cell collections

Phoresis

Total parenteral nutrition



> OVERVIEW OF THE SKILL

A central venous catheter is an IV catheter designed to be inserted into a large central vein, with the catheter terminus usually in or near the right atrium. Reasons for central venous catheter insertion include long-term IV therapy, total parenteral nutrition administration, chemotherapy administration, dialysis, peripheral stem cell collections, and central venous pressure monitoring. Central venous catheter insertion can be done

on an outpatient basis with client able to return home after insertion is complete. Discomfort may be experienced for a few days or for up to a week following this procedure. The length of time a central venous catheter can remain in place varies from a few months to years. Typically, it is necessary to cover the central venous catheter exit site with an air occlusive dressing to prevent potential bacterial contamination.

> ASSESSMENT

1. Verify policy regarding central venous catheter insertion. This allows the nurse to assure institutional policies are being followed.
2. Review client's past medical history to see if central venous catheter insertion is contraindicated on one side of the client's body (e.g., on the same side as a mastectomy) or if there is an optimal place to insert the catheter. Identification of this information assures that placement of central venous catheter will be in optimal position.
3. Assess client's knowledge regarding central venous catheter insertion and care at home. This determines need for further education and home care.
4. Assess the client's ability to cooperate with the procedure, especially if the physician or qualified

practitioner will want the client to hold his breath during insertion. This allows any modifications to be made in technique that may be required if the client is confused or uncooperative.

5. Assess whether or not signed consent is required by your facility and whether or not it has been obtained. This allows the procedure to be performed in a timely manner without delays.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 7.1.1 Body Image Disturbance
- 8.1.1 Knowledge Deficit, related to an indwelling central venous catheter

> PLANNING**Expected Outcomes:**

1. Central venous catheter will be placed in accordance with institution policy and in an optimal position for the client.
2. The client will not experience any adverse effects from the catheter insertion such as air embolus, infection, or pneumothorax.
3. The client will experience a minimum of anxiety and pain during the catheter insertion.

Equipment Needed (see Figure 8-11-2):

- Central venous catheter
- Central venous catheter insertion kit, if available
- Order stating type of catheter to be placed and number of lumens
- Scalpel
- Suture kit
- Air occlusive dressing
- Gauze
- Sterile gloves
- A 5-cc syringe with heparinized saline for each lumen
- Lidocaine
- Betadine



Estimated time to complete the skill:
20–30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain sensation felt during central venous catheter insertion.
2. Explain with pictures what central venous catheter will look like once it is inserted.
3. Explain care of central venous catheter at home and troubleshooting (e.g., difficulty flushing, catheter leaking).
4. Describe signs of infection or thrombus formation involving the central venous catheter and how to handle these situations.



Figure 8-11-2 Central venous catheter and insertion equipment

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Wash hands.
2. Check physician's or qualified practitioner's written orders stating type of catheter to be placed and number of lumens.
3. Identify client and check for drug or iodine allergies.
4. Clean chest area with betadine (see Figure 8-11-3) and drape appropriately (see Figure 8-11-4). (For more information on how to prepare a surgical site, see Skill 4-21.)

RATIONALE

1. Reduces spread of microorganisms.
2. Ensures accurate type and style of catheter is inserted.
3. Ensures proper client identification. Decreases risk of allergic reaction such as hives, urticaria, or anaphylactic shock.
4. Ensures minimal risk of contamination, which could cause infection.



Figure 8-11-3 Clean the insertion area with povidone-iodine.

5. Assist with administration of subcutaneous lidocaine.
6. Prior to insertion, the central venous catheter lumens must be primed with normal saline or heparinized saline.
7. A small incision will be made (see Figure 8-11-5) and the central venous catheter will be inserted directly into the subclavian vein and threaded through the innominate vein into the superior vena cava (see Figure 8-11-6). This procedure is only performed by a physician or qualified practitioner and will vary slightly depending on the type of central venous catheter used. Be familiar with the types of catheters generally used in your facility.

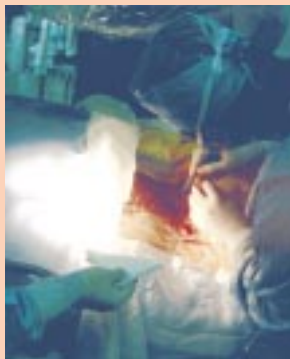


Figure 8-11-5 An incision is made.

8. The physician, or qualified practitioner will secure the central venous catheter with one suture (see Figure 8-11-7) and cover the wound with an air occlusive dressing.
9. The physician, or qualified practitioner, will check each lumen of the catheter for patency by flushing with normal saline or heparinized saline (depending on the type of catheter inserted) (see Figure 8-11-8).

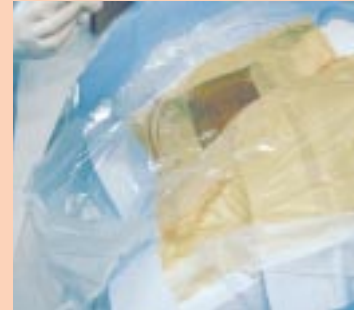


Figure 8-11-4 Drape the insertion site.

5. Decreases discomfort during this procedure.
6. To prevent the introduction of air into the bloodstream.
7. There is a high volume of blood flow in the superior vena cava allowing dilution of medication quickly once injected.



Figure 8-11-6 The catheter is inserted directly into the subclavian vein.

8. Prevents bacterial contamination and the leakage of air into the insertion site.
9. Prevents clot formation in the lumens and keeps them patent. Helps to determine placement of the catheter.



Figure 8-11-7 The central venous catheter is secured with one suture.



Figure 8-11-8 Each lumen is flushed with normal or heparinized saline.

10. Chest x-ray is performed.

11. Wash hands.

10. Verifies correct placement of central venous catheter.

11. Decreases transmission of microorganisms.

> EVALUATION

- Central venous catheter was placed in accordance with institution policy and in an optimal position for the client.
- The client did not experience any adverse effects from the catheter insertion such as air embolus, infection, or pneumothorax.
- The client experienced a minimum of anxiety and pain during the catheter insertion.

> DOCUMENTATION

Nurses' Notes:

- Document the date and time of catheter insertion.
- Note the type of catheter inserted, the insertion site, the chest x-ray results, and how the client tolerated the procedure.
- Note any unusual occurrences or observations.

Intake and Output Record/IV Flow Sheet:

- Chart if the client was started on IV therapy through the central line.



▼ REAL WORLD ANECDOTES

Mr. Schemp was admitted to the coronary care unit late in the evening with a diagnosis of congestive heart failure. The emergency room physician had ordered a central venous line placed to assess Mr. Schemp's central venous pressure. The physician inserting the central line noted that he had not done the procedure for several years and informed the nurse that he might need some coaching. The physician and the nurse entered the client room and started the procedure. The physician required quite a bit of coaching during the insertion. As the nurse gently explained how the equipment was used to the physician, Mr. Schemp became increasingly anxious even though he had received a mild sedative. The nurse noted Mr. Schemp's fear and tried to reassure him that the procedure was going smoothly and would be over soon. Finally, the physician did get the central line in and sutured into place. The chest x-ray showed good line placement. The nurse resolved to be sure the physician knew how to do the procedure prior to entering the client room.

> CRITICAL THINKING SKILL

Introduction

Central venous catheters are placed for a number of reasons, including long-term IV therapy, total parenteral

nutrition administration, chemotherapy administration, dialysis, and peripheral stem cell collections. There are a number of different types and styles of catheters, and some are better for a specific purpose than others. Know-

ing the purpose for catheter placement is important so that the appropriate central venous catheter is placed.

Possible Scenario

Steven has lymphoma and is having a central venous catheter placed for peripheral stem cell collections in preparation for a stem cell transplant. The nurse reviews the physician's orders and gathers the required supplies. She notes that the orders state that Steven is to have a dual lumen 13.5 French catheter placed for phoresis of peripheral stem cells. She remembers that the last time she assisted with this procedure they needed to place a 12 French catheter to accommodate the phoresis machine. The nurse double-checks the order; it is in fact for a 13.5 French catheter. The last time she assisted with this procedure was quite a while ago, and she assumes that the physician must know what he is doing. Perhaps they have new phoresis equipment. She prepares a 13.5 French, double-lumen central catheter for insertion. The catheter insertion goes smoothly and Steven tolerates the procedure well.

Possible Outcome

When it is time for his first stem cell collection, the floor nurse receives a call regarding Steven's central line. The

Bone Marrow Transplant Center is requesting information regarding the size of Steven's central line. When the nurse verifies that it is a 13.5 French catheter, the transplant center explains that their equipment will not work with anything smaller than a 12 French catheter. Steven has to return to the hospital for a replacement catheter of the correct size.

Prevention

If the nurse had been truly thinking like a client advocate, she would have questioned the original size of catheter ordered based on her previous experience. This would have saved Steven the additional trauma and expense of having a new catheter inserted. The nurse does not want to risk the possibility of the wrong central venous catheter being placed so she decides to call the Bone Marrow Transplant Coordinator at the hospital to verify this order. The Bone Marrow Transplant Coordinator verifies that a 12 French catheter is needed and thanks her for catching this potential mistake. This lumen size is needed to assure adequate volume can circulate through the phoresis machine. The nurse prevented an error in central venous catheter placement by verifying the correct catheter for the intended use.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not be able to tolerate lying supine while the central catheter is being inserted. A variation of client positioning may be necessary in order to place the central catheter.*



Pediatric Variations:

- *Children have smaller veins than adults. The central catheter will need to be shorter and smaller.*
- *Teenagers may have serious body image issues regarding long-term placement of a central line.*
- *The parents of a child receiving a central line need to be assessed for educational needs and anxiety about the placement.*



Home Care Variations:

- *If the nurse has a client who will receive a central line, the home care nurse can provide support and education to help the client prepare for the procedure.*



Long-Term Care Variations:

- *Central lines are not inserted in the long-term care setting.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Assisting with insertion of a central line with catheter lumens full of air.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember that the lumens of the central line must be flushed as part of the equipment preparation. Remind the physician or qualified practitioner, if necessary.

> NURSING TIPS

- Become familiar with the central venous catheter insertion policy at the facility in which you work.
- Think through the steps and review written instructions if unsure about supplies needed for central venous catheter insertion.
- Assure all supplies are available and ready for use before beginning this procedure. Be aware of any contraindications of catheter placement in the client. Be prepared to gently remind the physician or qualified practitioner of potential problems.

SKILL 8-12

Changing the Central Venous Dressing

Kathryn Lilleby, RN

KEY TERMS

Catheter
Dressing change
Povidone-iodine
Skin integrity

Sterile gauze
Transparent dressing
Venous access device



> OVERVIEW OF THE SKILL

Because the central venous catheter insertion site is a direct route to the circulatory system, care must be taken to keep the insertion site clean and infection free. The insertion site must be inspected frequently for signs and symptoms of infection, such as inflammation, heat, or drainage. Regular, aseptic dressing changes can help decrease the possibility of infection

at the insertion site and systemically. Policies vary from institution to institution regarding the type of dressing to apply as well as the frequency with which they are changed. Be aware of the policy at your institution and the rationale for it. Dressings that have become wet or are pulling loose from the insertion site must be changed immediately.

> ASSESSMENT

1. Assess the need for dressing change by noting the last dressing change documented in the medical record and standard of care recommended by the manufacturer and the institution. **This decreases the risk of infection by following the standard of care.**
2. Assess the timing of the dressing change as it relates to medication, IV fluid and transfusion schedules as well as the time of the client's daily shower or bath. **This allows the nurse to avoid simultaneous administration of medication and the need for two dressing changes in one day.**
3. Assess the type of central venous access in place in order to obtain the appropriate supplies.
4. Assess the integrity of the skin at the site for signs of infection or bleeding.

5. Assess the client and caregiver's knowledge of the purpose and care of the catheter so a **teaching plan** can be developed.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit related to insertion site care

> PLANNING


Expected Outcomes:

1. Skin is intact at catheter site, has normal color, and is not edematous.

2. Client has no signs of systemic infection such as fever or malaise.
3. Catheter and tubing are intact.
4. Client and caregiver are able to perform skin care and dressing change.

Equipment Needed (see Figure 8-12-2):

- Povidone-iodine swabs
- Povidone-iodine ointment
- Sterile gauze, tape, or moisture transparent dressing
- Label with date and time of dressing change



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the dressing change, the need for aseptic technique,

- and how to perform the dressing change if the catheter will be placed long term.
2. Provide written or illustrated instructions on how to change the dressing.
 3. Ask the client or caregiver to demonstrate the skill.
 4. Discuss the time of day the dressing change should be done.



Figure 8-12-2 Central venous catheter dressing change tray, mask, clamp, and nonsterile gloves

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands and put on clean gloves.
2. Remove old dressing carefully (see Figures 8-12-3 and 8-12-4), being careful not to dislodge the central catheter.

1. Reduces the number of microorganisms.
2. Skin integrity may be impaired.



Figure 8-12-3 Inspect the dressing.



Figure 8-12-4 Remove the old dressing. Be careful not to dislodge the catheter.

3. Note drainage on dressing.
4. Inspect skin at insertion site for redness, tenderness, or swelling (see Figure 8-12-5).

3. Potential for bleeding or infectious material.
4. Assesses for infection.



Figure 8-12-5 Inspect the site for redness, tenderness, and swelling.



Figure 8-12-6 Clean the site with povidone-iodine swab.

5. Palpate tunneled catheter for presence of Dacron cuff.
6. Inspect catheter from hub to skin.
7. Remove gloves and put on sterile gloves.
8. Clean exit site with povidone-iodine swab beginning at the catheter and moving out in a circular manner for 3 cm to maintain aseptic technique (see Figure 8-12-6).
9. Apply povidone-iodine ointment to exit site.
10. Apply sterile gauze dressing with tape or transparent dressing (see Figures 8-12-7, 8-12-8, and 8-12-9).
5. Documents proper placement of catheter.
6. Checks whether catheter has a crack or is split or cut.
7. Prevents transmission of microorganisms from skin to exit site.
8. Eliminates microorganisms by chemical and mechanical means.
9. Reduces growth of bacteria at exit site.
10. Prevents bacteria from entering exit site.



Figure 8-12-7 Slide the first piece of gauze directly over and under the catheter.



Figure 8-12-8 Place the next piece of gauze directly over the insertion site.

11. Label with date and time of dressing change (see Figure 8-12-10).
12. Secure tubing to client's clothing.
11. Documents time to plan for next change.
12. Prevents accidental displacement.

continues



Figure 8-12-9 Place a larger piece of gauze over the area and secure with tape or transparent dressing.



Figure 8-12-10 Write the date and time of the dressing change on the dressing.

13. Remove gloves and dispose of all used materials.

14. Wash hands.

13. Reduces transmission of microorganisms.

14. Reduces transmission of microorganisms.

> EVALUATION

- The client's skin is intact at catheter site, has normal color, and is not edematous.
- The client has no signs of systemic infection such as fever or malaise.
- The central venous catheter and tubing are intact.
- Client and caregiver are able to perform skin care and dressing change.

> DOCUMENTATION

Nurses' Notes

- The date and time the dressing was changed
- The type of ointment and dressing applied
- The condition of the skin at the site
- The presence of any exudate or bleeding at the site
- The client's or caregiver's ability to perform the dressing change



▼ REAL WORLD ANECDOTES

Mrs. Abukar was to be discharged to home with a central venous line in place. Mrs. Abukar was unable to change the dressing herself so the nurse planned to teach her caregiver how to change the dressing and care for the site. Mrs. Abukar's primary caregiver was her husband, Ali Abukar, who spoke no English. Mr. Abukar had seen the nurse change the central line dressing once but he had not participated, and the nurse was not sure he understood all of the steps or the need for asepsis. Mr. Abukar was not able to come in during the day for teaching because he worked full time on the weekdays. Mrs. Abukar's nurse arranged for a translator to be present one evening when Mr. Abukar would be at his wife's bedside. She waited to change the central line dressing until Mr. Abukar and the translator were present. She then went through the procedure step by step as Mr. Abukar watched and the translator explained the rationale for each step. Mr. Abukar looked frightened and overwhelmed but the nurse gently worked with him, showing him each step over again and having him help with each step until he felt somewhat at ease with the procedure. She then arranged for Mrs. Abukar's next dressing change to be supervised by a home health nurse. She encouraged Mr. Abukar to have an English-speaking family member present to help with the translation of any questions he might have.

> CRITICAL THINKING SKILL

Introduction

Mrs. Bouvier's tunneled central line exits in her upper chest right under her bra strap. The strap sometimes rubs the dressing at the site.

Possible Scenario

The skin around the exit site is red and, one day, she noticed a puslike drainage. She cleaned the area as instructed and reported the redness and drainage to her nurse by phone.

Possible Outcome

Mrs. Bouvier's nurse told her to continue to cleanse the area as instructed and apply an antibiotic ointment to the site. The nurse planned to come see Mrs. Bouvier within a day or two and would assess the site then. The nurse was unable to see Mrs. Bouvier until 3 days after her call. When she did arrive, she noted that the central venous catheter insertion site was quite reddened and pus was visible around the catheter. The nurse notified the physician and received an order for IV antibiotics as well as more frequent dressing changes.

Prevention

The nurse should have talked to Mrs. Bouvier regarding the site and its care. This way, she would have found out that Mrs. Bouvier's bra strap rubbed against the site and was quite irritating. The nurse should then have mentioned that perhaps Mrs. Bouvier could obtain a bra that did not rub on the central line insertion site or she could discontinue wearing a bra until the insertion site was no longer inflamed. She should have then recommended that Mrs. Bouvier change the dressings more frequently to assess the site condition and then seen Mrs. Bouvier the next day to determine if there were any other steps that could be taken to reduce the irritation to the central line insertion site.

▼ VARIATIONS



Geriatric Variations:

- *The integrity of the skin of an elderly client may be impaired. Care should be taken when removing tape and the dressing, which may stick due to exudate.*
- *Teaching a geriatric client or their caregiver about changing a dressing will need to be done after assessing their willingness and ability to perform this procedure.*



Pediatric Variations:

- *Children can be taught to help with the dressing change such as opening and holding the sterile dressing or holding the tape.*
- *Children may need an extra method for securing the catheter, such as a vest to attach the catheter and tubing.*



Home Care Variations:

- *Supplies should be kept in a clean, dry space.*
- *The nurse can contact the client at home to see if they are having problems with the dressing change.*
- *Discharge planning should include referral for home health services.*
- *Client should be given a written list of providers of supplies and equipment.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You accidentally pull the catheter while removing the dressing that is stuck to the catheter.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the dressing for drainage that may have stuck to the catheter. Be sure gloves are the correct size so fingers are agile. If this error does occur, assess the area around the catheter for bleeding. Soak the dressing with sterile normal saline in order to remove the dressing without further trauma. Proceed with the dressing change.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

The sterile dressing falls on the floor before it is applied to the skin.

Ask Yourself:

How do I prevent this error?

Prevention:

Have all supplies next to the client. Maintain sterile supplies on a sterile field. Be sure you do not have to reach over anything to use your equipment. If this does occur, discard the gauze, obtain another package, put on another pair of sterile gloves, and continue with procedure.

> NURSING TIPS

- Gather extra supplies to have available in case you drop something.
- A cotton-tipped applicator dipped in normal saline may help loosen exudate on a catheter.
- Have a catheter repair kit available if a leak or hole is seen during the dressing change.

SKILL 8-13

Changing the Central Venous Tubing

Eva Gallagher, RN, BSN

KEY TERMS

Central venous catheter

Central venous catheter tubing

Fluids

Hydration

Infusion

Intravenous (IV)

Medication



> OVERVIEW OF THE SKILL

Central venous catheter tubing is changed frequently to assure minimal risk of infection. The frequency of change depends on institutional policy, the status of the client, and the type of fluid that is being infused. In clients receiving total parenteral nutrition or those with compromised immune systems, tubing may be changed daily. Clients who are neutropenic, such as cancer clients undergoing

chemotherapy, also require more frequent central venous catheter tubing changes. However, if the client is receiving hydration such as normal saline and has an intact immune system, central venous catheter tubing may be changed just a few times a week. Central venous catheter tubing should be changed immediately if it is found to be damaged or contaminated.

> ASSESSMENT

1. Verify policy regarding frequency of central venous catheter tubing changes. This allows the nurse to assure institution policies are being followed.
2. Check original fluid or medication orders regarding rate of infusion and duration. Identification of this information assures that fluid or medication is given at the correct rate for the intended amount of time.
3. Assess client's knowledge regarding fluid or medications. Determine need for fluid or drug education.
4. Assess client's catheter site. Determine need for dressing change and observe for signs of infection.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. Central venous catheter tubing will be changed in accordance with institutional policy.
2. The client will remain free of infection secondary to the central venous catheter tubing.
3. The client will remain free of infection secondary to the central venous catheter tubing change.

Equipment Needed (see Figure 8-13-2):

- Central venous catheter tubing
- Medication administration record (MAR) or original order containing documentation of the type and rate of medication or fluids to be administered
- Medication or fluids
- Tag or a piece of tape with the date tubing is due to be changed



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain type of medication or fluids.
2. Explain action of medication or fluids.
3. Explain use of central venous catheter tubing and why it is changed on a schedule.
4. If the client is going to be administering medication or fluids at home using an infusion central venous catheter tubing, have client do a return demonstration setting up the infusion set independently.

5. Make sure client knows who to call with questions.
6. Reinforce verbal teaching with written instructions.



Figure 8-13-2 Types of IV tubing

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Check MAR against physician's or qualified practitioner's written orders.
3. Check for drug allergies.
4. Prepare the medication or fluids for one client at a time. Decide what type of central venous catheter tubing is needed and assemble equipment (see Figure 8-13-3).

1. Reduces the transmission of microorganisms.
2. Ensures accuracy in the administration of the fluid or medication.
3. Decreases risk of allergic reaction such as hives, urticaria, or anaphylactic shock.
4. Ensures that the right client receives the right medication using the right equipment.



Figure 8-13-3 Select the correct tubing and bring it with other equipment to the bedside.



Figure 8-13-4 Disconnect old tubing.

5. Check the client's arm band before hanging the new central venous fluids (if appropriate).
6. Identify the fluids for the client and their therapeutic purpose.

5. Ensures right client.
6. Encourages client cooperation and increases client awareness of what to expect from the medication or fluids.

7. Clamp off new tubing. Spike bag of medication or fluids with new tubing. Squeeze drip chamber (if there is one) until it is about half full. Open clamp on new tubing until medication or fluids have filled tubing completely.
8. Clamp off the central venous catheter and old tubing if it is currently hanging. Disconnect old tubing or cap from central venous catheter site. Connect new tubing without letting the end of the catheter or the needle become contaminated. (See Figures 8-13-4, 8-13-5, and Figure 8-13-6.) Secure the connection (see Figure 8-13-7).



Figure 8-13-5 Connect new tubing. Be careful not to contaminate the needle.

Figure 8-13-7 Secure the connection with tape.

9. Insert tubing into pump if one is being used and unclamp new tubing. Set pump or adjust drip rate to infuse at ordered rate.
10. Put tag on tubing with next date to be changed. Document tubing change in client's chart or on MAR if space is allotted.
11. Wash hands.

7. Prevents air from being infused through the central venous catheter causing an air embolus.
8. Sterile tips on catheter and tubing must be maintained to minimize risk of contamination and infection.



Figure 8-13-6 Connecting tubing using a needleless system.



9. Necessary to ensure proper rate and to prevent fluid bolus.
10. Ensures that other nurses will be aware of date the tubing needs to be changed.
11. Reduces the transmission of microorganisms.

> EVALUATION

- The central venous catheter tubing was changed in accordance with institutional policy.
- The client remains free of infection secondary to the central venous catheter tubing.
- The client remains free of infection secondary to the central venous catheter tubing change.

> DOCUMENTATION

Nurses' Notes

- Record any unusual findings.

MAR/IV Flow Sheet

- Record the time and date the tubing and fluids were changed. Sign and initial the entry.



▼ REAL WORLD ANECDOTES

Scenario 1

The nurse brought in the supplies to change the central venous tubing connected to Bill's central line. She clamped off the old tubing and disconnected it from the central line. She then uncapped the new central venous catheter tubing and connected it to the end of Bill's central venous catheter. The nurse then realized that she had forgotten to purge the tubing of air. She carefully disconnected the tubing from the central venous catheter and squeezed the drip chamber of the new tubing. She then opened the clamp to allow the fluid to replace the air in the tubing and reconnected the new tubing to the central venous catheter.

Scenario 2

The nurse notes that Jane's central venous catheter tubing and total parenteral nutrition (TPN) is due to be changed so she gathers the supplies and heads into her room. She sets up the new IV solution and tubing, turns off the IV pump, carefully removes the old tubing, and replaces it with the new tubing. As she opens the IV pump to place the new tubing in it, she realizes that she has forgotten to close the clamp on the old tubing. She glances down to see a stream of yellow TPN draining onto her uniform and shoes. She quickly clamps the tubing and proceeds to place the new tubing into the IV pump. Unfortunately, the tubing she had so carefully primed and connected to the central catheter is not the type of tubing required by the IV pump in use. The nurse now finds herself, sticky with TPN, smelling of vitamins, having to redo the entire procedure. She is ruefully reminded to plan ahead and know what type of tubing will be required as well as to close all clamps prior to changing IV tubing.

> CRITICAL THINKING SKILL

Introduction

Take all precautions to ensure that the tubing is sterile.

Possible Scenario

The nurse is preparing to change the central venous fluids and infusion tubing for Mr. Xydis. She prepares the solution and tubing in the medication room, spiking the solution bottle, priming the tubing, and placing a sterile cover on the end of the tubing. Before she can take the prepared solution and tubing to Mr. Xydis's room, she is called away to care for another client. When she returns to the medication room, the end of the central venous infusion tubing is lying on the floor. The sterile cap is still in place.

Possible Outcome

Seeing that the sterile cap is still on the tubing, the nurse proceeds with the solution and tubing to Mr. Xydis's

room and hangs them, replacing Mr. Xydis's old central line solution and tubing. Sixteen hours later Mr. Xydis spiked a temperature of 102°F. Blood cultures revealed staph sepsis. When she returned to duty the next day, the nurse wondered if Mr. Xydis's sepsis had been due to the central venous tubing she had used.

Prevention

Upon seeing the end of the tubing lying on the floor, she should have started over with a new solution and tubing setup. The tubing was still capped, but contamination was possible. The best precaution is to take the tubing and solution to Mr. Xydis's room and prepared it at his bedside. The nurse can use the time to assess the old tubing and solution and to check his central line insertion site for infection or other complications. If there is any question in your mind regarding the sterility of an object, throw away the tubing and start over. The cost and time savings are not worth endangering a client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may have compromised immune systems and delicate, thin skin. Changing the tubing is a good time to assess for signs of infection and skin breakdown at the insertion site.*

▼ VARIATIONS *continued*



Pediatric Variations:

- *Pediatric clients are very susceptible to small fluid balance changes. Be sure to use the correct tubing when changing the central line tubing. Some tubing sizes deliver large drops and some deliver small drops. You should use a volume control mechanism, such as a pump or Volutrol, on any pediatric IV.*
- *Remind the pediatric client that changing the tubing is not painful.*



Home Care Variations:

- *Make sure that you have supplies set up and a clear work field when changing tubing in the home setting. It can be difficult to replace contaminated tubing.*
- *Make sure the home caregiver knows how to work the IV pump and how to respond to alarms and emergencies.*
- *Make sure the home caregiver has the correct tubing and equipment for the pump.*



Long-Term Care Variations:

- *Establish a regular schedule for changing tubing.*
- *Complications can occur in central lines that have been placed for long periods of time. Do not become complacent about assessment.*
- *People who care for the client daily should know what changes to look for, who to report them to, and how to respond to pump alarms.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

One hour after changing the central venous catheter tubing, the nurse returns to the client's room to find that no fluid has infused during this time period.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check back within 20 to 30 minutes after setting up new central venous catheter tubing to see if it is infusing properly and to adjust the rate as needed. Consider using an infusion pump to ensure the desired rate of infusion is achieved.

Possible Error:

There is no tag with a date on the central venous catheter tubing.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure to tag and chart the date and time of IV tubing changes. The potential for bacterial growth increases as the days pass without changing the central venous catheter tubing.

> NURSING TIPS

- Become familiar with the central venous catheter tubing policy at the facility in which you work.
- Think through the steps and review written instructions if unsure about how to change the central venous catheter tubing.
- If teaching a client this skill, use the same equipment he or she will be using at home.

SKILL 8-14

Flushing a Central Venous Catheter

Kathryn Lilleby, RN

KEY TERMS

Central venous catheter

Patent

Peripherally inserted central catheter (PICC)

Povidone-iodine

Tunneled central

venous catheter

Urokinase

Venous



> OVERVIEW OF THE SKILL

A central venous line is a safe, convenient, and painless way to infuse fluid, medications, and blood products or obtain blood samples from clients who require specific therapy and monitoring. Frequent venipuncture and multiple IV lines increase the risk of infection and bleeding. Long-term therapy involving multiple treatments with corrosive medications can cause peripheral venous hardening or collapse. Central venous catheters, which are inserted through a large vein into the superior vena cava, can help avoid these problems.

There are several types of venous access devices. This skill deals with flushing peripherally inserted central catheters (PICCs) and tunneled catheters.

- The PICC is inserted into a large vein in the antecubital fossa and advanced to the subclavian vein and finally into the superior vena cava.

- Tunneled central venous catheters are surgically inserted while the client is under general or local anesthetic in the operating room. They can have 1 to 3 lumens depending on the needs of the client. A tunnel is made through subcutaneous tissue below the clavicle; then the catheter tip is inserted through one of the large veins, such as the internal or external jugular, and the distal end is threaded into the right atrium. The proximal end is pulled out through the tunnel where it can be anchored.

The patency of a central venous catheter depends on regular flushing with saline and possibly heparin solution to prevent clots from forming within the catheter or at the tip. Changing the dressing at the insertion site is detailed in Skill 8-12.

> ASSESSMENT

1. Assess the type of central venous line in place. This allows the nurse to know how many lumens are available to access.
2. Assess the function and patency of the catheter to ensure minimal complications during a blood draw or infusion.
3. Assess client's knowledge of the purpose of the central venous line to determine the need for education.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit related to the procedure

> PLANNING**Expected Outcomes:**

1. The nurse will be able to aspirate blood through the catheter.
2. The nurse will be able to infuse fluid through the catheter.
3. The client will not exhibit any signs or symptoms of systemic infection.
4. The visible portion of the catheter will be intact without leaks, holes, or tears.

Equipment Needed (see Figure 8-14-2):

- Povidone-iodine and alcohol swabs
- Syringes (10 ml)
- Vial or ampoule of normal saline solution
- Vial of heparin solution (heparin flush or heparin 100 U/ml in saline) (check agency policy on heparin solution use)
- Plastic clamp or metal bull-dog clamp
- Sterile needle (20 to 22 gauge)
- Sterile gloves, gown, and mask



Estimated time to complete the skill:
5 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for flushing the catheter with normal saline and/or heparin

according to the institution's or manufacturer's guidelines.

2. The client should be instructed about the need for aseptic technique.
3. The client and caregiver should be taught how to flush the catheter.
4. The client and caregiver should be taught what complications to look for and how to react to them.
5. Ask the client or caregiver to demonstrate their ability to flush the catheter after they have been taught.



Figure 8-14-2 Ampoules of sodium chloride

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Wash hands. Apply gloves, gown, and other protective equipment as needed.
2. Prepare two syringes (see Figure 8-14-3): one with 10 ml normal saline and one with 5 ml heparin solution.
3. Swab injection cap or catheter hub with povidone-iodine and alcohol.
4. Clamp catheter and remove cap.
5. Check catheter for patency:
 - Attach syringe with normal saline.

RATIONALE

1. Reduces transmission of microorganisms, and ensures proper client identification.
2. Preparing equipment in advance allows for a smooth procedure.
3. Prevents introduction of microorganisms into catheter.
4. Prevents entrance of air into catheter.
5. Ensures patency of catheter.
 - Connects syringe to catheter.

continues



Figure 8-14-3 Prepare two syringes.

- Release clamp.
 - Aspirate heparin solution from catheter (see Figure 8-14-4).
 - Observe blood return.
 - Flush quickly with normal saline (see Figure 8-14-5).
 - Reclamp.
-
- Remove empty syringe.
 - Attach syringe filled with 5 ml heparin solution to catheter.
 - Release clamp.
 - Flush quickly.
 - Reclamp.



Figure 8-14-4 Aspirate heparin solution from the catheter and flush with saline.

- Opens catheter lumen.
 - Removes old heparin solution.
-
- Verifies patency of catheter.
 - Ensures that catheter will be cleared of any blood so it will not clot.
 - Clamping catheter during changes of syringes prevents air from entering catheter.
 - Continues procedure
 - Connects syringe to catheter.
-
- Opens catheter lumen.
 - Injects heparin solution into catheter.
 - Closes catheter lumen.



Figure 8-14-5 Flush with heparin solution.

6. Place new cap on end of catheter, tape all tubing connections, and attach tubing to client's clothing.
7. Dispose of soiled equipment and used supplies.
8. Wash hands.

6. Maintains sterile seal to catheter.
7. Reduces transmission of microorganisms.
8. Reduces transmission of microorganisms.

> EVALUATION

- The nurse was able to aspirate blood through the catheter.
- The nurse was able to infuse fluid through the catheter.
- The client does not exhibit any signs or symptoms of systemic infection.
- The visible portion of the catheter is intact, without leaks, holes, or tears.

> DOCUMENTATION

Nurses' Notes

- Report the condition of the catheter.
- Report the patency of the catheter, including the ability to draw blood and difficulty of infusing fluids.
- Report occlusions, damage to the catheter, or air embolus to the physician or qualified practitioner immediately.



▼ REAL WORLD ANECDOTES

Mr. Wilson had a central venous catheter placed for the infusion of total parenteral nutrition (TPN). He received 2 liters a day and liked to have a few hours away from the IV pump. His 13-year-old daughter had learned how to care for his central line in case his wife was not home. One day, she felt a slight resistance when she flushed the catheter after stopping the TPN. She had been taught to try to aspirate blood to check for patency. When she saw a small amount of blood appear in the syringe, she was relieved and assured that the catheter was patent, but since it still did not flow as easily as before, she notified the home health nurse who came later to evaluate the catheter for patency.

> CRITICAL THINKING SKILL

Introduction

There are several causes of difficulty in aspirating blood from a central venous catheter. It could be a thrombus, precipitation from incompatible medications, or malposition.

Possible Scenario

The client was lying on his side when the nurse came to check on his central line. She wanted to check on its patency before starting the IV infusion of antibiotics. When she tried to aspirate blood, nothing happened. She knew the catheter had been patent just 2 hours before.

Possible Outcome

She asked the client to turn on his other side, then raise his arms and cough. No blood returned into the syringe. Finally, she asked him to perform the Valsalva's (bear down and attempt to exhale while keeping the nose and mouth closed) maneuver and blood easily flowed into the syringe.

Prevention

The tip of the catheter can become lodged against the side of the blood vessel. Knowing how to cause the catheter to return to a good position will reestablish patency of the catheter.

▼ VARIATIONS



Geriatric Variations:

- If the client is fluid compromised, adjust the volume of flushes.



Pediatric Variations:

- Be sure to reduce the volume of fluids used to aspirate and to flush the catheter.

continues

▼ VARIATIONS *continued***Home Care Variations:**

- *A receptacle for disposing of soiled equipment is needed.*
- *Be sure the client or caregiver knows the signs and symptoms of complications and what steps to take if they occur.*

**Long-Term Care Variations:**

- *If the catheter has been indwelling for a long period, be sure to assess carefully for cracks, tears, or leaks.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The catheter was not clamped between changing the saline syringe and the heparin syringe. When the client took a deep breath, an air embolus formed.

Ask Yourself:

How do I prevent this error?

Prevention:

Keep one hand near the clamp in order to remember to clamp the catheter between changing syringes. If this error does occur, clamp the catheter. Attach an empty syringe and aspirate blood. Observe for air bubbles. Place client on his left side with head slightly elevated. Assess for dyspnea, hypoxia, or tachycardia. Notify the physician or qualified practitioner immediately.

> NURSING TIPS

- Have all the equipment available for the procedure.
- Take advantage of this procedure to assess the client and provide emotional support.
- Different catheters require different amounts of heparin, or no heparin at all.
- Some catheters do not require clamps.
- If maneuvers to aspirate blood are not successful, the physician or a qualified practitioner should be notified so fibrinolytic therapy (urokinase) can be ordered and given according to institutional policy.

SKILL 8-15

Measuring Central Venous Pressure (CVP)

Robi Thomas, MSN, RN, AOCN

KEY TERMS

Central venous pressure
CVP
End expiratory pressure

Fluid overload
Manometer
Transducer



> OVERVIEW OF THE SKILL

Central venous pressure (CVP) is a measure of the pressure within the right atrium of the heart. Central venous pressure measures the ability of the right side of the heart to deal with the systemic fluid load. Central venous pressure changes reflect the client's overall fluid volume status. A low CVP is an indicator of hypovolemia generally calling for an increase in IV fluids. A high CVP can be caused by hypervolemia or by poor cardiac function. This is usually treated by diuresing the client.

Central venous pressure is commonly measured using a pressure transducer attached to a bedside monitor. The transducer must be leveled at the phlebostatic axis as well. Using a pressure trans-

ducer reduces the risk of air embolus while measuring the CVP.

Central venous pressure can be measured using a manometer attached to the intravenous fluid line. The CVP is measured in terms of fluid pressure in the column of the manometer. In order to ensure the accuracy of the CVP reading, the manometer must always be positioned in the same place, relative to the right atrium. This spot is called the phlebostatic axis. It is located on the midaxillary line in the fourth intercostal space. Once located, the phlebostatic axis should be marked with ink to assure the accuracy of following measurements. Using the traditional manometer does involve the possible complications of infection and air embolism.

> ASSESSMENT

1. Assess the client's ability to lie in a supine position without a pillow. This allows the nurse to take a more accurate reading of the CVP.
2. Assess the client's vital signs and intake and output. This information will aid the health care team in determining how best to manage the client.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit
- 1.6.2.1.2.1 Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The client's CVP will be measured accurately.
2. Aseptic technique will be maintained.
3. The client will not suffer any complications as a result of the CVP measurement.

Equipment Needed (see Figure 8-15-2):

- Sterile gloves
- IV tubing
- Manometer set or pressure transducer setup
- Stopcock, if not included in manometer set
- Indelible ink marking pen

- Tape
- Mask
- Normal saline



Figure 8-15-2 Manometer



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client why it is important to be placed in a supine position without pillow for the measurement. Reassure the client that once the procedure is completed, the client can be placed in a more comfortable position.
2. Explain to the client the importance of leaving the “X” marking the right atrium in place. Reassure the client that once measurements are no longer needed, the mark can be washed off.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Taking a CVP with a Manometer

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands and apply gloves. 2. Explain procedure to client. 3. Gather equipment needed to bedside. 4. Mark the right atrium (at the midaxillary line about one-third of the distance from the anterior to the posterior chest wall, in the fourth intercostal space) with an “X” using indelible ink pen (see Figure 8-15-3). | <ol style="list-style-type: none"> 1. Reduces transmission of microorganisms. 2. Reduces anxiety to client. 3. Maximizes efficiency and minimizes chance of breaking sterility once started. 4. The manometer should always be zeroed at the “X” to minimize variance in measurements. |
|--|--|



Figure 8-15-3 Mark the right atrium line directly on the skin using an indelible ink pen.

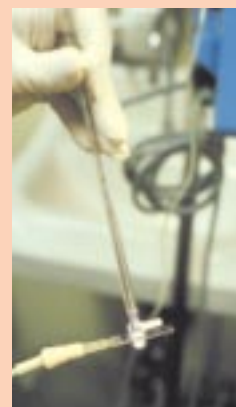


Figure 8-15-4 Connect the CVP manometer to the upper port of the stopcock.

5. Connect the IV fluid (usually normal saline) to a three-way stopcock and flush the other two ports.
6. Apply sterile gloves and mask.
7. Connect the CVP manometer to the upper port of the stopcock (see Figure 8-15-4).
8. Connect the CVP tubing from the client to the second side port of the stopcock (see Figures 8-15-5 and 8-15-6).



Figure 8-15-5 Connect the tubing from the client to the second port of the stopcock.

5. Forces air out of the stopcock. Fluids with glucose are stickier than normal saline and may cause manometer to stick; thus glucose should be avoided.
6. Aseptic technique should be used to minimize infection.
7. Inserts the CVP manometer into the central line system.
8. Establishes IV line from normal saline to CVP catheter.

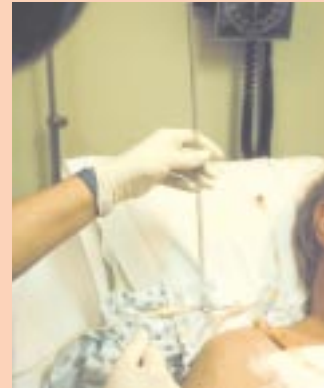


Figure 8-15-6 This is the correct setup. Note that the IV fluid, manometer, and the line to the client are all connected to the stopcock.

9. Allow normal saline to drip rapidly into client for a few seconds, with stopcock closed to manometer.
10. Turn stopcock off to client and fill manometer with normal saline to the 20-cm mark above the anticipated reading.
11. Hold manometer at the phlebostatic axis and turn the stopcock off to the normal saline (see Figure 8-15-7).
12. Watch as the fluid falls in the manometer. Take the central venous pressure reading when the fluid stabilizes (see Figure 8-15-8).
13. Turn the stopcock off to the manometer.
14. Store the manometer in an upright position (usually hanging from the IV pole) to prevent
9. Establishes that CVP line is patent. Fluids must flow freely for reading to be accurate.
10. The normal CVP reading varies from 5 to 12 cm of water.
11. System is open from the manometer to the client.
12. The fluid will stabilize at a level equal to the pressure in the central veins or right atrium. If the fluid level fluctuates with the client's respirations, take the reading at the end of the client's expiration.
13. Reestablishes fluid flow from the IV to the client.
14. The top of the manometer is open to the air. If the manometer is not properly stored,

Taking a CVP with a Manometer *continued*

Figure 8-15-7 Hold the manometer at the marking on the chest.

air bubbles from entering the fluid column or the client and to prevent contamination of the manometer.

15. Wash hands.
16. Document reading.

Taking a CVP Using a Transducer

17. Wash hands.
18. Prime the transducer and the IV lines that are attached to it using the ordered solution (usually heparinized normal saline).
19. Place the IV bag into a pressure bag and pressurize the IV solution.
20. Attach the IV pressure tubing from the transducer to the central line.
21. Attach the transducer to the pressure-monitoring equipment.
22. Place the client in the supine position with the bed flat if tolerated.
23. Level the pressure transducer to the phlebostatic axis.
24. Zero the monitor according to the manufacturer's instructions.
25. The CVP will appear on the monitor. If the reading varies, use the reading obtained at the end of the client's expiration.



Figure 8-15-8 Watch the fluid fall in the manometer. When the fluid level stabilizes, take a central venous pressure reading.

contaminants or air can enter the manometer and be flushed into the client.

15. Prevents the spread of microorganisms.
16. Provides continuity of care.
17. Prevents the spread of microorganisms.
18. The transducer provides a very low flow of IV fluids and the heparin helps to maintain the patency of the line.
19. The pressure prevents the backflow of blood into the central catheter and the IV line.
20. Establishes a pathway for the pressure monitoring.
21. Allows for the translation of the signal emitted by the transducer.
22. Provides the most accurate measure of CVP.
23. Obtains an accurate, consistent reading of the CVP.
24. Obtains an accurate CVP reading.
25. The end expiratory pressure is the most accurate measure of CVP.

26. Return the client to a position of comfort.

27. Wash hands.

28. Document CVP reading.

26. Increases client comfort and decreases client anxiety.

27. Reduces transfer of microorganisms.

28. Provides continuity of care.

> EVALUATION

- The client's CVP was measured accurately.
- Aseptic technique was maintained.
- The client did not suffer any complications as a result of the CVP measurement.

> DOCUMENTATION

Nurses' Notes

- Record CVP results on the graphic sheet, on a flow sheet, and/or in the narrative record.
- Actions based on the results should be documented (i.e., notifying physician or qualified practitioner, interventions performed based on results, and any results based on the interventions) in the narrative record.



▼ REAL WORLD ANECDOTES

Scenario 1

John was hospitalized following an automobile accident, in which he lost a large amount of blood. The physician inserted a catheter into the superior vena cava and ordered CVP readings to be performed every 4 hours. The first reading was 8. John's nurse was scheduled to be at lunch when the second reading was due, and she asked one of the other staff nurses to take the reading while she was gone. The staff nurse got a reading of 4 when she took it and reported this to John's nurse when she returned from lunch. John's nurse was concerned about the drop in John's CP. She was unsure if the drop was due to technique differences or an actual deterioration in John's condition. She reevaluated John, noting that his blood pressure was slightly lower than it had been 4 hours earlier, but his pulse had increased from a rate of 92 to 110. John's nurse took another CVP reading, being careful to hold the manometer at the same phlebostatic axis level she had used earlier. She obtained a reading of 5. When the nurse notified the physician of the CVP and John's vital signs, the physician ordered a stat complete blood count (CBC) to be drawn. The results of the CBC showed that John's hemoglobin had dropped 1.5 grams. John's physician ordered a stat computerized tomography (CT) scan, which revealed internal bleeding. John was taken directly to surgery.

Scenario 2

Ms. Robinson, a 70-year-old woman with a history of pneumonia, was transferred from the intensive care unit to the floor. Her physician was concerned about her fluid status and ordered CVP measurements every shift. She had multiple IV fluids infusing as well as total parenteral nutrition. Over the course of the shift Ms. Robinson's blood pressure increased from 110/76 to 140/90. The nurse was concerned about the increase but attributed it to Ms. Robinson's agitation due to her noisy roommate. Following the shift change the evening shift nurse measured Ms. Robinson's CVP. She noted that it had increased from the reported 10 cm to 14 cm. She relevelled the transducer and recalibrated the monitor to be sure her reading was accurate. After confirming that Ms. Robinson's CVP was in fact 14 cm, she notified the physician, who asked for Ms. Robinson's intake and output totals for the last shift. Upon checking the totals, the nurse realized

continues

▼ REAL WORLD ANECDOTES *continued*

that Ms. Robinson's output had been significantly lower than her intake during the previous shift. The physician ordered 40 mg of furosemide IVP, and he minimized her IV fluids. Over the next 8 hours, Ms. Robinson's output increased, her blood pressure dropped to 124/82, and her next CVP reading was 12. If the day shift nurse had reassessed Ms. Robinson's CVP after noting the increase in blood pressure, Ms. Robinson's treatment would have been initiated in a more timely manner.

> CRITICAL THINKING SKILL

Introduction

The following is a scenario in which the nurse prevents an inaccurate measurement of CVP.

Possible Scenario

The nurse has just started her shift and is beginning to position Mr. Clark to measure his CVP. As she lowers the head of the bed and removes his pillow, the nurse notices that he immediately begins breathing more rapidly.

Possible Outcome

The nurse is aware that Mr. Clark's CVP has been taken the previous shift so she decides to simply take the reading quickly while Mr. Clark is flat. To compensate for Mr. Clark's respiratory distress, the nurse turns Mr. Clark's oxygen level up while she is taking the reading. As she is taking the reading, she can hear Mr. Clark's breathing become increasingly labored. Anxiously she

waits for the fluid in the manometer to stop falling. As she is concentrating on the fluid level, she suddenly realizes that Mr. Clark's breathing is no longer labored and that, in fact, she cannot hear his breathing at all. As the nurse glances over at Mr. Clark, she realizes that he is no longer breathing and she calls for emergency resuscitation.

Prevention

The nurse should have noticed a sign over the head of Mr. Clark's bed that was written by the nurse who cared for Mr. Clark on the prior shift. The sign stated that due to his history of chronic obstructive pulmonary disease (COPD), Mr. Clark had extreme difficulty lying flat, and thus all CVP readings were performed at a 45° angle. While this angle is not optimal for CVP monitoring, if all nurses were consistent in the positioning of the client, Mr. Clark's CVP measurement would be consistent and a useful diagnostic tool.

▼ VARIATIONS



Geriatric Variations:

- As a rule, geriatric clients are more sensitive to fluid shifts, and accurate CVP monitoring is even more important in this population.
- Geriatric clients may not be able to lie flat or even supine. The nurse may have to use a less-than-optimal position for measuring CVP to prevent injury to the client. Any unusual positioning or technique must be noted in the nurses' notes as well as both verbally and in the kardex at change of shift.



Pediatric Variations:

- Children are sensitive to fluid imbalances, and a slight increase or decrease from the institution's norms for CVP monitoring may have serious implications for pediatric clients.
- It is important that the right atrium is clearly marked and that all readings are zeroed, to ensure that all variations in the CVP measurements are hemodynamic changes, not technique variations.

▼ VARIATIONS *continued*



Home Care Variations:

- *Central venous pressure readings are not performed at home. A client may have a central venous catheter in place for IV fluids, frequent blood draws, or hyperalimentation. The client and family should be taught how to care for the catheter.*



Long-Term Care Variations:

- *Central venous pressure measurements are rarely performed in long-term care facilities.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not using a consistent protocol when measuring CVP.

Ask Yourself:

How do I prevent this error?

Prevention:

Make sure that the client is in the same position when CVP measurements are performed. The client should lie in a supine position without a pillow for CVP measurements. The position of the client should be standard in the institution and/or documented to ensure that all nurses caring for the client perform the measurement in the same manner.

> NURSING TIPS

- Consistency when positioning the client for CVP measurements will improve the accuracy of the measurements over time. Establish a standard client position for CVP measurements in the institution where you work so that all nurses will follow the same protocol to ensure accurate measurements.
- It is helpful to label the tubing that is used to measure the CVP. This makes it less likely that the nurse will flush the line with fluid other than normal saline, especially if the client is receiving multiple fluids.
- It is helpful to have extra sterile injection caps available at the bedside, in case one drops during the manipulation of the stopcock. It is essential that the injection caps and stopcock be sterile and intact to minimize the risk of infection.
- Be careful to close the stopcock to the manometer after measuring the CVP to prevent air from entering the client's central venous catheter.
- When changing the heparin flush solution attached to a transducer for measuring CVP, mark the fluid loss from the old bag as intake on the intake and output record.

SKILL 8-16

Drawing Blood from a Central Venous Catheter

Kathryn Lilleby, RN

KEY TERMS

Blood draw
Central venous catheter
Patent

Povidone-iodine
Urokinase
Venous access device



> OVERVIEW OF THE SKILL

A central venous line is a safe, convenient, and painless way to obtain frequent blood samples from clients with chronic disease or who require specific therapy and monitoring. Frequent venipuncture and multiple IV lines increase the risk of infection and bleeding. Clients receiving multiple doses of chemotherapy may

have hardening of the veins so that it is difficult to find a vein to use for obtaining blood samples.

Central venous catheters are inserted into a large vein, usually the superior vena cava via the subclavian vein. This allows easy access to the right atrium of the heart.

> ASSESSMENT

1. Assess the type of central venous line in place. This allows the nurse to know how many lumens are available to access.
2. Assess the need to use the central venous line for blood samples. This ensures that a blood draw schedule can be established to minimize the number of times the catheter is accessed.
3. Assess the function and patency of the catheter. This ensures minimal complications during the blood draw such as the inability to infuse normal saline or aspirate blood.
4. Assess client's knowledge of the purpose of the central venous line in relation to obtaining blood samples. Determines the need for education regarding the uses of a central venous line.
5. Check the physician's or qualified practitioner's order for blood sampling. Ensures that only necessary testing is done for the client.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit

> PLANNING

Expected Outcomes:

1. The blood sample obtained will be representative of the client's circulating blood, without undue dilution from fluids present in the central catheter.
2. The blood sample will not be contaminated by IV fluid or topical flora.
3. The blood will be collected in the appropriate containers for the ordered tests.
4. The client will not suffer any infection or complications as a result of the blood draw.
5. The client's central venous catheter will remain intact and patent during and after the blood draw.

Equipment Needed (see Figure 8-16-2):

- Povidone-iodine and alcohol swabs
- Four to five syringes (10 to 20 ml)
- Sterile drape
- Vial of normal saline solution
- Vial of heparin solution (heparin flush or heparin 100 U/ml in saline)

- Plastic clamp or metal bull-dog clamp
- Sterile needle (20 to 22 gauge)
- Blood tubes with labels and requisitions
- Sterile gloves
- Gown, mask, and eye protection optional



Figure 8-16-2 Povidone-iodine, alcohol, drape, blood collection tubes, syringes, sterile saline, and sterile heparinized saline



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the blood sampling.
2. The client should be instructed about the need for aseptic technique.
3. The client should be told the reason for flushing with normal saline and/or heparin according to the institution’s or manufacturer’s guidelines.
4. The client should be told why the blood sample is needed.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands. Don gown and apply gloves, and identify client.
2. Prepare two syringes: one with 10 ml normal saline and one with 5 ml heparin solution.
3. Expose the venous access site. Swab injection cap, catheter hub, or catheter implantation site with povidone-iodine and alcohol.
4. Shut off any IV solutions infusing through the other ports of the central line. This does not apply to life-sustaining fluids such as dopamine, nitroglycerin, nifedipine, or other medications that would adversely affect the client’s condition if shut off even briefly.
5. Clamp catheter and remove cap if appropriate.
6. Aspirate heparin solution in catheter:
 - Attach empty syringe or plastic vacutainer adapter and vacutainer tube to catheter.
 - Release clamp.

1. Reduces the transmission of microorganisms. Ensures proper client identification.
2. Preparing equipment in advance allows for a smooth procedure.
3. Prevents introduction of microorganisms into catheter.
4. Prevents dilution of the drawn blood by IV fluids infusing through nearby central line ports.
5. Prevents entrance of air into catheter.
6. Ensures patency of catheter.
 - Continues procedure.
 - Opens catheter lumen.

continues

- Aspirate 5 ml of blood.
- Clamp catheter.
- Remove syringe or vacutainer tube and discard.

7. Obtain blood samples:

- Attach empty syringe (size according to the volume of blood to be obtained) or place appropriate vacutainer tube into the plastic adapter (see Figure 8-16-3).
- Release clamp.
- Collect blood (see Figure 8-16-4).
- Clamp catheter.
- Remove syringe or adapter and attach new needle with cap to it.



Figure 8-16-3 Attach vacutainer tube.

- Aspirates heparin solution.
- Prevents air from entering catheter.
- Continues procedure.

7. Clamping catheter during changes of syringes prevents air from entering catheter.

- Allows all of the blood to be obtained for laboratory analysis at one time.
- Opens catheter lumen.
- Obtains blood samples.
- Prevents air from entering catheter.
- Continues procedure.



Figure 8-16-4 Collect blood.

8. Flush catheter:

- Attach syringe filled with 10 ml normal saline to catheter (see Figure 8-16-5).
- Release clamp.
- Flush quickly.
- Reclamp.
- Attach syringe filled with 5 ml heparin solution to catheter.
- Release clamp.
- Flush quickly.
- Reclamp.

8. Ensures that catheter will be cleared of any blood so it will not clot.

- Connects syringe to catheter.
- Opens catheter lumen.
- Flushes blood from catheter.
- Prevents air from entering catheter.
- Connects syringe to catheter.
- Opens catheter lumen.
- Injects heparin solution into catheter.
- Closes catheter lumen.



Figure 8-16-5 Flush with normal saline.

9. Place new cap on end of catheter, tape all tubing connections, and attach tubing to client's clothing.

10. Prepare blood samples:

- Insert blood-filled syringe into blood tube if necessary and allow to fill. Repeat for all tubes ordered.
- Label blood tubes with client's identification (see Figures 8-16-6 and 8-16-7).
- Fill out requisition forms and send to laboratory.



Figure 8-16-6 Label blood specimen tube with client's identification.

9. Maintains sterile seal to catheter.

10. Ensures the correct identification of the client for reporting correct laboratory results.



Figure 8-16-7 If blood specimen tubes are placed in a bag, also label the bag with the client's identification.

11. Dispose of soiled equipment and used supplies. Wash hands.

11. Reduces the transmission of microorganisms.

> EVALUATION

- The blood sample obtained was representative of the client's circulating blood, without undue dilution from fluids present in the central catheter.
- The blood sample was not contaminated by IV fluid or topical flora.
- The blood was collected in the appropriate containers for the ordered tests.
- The client did not suffer any infection or complications as a result of the blood draw.
- The client's central venous catheter remained intact and patent during and after the blood draw.

> DOCUMENTATION

Nurses' Notes

- Record the date and time the blood was obtained.
- Report that the laboratory samples were sent.
- Note the condition of the catheter.
- Record the patency of the catheter, including the ability to draw blood and difficulty of infusing fluids.
- Report occlusions, damage to the catheter, or air embolus to the physician or qualified practitioner immediately. Note the condition of the client's skin at the insertion or implantation site.



▼ REAL WORLD ANECDOTES

Scenario 1

The doctor ordered a CBC and chemistries to be drawn on Mr. Ellison in the afternoon when he made rounds. The nurse checked the order and the previous laboratory reports and noticed that a CBC had already been ordered. She reported to the physician that it had been ordered so another test was not duplicated.

continues

▼ REAL WORLD ANECDOTES *continued*

Scenario 2

Mr. Arnold's central line had been functioning well for the 2 weeks since it had been inserted. One day, however, the nurse was unable to aspirate blood. She tried flushing the line with normal saline; it flushed easily, but she was still unable to aspirate blood. She then instructed Mr. Arnold to raise his arms and cough. There was no change. She suggested taking a deep breath and then performing the Valsalva maneuver. There was still no change. Since he was already sitting on the edge of the bed, he tried lying down on his side. Again no change. Finally, he turned to the other side and the nurse was able to aspirate the blood she needed for the test. The catheter must have been lodged against the vessel so that changing position freed it. Afterward, she flushed the line with saline and then heparin and recorded the event in the nurses notes as well as reporting it to the physician.

> CRITICAL THINKING SKILL

Introduction

There are several causes of difficulty in aspirating blood from a central venous catheter. It could be a thrombus, precipitation from incompatible medications, or malpositioning.

Possible Scenario

The catheter was patent but sluggish after an incompatible drug was infused with total parenteral nutrition (TPN). Now, it is occluded. Attempts to change position, raise arms, cough, or perform the Valsalva maneu-

ver have failed. It is unknown whether a precipitate or a clot is the cause.

Possible Outcome

A venogram shows a clot at the distal end of the catheter so the physician orders urokinase, a fibrinolytic agent, to be given to dissolve the clot.

Prevention

The nurse should carefully check each drug and IV fluid being given to the client in order to plan the administration so incompatible drugs do not result in a precipitate that can cause an occlusion in the central venous catheter.

▼ VARIATIONS



Geriatric Variations:

- The volume of blood drawn should be assessed according to the client's hemoglobin and hematocrit.



Pediatric Variations:

- Children should have no more than 1 ml/kg of blood drawn per day.
- Children may not like the smell of normal saline or heparin flushes. Giving them a freshly cut lemon or peppermint candy to smell during the flushing process may help.



Home Care Variations:

- A receptacle for disposing of soiled equipment is needed.



Long-Term Care Variations:

- Be sure this procedure is performed by a person licensed to perform blood draws.
- Deposit the marked blood samples and laboratory requisition slips in the proper location for pickup by the laboratory.
- Note if the sample requires special handling so it can be properly stored until pickup.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The catheter was not clamped after the blood sample was obtained and the syringe removed so blood flowed out of the catheter and saturated the client's gown.

Ask Yourself:

How do I prevent this error?

Prevention:

Keep one hand near the clamp in order to remember to clamp the catheter. If this error occurs, clamp the catheter. Attach the syringe with normal saline and flush. Then flush with heparin. Remove the blood-soiled clothing. Note the incident for follow-up regarding the amount of blood loss.

Possible Error:

The catheter was not clamped after the blood sample was obtained and the client took a deep breath so an air embolus formed.

Ask Yourself:

How do I prevent this error?

Prevention:

Keep one hand near the clamp in order to remember to clamp the catheter between changing syringes. If this error occurs, clamp the catheter. Attach an empty syringe and aspirate blood. Observe for air bubbles. Place client on his left side with head slightly elevated. Assess for dyspnea, hypoxia, or tachycardia. Notify the physician or qualified practitioner immediately.

> NURSING TIPS

- Have all the equipment available for the procedure.
- Label the blood tubes before obtaining the sample.
- Check the label and requisition form and physician's or qualified practitioner's order before obtaining the sample. Check for any special handling requirements for the blood sample, such as refrigeration, freezing, or specially prepared blood tubes.

SKILL 8-17

Infusing Total Parenteral Nutrition (TPN) and Fat Emulsion through a Central Venous Catheter

Catherine H. Kelley, RN, MSN, OCN, Kathryn Lilleby, RN, and Susan Randolph, RN, MSN, CS

KEY TERMS

Central parenteral nutrition

Cyclic parenteral nutrition

Dextrose

Hyperalimentation

Lipid emulsions

**Malabsorption/
malnourished**

Parenteral nutrition

Peripheral parenteral nutrition

Short bowel syndrome

Total nutrient

admixture system

Total parenteral nutrition



> OVERVIEW OF THE SKILL

Total parenteral nutrition (TPN) is the intravenous administration of varying combinations of hypertonic or isotonic glucose, lipids, amino acids, electrolytes, vitamins, and trace elements. Although the formulas vary for individual clients, they are designed to be nutritionally complete and meet the total nutrient needs of the client. The TPN formulas are used for clients who, due to their disease process or treatment, are unable to receive adequate nutrition through the gastrointestinal tract. The following are examples of disease states that require this type of nutritional intervention:

- Short bowel syndrome
- Inflammatory bowel disease
- Gastrointestinal fistula
- Hypermetabolic state (severe burns)
- Intractable diarrhea
- Serious acute alimentary disease (pseudomembranous colitis)
- Chronic idiopathic intestinal pseudo-obstruction

Total parenteral nutrition can be administered either through a peripheral (PPN) or central line (CPN). Determination of the type of venous access is based on a number of factors: the length of the therapy; concentration of the TPN solutions (more hypertonic solutions require a central line); and client contraindications for line placement. Table 8-17-1 outlines the comparison between peripheral and central line administration.

Another component of TPN is the addition of lipid emulsions. Lipid emulsions are a 10% or 20% combination of triglycerides, egg phospholipids, glycerol, and water. These solutions may be given as a separate infusion; however, more commonly they are incorporated into a total nutrient admixture or three-in-one emulsion. Fatty acids are an essential part of a normal diet. Clients at risk for fatty acid deficiency will exhibit signs and symptoms such as dry skin, sparse hair, impaired wound healing, liver abnormalities, and decrease in immune system function.

Total parenteral nutrition is administered continuously over 24 hours or may be given intermittently (cyclic TPN). Cyclic TPN is given over 10 to 12 hours in a 24-hour period, which allows for easier integration of the therapy into the client's lifestyle and minimizes adverse effects of TPN. Intermittent therapy is desirable for those clients on long-term therapy at home.

Total parenteral nutrition may have both physiological and psychological consequences for the client. Clients may feel socially isolated if they cannot eat and are unable to enjoy the usual atmosphere, which centers on food. Client and family education and support become integral components of the treatment plan.

This procedure will focus on the administration of TPN through a central line, also known as central parenteral nutrition (CPN).

Table 8-17-1 Comparison between Peripheral and Central Line Administration

PARAMETER	PERIPHERAL ADMINISTRATION	CENTRAL ADMINISTRATION
Osmolality	600–700 mOsm	1800–2000 mOsm
Usual daily caloric intake	700–2000	2000–4000
Fat emulsion	Major caloric source	Minor caloric source
Duration of therapy	3–7 days	> 6 days
Objectives	Weight maintenance	Weight gain or maintenance

> ASSESSMENT

1. A nutritional assessment should be preformed prior to initiating therapy. There should also be a plan of care for ongoing nutritional assessment as the client proceeds with this therapy. **Central parenteral nutrition is indicated when a client has been or is expected to be unable to take adequate oral or enteral nutrition due to the inability to ingest, digest, or absorb nutrients.**
2. Determine the type of venous access to be utilized for TPN. Anticipate placement of a central venous line if indicated. **Clients that require TPN short term and have adequate peripheral assess may be candidates for PPN depending on the concentration of the solution ordered. If the client needs a central line for access, that procedure will be scheduled in advance and the nurse may be required to assist with the line placement.**
3. Review the physician’s or qualified practitioner’s orders and the TPN formula. Compare the ordered solution with the venous access to be utilized. **Remember, the concentration of the TPN solution will determine the need for a central line. For example, a dextrose solution >10% should be given via central versus peripheral line.**
4. Review the client’s medical history and rationale for CPN. **The nurse should have an understanding of the disease process, treatment plan, or acute situation (burns, trauma) that has led to the need for CPN. This knowledge will help the nurse anticipate the length of time the client may expect to remain on CPN and he or she will format the teaching plan for self-care accordingly.**
5. Review the client’s normal range of vital signs, weight, electrolytes, liver function, triglyceride levels, and fluid balance. Also check blood counts in clients that may be at risk of neutropenia, either due to their disease process or treatment. **Central parenteral nutrition can produce serious complications such as metabolic changes, fluid and elec-**

trolyte imbalance, line maintenance, or sepsis. It is critical that the nurse understands the client’s baseline data and monitor for complications.

6. If the client is to receive a lipid emulsion, review the client’s history of food allergies, particularly to egg, soybean, or safflower products. **Lipid emulsions may contain these products, and clients may experience adverse side effects such as fever, chills, or rash during administration.**

> DIAGNOSIS

- 1.1.2.2 Altered Nutrition, Less Than Body Requirements
- 1.2.1.1 Risk for Infection
- 9.3.1 Anxiety related to the disease process and treatment plan
- 5.1.1.1 Ineffective Individual Coping related to the disease process and treatment plan
- 8.1.1 Knowledge Deficit related to self-care management

> PLANNING

Expected Outcomes:

1. Client maintains ideal body weight (for those clients on preventative CPN).
2. Client gains 1 to 2 pounds per week to reach ideal body weight as appropriate.
3. Serum glucose levels are less than 200 mg/dl.
4. Venous access site remains patent and free of signs and symptoms of infection.
5. Client masters self-administration of CPN in those situations requiring long-term nutritional support.

Equipment Needed (see Figure 8-17-2):

- Disposable gloves
- IV infusion tubing



Figure 8-17-2 Gloves, IV pump, tubing, alcohol, povidone-iodine, and sodium chloride

- IV infusion pump
- CPN solution
- IV filter (optional: 0.22 μm for dextrose/amino acids; 1.2 μm for three-in-one solutions)



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the rationale for CPN as it relates to the client's disease state.
2. Instruct the client to report discomfort around the venous access site during infusion.
3. Teach the client and caregiver catheter care procedures for long-term administration as appropriate.
4. Instruct the client to report any symptoms of infection or sepsis, such as shaking, chills, malaise, fever (if not in a monitored setting), and redness or tenderness at catheter site.
5. Instruct the client to report any symptoms of hyperglycemia: thirst, malaise, flushed skin, nausea or vomiting, or polyuria. Also review with client symptoms of hypoglycemia: headache, drowsiness, diaphoresis, dizziness, tremor, tachycardia, muscle twitching, or seizure activity.
6. Review with the client symptoms related to venous thrombosis—a potential complication of CPN. These symptoms include edema and pain in neck or shoulder, leaking of infusate around catheter site, and inflammation or swelling at insertion site.
7. Instruct the client to report any symptoms associated with a potential allergic reaction such as rash, shortness of breath, headache, flushing, pain in chest or back, or chills.
8. Teach the client to report any adverse symptoms.
9. Teach the client emergency measures in the event of problems with the central line (breakage, disconnection from IV tubing). Include information regarding true emergencies (and calling 911) versus reporting minor problems to the physician or qualified practitioner or home care team.
10. In the home care setting, teach the client to call the home care provider with any questions related to the solution or the infusing device. The home care provider will usually work with the client over the phone to solve the problem and provide a nursing visit for those problems that the client cannot resolve by phone.
11. Teach the client to weigh self daily on the same scale and at the same time for more accurate results. The client may also need to know how to take his temperature.
12. Allow the client to observe the central line catheter site during routine care so he will have a baseline of what to expect as he learns self-care.
13. Ask the client to tell you why he is receiving TPN and fat emulsion.
14. Tell the client how long to expect to receive TPN.
15. Discuss the need for setting aside a special place for IV fluids at home.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Remove TPN from refrigerator at least an hour before hanging, if appropriate (see Figure 8-17-3).
2. Inspect fluid for presence of cracking or for precipitate or discoloration of solution. If the

RATIONALE

1. Some solutions must be refrigerated, decreases risk of hypothermia or venous spasm.
2. The CPN solution should be clear without clouding. The three-in-one solution should be



Figure 8-17-3 Remove lipid emulsion from the refrigerator at least an hour before hanging, if necessary. Inspect for cracking or discoloration.

solution is a three-in-one solution, check for a cream layer of separation. Check label against order and check expiration date.

3. Wash hands and identify client.
4. Using aseptic technique, attach tubing (with filter) (see Figure 8-17-4) to the CPN bag or bottle; prime tubing.
5. Attach tubing into volume control infusion pump (see Figure 8-17-5). Connect the tubing to the catheter. With some infusion devices, you may connect the IV tubing first to the client's catheter and then to the infusion device.

Figure 8-17-5 Connect the tubing to the volume control infusion pump.

6. Regulate flow rate based on client's nutritional and metabolic needs.



Figure 8-17-4 Attach the tubing to the lipid emulsion bottle.

uniform without areas of fat separation. If there is any problem with the solution, notify pharmacy and receive a new product.

3. Reduces the transmission of microorganisms. Ensures proper client identification.
4. Prevents air embolus.
5. Note that infusion pumps vary on tubing requirements, priming, and attachment to the central line. Review this information and be familiar with the equipment before beginning this step.



6. Flow rate may begin at 40 to 60 ml/hr. The rate is increased each day toward a target goal. For example: Begin the infusion flow rate at one-half the end desired rate for 1 hour; then increase to the end desired rate. Institute more gradual tapering increments for pediatric clients.

7. Check to see that all IV connections are secured.
8. Recheck flow rate on infusion pump; check to see that unit is plugged into wall or has adequate battery reserve (see Figure 8-17-6).

Figure 8-17-6 Check the infusion pump and the flow rate, and make sure the pump is on and operating correctly.

9. Wash hands.

7. Prevents disconnection of tubing. Many facilities tape the connections as an added measure of security.

8. Prevents flow rate errors.



9. Reduces the transmission of microorganisms.

> EVALUATION

- If this is a new start of therapy, monitor the client's response hourly, assessing for complications such as allergic reactions, fluid overload, occlusion of the line, and electrolyte imbalance (mental status changes).
- Monitor blood glucose frequently with initiation of CPN; schedule will vary per facility routines.
- Monitor electrolytes daily, particularly liver function tests and triglyceride levels, and assess for the presence of jaundice. Clients on long-term CPN will require ongoing evaluation of liver function tests (at least monthly).
- Monitor client's weight daily and intake and output, and assess for peripheral edema.
- Inspect venous access site for signs of infection and patency.
- Check breath sounds for crackles, indicating fluid overload.
- Table 8-17-2 outlines some of the more common complications of CPN therapy. The nurse should be

familiar with these and incorporate the information into his or her ongoing assessment of the client.

> DOCUMENTATION

Nurses' Notes

- Document initiation of therapy; record client's pre-infusion vital signs.
- On the medication record, document the components of the CPN solution (some facilities have pre-typed labels that the nurse verifies and documents).
- Document client's response to initial flow rate and subsequent increase in rate.
- Document tubing changes and condition of venous access site. Review record for date that the venous access site dressing was last changed.
- Document client/caregiver education.
- Document results of the physical assessment (e.g., breath sounds) during the infusion.

Table 8-17-2

TECHNICAL COMPLICATIONS	SYMPTOMS	ACTION
Pneumothorax	Sharp pain in chest, dyspnea after insertion of central line	Stop infusion; obtain chest x-ray as ordered by physician or qualified practitioner.
Air embolism	Chest pain, dyspnea, tachycardia, apprehension, shock	Clamp central line near insertion site; turn client to left side in Trendelenburg position provide respiratory support.
Venous thrombosis	Edema and pain in neck, shoulder, and arm; leaking of infusate around site	Remove catheter as ordered; culture tip; administer anticoagulant therapy as ordered.

Table 8-17-2 *continued*

TECHNICAL COMPLICATIONS	SYMPTOMS	ACTION
Clot or blockage in catheter	Infusion pump unable to deliver solution; occlusion	Check tubing for kinks; provide urokinase to dissolve blockage as ordered.
Difficulty aspirating blood from line	Catheter tip may be against atrium or vessel wall; fibrinous sheath around catheter tip	Have client change position; raise arms; take a deep breath; may need to declot.
METABOLIC COMPLICATIONS	SYMPTOMS	ACTION
Hyperglycemia	Thirst, malaise, polyuria, nausea and vomiting, flushed skin, dry mouth	Monitor blood glucose; insulin dose in solution may be adjusted; check urine for sugar and acetone.
Hypoglycemia	Headache, dizziness, drowsiness, diaphoresis, tachycardia, tremor, seizures	May administer D ₁₀ W as ordered if CPN is stopped.
Protein intolerance	Nausea, vomiting, diarrhea, jaundice	Reduce rate of infusion as ordered. Reduce concentration of protein source in solution as ordered.
Electrolyte imbalance	Symptoms vary with specific disturbances; nausea, vomiting, muscle weakness, confusion, lethargy are common to many of these imbalances.	Treat imbalances as ordered; monitor electrolytes regularly; assess client behavior and associated symptoms.
Fatty acid deficiency	Dry, scaly skin; sparse hair; poor wound healing; thrombocytopenia; fatty degeneration of the liver	Monitor serum triglycerides; CPN solution should contain 4%–10% of total caloric intake as lipids.
Trace element deficiencies	Dermatitis, hair loss, impaired wound healing, diarrhea (zinc); or anemia, neutropenia (copper)	Monitor serum copper and zinc levels; add trace elements to CPN.
Liver toxicity	Liver tenderness; elevated liver tests	Monitor liver function.
Allergic reaction to amino acids, peptides, or fats	Headache, fever, chills, nausea, vomiting, or rash	Check vital signs. Report symptoms; may result in discontinuation of CPN.
Excessive weight gain	Client gains more than 1/2 lb./day; signs of edema	Evaluate daily weights; monitor for fluid retention or overload.
INFECTION	SYMPTOMS	ACTION
Bacteremia/sepsis	Fever, chills, hypotension, tachycardia, tachypnea, change in level of consciousness	Discontinue CPN if ordered; obtain blood cultures; monitor vital signs; remove catheter as ordered; administer antibiotics as ordered.
Catheter site infection	Swelling; purulent drainage	Culture site; remove catheter as ordered; change dressing with aseptic technique; administer antibiotics as ordered.
PSYCHOLOGICAL COMPLICATIONS	SYMPTOMS	ACTION
Psychological complications	Anxiety, depression, oral cravings, feelings of isolation from social activities	Encourage verbalization of feelings; provide client education; encourage participation in self-care; provide diversional activities; provide support and encouragement for client and caregiver.



▼ REAL WORLD ANECDOTES

Scenario 1

Mr. George was nearing hospital discharge and the staff were in the process of converting his CPN therapy from a 24-hour infusion to a 12-hour cyclic schedule. Upon routine assessment of Mr. George, the nurse found him to be very shaky, dizzy, and anxious. She called the physician, who suspected that the CPN had been stopped too rapidly and Mr. George was suffering from hypoglycemia. The nurse checked his blood glucose and provided him with D₁₀W per the physician's order. The taper schedule was changed for the next cycle of TPN to a more gradual rate.

Scenario 2

Mike was a new nurse in the surgical unit. He knew how important it was to provide care to his clients in a timely fashion. Mike had three clients on CPN. One of them, Mr. Green, had an occlusion of his central line during the night and was 1½ hours behind in his CPN administration schedule. Mike felt it was important to keep Mr. Green on his schedule and increased the CPN infusion rate to “catch up” during his shift. Mr. Green reported symptoms of thirst and frequent urination. He was suffering from hyperglycemia from receiving the solution too quickly. Central parenteral nutrition therapy must be infused as ordered, without rate adjustments in order to “catch up” for other temporary interruptions in the therapy.

> CRITICAL THINKING SKILL

Introduction

Caring for the client on CPN also means caring for the central line. Prevention of complications arising from the line placement or line maintenance is key for clients receiving this therapy.

Possible Scenario

Mrs. Bauer had a subclavian catheter placed in anticipation of initiating CPN therapy. Currently she was only receiving normal saline to maintain the line until the compounding was completed for her CPN solution. Mrs. Bauer's call light went on. When the nurse entered the room, Mrs. Bauer was short of breath, very anxious, coughing, and reporting chest pain. The nurse quickly clamped the central line and placed the client on her left

side, in Trendelenburg position. She immediately called the physician. Upon close inspection of the IV tubing, the nurse noticed that it was disconnected at the extension tubing site.

Possible Outcome

Most likely the client had received an air embolism from the disconnected central line.

Prevention

Carefully check all connections with each client assessment. Many settings require that the connection sites be taped together for added security. Teach the client to help monitor the connections as well; frequently it may be the client that reminds a nurse to tape a tubing connection.

▼ VARIATIONS



Geriatric Variations:

- Older adults may have visual or mental impairment, which may interfere with their ability to perform self-care routines related to the central line dressing or administration of CPN. Precautions may be needed to protect the central line site, particularly if the client is disoriented.
- Elderly clients are also at risk for lipid intolerance and hyperglycemia.
- The geriatric client will need to be monitored for fluid overload and cardiac status when receiving these concentrated IV fluids.

▼ VARIATIONS *continued*



Pediatric Variations:

- Central parenteral nutrition may be indicated for infants with gastrochisis, congenital anomalies of the gastrointestinal system, or short bowel syndrome. Infants are also more prone to complications such as hepatobiliary dysfunction.
- Care and protection of the central line for infants and young children are especially important. Young children should be carefully supervised at all times. Additional extension tubing may be required for children in order to allow them adequate room to play and move about.
- Glucose levels may be difficult to maintain in children.
- Children will need emotional support with frequent glucose monitoring if done by needle stick.



Home Care Variations:

- Extensive client and caregiver education is needed to successfully manage this therapy in the home setting. The therapy administration schedule will need to be integrated into the client's lifestyle; most of these clients will be on cyclic CPN.
- The client should have written information related to the storage, handling, preparation, and infusion instructions.
- Care should be taken to ensure that the client has a refrigerator, which can store the premixed solutions at 2°–8°C (35.5°–46.5°F).
- Client and caregiver should be taught aseptic technique for caring for central venous catheter, tubing, and IV fluids.
- Clients should be taught to record their weight, intake and output, and glucose levels.



Long-Term Care Variations:

- Long-term care facilities may not be equipped for the management of CPN. Some facilities will require pharmacy support from a qualified provider and extensive training of nursing personnel for the ongoing management of the client on this therapy.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Upon removal from the refrigerator, the CPN solution (three-in-one) has a layer of separation, or “creaming,” of the solution.

Ask Yourself:

How do I prevent this error?

Prevention:

The nurse cannot actually “prevent” solution separation. However, her role is critical in inspecting the solution prior to administration for signs of discoloration, precipitation, or separation.

Possible Error:

The CPN solution is tapered too quickly.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Verify the physician's or qualified practitioner's orders for the solution composition and for the rate ordered. Verify that the infusion pump is set for the correct rate and that it is operating properly. If this error does occur, call the physician or qualified practitioner. The client may exhibit symptoms of hypoglycemia. The physician or qualified practitioner may order D₁₀W at the previous CPN rate. He may also have the blood glucose checked.

> NURSING TIPS

- Prepare several syringes with normal saline to have available for flushing the catheter.
- Have a reference card for drug compatibility to refer to.
- Write a medication schedule to ensure safe administration.
- Have an extra cap and syringes at hand.
- Hyperglycemia is defined as a serum glucose of >160 mg/dl and causes thirst and increased urination due to a lack of insulin in the bag of TPN.
- Hypoglycemia is defined as a serum glucose of <80 mg/dl and causes the client to be shaky, dizzy, nervous, and anxious due to an excess of insulin or TPN that is stopped abruptly.
- Be familiar with the infusion pump. Some pumps can be programmed for a tapering schedule. Other devices will require manual programming for each change.
- Allow adequate time for client teaching for those clients going home on this therapy. Always include a caregiver in the teaching session and allow for adequate opportunity for return demonstration. Provide written instructions and check client's insurance benefits for home care services.
- It is important that the home environment be reviewed with the client who is self-administering CPN. Does the client have, for example, adequate refrigeration, electricity, water supply, and access to 911.
- Check carefully the prepared CPN solution with the physician's or qualified practitioner's orders. The solution is composed of many types of additives (i.e., trace elements) that are an important part of the therapy.
- Always use sterile technique when working with the central line due to the increased risk for septicemia.

SKILL 8-18

Removing the Central Venous Catheter

Eva Gallagher, RN, BSN

KEY TERMS

Catheter
Central venous catheter
Central venous catheter removal

Infection
Thrombosis



> OVERVIEW OF THE SKILL

Central venous catheters can remain patent and free from infection until treatment is no longer required. However, infections involving catheters do occur and often are indications for catheter removal. If the catheter is blocked, an effort should be made to attempt to aspirate the clot gently with a syringe. Any unusual sign or symptom (chills, fever) occurring immediately

after a procedure may indicate septic thrombosis and is an indication for catheter removal. Removal of a central venous catheter can be performed in a clinic or in a client's hospital room. Catheter removal is performed by a qualified health care professional. Check your institution policies regarding specifics of who this includes.

> ASSESSMENT

1. Verify policy regarding removal of central venous catheter. This allows the nurse to assure institution policies are being followed.
2. Check original order regarding removal of central venous catheter. Identification of this information assures the nurse that removal of the catheter is indicated at this time.
3. Assess client's knowledge regarding central venous catheter removal. Determines need for education about this procedure.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection related to indwelling central venous catheter

- 1.4.1.1 Risk for Reduced Tissue Perfusion related to thrombus formation from indwelling central venous catheter

> PLANNING

Expected Outcomes:

1. Central venous catheter will be removed in accordance with institution policy.

Equipment Needed:

- Scalpel
- Gauze, 4 × 4's
- Tape
- Sterile container for culture of catheter tip (if ordered)
- Sterile scissors



Estimated time to complete the skill:

5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain sensation felt when central venous catheter is removed.
2. Explain what exit site will look like when central venous catheter is removed and care needed.
3. Discuss how to care for exit site wound when the client is sent home.
4. Make sure client knows who to call with questions.
5. Reinforce verbal teaching with written instructions.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands and apply gloves.
2. Check physician's or qualified practitioner's written orders regarding removal of catheter.
3. Check the client's arm band before removing catheter.
4. Set up equipment and supplies. Open sterile packages using sterile technique (see Figure 8-18-2).

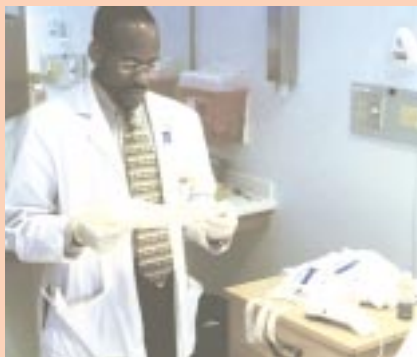


Figure 8-18-2 Open sterile packages using sterile technique.

5. Remove tape and dressings from around catheter (see Figure 8-18-3).
6. Remove the catheter by freeing the cuff from the tissue and pulling the catheter gently and smoothly (see Figures 8-18-4 and 8-18-5). Do not use a sharp, jerking motion or undue force.
7. Apply pressure to the site. Assess for bleeding (see Figure 8-18-6).

RATIONALE

1. Practices sterile technique.
2. Ensures removal of catheter is indicated.
3. Ensures right client.
4. Ensures a smooth procedure.



Figure 8-18-3 Remove the tape and dressing.

5. Allows visualization of the catheter.
6. Avoids breaking the catheter while removing and tearing tissue around the exit site.
7. Prevents excess bleeding.



Figure 8-18-4 Free the cuff from the tissue.



Figure 8-18-5 Remove the catheter by pulling in a gentle, smooth motion.



Figure 8-18-6 Apply pressure to the site.



Figure 8-18-7 Make sure that the catheter tip is intact. Cut off the catheter tip into a sterile container if a culture has been ordered.

8. Cut off tip of catheter into a sterile container if culture is ordered (see Figure 8-18-7).
9. Place two or three 4 × 4's over exit site and hold pressure for a few minutes until bleeding stops. Apply a dressing using two 4 × 4's and tape.
10. Wash hands.

8. Needed to diagnose infection of central venous catheter.
9. Attempts to decrease bleeding.
10. Decreases transmission of microorganisms.

> EVALUATION

- Return within appropriate time (10 to 20 minutes) to evaluate client's response to catheter removal and exit site.

> DOCUMENTATION

Nurses' Notes

- Date and time of central venous catheter removal
- Description of exit site
- Client's response
- Signature of nurse



▼ REAL WORLD ANECDOTES

The nurse gets an order from Jerry's physician to remove his central venous catheter. She gathers the supplies and enters his room. After preparing the client for this procedure, she frees the cuff from the tissue and gently pulls the catheter. The catheter offers resistance and will not give. The nurse

continues

▼ REAL WORLD ANECDOTES *continued*

decides to inject some subcutaneous lidocaine and performs a cutdown. She then removes all the sutures at the venotomy site and removes the catheter. The nurse was reminded of the importance of not using force or jerking movements when removing the catheter to prevent breakage.

> CRITICAL THINKING SKILL

Introduction

Central venous catheter removal can be safely performed by a qualified health care professional in a clinic. However, occasionally catheters break, are accidentally cut, or fall out. It is important that the client and the nurse know how to handle these situations.

Possible Scenario

The nurse working with Mary heard a noise from her room and entered to see what happened. She found Mary on the floor and her IV equipment with the central line still attached, on the other side of the room. Mary was holding her chest with her hands and the nurse noticed that there was a significant amount of blood on Mary's hands. Mary told her nurse that she was dizzy when she

stood up to go to the bathroom and she fell over. The nurse was reminded of the importance of making sure clients are helped out of bed when dizzy.

Possible Outcome

The nurse helped the client back to bed and covered the catheter exit site with three 4 × 4's applying pressure until the bleeding stopped. She then contacted the client's physician to report the incident and inquire about new intravenous access.

Prevention

Remind clients to call for help when out of bed, especially if they are feeling dizzy. Warn them of the possibility of the catheter becoming dislodged.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have fragile skin. They may be more prone to bruising, tearing the skin, and hematoma development.



Pediatric Variations:

- Assess frequently for signs of infection. Small children are at greater risk for central line related bacteremia, which often requires removal and replacement of the catheter.
- Have another nurse or a parent assist with distracting or gently restraining the child during the procedure, if needed.



Home Care Variations:

- Central lines are generally removed in the hospital or clinic setting. Make a point to review the policy at the agency where you work. Have a contingency plan to arrange for this procedure if the home care client must have the catheter removed unexpectedly.



Long-Term Care Variations:

- Watch for signs and symptoms of infection or bacteremia that may necessitate catheter removal in the long-term care client.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

One hour after removing the central venous catheter, the client calls the nurse into his room to find that the gauze dressing that was applied following central venous catheter removal was completely saturated with blood.

Ask Yourself:

How do I prevent this error?

Prevention:

Always check back within 10–20 minutes after removing the central venous catheter to see if bleeding has stopped or if dressing needs to be changed. If this error does occur, apply a new 4 × 4 gauze to catheter exit site. Apply pressure for a few minutes until bleeding has stopped.

> NURSING TIPS

- Become familiar with the central venous catheter removal policy at the facility in which you work.
- If the client is able to cooperate, have him perform a Valsalva maneuver (hold breath and bear down) during removal to prevent an accidental air embolism.
- Think through the steps and review written instructions if unsure about how to remove the central venous catheter.

SKILL 8-19

Inserting a Peripherally Inserted Central Catheter (PICC)

Kathryn Lilleby, RN

KEY TERMS

Aspirate	PICC
Basilic vein	Stylet
Cephalic vein	Subclavian vein
Guidewire	Superior vena cava
Introducer needle	
Peripherally inserted central catheter	



> OVERVIEW OF THE SKILL

A peripherally inserted central catheter (PICC) is used for clients who need a venous access for 1 week to 3 months. The advantages of a PICC compared to a central venous catheter include less risk of pneumothorax, hemothorax, or air embolism and less cost. A PICC is also preferred over a peripheral IV since it can remain in place longer and, has less risk of infiltration and phlebitis.

A PICC can be used for infusions of IV fluids, parenteral nutrition, blood products, and medications. Some PICCs can be used to draw blood samples.

A client eligible for a PICC must have a palpable cephalic or basilic vein in the antecubital fossa.

The catheter is made of soft, nonirritating materials and they vary in size from 16 to 24 gauge with a length from 40 to 60 cm. The catheter can have a single, double, or triple lumen. It is inserted using a guidewire or stylet to make the catheter stiff and easier to advance into place. Complications of PICCs may include clotting, leaking, or breaking of the catheter.

> ASSESSMENT

1. Check the physician's or qualified practitioner's order for the type of catheter to ensure accurate placement of the PICC.
2. Review information regarding the insertion of the catheter in order to insert the catheter safely.
3. Know the agency's policy regarding who may insert a PICC as many agencies require special training for nurses before they can perform this procedure.
4. Assess the pulse of the cephalic or basilic vein in the antecubital fossa to ensure that the client is a good candidate for a PICC.

5. Check the client's fluid, electrolyte, and nutritional status to provide baseline data for comparison with the client's response to IV therapy.
6. Assess the client's understanding of the purpose of the procedure so that client teaching can be used to decrease anxiety.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 6.1.1.1.1 Risk for Peripheral Neurovascular Dysfunction

> PLANNING**Expected Outcomes:**

1. The PICC will be inserted into the vein without complications and will remain patent.
2. The client will remain free of infection, thrombus, or other complications secondary to the insertion of a PICC.
3. The client will not suffer from neurovascular damage to the extremity secondary to the PICC insertion.
4. The client will be able to discuss the purpose of the PICC.

Equipment Needed (see Figure 8-19-2):

- Two pairs of sterile gloves
- Two drapes (one fenestrated and one nonfenestrated)
- Sterile forceps without teeth
- Sterile scissors
- Tourniquet
- Three povidone-iodine swabs
- Three alcohol swab sticks
- Two sterile 2 × 2 gauze pads
- Two sterile 4 × 4 gauze pads
- Tuberculin syringe and 25-gauge needle
- Vial of 1% lidocaine
- Transparent dressing
- Steri-strips
- Six 10-ml syringes with 1-inch, 21-gauge needles
- Four-inch extension tubing (one for each lumen)
- Injection cap (one for each lumen)
- Two 10-ml vials of sterile normal saline for injection
- A 10-ml vial of heparin 10 to 100 U/ml (check agency policy for heparin solution use)
- Peripherally inserted central catheter (size and length determined by size of client's vein and type of infusion ordered)
- Two tape measures (one sterile and one nonsterile)
- Face mask, gown, goggles (optional)



Estimated time to complete the skill:

30 minutes**> CLIENT EDUCATION NEEDED**

1. The client should be given oral and written instructions about the insertion of a PICC.
2. The client should be taught to report any signs of inflammation, clotting, leaking, or breaking.
3. The client should be taught how to bathe without getting the dressing wet.
4. The client should be warned not to participate in activities that may dislodge the catheter such as weight-lifting or golf.
5. The client should be assured that he can move his arm freely but may be restricted due to the dressing on his antecubital fossa.



Figure 8-19-2 PICC catheter, catheter insertion kit, sterile drapes, lidocaine, and dressings

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Check physician's or qualified practitioner's order for PICC, and identify client.
2. Wash hands; apply mask and gown.
3. Organize all equipment at bedside.

RATIONALE

1. Ensures accurate insertion of catheter.
2. Reduces the number of microorganisms.
3. Ensures smooth procedure without accidents or contamination.

continues

4. Explain procedure and reason the catheter is being inserted.

5. Identify vein to be used:

- Place a tourniquet around the right upper arm close to the axilla.
- Examine the veins in the antecubital fossa.
- Release the tourniquet.

6. Ask the client to lie flat in bed with arm extended at a 90° angle. Have client apply mask to cover mouth and nose (see Figure 8-19-3).



Figure 8-19-3 Have the client lie flat. Apply a mask to the client to cover the nose and mouth.

7. Determine the length of catheter:

- For subclavian placement, measure from the insertion site up the arm to the shoulder and across to the midclavicular line.
- For superior vena cava placement, measure from the insertion site up the arm to the shoulder, across to the sternal notch, and down to the third intercostal space on the right of the sternum.

8. Prepare supplies and sterile field:

- Open sterile towel and place on table for the sterile field.
- Open sterile supplies (gauze, extension tubing, and injection cap) and drop onto sterile field.
- Place heparin and saline vials next to sterile field.

9. Clip hair on skin at site if necessary.

4. Information decreases anxiety.

5. The cephalic or basilic vein may be used; however the basilic vein is preferred because it is straighter.

- Allows veins to fill with blood.
- Determines the most appropriate vein.
- Releases engorgement of vein.

6. Ensures a straight course for the catheter to be advanced in the vein. Mask protects the sterile field.



Figure 8-19-4 Swab the area with alcohol, then three povidone-iodine swabs.

7. The physician's or qualified practitioner's order will be carried out.

- Anatomic landmarks correspond with the venous structures below.
- Parenteral nutrition or any irritating solution should be infused into the superior vena cava with its high blood flow.

8. Provides a sterile working surface for an efficiently performed procedure.

9. Ensures adherence of dressing and that removal is less painful. Shaving should be avoided since it causes small abrasions that increase the risk of infection.

10. Put on sterile gloves.

11. Prepare catheter and tubing:

- Measure the catheter with the sterile tape to the length determined and add 1 inch.
- Cut the catheter with sterile scissors at the appropriate length. Or coil the excess catheter and tape to arm after insertion.
- Attach the injection cap to the extension tubing.
- Draw up 5 ml of normal saline into a syringe using a sterile gauze to hold the nonsterile vial.
- Flush each cap, tubing, lumen with sterile saline, and leave the syringe in place.
- Inspect the catheter for cracks or kinks.
- Verify patency of introducer.

12. Prepare insertion site:

- Place sterile drapes under the arm.
- Scrub the insertion site with three alcohol swabs, then three povidone-iodine swabs (see Figure 8-19-4).
- Allow the povidone-iodine to dry.

13. Remove gloves and reapply tourniquet.

- Place sterile 4 × 4 gauze over tourniquet.

14. Put on new pair of sterile gloves without powder.

15. Place sterile drapes over the insertion site (see Figures 8-19-5 and 8-19-6).



Figure 8-19-5 Place sterile drapes over the insertion site.

10. Reduces transmission of microorganisms.

11.

- Ensures the tip of catheter will be in desired position.
- Cutting straight across may prevent the catheter tip from lying against the wall of the vein, causing an occlusion.
- Continues procedure.
- Prepares saline solution for flushing catheter.
- Prevents air embolus.
- Ensures proper function of catheter.

12.

- Reduces transmission of microorganisms.
- Alcohol removes fat on the skin and vigorous scrubbing in circular motion with povidone-iodine removes bacteria. Using a separate swab and starting in the middle of the site working outward prevent bacteria from being reintroduced to the site.
- Povidone-iodine must be dry to be effective.

13. Nonsterile tourniquet should not be touched with sterile gloves. Tourniquet is needed to allow the vein to engorge for easier venipuncture.

- Allows release of tourniquet without contamination.

14. Reduces transmission of microorganisms during procedure. Powder could adhere to catheter.

15. Provides a sterile field at the site.



Figure 8-19-6 Sterile drapes should completely cover the area surrounding the insertion site.

16. Inject local anesthetic of 0.1–0.2 ml of 1% lidocaine at the insertion site (see Figure 8-19-7).



Figure 8-19-7 Numb the site by injecting local anesthetic.

16. Reduces pain.



Figure 8-19-8 After inserting the introducer, insert the catheter through the introducer needle and advance 2–3 inches.

17. Insert the PICC:

- Insert the introducer needle at a 20–30° angle with the bevel up.
- Watch for a quick blood return through the introducer.
- Verify its placement in a vein, not artery.
- Advance the introducer $\frac{1}{4}$ – $\frac{1}{2}$ inch further into the vein while it is parallel to the skin.
- Insert the catheter through the introducer needle (see Figure 8-19-8).
- Advance the catheter slowly 2–3 inches using the nontoothed forceps maintaining the end of the catheter on the sterile field.
- If a guidewire is used, be sure that it remains within the lumen of the PICC during insertion.
- Release the tourniquet using the sterile 4 × 4 gauze.
- Advance the catheter 6 more inches depending on the client's size until the tip of the catheter is at the shoulder.
- Instruct the client to turn his head toward the venous access site and drop his chin to his chest (see Figure 8-19-9).
- Continue to advance the catheter to the predetermined length.
- Withdraw the introducer needle using the forceps. Apply pressure 2 inches above the insertion site to maintain the catheter in place (see Figure 8-19-10).
- Tell the client they will hear a snapping sound when the needle is removed.

- 17.

- Prevents puncture of posterior wall of vein.
- Indicates introducer has entered the vein.
- The brachial vein is close to the brachial artery. Arterial blood is bright red and pulses.
- Ensures the introducer is in the vein.
- Makes a path for the catheter to enter the vein.
- Prevents trauma to the vein when advanced slowly.
- Prevents contamination of catheter. Also, agency policy must be checked for use of guidewire or stylet to stiffen catheter during advancement.
- Prevents contamination of the sterile glove.
- Allows catheter to travel further up the vein.
- Facilitates the catheter to enter the subclavian vein.
- Ensures proper placement of the catheter.
- Prevents accidental puncture of the vein with the introducer. Ensures that the catheter will not be withdrawn with the introducer since it could cut off the catheter, causing a catheter embolism.
- Prevents anxiety during procedure.



Figure 8-19-9 Have the client turn his head and drop his chin to help the catheter enter the subclavian vein.



Figure 8-19-10 Withdraw the introducer while applying pressure 2 inches above the site to keep the catheter in place.

- Press the wings together until they snap; then peel the needle from around the catheter.
- If a guidewire has been used, remove it with a gentle twisting motion.

18. Check catheter placement:

- Attach a syringe filled with 3 ml of normal saline to the lumen (see Figure 8-19-11).
- Aspirate blood.
- Flush the catheter with normal saline.
- Repeat if there is more than one lumen.



Figure 8-19-11 Attach a syringe with 3 cc of normal saline to the catheter lumen and flush the catheter.

19. Secure catheter in place:

- Remove the syringe and attach the extension tubing and cap to the lumen.
- Place Steri-strips over the hub of the catheter or suture in place (see Figure 8-19-12).
- Place 2 × 2 gauze pads over insertion site and cover with transparent dressing (see Figure 8-19-13).
- Coil the extension tubing and tape to client's arm.

20. Fill syringe with 3 ml heparin and flush each lumen (please note, not all PICCs require heparin).

- Prevents the catheter from being punctured by the needle.
- Opens lumen for use. Prevents injury to catheter and vein.

18. Verifies patency of the catheter.

- Prepares saline for injection.
- Verifies patency of the catheter
- Prevents blood from clotting in the catheter.
- Ensures all lumens are patent.



Figure 8-19-12 Suture the catheter in place.

19.

- Maintains sterile, closed system.
- Ensures catheter's safe position.
- Controls bleeding by pressure for first 24 hours after insertion.
- Prevents accidental dislodgment.

20. Maintains patency of lumen.



Figure 8-19-13 Dress the site with gauze and transparent dressing.



Figure 8-19-14 Label the dressing with the date and time of the insertion.

21. Remove gloves and dispose with all used materials.
22. Place label with date and time of insertion and size and gauge of catheter on the dressing (see Figure 8-19-14).
23. Wash hands.
24. Order chest x-ray to document correct placement of PICC.
25. Postinsertion care of the PICC:
 - Replace 2 × 2 gauze with sterile, transparent occlusive dressing 24 hours after insertion.
 - Change dressing every 3–7 days.
 - Check length of external tubing with each dressing change.
 - Flush the catheter with normal saline, then heparin (if necessary, per agency policy) after any infusion.

21. Reduces transmission of microorganisms.
22. Provides information to schedule next dressing change.
23. Reduces transmission of microorganisms.
24. Ensures solution will be infused into the subclavian vein or superior vena cava.
25.
 - Allows visual inspection of the site and prevents entrance of microorganisms.
 - A clean, intact dressing reduces the transmission of microorganisms and protects the wound.
 - Ensures the catheter has not become dislodged.
 - Maintains patency.

> EVALUATION

- The PICC was inserted into the vein without complications and remains patent.
- The client remains free of infection, thrombus, or other complications secondary to the insertion of a PICC.
- The client does not suffer from neurovascular damage to the extremity secondary to the PICC insertion.
- The client is able to discuss the purpose of the PICC.

> DOCUMENTATION

Nurses' Notes

- Date and time the PICC was inserted
- Length and gauge of catheter
- Results of chest x-ray checking for placement of catheter
- Serious side effects should be reported to the physician or qualified practitioner immediately
- External length of catheter for comparison with each dressing change



▼ REAL WORLD ANECDOTES

When Jennifer was ready to be discharged from the hospital after several weeks in the intensive care unit following a septic shock episode, she still required parenteral nutrition. She had had many peripheral venipunctures for IV fluids and medications; however, her basilic veins were still intact.

▼ REAL WORLD ANECDOTES *continued*

Her nurse prepared her for the last venipuncture in order to send her home with a PICC and total parenteral nutrition. She assured her that when she could eat and drink normally and maintain her weight she would no longer need IV fluids. Jennifer was glad to have only one line left after her serious illness and felt she could care for it with her mother's help and a daily visit from a home health nurse.

> CRITICAL THINKING SKILL

Introduction

When the catheter is inserted through the introducer needle and is advanced up the basilic vein to the subclavian vein, it should never be withdrawn since the catheter could be pulled against the sharp edge of the needle and be cut off.

Possible Scenario

After a successful insertion of the introducer needle and advancement of the catheter, the nurse asked the client to turn his head toward the insertion site and drop his head. She thought this should help advance the catheter into the subclavian vein; instead, she was not able to advance the catheter at all. So, she pulled back on the catheter to try again. She met resistance. She could not advance or withdraw.

Possible Outcome

The resistance she felt could mean that the catheter was against the edge of the needle. There was a risk of cutting off the catheter and causing an embolism, a life-threatening event.

Or she realized that it was wrong to pull the catheter out through the introducer needle. If she was sure she could not advance it, she could either have asked for assistance from a coworker or removed the introducer needle, then the catheter, and start again with new supplies.

Prevention

When resistance is met while advancing the catheter, the nurse needs to know what other methods may help, such as a change in the client's position of their arm or head. She should be especially alert to the danger of removing a catheter through the introducer needle.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have greater risk of dependent edema in the arm where a PICC is placed due to decreased circulation.
- The veins of elderly clients may be more fragile.



Pediatric Variations:

- In neonates, other veins can be used such as the antecubital, saphenous, superficial temporal, external jugular, popliteal, ankle, and axillary veins.
- Special precautions are needed to maintain a PICC intact in very young clients.



Home Care Variations:

- The PICCs are easily adaptable to the home care setting.
- The catheter can be inserted in the home by a nurse.
- Clients may receive antibiotics, pain medication, or parenteral nutrition at home.
- A more secure dressing may be necessary if the client is active.



Long-Term Care Variations:

- The PICCs can be useful in the long-term care setting in older clients as well as younger clients requiring rehabilitation.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The catheter is noted to be pulled out 1 inch at the time of the dressing change.

Ask Yourself:

How do I prevent this error?

Prevention:

Make sure the catheter is secure. Advise the client to be careful of the catheter during activity. If this error does occur, do not push catheter back into vein. Check for patency of the catheter. Report the dislodgment to the physician or qualified practitioner. A chest x-ray may be ordered to check placement if it was in the superior vena cava.

> NURSING TIPS

- Use the dominant arm when placing a PICC intended to be placed in the superior vena since movement enhances blood flow and reduces the risk of edema.
- The catheter has marks at regular intervals to aid in advancing it to the correct length.
- Be sensitive to the client's restriction of flexing the elbow of the arm with a PICC.
- Use an 18-gauge or larger catheter if the infusion of blood products is anticipated.

SKILL 8-20

Administering Peripheral Vein Total Parenteral Nutrition

Nancy Unger, RN, MN, MPH

KEY TERMS

Air lock

Drip chamber

Infiltration

Lipid emulsion

Phlebitis

PPN

Precipitates

Sepsis



> OVERVIEW OF THE SKILL

Peripheral parenteral nutrition (PPN) is the IV administration of a nutritionally balanced solution via a peripheral vessel. Peripheral parenteral nutrition tends to be used as short-term therapy (3 weeks or less) for clients who are unable to eat secondary to surgery or illness and who require supplemental nutritional support. Approximately 1400 to 2000 calories per day are provided from a solution containing protein, carbohydrates, electrolytes, vitamins, trace elements, and water. Carbohydrates are provided from a 5% to 10% dextrose solution. Crystalline amino acids, 2.75% to 4.25%, provide protein. (In some agencies, dextrose 20% and crystalline amino acids 8.5% are approved to be administered in PPN.) Lipid emulsion, 10% to 20%, is administered daily to provide calories and essential fatty acids.

Prior to starting PPN, a baseline nutritional assessment is completed that includes the client's weight and the following laboratory work: electrolytes, blood-urea-nitrogen (BUN), creatine, glucose, albumin, transthyretin, triglycerides, and liver enzymes. While on PPN, daily blood work should in-

clude electrolytes, BUN, creatine, and glucose. Initiation of PPN begins slowly. The first bag, approximately 1 liter, is administered over 24 hours. Daily lipid emulsion is administered at the same time and runs concurrently with PPN to minimize vein irritation. As the client tolerates, the volume, rate, and concentrations of dextrose and protein in PPN are increased over several days until the client's caloric needs are met. If a client is unable to tolerate a relatively high volume of fluid, PPN is not an effective means of caloric support. At the conclusion of the PPN therapy, the rate of administration of PPN should be decreased to half the original rate for the last 30 to 60 minutes to minimize hypoglycemia.

It is important to assess the nutritional status of the client. This can be done by looking at weight, laboratory values, client's ability to eat, and extent of NPO status. Dietitians are excellent resources to verify that clients are at risk for healing because of poor caloric intake. In some hospitals, dietitians are often actively involved in overseeing PPN orders and assuring the proper solution is ordered.

> ASSESSMENT

1. Prior to starting the PPN, assess the client's knowledge of the therapy, including what to expect be-

fore, during, and after PPN administration to determine the client's need for education and provide information as indicated.

2. Check for an allergy to eggs. Clients who are allergic to egg protein may have an acute or allergic reaction to lipid emulsion.
3. Assess the client's veins, selecting the largest peripheral vein available for the venipuncture. Also, consider the proposed length of treatment and begin with the most appropriate distal vein. A large vein will minimize the irritation from PPN by better hemodilution. By utilizing distal sites first, the nurse will have access to proximal sites later on in therapy (see Figure 8-20-2).
4. Assess the client's IV site several times daily for phlebitis or infiltration. Peripheral parenteral nutrition is irritating to the veins due to its high osmolarity. Administration of the lipid emulsion over 24 hours or the duration of the PPN will diminish the irritation from the PPN solution by directly protecting the endothelium. Sometimes low-dose heparin or hydrocortisone may be added to PPN to decrease vein irritation. Changing the IV site is indicated if erythema, edema, hardness of the vein, or pain is identified. Also designate that the IV site be solely used for PPN and lipids.
5. Assess for signs of sepsis. Elevated temperature, leukocytosis, chills, or malaise may indicate sepsis.
6. Monitor blood sugars according to the physician's or qualified practitioner's guidelines. This can be as often as every 6 hours for the first 48 hours. Peripheral parenteral nutrition is often more concentrated in sugars than the IV solution and can cause hyperglycemia. For diabetic clients, glucose monitoring can be more extensive and require adjustments to insulin.
7. Check daily for the physician's or qualified practitioner's order of PPN in advance of the finish time of the present bag. Verifying the order will assure that next bag of PPN is available and ready



Figure 8-20-2 PPN may be administered through a PICC line.

to be used, thus avoiding an interruption in administration.

8. Check the client's laboratory results daily, reporting abnormal values to the physician or qualified practitioner when indicated. If electrolyte replacement is indicated, the physician or qualified practitioner often will include the replacement orders in the next bag of PPN. If the blood glucose level is elevated, the physician or qualified practitioner may wish to include insulin in the PPN. Serum triglyceride levels are monitored to assess client's response to the lipid infusion.
9. Check that the label on the bag of PPN exactly matches the order prior to hanging the bag. This verifies that the correct solution will be administered.
10. Check identification band when hanging a new bottle of PPN. Peripheral parenteral nutrition is administered via IV and should be managed as though it were an IV medication because complications can occur quickly.
11. Daily weight assessment needed to help assess nutritional status.

> DIAGNOSIS

- 1.1.2.1 Altered Nutrition: Less Than Body Requirements, related to client's extended NPO status secondary to slow return of bowel function after surgery as evidenced by hypo or no bowel tones, no flatus, and inadequate caloric intake

> PLANNING

Expected Outcomes:

1. Client will receive adequate nutritional support via PPN during the course of administration.



Figure 8-20-3 Gloves, IV pump, lipid emulsion, tubing, alcohol, povidone-iodine, and sodium chloride

2. Client will maintain weight.
3. There are no complications at peripheral site.

Equipment Needed (see Figure 8-20-3):

- Physician's or qualified practitioner's order
- PPN and lipid solution, verified with the order.
- Two IV controllers or pumps (lipid emulsion should be administered over 24 hours or the duration of the PPN and should also be on an IV controller or pump)
- Appropriate IV tubing with filter for the PPN line. Vented tubing for the lipids. Include a Y-type administration or connector in order that PPN and lipids can be administered together.
- Alcohol wipes
- IV pole
- Gloves



Estimated time to complete the skill:
10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the procedure involved with PPN, including venipuncture, monitoring of daily laboratory values, and the use of the IV controllers.
2. Instruct the client to notify the nurse if pain or swelling develops at the IV insertion site.
3. Explain associated procedures (blood glucose monitoring, frequent blood draws, daily weights, etc.).

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Check the label on the PPN bag against the physician's or qualified practitioner's order. Check expiration date.
2. Inspect the PPN bag for precipitates, cloudiness, or leakage.
3. Inspect the lipid solution for separation, oiliness, or particles (see Figure 8-20-4).

Figure 8-20-4 Inspect the solution for separation, oiliness, or particles. Check the bottle for cracks.

4. Check that the client does not have an allergy to eggs.
5. Gather IV controller tubing and a filter (0.22 μm) for the PPN. If the lipids come in a bottle, vented tubing is essential for administration. If a lipid filter is used, 1.2 μm is recommended.

RATIONALE

1. Ensures that the correct solution will be administered within the proper time frame.
2. Prevents the inadvertent administration of precipitates into the client. If the bag is leaking, inform pharmacy so a new bag can be prepared.
3. Prevents administration of possibly contaminated solution.



4. Client's who have an allergy to eggs may develop an allergic reaction to the lipid infusion.
5. PPN is filtered to remove unseen precipitates from reaching the client. A filter may not be used with lipids, but vented tubing is essential to assure that the tubing does not develop an air lock.

continues

6. Wash hands.
 7. Attach the filter to the IV controller tubing and close the roll clamp. Remove the protective cap from the PPN bag and insert the tubing spike into the bag using aseptic technique.
 8. Hang the PPN and squeeze the drip chamber until the fluid reaches desired level. Prime the tubing according to the manufacturer's directions. Date the tubing.
 9. Remove the protective cap from the lipid container and cleanse the rubber stopper with alcohol.
 10. Close the roll clamp on the vented tubing and insert the tubing spike into the bottle using aseptic technique.
 11. Hang the lipids and squeeze the drip chamber until the fluid reaches the desired level. Prime tubing according to the manufacturer's directions. Date the tubing.
 12. Attach the lipid tubing to the PPN tubing via the Y-connector.
 13. Attach IV pumps to IV pole and insert tubing for PPN and lipids into the machines according to the manufacturer's directions.
 14. Check client's armband before beginning infusion.
 15. Verify patency of IV site or perform venipuncture, if necessary.
 16. Wear gloves to connect the IV administration set to the IV catheter using aseptic technique. Tape all connections.
 17. Turn on the IV controllers and set them to the prescribed rate. The initial infusion of PPN should start slowly, at half the prescribed rate for the first 30–60 minutes. (See Figure 8-20-5.)
6. Decreases the transmission of microorganisms.
 7. Assures that the PPN bag is correctly attached to the tubing.
 8. Prevents air embolism by correctly priming tubing. Dating the tubing will ensure that tubing is changed according to the hospital policy.
 9. Decreases the transmission of microorganisms.
 10. Assures that the lipid bottle is correctly attached to the tubing.
 11. Prevents air embolism. Dating the tubing will ensure that tubing is changed according to the hospital policy.
 12. Assures that PPN and lipids will be administered together.
 13. An IV pump or controller is necessary for the administration of PPN. Because the lipids (usually 500 cc) will be administered throughout the duration of the PPN (usually 24 hours), an IV controller is used to assure accuracy of the drip rate.
 14. Ensures right client.
 15. Ensures proper administration of PPN and lipids and avoids infiltration.
 16. Decreases the transmission of microorganisms and prevents body fluids from contacting the nurse's skin. Taping prevents accidental disconnection.
 17. An initial slower rate allows the client's body to adjust to the hypertonic solution. If the client tolerates the slower rate for the first bag of PPN or has been on a continuous infusion of PPN, set the pumps to the prescribed rate.



Figure 8-20-5 Set the IV controller at the prescribed rate.

- | | |
|---|--|
| <p>18. Monitor client for an allergic reaction during the initial lipid administration.</p> <p>19. Record the PPN and lipid administration of the appropriate flow sheets.</p> <p>20. Check the IV site several times during the day for signs of infiltration or phlebitis.</p> <p>21. Wash hands.</p> | <p>18. An adverse reaction to lipids occurs in less than 1% of clients and can include fever, diaphoresis, flushing, dyspnea, syncope, and chest and back pain.</p> <p>19. Provides documentation of administration.</p> <p>20. The major side effect of PPN, phlebitis, can be avoided or minimized by careful IV site monitoring.</p> <p>21. Reduces transmission of microorganisms.</p> |
|---|--|

> EVALUATION

- Check the IV site several times during each shift for signs of infiltration or phlebitis.
- Discontinue the PPN and lipid administration if erythema, edema, hardness of the vein, or pain is detected and start a new IV site.
- Monitor the client's laboratory values daily, including blood sugars, reporting abnormal results to the physician or qualified practitioner.
- Check insulin requirements for diabetic clients.

> DOCUMENTATION

Medication Administration Record

- Client's response to initiation PPN
- Percentage and amount of solution

- Any unusual reactions
- Route
- Signature of nurse
- Site
- Time hung
- Initials of nurse
- Signature of nurse identifying initials

Intake and Output Record/IV Flow Sheet

- Time and date
- Site
- Amount of fluid infused/hung
- Initials of nurse hanging PPN and lipids
- Signature of nurse identifying initials



▼ REAL WORLD ANECDOTES

Scenario 1

Earlier in the day, Barbara was started on PPN and lipids via a new IV site. Upon awakening from a nap, she noticed that her bed was wet and smelled like vitamins. She called the nurse to check on

continues

▼ REAL WORLD ANECDOTES *continued*

her IV site. The nurse noted that the IV tubing was not connected tightly to the IV catheter and had been leaking onto the bed. Applying gloves, the nurse cleaned the IV connection site with alcohol before tightening the connection and applied spiral taping to the connection site. The nurse then changed the linens and assisted Barbara with the changing of her gown.

Scenario 2

While checking the PPN label with the physician's orders, the nurse noted that the percentage of dextrose listed did not match the physician's order. The nurse called the pharmacy to clarify the discrepancy. After checking the orders, the pharmacist stated that an error had been made in the percentage of dextrose. The nurse was asked to return the incorrect bag to the pharmacy and wait for the new bag of PPN to be made. Accurate checking by the nurse prevented an error from occurring.

> CRITICAL THINKING SKILL

Introduction

Three days ago, 86-year-old Charlie Black had an extensive bowel resection for cancer resulting in a colostomy and large midline abdominal incision. His bowel function is slow to return, as evidenced by his lack of bowel tones and no flatus or stool via his colostomy bag. Mr. Black also has been reporting generalized weakness with his daily activities. His doctor has decided to start Mr. Black on PPN and lipids until he is able to eat.

Possible Scenario

The nurse decided to use Mr. Black's existing IV site, started 3 days ago, for the PPN and lipid infusions. Shortly after she began the infusion, Mr. Black began complaining of pain at the site. On inspection, the nurse noticed that the IV site was cold, hard, and edematous.

Possible Outcome

Infiltration: The nurse stopped the PPN and lipid infusion and discontinued the IV site. A new IV site was started on the opposite arm using one of the larger vessels of the forearm. Then, the PPN and lipid infusion was restarted. A warm pack was applied to the old IV site.

Prevention

This situation could have been prevented by carefully checking out the existing IV site prior to starting the PPN and lipids. The IV site should have been flushed with saline to verify patency and inspected for redness and edema. By palpating, the nurse could detect hardness or a firm cord if the vein was inflamed. Also, asking the client if the site was tender to touch would have provided additional information. Usually, when IV sites are 72 hours old, they should be changed to minimize problems with phlebitis.

▼ VARIATIONS



Geriatric Variations:

- If PPN is ordered for a frail malnourished older adult, it will take longer to achieve an adequate caloric intake parenterally.



Pediatric Variations:

- Strength of the nutritional solution and rate of administration are less than that of the adult.
- Check your drug guide book.



Home Care Variations:

- Peripheral parenteral nutrition can be given at home and family members can be trained to hang the IV bags.
- Follow-up with a home infusion company is essential to ensure that the client has adequate supplies and IV access.

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *PPN is not generally given in the long-term care setting. If parenteral nutrition is needed in this setting, it is generally given through a central line.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The wrong PPN solution was administered.

Ask Yourself:

How do I prevent this error?

Prevention:

Carefully checking the label on the PPN bag against the physician's or qualified practitioner's orders. If there are any discrepancies, verify with the pharmacist who prepared the PPN solution. If this error does occur, inform the physician or qualified practitioner of the error and complete a hospital incident report. Replace the wrong solution with a mixture of dextrose 10% until the new bag of PPN is available.

Possible Error:

Utilizing the PPN-designated IV line for other IV medication administration resulting in precipitation.

Ask Yourself:

How do I prevent this error?

Prevention:

Only administer PPN and lipids through the IV site designated for that purpose. If it is absolutely essential to give additional IV medication through the designated IV line, generously flush the IV line with normal saline before and after IV medication administration. If this error does occur, wearing gloves, disconnect the IV tubing from the IV site. Aspirate back at the IV site to remove any precipitate and ensure blood supply. If unable to verify the patency of the IV site, discontinue the IV site and start a new IV. Change the IV tubing for the PPN and lipids before reconnecting the tubing.

> NURSING TIPS

- Administer lipid emulsion over 24 hours concurrently with PPN to protect the endothelial lining and minimize phlebitis.
- Designate one IV site only for PPN and lipids, thus preventing medication incompatibilities. It is hard to see precipitate forming when the lipids are also infusing.
- Use vented tubing on the IV lipid line in order to prevent an air lock.
- Check the IV site frequently for phlebitis and infiltration, restarting the IV site when indicated.
- Check the client's laboratory values, reporting abnormal values to the physician or qualified practitioner, before the new bag of PPN is mixed. It is possible that the physician or qualified practitioner may want to change the composition of the PPN based on the current laboratory values.

SKILL 8-21

Hemodialysis Site Care

Joan M. Mack, RN, MSN, CS

KEY TERMS

Bruit
Central venous catheter
Double-lumen catheter

Fistula
Graft
Shunt
Thrill



> OVERVIEW OF THE SKILL

Hemodialysis is a renal replacement therapy for clients with end-stage renal disease (ESRD). It utilizes the principles of osmosis, diffusion, and ultrafiltration to replace some of the kidney's major functions. Waste products, fluid, and excess electrolytes are removed to help maintain a more stable weight, acid-base balance, and blood pressure in the ESRD client. To accomplish this, the blood must be taken from the client using some type of vascular access device. This can be an internal shunt or graft or an external double-lumen catheter. The arteriovenous fistula, shunt, or graft (bovine or goretex) is surgically created in a client's extremity (most frequently the arms) to enlarge the veins for easy venipuncture and attachment to the hemodialysis machine. The fistula takes 2 to 6 weeks to mature so that blood flow is adequate to support hemodialysis. Over the maturation process the vein distends as a result of the high-pressure arterial flow. This causes the wall of the vein to become thicker and tougher and allows for frequent puncture of the fistula for hemodialysis. The fistula/graft will

only have a dressing in the immediate postoperative period, and dressing changes are usually not required.

Catheters may be permanent or temporary. The temporary double-lumen catheter is a large lumen catheter inserted into the subclavian or jugular vein and threaded to the superior vena cava or right atrium. It is used until the permanent one is ready or for longer periods in the client with venous access problems related to circulation or infection. This catheter is also used for the client in acute renal failure to facilitate dialysis until the kidneys recover. There are also permanent double-lumen catheters that are usually made of a flexible and less reactive plastic such as silastic. They have a cuff similar to other long-term venous access devices to decrease infection.

There are various manufacturers of these catheters so they may appear differently from client to client. Most will be kept patent by a predetermined amount of heparin and saline and have a transparent dressing that needs to be changed every 48 to 72 hours depending on hospital policy and frequency of hemodialysis.

> ASSESSMENT

1. Identify the cause of the client's renal failure and other chronic diseases to **determine risk for other complications related to the access device.**
2. Assess the venous access site for redness or swelling and dressing for bleeding or other
3. Assess vital signs for **signs of infection.**
4. Check for the presence of pain or numbness in the extremity where the access is located to **determine if the change in blood flow is taking blood supply**

from the tissue distal to the fistula. Clients may develop a problem known as steal syndrome as the fistula changes blood patterns and “steals” oxygen from parts of the extremity.

5. Check for the presence of audible bruit and palpable thrill in the fistula/graft to determine patency and monitor flow through the access.
6. Assess client’s knowledge of access care and hemodialysis to determine need for education.

> **DIAGNOSIS**

- 1.2.1.1 Risk for Infection related to ESRD and invasive procedures or indwelling catheter
- 1.6.2.1.2.1 Impaired Skin Integrity related to ESRD and surgery
- 1.4.1.2.2.2 Risk for Fluid Volume Deficit related to possible bleeding secondary to ESRD and anticoagulation required for hemodialysis
- 1.4.1.1 Altered Tissue Perfusion related to alterations in blood flow due to fistula or graft

> **PLANNING**


Expected Outcomes:

1. Access is patent for dialysis without evidence of any redness, drainage, or swelling.
2. Client is able to state rationale for access and self-care principles and practices.

Equipment Needed (see Figure 8-21-2):

- Povidone-iodine swabs
- Sterile and nonsterile gloves
- Mask
- Alcohol swabs
- Transparent dressing or gauze dressing supplies

- Heparin (concentration depends on hospital policy for flushing)
- Note: Many institutions package the first five items in a sterile pack with sterile drapes and a plastic tray.



Estimated time to complete the skill:
10–15 minutes

> **CLIENT EDUCATION NEEDED:**

1. There is much anxiety surrounding the whole dialysis experience. Be sure to implement interventions, that is, counseling or support groups, to deal with this anxiety or very little will be heard by the client and family.
2. Be sure to demonstrate proper techniques for assessment of sites and determination of fistula patency. Models are very helpful to reinforce the teaching and evaluate the client’s abilities to provide safe self-care.
3. Communicate teaching plan with home health care providers so that learning can continue to be evaluated.
4. Teach the client not to wear constrictive clothing on the extremity with the permanent shunt.



Figure 8-21-2 Gloves, tape, gauze, and povidone-iodine swabs

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Arteriovenous Fistula: Shunt or Graft

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Position extremity so that you can easily palpate the fistula. | <ol style="list-style-type: none"> 1. Prevents the spread of microorganisms. 2. Prevents trauma to fistula. |
|---|---|

continues

Arteriovenous Fistula: Shunt or Graft *continued*

3. Palpate gently over the area with finger tips or palm of your hand to feel for thrill (vibration).
4. Auscultate over the area with a stethoscope to detect a bruit (swishing noise).
5. Palpate pulses distal to the fistula and observe capillary refill in the extremity.
6. Assess for symptoms of infection, bleeding, or sensation impairment in the area around the fistula and the entire extremity.
7. Post signs in the client's room to let all caregivers know to avoid venipuncture and blood pressure in the fistula extremity.
8. Inform client to avoid any activities that will restrict flow or cause injury to the affected extremity.
9. Once the surgical incision is healed, the skin over the fistula or graft requires only routine care with soap and water.
3. Tests for adequate blood flow through the fistula.
4. Tests for adequate blood flow through the fistula. Notify the physician or qualified practitioner if bruit and thrill are absent. Surgical interventions may be necessary to restore flow.
5. Checks for adequate blood flow and perfusion to the fistula extremity.
6. Monitors for potential complications.
7. Prevents restriction of flow and possible clotting or rupture of fistula. Reduces chances for infection.
8. Prevents unnecessary loss of access site due to occlusion or infection.
9. Prevents infection at the puncture sites.

Double-Lumen Catheter

10. Wash hands.
11. Fill two 5-cc syringes with heparin and saline per agency protocol.
12. If changing caps, prime with heparin and saline.
13. Open central line care kit or assemble needed supplies and place on sterile field.
14. Put on mask and nonsterile gloves.
15. Remove old transparent dressing and discard with gloves in appropriate receptacle.
16. Put on sterile gloves.
10. Prevents the spread of microorganisms.
11. Used to fill both lumens of catheter at end of site care. Actual volume used may vary, but most catheters hold <3 cc.
12. Prevents air from entering the system.
13. Maintains sterile technique
14. Protects site from expired pathogens and used in removal of dressing as part of standard precautions.
15. Complies with standard precautions.
16. Maintains sterile technique.

17. Cleanse site with alcohol and assess site for any redness, swelling, or drainage.
 18. Cleanse area surrounding the catheter site with povidine-iodine swabs beginning at insertion site and going out in a circular motion. Repeat for a total of three times.
 19. Let air dry and apply transparent dressing.
 20. Close clamp to both lumens and remove and discard old male adapters (caps).
 21. Cleanse ends of catheter with alcohol swabs and then attach new primed male adapters.
 22. Unclamp lumens and flush with heparin and saline per agency protocol. Close clamp as the last 0.5 cc is being injected.
 23. **Note:** Some institutional policies will include aspirating the heparin solution in the catheter before flushing. The permanent catheters may also require flushing with normal saline before the heparin depending on the frequency of dialysis.
 - Normal saline is never used without heparin unless the client has an allergy to heparin.
17. Removes any remaining iodine, skin oils, and drainage to allow clear visualization of site.
 18. Removes pathogens from the skin and prepares for a new dressing.
 19. Allows the iodine solution to complete the disinfectant process and ensures that the dressing will adhere tightly to the skin.
 20. Clamping prevents air from entering the system when the client inspires and creates a negative pressure.
 21. Removes any old blood or drainage.
 22. Creates a positive pressure within the catheter, thereby preventing backup of blood into the catheter.
 23. Aspirating the heparin solution before flushing prevents over anticoagulating the client, who may already have bleeding tendencies.
 - Heparin maintains patency of dialysis catheters.

> EVALUATION

- Assess catheter site for signs of infection or bleeding.
- Determine if catheter or fistula is patent and provides adequate blood flow for dialysis.
- Determine client's understanding of rationale for fistula/catheter and related care.

> DOCUMENTATION

Medical Administration Record

- Document heparin/saline concentration used and when flushed.

Nurses' Notes/Dialysis Flow Sheet

- Location of access, status of site, and dressing
- Vital signs
- Dressing changes
- Result of assessment of bruit and thrill; pulses and sensation distal to access as applicable



▼ REAL WORLD ANECDOTES

Mike was a middle-aged client in chronic renal failure. He was scheduled for dialysis three times a week at the clinic but he often missed appointments. He was not compliant with dietary restrictions or fistula care. When he came in after two missed appointments, the clinic nurse assessed the fistula. He noted that Mike's fistula did not have a thrill or a bruit. He also noted what appeared to be fresh puncture wounds over the fistula. When questioned, Mike became defensive and hostile. He accused

continues

▼ REAL WORLD ANECDOTES *continued*

the nurse of not knowing how to properly assess a fistula. When it became clear that the fistula was actually clotted, he accused the clinic staff of not flushing the fistula properly the last time he had dialysis. When confronted by his doctor, Mike admitted that he had been injecting IV drugs using his fistula. He did not have any heparin and so was unable to flush the fistula after the injections. The doctor ordered a lytic agent to attempt to reopen the fistula. This was unsuccessful and Mike had to have a new fistula created surgically. His doctor counseled Mike regarding fistula care and IV drug abuse. Mike promised to keep appointments at the clinic and to take better care of his fistula.

> CRITICAL THINKING SKILL

Introduction

The nurse must be astute in assessment of the client returning from dialysis. They are prone to many complications. The site is in particular need of assessment to determine if appropriate hemostasis has been achieved and patency of the access has been maintained.

Possible Scenario

Jim just returned from dialysis. He complained of being cold and the nurse placed several blankets over him, tucking them in close to his body to help him warm up. Shortly after getting warm, Jim fell asleep.

Possible Outcome

Since Jim had been so miserable earlier, the nurse was reluctant to wake him and check his fistula site. She waited as long as she could before returning to his room to check the site. When she pulled back all the blankets, she saw that the site had been actively bleeding and there was a large pool of blood beneath Jim's arm at the fistula site. She immediately placed pressure on the site

of the bleeding and called for help. When the dialysis nurse arrived to assess the situation, she noted that the floor nurse was applying quite a bit of pressure in an attempt to stop the bleeding.

Prevention

The nurse was reluctant to wake Jim by assessing his fistula site, but she wanted to be sure the site was not bleeding or clotted. She washed her hands with warm water to try to have them warm when she assessed Jim's fistula site. She pulled the blankets back just enough to expose Jim's arm and fistula site. As she did this, she noted some blood on the sheets and discovered that Jim's fistula had been bleeding. Because she had not waited too long before checking the graft site, the bleeding was minimal. The nurse applied moderate pressure to the site and called for the dialysis nurse. She was careful to feel for the thrill of blood through the fistula even when she was holding pressure on the site. It is critical to apply only enough pressure to stop bleeding but still be able to detect flow through the fistula.

▼ VARIATIONS



Geriatric Variations:

- *Frail skin may necessitate use of different dressings if tears are noted when the dressing is removed.*
- *The elderly have less total body water and more sclerotic vessels and so respond slower to changes in blood volume with initiation of treatment. They may also have more cardiac abnormalities and poor tolerance of dialysis.*



Pediatric Variations:

- *Children have more total body water and may respond differently to dialysis. Peritoneal dialysis is the preferable method to dialyze children.*
- *The catheter will need to be covered well to prevent dislodgment. Supervise play to make sure the catheter or access is not pulled on or damaged in any way.*

▼ VARIATIONS *continued*



Home Care Variations:

- *The family will need to be taught to perform the site care.*



Long-Term Care Variations:

- *The client may need transportation to dialysis.*

▼COMMON ERRORS—ASK YOURSELF

Common Error:

Cutting off blood flow while taking blood pressures or applying a tourniquet to the extremity with the shunt.

Ask Yourself:

How do I prevent this error?

Prevention:

Do not perform any procedure that will cut off any blood flow in the shunt extremity. Post signs in the client's room reminding that no blood pressures or venipunctures are to be performed on the shunt extremity.

> NURSING TIPS

- Dialysis catheter can be used for medications and fluids if there is no other venous access. Generally a physician's or qualified practitioner's order is required. Strict aseptic technique must be used to ensure patency and sterility of this lifeline. A pump should be used to control flow as clients with renal failure cannot tolerate any excess fluids.
- Dialysis staff may provide care to catheters in some institutions and may ask that no other staff work with the catheter except in emergencies.
- If the dialysis double-lumen catheter is clotted, the physician or qualified practitioner may order a urokinase injection to lyse the clot and restore patency. Follow institutional protocol to administer.
- If the fistula or graft is suspected of being clotted, Doppler and/or angiography studies are done to determine if surgical intervention is needed to restore patency or if an alternate site will need to be created. If no thrill is felt or no bruit heard, suspect that the graft is clotted.

SKILL 8-22

Using an Implantable Venous Access Device

Jeanne Erickson, RN, MSN, AOCN

KEY TERMS

Catheter
Implantable venous access device
Implanted port

Port
VAD
Venous access device



> OVERVIEW OF THE SKILL

Venous access devices (VADs) are inserted in clients who require long-term IV therapy and/or frequent blood sampling. The VADs promote client comfort by minimizing repeated venipunctures and offer reliable venous access to maximize safe medication delivery. Implanted venous access ports are one type of VAD. It is used for administering blood or blood products, chemotherapy, fluid replacement therapy, medication, and for blood sampling.

The port is a self-sealing silicone domed reservoir connected to a silicone or polyurethane catheter. The

system remains under the skin for months to years. Implantable VADs may have a Groshong tip, with a slit-valve that opens with negative pressure to allow blood aspiration and opens with positive pressure to permit infusion of fluids. When not in use, the valve remains closed and heparin instillation is not necessary.

The port is inserted using local anesthesia (see Figure 8-22-2). The catheter is threaded into a large vein, most commonly the subclavian vein, with the distal tip



Figure 8-22-2 Implantable venous access device



Figure 8-22-3 The port is sutured into a subcutaneous pocket and the catheter is threaded into the subclavian vein.

positioned in the superior vena cava at the entrance to the right atrium (see Figure 8-22-3). The port is sutured into a subcutaneous pocket near the vessel where the catheter is inserted, generally around the third rib, lateral to the sternum.

An implanted port is accessed aseptically through the skin with a noncoring needle, called a Huber needle after skin preparation. Port access is usually completed

with minimal client discomfort, and, once accessed, the needle can be left in place for up to 7 days. When the port is not accessed, the catheter should be flushed with a saline or heparin solution at least once a month.

Complications associated with implantable ports include infection, malposition, and occlusion. Ports are removed as a minor surgical procedure using a cut-down method to remove the port and catheter.

> ASSESSMENT

1. The client should be assessed for criteria that favor the placement of an implantable port. **Physical factors such as obesity, chest wall disease, or superior vena cava abnormalities usually contraindicate placement of an implantable port.**
2. The client's treatment plan should be considered for suitability of delivery via an implantable port. **Clients requiring continuous long-term infusions, such as bone marrow transplants, are not good candidates for a port.**
3. The client's knowledge of VAD insertion, procedures for use, and removal should be examined before a VAD is placed. **Client education promotes client comfort and compliance and decreases anxiety.**
4. The function of the catheter should be verified before each use by assessing the condition of the skin over the port site, presence of a blood return via the catheter, and infusion without resistance. **The presence of complications require interventions to restore catheter patency and vascular or skin integrity.**

> DIAGNOSIS

- 1.2.1.1 Potential for Infection related to placement of VAD
- 9.1.1 Potential Pain related to surgical procedure or placement of port needle
- 8.1.1 Knowledge Deficit related to placement, procedures for use, and removal of implantable port
- 7.1.1 Body Image Disturbance related to placement of VAD

> PLANNING

Expected Outcomes:

1. The client describes the purpose, benefits, and risks of an implantable venous access device.

2. The client reports minimal discomfort when the implantable venous access device is accessed.
3. The client completes blood sampling and IV therapy via the implantable venous access device with minimal complications.
4. The client describes signs and symptoms of port complications and measures to prevent and manage these complications.

Equipment Needed (see Figure 8-22-4):

- Extension set/noncoring port needle (e.g., Huber needle)
- Sterile gloves
- Sterile barrier
- Three alcohol swabsticks
- Three povidone-iodine swabsticks
- Dressing material of choice (e.g., transparent, gauze)
- Normal saline solution
- Heparin solution (100 U/ml) if establishing an intermittent access (check agency policy for heparin solution use)
- Local anesthetic of choice (EMLA[®] cream or lidocaine) if necessary



Estimated time to complete the skill:

15 minutes



Figure 8-22-4 Noncoring port needle

> CLIENT EDUCATION NEEDED:

1. The client and family should receive the following information about the implantable VAD:
 - Purpose
 - Benefits and risks
 - Insertion procedure
 - Procedures for use for blood sampling and medication administration
 - Management of complications

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Review the prescribed order for blood sampling and/or medication administration. 2. Identify client and explain the procedure to the client. 3. Gather supplies. 4. Wash hands. 5. Expose skin and palpate port septum. 6. Although most needle insertions can be performed with minimal discomfort, administer local anesthetic if necessary. EMLA® cream may be applied 1 hour prior to the insertion. Lidocaine may be injected subcutaneously just prior to insertion. 7. Put on sterile gloves. 8. Clean area with alcohol and povidone-iodine swabsticks (see Figure 8-22-5). | <ol style="list-style-type: none"> 1. Prevents laboratory and medication errors. 2. Ensures proper client identification and promotes client comfort and compliance. 3. Organization promotes efficiency. 4. Prevents infection. 5. Identifies exact location for needle insertion and assess for infection at port site. Deeper ports should be accessed with a longer needle (1½ inches). Superficial ports can be accessed with shorter needles (¾ or 1 inch). 6. Local anesthetics reduce client discomfort 7. Prevents infection. 8. Prevents infection. |
|---|---|



Figure 8-22-5 Clean the area with povidone-iodine swab sticks.



Figure 8-22-6 Flush the line with normal saline, using a noncoring needle.

9. Prime needle and extension set with normal saline solution.
 10. Stabilize port and firmly insert needle, at a right angle to the skin, through the skin and septum until needle touches the back of the port.
 11. Aspirate blood to verify needle placement and function of port.
 12. Obtain blood samples as prescribed.
 13. Flush the line with normal saline solution to clear blood and establish patency of the line (see Figure 8-22-6).
 14. Proceed with medication administration as indicated.
 15. If needle will be left in place, secure needle with a sterile dressing. If left in place for continuous use, the needle should be changed every 7 days. The dressing should be changed every 2–3 days or whenever it is not clean and intact.
 16. If needle will be removed, flush needle with heparin solution to establish heparin lock, maintaining positive pressure at the end of the heparin instillation. Positive pressure may be created by clamping the tubing while instilling the last $\frac{1}{2}$ ml of heparin solution.
 17. Remove needle by stabilizing port and pulling with a firm and straight motion.
 18. Apply pressure and dressing to needle insertion site.
 19. Document interventions with implantable VAD in client record. Documentation should include function of VAD, blood samples drawn, medications administered, and client response.
9. Prevents air embolism.
 10. Stabilization is essential for correct entry and to minimize discomfort. Twisting or inserting needle at the wrong angle may result in incorrect needle placement.
 11. No blood return may indicate incorrect needle placement, presence of fibrin sheath at the tip of catheter, or clot in the catheter. The presence of a blood return is critical before administering medications, especially irritant or vesicant drugs.
 12. A small amount (4–5 ml) of blood must be discarded prior to obtaining blood samples to remove heparin from sample.
 13. Inability to flush the line or client discomfort during flush may indicate incorrect needle placement or clot in the catheter. Recommended for use are 10-cc syringes.
 14. Provides client with ordered medication regimen.
 15. Stabilizes needle and prevents site infection.
 16. Heparin prevents blood clots in the line. Positive pressure prevents blood reflux into the catheter.
 17. Minimizes discomfort.
 18. Minimizes bleeding and prevents infection.
 19. Accurate documentation provides a record of the procedure.

> EVALUATION

- Correct catheter placement and patency is confirmed before the catheter is used for medication administration.
- If blood return is absent or sluggish or when there is resistance to infusion, the catheter should be evaluated for possible occlusion, damage, or displacement.
- If fluids infuse freely but blood return is absent or sluggish, possible causes include fibrin sheath formation, a kinked catheter, or “pinch-off” syndrome.
- Patency resolution solutions have been tried including changing client position, alternately flushing and aspirating the catheter, and performing a dye study and/or x-ray to verify catheter position.
- A trial of urokinase to dissolve a thrombotic occlusion or other solutions to dissolve occlusions from precipitates is indicated. A follow-up dye study may illustrate the site of an occlusion, if indicated.
- Catheter has been removed if the occlusion is not able to be dissolved.

> DOCUMENTATION

Nurses' Notes

- Record function of VAD.
- Indicate blood samples drawn.
- Report client response.

Medical Administration Record

- Record medications administered.



▼ REAL WORLD ANECDOTES

Scenario 1

Mrs. Rogers had an implantable VAD placed 3 months ago to facilitate monthly chemotherapy infusions. She relates that during each visit nurses have had difficulty placing the needle because the port “moves.” Even when the needle is successfully placed, the catheter has to be flushed several times and her position changed numerous times before a blood return can be obtained. She reports that repeated needle punctures of the VAD are uncomfortable and the VAD site stays sore during the month it is not used. Her port is palpable deeper than usual and closer than usual to the axillary line, and it is tender to palpation. She elects to have a local anesthetic used for access, and lidocaine is injected subcutaneously before access, which makes the access less painful. The needle is inserted into the port, with metal contact confirming correct needle placement. However, despite numerous flushing and aspirating techniques and client repositioning, a blood return is absent. In addition, when the catheter is flushed, the client reports a tingling sensation close to her axilla. Heparin is instilled into the catheter and a dressing is applied. The physician is notified, and a chest x-ray is ordered to check correct placement of the needle as well as placement of the catheter. The x-ray reveals that the catheter is kinked close to the axilla and the end of the catheter is in the axillary vein rather than in the superior vena cava. Since the client was near the completion of her therapy, she elected to have the catheter removed and to complete her treatments using peripheral veins.

Scenario 2

Mr. Minifield was at home and self-administering intermittent antibiotic therapy via an implanted VAD. When an antibiotic is not infusing, the needle is left intact in the port and flushed with heparin to create a heparin lock. At a scheduled time one afternoon Mr. Minifield assembled his supplies to begin an antibiotic infusion. With a 10-ml syringe of normal saline, he attempted to check for a blood return to verify catheter patency. When he did not obtain a blood return, he changed positions, ambulated, and tried again with no success. He gently tried to flush the catheter and met resistance. When he checked under the dressing, he noted that the needle was pulled halfway out of the port. He replaced the dressing and contacted his home care nurse. The nurse visited the client, reinserted the needle, and verified catheter patency before antibiotic therapy was resumed.

> CRITICAL THINKING SKILL

Introduction:

Too little knowledge can be a dangerous thing.

Possible Scenario:

The nurse on the previous shift was new. She had never worked with an implantable port and did not know that she needed special training prior to accessing the port to administer chemotherapy. She placed the Huber needle into the edge of the port at a 15° angle and started the medication. The client complained of burning pain at the site. The nurse stopped the medication immediately and notified the nurse practitioner.

Possible Outcome:

Extravasation, or leaking of the fluid into the surrounding subcutaneous tissue, had occurred, due to improper needle placement. The nurse practitioner looked up the specific agent to determine if an antidote is available and to determine if hot or cold compresses should be used at the site. She ordered cold compresses placed every 2 hours for 3 days. Since less than 0.5 ml of the chemotherapeutic agent leaked into the skin, the damage was painful but did not require grafting or other interventions.

Prevention:

The nurse needed to ask for help when faced with a new procedure.

▼ VARIATIONS



Geriatric Variations:

- The elderly have fragile skin and the site should be monitored closely after needle removal.
- A confused elderly individual might push or rub a device enough to displace it. Monitor closely for signs the site has been disturbed.



Pediatric Variations:

- Pediatric clients may require consistent and/or additional measures to minimize the discomfort associated with needle placement.
- Children may need to be distracted or watched closely to make sure they do not dislodge the needle placed into the port.



Home Care Variations:

- The home caregiver can be taught to use the Huber needle. Stress the need for proper technique.
- Stress the need to report any signs or symptoms of extravasation around the port site early, so further damage can be prevented and treatment can be started.



Long-Term Care Variations:

- Since the port can remain in place for months or years, displacement or leakage of the catheter may occur well after the site has healed.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Trying to access the port with a needle that is too short.

Ask Yourself:

How do I prevent this error?

Prevention:

A short needle may be inadequate when the port is deeper than usual. Always palpate the port first before preparing supplies. Choose a longer needle when the port feels deeper in the subcutaneous tissue.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Possible Error:**

Tissue infiltration or extravasation around the port.

Ask Yourself:

How do I prevent this error?

Prevention:

Catheters should have a free blood return and allow rapid infusions before being used for medications. Any complications should be addressed prior to using the catheter for access.

> NURSING TIPS

- Place the client in a comfortable position to access an implantable VAD. Be sure to assess the location of the port before use and determine any previous complications with the VAD that have occurred.
- Be patient when problem solving with an implantable VAD that has a sluggish blood return.

Try flushing and aspirating using different pressures with the syringe and reposition the client to change intrathoracic pressures, which affect catheter function.

- Clients may be placed on low-dose systemic anti-coagulants (Coumadin 1 mg PO daily) in an attempt to prevent fibrin sheath formation.

SKILL 8-23

Caring for an Implanted Venous Access Device

Kathryn Lilleby, RN

KEY TERMS

Central venous catheter

Huber needle

Implanted infusion port

Povidone-iodine

Venous access device



> OVERVIEW OF THE SKILL

An implanted venous access device (VAD) is a safe and convenient method of accessing the right atrium of the heart. VADs are used to administer IV fluids, antibiotics, chemotherapy, parenteral nutrition, other medications, and blood products or to obtain blood samples for clients who require specific therapy and monitoring. An implanted VAD differs from other central VADs in that the entire device, including the injection port, is internal. The implanted VAD consists of a self-sealing injection port in a plastic or metal case connected to a silicone venous catheter. The injection port may have one or two lumens. The

injection port is implanted in a subcutaneous pocket at the infraclavicular fossa under sterile conditions. The catheter is inserted into a large vein and threaded into the right atrium. The procedure is performed in the operating room after the client has been given local anesthesia.

Caring for an implanted VAD differs somewhat from caring for other central VADs. As well as preventing infection, clotting, the self-sealing integrity of the injection port must be maintained. The plastic of the injection port is preserved by using a noncoring needle, such as a Huber needle.

> ASSESSMENT

1. Assess the type of VAD in place in order to know how to care for the device.
2. Assess the function and patency of the catheter to ensure minimal complications during a blood draw or infusion such as the inability to infuse normal saline or aspirate blood.
3. Assess client's knowledge of the purpose of the central venous line in order to determine the need for education.

4. Check the manufacturer's and institution's policies regarding maintaining patency of an implanted VAD in order to ensure the proper care of the catheter.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 8.1.1 Knowledge Deficit regarding procedure

> PLANNING**Expected Outcomes:**

1. The nurse will be able to aspirate blood through the catheter without difficulty.
2. The nurse will be able to infuse fluid through the catheter without difficulty.
3. The skin at the catheter insertion site and the puncture site will remain intact and without redness or swelling.
4. The client will have no signs or symptoms of localized or systemic infection.
5. The catheter injection port will remain intact and without leaks.
6. The client and caregiver will be able to explain the purpose of the VAD and the proper method of maintaining the VAD.
7. The client and caregiver will be able to perform dressing changes and skin care.
8. The access site will be free of signs or symptoms of infiltration of blood or IV fluids.

Equipment Needed:

- Povidone-iodine and alcohol swabs
- Four to five syringes (10 ml)
- Vial of normal saline solution
- Vial of heparin solution (heparin flush or heparin 100 U/ml in saline)
- Sterile needle (20–22 gauge)
- Sterile Huber needle (20–22 gauge) (see Figure 8-23-2)
- Sterile drape
- Sterile gloves, gown, and mask, as needed



Estimated time to complete the skill:

10–15 minutes**> CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for flushing the VAD with normal saline and/or heparin according to the institution's or manufacturer's guidelines.
2. The client should be instructed about the need for aseptic technique.
3. The client and caregiver should be taught how to change the dressing at the insertion/access site of the VAD.
4. Discuss with the client how to care for the VAD.
5. Ask the client or caregiver to demonstrate their ability to care for the VAD after they have been taught.

**Figure 8-23-2** Noncoring needle**IMPLEMENTATION—ACTION/RATIONALE****ACTION**

1. Wash hands. Apply gown and mask, if required by institutional policy.
2. Prepare sterile field and lay out supplies (see Figure 8-23-3).
3. Swab skin over injection port with alcohol and then povidone-iodine using a circular motion and moving from the center outward (see Figure 8-23-4).
4. Apply sterile gloves.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Protects sterile supplies from contamination.
3. Prevents introduction of microorganisms into system.
4. Reduces transmission of microorganisms.



Figure 8-23-3 Lay out supplies on a sterile field.



Figure 8-23-4 Swab skin over injection port.

5. Prepare sterile syringe with 20 ml of normal saline.
6. Prepare Huber needle:
 - Attach sterile extension tubing between saline-filled syringe and Huber needle (see Figure 8-23-5).
 - Fill tubing with saline solution.



Figure 8-23-5 Attach syringe to extension tubing.

5. Flushing solution is ready for procedures.
6. Removes air from tubing to reduce the risk of air embolus.



Figure 8-23-6 Using aseptic technique, palpate to find the port.

7. Apply sterile drape to port site.
8. Access port:
 - Palpate port septum using aseptic technique (see Figure 8-23-6).
 - Insert Huber needle through skin.
 - Push down until needle penetrates the septum and rests against needle stop.
9. Flush port with 20 ml normal saline.
10. Obtain blood sample if ordered:
 - Aspirate 5 ml of fluid and discard.
 - Aspirate blood with syringe size equal to desired amount.
 - Flush port with 20 ml normal saline.
 - Flush port with 5 ml heparin solution if no IV infusion is started.

7. Provides sterile work area.
8.
 - Ensures proper needle entry of port.
 - Huber needle is bent at a 90° angle.
9. Ensures patency of device.
10.
 - Ensures undiluted sample.
 - Avoids repeated puncture of port.
 - Clears blood from port.
 - Prevents clot formation.

11. Set up IV infusion:

- Secure Huber needle with sterile gauze or transparent dressing.
- Connect IV tubing to tubing from Huber needle.
- Set flow rate of infusion as ordered.

When the infusion is finished:

- Flush port with 20 ml normal saline.
- Flush port with 5 ml heparin solution if no further therapy is ordered (see Figure 8-23-7).

Figure 8-23-7 Flush with heparin solution.

- 12.** Dispose of soiled equipment and used supplies. Remove gloves and wash hands.

11.

- Prevents accidental dislodging of needle and maintains aseptic technique.
- Maintains sterile system.
- Ensures correct administration of fluid.
- Clears blood from port.
- Prevents clot formation.



- 12.** Reduces the transmission of microorganisms.

> EVALUATION

- The nurse was able to aspirate blood through the catheter without difficulty.
- The nurse was able to infuse fluid through the catheter without difficulty.
- The skin at the catheter insertion site and the puncture site is intact and without redness or swelling.
- The client does not have signs or symptoms of localized or systemic infection.
- The catheter injection port remained intact and without leaks.
- The client and caregiver were able to explain the purpose of the VAD and the proper method of maintaining the VAD.
- The client and caregiver were able to perform dressing changes and skin care.
- The access site is free of signs or symptoms of infiltration of blood or IV fluids.
- Document the client's response to therapy.
- Record the patency of the catheter, including the ability to draw blood and difficulty of infusing fluids.
- Immediately report occlusions, damage to the catheter, or air embolus to the physician or qualified practitioner.
- Report signs or symptoms of infection or infiltration.
- Report client teaching or concerns voiced by the client or caregiver.
- Report laboratory specimens drawn and their disposition.

Parenteral Flow Sheet

- Record date, time, type, and volume of fluids given.

Medication Administration Record

- Record medications and dose infused via the venous access device.
- Report the heparin flush.

> DOCUMENTATION

Nurses' Notes

- Record the condition of the skin at the site of the VAD.



▼ REAL WORLD ANECDOTES

Ms. Chen had an implanted VAD placed for blood draws and chemotherapy infusions. Several weeks later, she reported to the outpatient clinic for blood work and chemotherapy. The nurse caring for Ms. Chen was not familiar with implanted VADs and was not aware of the need to use a Huber needle to access the implanted port. He prepared the tubing and the saline and heparin flushes. The nurse then attached a 2-inch, 18-gauge needle to the tubing for the blood draw to allow a quicker draw without damaging the red blood cells. As he was getting ready to insert the needle into the VAD access port, Ms. Chen pointed out that the needle looked very different from the one that was normally used. She told the nurse that the needle she was supposed to use should be bent. The nurse stopped and sought out the nurse practitioner in the clinic for advice, preventing a potentially dangerous mistake. He had learned to listen to his clients when they pointed out discrepancies in technique.

> CRITICAL THINKING SKILL

Introduction

One of the most common complications in clients with an implanted VAD is infection. Aseptic technique must be maintained when accessing the device to obtain blood samples or infuse fluids. Assessment of the site and systemic symptoms is necessary for early detection and treatment.

Possible Scenario

The client with an infusion port was feeling tired at home the day after his clinic visit when he had blood drawn. He felt slightly warm, and when he took his tem-

perature, it was 38.3°C. He called the clinic and reported it to the nurse.

Possible Outcome

The nurse knew that he had an infusion port and asked about the skin above the port. When he told her that it was pink and warm, she instructed him to come to the clinic to be assessed.

Prevention

The infusion port may not have been properly prepared before the blood draw the previous day. Scrubbing the skin over the port is the only way to prevent transmission of microorganisms from entering the circulation.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients often have thin skin. Be careful not to tear their skin when inserting the Huber needle or when removing tape.



Pediatric Variations:

- Have the child's caregiver distract the child while inserting the Huber needle and during the therapy to prevent the child from dislodging the needle.



Home Care Variations:

- An infusion port needs to be flushed only every 4 weeks if not in use.
- A receptacle for disposing of soiled equipment is needed.



Long-Term Care Variations:

- If an implanted VAD is being used for long-term therapy, be sure the access port is not damaged during use. Multiple sticks can break down the plastic of the access port leading to infiltration of blood or IV fluids.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

When flushing the infusion port, too much force is used and a small clot is pushed into the muscular tissue around the port.

Ask Yourself:

How do I prevent this error?

Prevention:

If resistance is felt when flushing the port, do not irrigate with force. If this error occurs, stop flushing the port. Aspirate into the syringe to observe for clots. Use another syringe to flush more gently.

> NURSING TIPS

- Have all the equipment available for the procedure.
- Take advantage of this procedure to assess the client and provide emotional support.

SKILL 8-24

Obtaining an Arterial Blood Gas Specimen

Kathryn Lilleby, RN

KEY TERMS

Acid-base balance	Brachial
Allen's test	Femoral
Arterial blood gases	Radial
Arterial oxygen saturation	Respiratory acidosis
Artery	Respiratory alkalosis



> OVERVIEW OF THE SKILL

Arterial blood gases are measured to assess a client's oxygenation, ventilation, and acid-base balance. The blood sample is easily, although often painfully, obtained from an artery and is analyzed for arterial blood pH, partial pressure of oxygen (PaO₂), partial pressure of carbon dioxide (PaCO₂), and arterial oxygen satu-

ration (SaO₂). The analysis can quickly provide information on the client's respiratory or metabolic status and response to a disease process. Clients who require mechanical ventilation or have sudden respiratory distress or change in level of consciousness may benefit from this test for diagnosis and treatment.

> ASSESSMENT

1. Assess the type of symptom and lung sounds that require an arterial blood gas (ABG) sample. Signs and symptoms may include, dyspnea, sudden change in respiratory rate or pattern, unequal breath sounds, unequal chest expansion, cyanosis, change in level of consciousness, self-extubation, and increased work of breathing. **Determines when an ABG is needed.**
2. Assess if the client has just awakened, just been suctioned, or had a change in oxygen or ventilator settings within the last half hour. **Identifies factors that may affect an ABG measurement.**
3. Assess collateral blood flow by performing Allen's test to choose a site for ABG sample.
4. Assess tissue surrounding artery to avoid sites of previous punctures and proximity to veins.
5. Assess baseline or most recent ABG for client to compare with current status.

6. Assess client's knowledge about the procedure of obtaining an ABG sample to ensure cooperation and reduce anxiety.

> DIAGNOSIS

1.5.1.1 Impaired Gas Exchange

> PLANNING

Expected Outcomes:

1. The client will have normal ABG results.
2. The pulse, color, and temperature of the client's extremity distal to the puncture will be unchanged.
3. The client will be calm and free of pain.
4. The client will have minimal bleeding from the site following the puncture.

Equipment Needed (see Figure 8-24-2):

- Heparinized syringe with cap, 3 ml (check agency policy for heparin solution use)
- A 23- or 25-gauge needle
- Povidone-iodine and alcohol swabs
- Gauze pad, 2 × 2
- Heparin 1:1000 solution
- Cup with crushed ice
- Label with date, time, and client's name
- Laboratory requisition
- Disposable gloves
- Protective eye wear



Estimated time to complete the skill:
15–20 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the ABG sample.

2. Prepare clients by telling them that the needle stick will be painful so they do not reflexively pull their arm away.
3. Client should be instructed to breathe slowly and deeply.
4. The client should be taught to report these symptoms immediately: numbness, burning, tingling or bleeding in the hand that was punctured.



Figure 8-24-2 Alcohol, syringe, gauze, and heparinized solution

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Identify client and explain procedure to client in calm tone of voice.
2. Prepare syringe with heparin:
 - Aspirate 0.5 ml sodium heparin (1000 U/ml) into syringe from vial.
 - Withdraw plunger entire length of syringe and eject all heparin out of syringe.
3. Select safest and most accessible site for ABG sample:
 - Perform Allen's test. Have client make tight fist and apply direct pressure to both radial and ulnar arteries. When client opens hand, release pressure over ulnar artery and observe color of fingers, thumbs, and hand. Fingers should flush within 15 seconds—a positive Allen's test.
 - If Allen's test is positive, use the radial artery.

RATIONALE

1. Ensures proper client identification and reduces anxiety and promotes cooperation.
2. Needed if a heparinized syringe is not available.
 - Prevents blood from clotting before analysis is performed.
 - Coats the barrel of syringe with heparin. More than 0.25 ml of sodium heparin in 3 ml of blood may affect the pH level.
3. Arterial puncture may result in spasm, clotting, or hematoma, which could reduce blood flow, so collateral flow is essential.
 - Determines adequate blood flow to the hand by removing blood from hand, obstructing blood flow, then allowing blood to flow into hand through the ulnar artery. Indicates collateral flow is positive.
 - The radial artery is the safest and most accessible site.

- Brachial artery should be used if radial artery is inaccessible or Allen's test is negative.
- Femoral artery should be used only by specially trained nurses, physicians, or qualified practitioners.

4. Wash hands and put on gloves.
5. Palpate selected radial site with fingertips and stabilize artery by slightly hyperextending wrist.
6. Use alcohol swab to clean in a circular motion the area above the pulse (see Figure 8-24-3).



Figure 8-24-3 Clean the area with an alcohol swab.

7. Hold alcohol swab in fingers of one hand while keeping a fingertip from the other hand on the artery.
8. Insert needle with bevel up into artery at a 45° angle (see Figure 8-24-4).
9. Hold the needle and syringe still when blood appears in the syringe.
10. Allow arterial pulsing to slowly pump 2–3 ml of blood into heparinized syringe.
11. When sample is collected, hold alcohol swab over the puncture site and withdraw needle.
12. Apply pressure with the alcohol swab over the puncture site for 5 minutes, or 10 minutes if the client is on anticoagulant therapy or has a bleeding disorder.

- Has collateral blood flow but is less superficial and more difficult to palpate and stabilize and has risk of damage to adjacent structures such as brachial nerve or vein.
- Has no collateral blood flow if obstructed below the inguinal ligament, is difficult to stabilize, and is adjacent to femoral vein. However, this is the best artery to use in emergency such as cardiac arrest or shock.

4. Reduces number of microorganisms.
5. Determines area of maximal impulse for puncture site and facilitates successful insertion of needle.
6. Reduces number of bacteria on surface of skin.



Figure 8-24-4 Insert the needle with the bevel up at a 45° angle.

7. Keeps swab accessible during procedure.
8. Allows for better arterial flow into needle. Oblique hole in artery seals more easily.
9. Prevents traversing needle through artery.
10. Prevents air bubbles from entering sample, which can alter results.
11. Swab minimizes pulling of skin as needle is withdrawn.
12. Ensures adequate coagulation at puncture site.

13. Inspect site for signs of complications:

- Bleeding
- Change or disappearance of pulse
- Color of hand

14. Remove gloves and wash hands.**15.** Prepare sample for laboratory and send it:

- Expel air bubbles from syringe.
- Label syringe with client identification.
- Place syringe in cup of crushed ice.
- Fill out requisition form, including amount of oxygen the client is receiving (e.g., 2 liters O₂ by nasal cannula, room air, 70% on ventilator)
- Note some laboratories also require a recent body temperature.

16. Review results of ABG sample and compare with normal values:

- pH 7.35–7.45, PaCO₂ 35–45
- PaO₂ 80–100
- SaO₂ 94%–98%

17. Report ABG results to physician or qualified practitioner and perform nursing measures accordingly:

- Respiratory acidosis
- Respiratory alkalosis

13. Determines need for further treatment.

- Indicates need to exert pressure.
- Shows change in blood flow to hand.
- Paleness may indicate obstruction of blood flow.

14. Reduces transmission of organisms.**15.**

- Prevents false ABG results.
- Ensures results are correct for client.
- Reduces blood cell metabolism.
- Ensures proper identification of sample.

16. Identifies abnormality:

- pH and decreased PaCO₂—respiratory alkalosis; pH and increased PaCO₂—respiratory acidosis
- PaO₂—inadequate oxygenation
- SaO₂—contamination of sample

17. Ensures proper treatment of client:

- Encourages coughing and deep breathing; perform tracheal suctioning, elevate head of bed, administer or increase oxygen therapy, hold pain medication if possible.
- Encourages slow, deep breaths; have client breathe into a paper bag, administer pain medication, help client alleviate anxiety.

> EVALUATION

- The client has normal ABG results.
- The pulse, color, and temperature of the client's extremity distal to the puncture is unchanged.
- The client was calm and free of pain.
- The client had minimal bleeding from the site following the puncture.

> DOCUMENTATION

Note: When the blood gas results are delivered to the nurse, they should be reported to the client's physician.

Nurses' Notes

- The date and time of the ABG sampling should be recorded in the narrative notes.

- Also record the reason for the test, the results of the Allen's test, the client's response to the blood sampling, and any unusual observations.
- Note the route and amount of oxygen the client is receiving and any respiratory assessment observations.
- Record the condition of the puncture site prior to the blood draw and after the blood draw.
- Be sure to note the follow-up check on the condition of the site.

Laboratory Requisition Slip

- Record the date and time of the sample, the client's name and room number, the site the sample was drawn from, and the amount and route of oxygen delivery.



▼ REAL WORLD ANECDOTES

Mrs. Anderson was admitted to the hospital with pneumonia. She was started on IV antibiotics and IV fluids. Her daily chest x-ray was stable and she had a low-grade fever.

One afternoon, the nurse noticed that her temperature was 38.9°C and her respirations were 36 and shallow. She seemed less alert than earlier and restless. The nurse reported her symptoms to the physician, who ordered oxygen to be given at 40% by mask and that ABGs and a chest x-ray be done immediately.

The nurse obtained a blood gas sample while waiting for the portable chest x-ray to arrive. The blood gas results showed a reduced PaO₂ level, indicating inadequate oxygenation. The nurse notified Mrs. Anderson's physician of the ABG results immediately. The physician ordered Mrs. Anderson's oxygen to be increased, and she informed the nurse that she would be right in to see the client. Since the nurse had noted and correctly assessed Mrs. Anderson's symptoms in a timely manner, the appropriate care was administered before Mrs. Anderson's condition could deteriorate to a life or death situation.

> CRITICAL THINKING SKILL

Introduction

The rate and depth of respirations can affect the results of an ABG sample. It is necessary to assess the client's respirations before obtaining the sample.

Possible Scenario

A 19-year-old presents to the emergency room complaining of difficulty breathing. Her lungs are clear and her physical assessment does not seem to indicate poor oxygenation. The emergency room doctor orders ABGs to be sure the teenager's blood oxygen level is normal. As the nurse explains the test to the client and prepares the needle and syringe, the client becomes increasingly anxious. Her respiratory rate increases to 36 breaths per minute.

Possible Outcome

The test results show respiratory acidosis. While examining the results, the nurse remembers that the cli-

ent had been very anxious about the procedure and that her respiratory rate had increased dramatically. As the nurse gives the doctor the blood gas results, she reports this observation. The doctor recognizes that the blood gas results are probably not indicative of the client's actual blood gas levels. Since the client's other symptoms do not indicate respiratory acidosis, the physician pursues other possible causes for the client's shortness of breath. The eventual cause is found to be a sinus infection that has caused swelling of the nasopharyngeal mucosa.

Prevention

Assess the client for knowledge deficit of the procedure as well as for fear and anxiety. Take time to explain the procedure to allay the client's fears. Instruct the client to breathe normally. Note and record the client's respiratory rate and depth at the time of the ABG test. If the test is not consistent with the client's observable condition, treat the client, not the test results.

▼ VARIATIONS



Geriatric Variations:

- Blood vessels can be fragile in elderly clients.
- Capillary refill can be slow in older clients.
- If the Allen's test is failed in hands, it may be necessary to use the brachial or femoral artery.



Pediatric Variations:

- A heel stick for obtaining a capillary blood gas may be used in neonatal or pediatric clients.
- Values for neonatal clients may be different from adult values.

▼ VARIATIONS *continued*



Home Care Variations:

- Arterial blood gas samples are less stable than venous blood samples and should be tested as soon as possible. When drawing this sample in the home care situation, take the blood to the laboratory as soon as possible.
- Between the time the arterial blood is drawn and the time it is tested, it should be stored in ice. Be sure to have ice in a cup or plastic bag available prior to drawing the sample. If the weather is hot or the drive to the laboratory is long, the nurse might want to have a small, portable ice chest available for transporting the sample.



Long-Term Care Variations:

- Clients with chronic obstructive pulmonary disease may have peripheral vascular insufficiency and may require a brachial or femoral sample.
- Clients with chronic obstructive pulmonary disease often have abnormally high PaCO₂ levels. The nurse should be aware of this when assessing blood gas results.
- The high PaCO₂ levels should not be treated with increased oxygen as this could cause the client to stop breathing.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Air bubbles enter the syringe while obtaining the ABG.

Ask Yourself:

How do I prevent this error?

Prevention:

Do not pull back on the plunger of the syringe while obtaining arterial blood. Be sure the needle is attached securely to the syringe before inserting the needle into the artery. If a sufficient amount of blood has been obtained, remove the needle and expel the air bubbles from the syringe. If not, remove the needle, apply pressure to the site, wait 5 minutes, and obtain the sample at another site with a new needle and syringe.

> NURSING TIPS

- Prepare the heparinized syringe before going into the client's room.
- Remember that superficial arteries are at the distal ends of extremities.
- Be sure to calmly warn the client before you insert the needle so he does not pull back his hand.
- A rolled towel placed under the client's wrist helps him to relax his hand and allows easier access to the artery.
- Never pull back on the plunger of the syringe while sampling arterial blood.
- Bring a cup of ice into the room to have available to transport the sample.

SKILL 8-25

Assisting with the Insertion and Maintenance of an Epidural Catheter

Pam Talley, MN, CNS

KEY TERMS

Analgesia
Anesthesia
Labor pain

**Patient-controlled
analgesia**
Surgery



> OVERVIEW OF THE SKILL

Epidural catheter placement is an effective method used to administer regional anesthesia and/or analgesia. Epidural placement is performed by qualified personnel. Qualification guidelines are determined by

law and institutional policy. Persons assisting with placement must be knowledgeable about the routine, possible complications, desired outcomes, and client support.

> ASSESSMENT

1. Perform a thorough history and physical before epidural placement. Report positive findings to the anesthetist/anesthesiologist. **Prior experiences with anesthesia, medical problems, and current medical status are vital information and must be assessed prior to therapy.**
2. Assess baseline vital signs. **Alterations in blood pressure and pulse will indicate reactions to medications used in epidural dosing.**
3. Assess client's ability to follow direction and communicate. **Client must be able to maintain a steady position and convey any symptoms to the practitioner.**

> DIAGNOSIS

- 9.3.1 Anxiety related to invasive procedure
9.1.1 Pain

> PLANNING

Expected Outcomes:

1. Client will experience relief of pain or lack of sensation in accordance with the reason for the epidural.
2. Client will experience no untoward effects of epidural anesthesia.
3. Client will perform self-medication as appropriate (i.e., client-controlled analgesia).
4. Client will experience desired effect of anesthesia/analgesia until it is appropriate to discontinue treatment.

Equipment Needed (see Figure 8-25-2):

- Oxygen
- Suction
- Anesthesia equipment
- Emergency medication
- Automated blood pressure recorder

- Oximeter
- EKG monitor
- Drugs as requested by anesthesia personnel
- Positioning aids: e.g., pillows, sandbags



Estimated time to complete the skill:
10–30 minutes. Time requirements will vary with anesthesia practitioners, difficulty of the procedure, and hospital policy for monitoring.



Figure 8-25-2 Pulse oximeter

> CLIENT EDUCATION NEEDED:

1. Describe the procedure to the client in easy-to-understand terms. Clients experiencing anxiety may require calm reassurance throughout the procedure and benefit by knowing ahead of time sensations they may feel.
2. Remind client to maintain position during the procedure.
3. The most uncomfortable part of the procedure for most people is numbing the skin. After the skin is numb, most people feel pressure as the anesthetist places the catheter.
4. Ask the client to report any sudden shooting pain or back pain, which might indicate that the skin is not numb. Some practitioners prefer to teach this themselves, and it is important to check before the client is present if the anesthesiologist/anesthetist has a preference.
5. If anesthesia is desired, client will not be able to ambulate and may not have sensation below the level of anesthesia effect.
6. If analgesia is provided on client-controlled analgesia device, assure that the client understands that medication is available on demand and is able to demonstrate the technique for medication delivery.
7. If client is to have intermittent bolusing: Teach client to report when they begin to feel pain. Notify anesthesia immediately for bolus (or follow hospital protocol) as feeling often returns rapidly.
8. If client is to receive client-controlled analgesia: Assure that the client understands medication principles associated with their dosing scheme.
9. Reinforce that if the epidural is not providing adequate relief there are changes that can be made to dosage and administration. Often, clients may think that there are no alternatives to the current treatment.
10. If therapy is to be long term, assure that client understands mobility limitations and learns to identify sensations that indicate, for example, full bladder and pressure over bony prominences.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Identify client and review preanesthesia orders.

1. Ensures proper client identification and that the client has received medications and fluids before start of the procedure. Some practitioners will ask that fluid boluses be given within an hour of epidural starts.

2. Assemble equipment.

2. Assures functionality of emergency equipment. Extra and alternative supplies are brought to the room in case of contamination or client needs.

3. Apply client monitors in accordance with institutional policy.
4. Assist client to lying or sitting position.
5. Assess that the client can maintain a stable position (see Figure 8-25-3). Assist if necessary.
3. Ensures correct monitors will be utilized during surgery or evaluates oxygenation and cardiac function following epidural insertion. Alerts to sudden changes in the client's status that will require immediate attention.
4. Positioning will depend on practitioner preference, patient condition, and environmental constraints.
5. If the client is unable to maintain a stable position, alternative anesthesia/analgesia methods must be used.



Figure 8-25-3 Help the client maintain a position on his side.

6. Maintain calm milieu; encourage client to follow anesthesia practitioner's directions. Instruct client to report symptoms to the anesthesia practitioner throughout the procedure.
7. Monitor for:
 - Untoward effects of intravenous administration of medication or anesthesia.
 - Untoward effects associated with a dural puncture.
8. Assist anesthesia practitioner to stabilize catheter. Often the catheter will be taped along the client's back, then over the shoulder for easy access. Take care to prevent kinks in the soft material.
6. Provides clues as to the progress of insertion, especially in difficult cases.
7. Detects adverse signs including ringing in the ears, sudden tachycardia, metal taste in the mouth.
 - Some medications used in epidurals will cause seizure. This is the reason test dose is used before initial dosing.
 - If a dural puncture occurs, the client will be immediately and profoundly numb as soon as medication is administered. Respiratory assistance may be required in this instance as dosages for epidural therapy are much higher than those required for intrathecal (spinal) therapy.
8. Prevents catheter from becoming dislodged.

9. Follow anesthesia practitioner's direction for client positioning after anesthesia is administered.
10. Initiate automatic drug delivery system (if appropriate to hospital policy). Some state laws require that automatic drug delivery be started by anesthesia personnel. Know your practice act. (See Figure 8-25-4.)
9. Positioning may be used to "even out" the drug and therefore the effect. Epidural anesthesia does not provide instantaneous relief; rather it requires several minutes to set up depending on which drugs are used, the client's anatomy, and position of the catheter.
10. Provides drug administration as ordered.



Figure 8-25-4 Initiate drug delivery system.

11. Perform frequent blood pressure and neurologic exams in compliance with institutional policy.
11. Regional anesthesia may cause motor blockade and lead to vasodilation.
12. Monitor client at frequent intervals for ability to void, pressure and positioning, analgesic and/or anesthetic effects, and compliance with mobility limitations if appropriate.
12. Basic assessment ensures effectiveness and reduces risk of complications from the intervention.

> EVALUATION

- The client experiences relief from pain or lack of unpleasant sensation.
- The client does not experience the untoward effects of epidural anesthesia.
- The client understands the purpose and action of the epidural anesthesia, and performs self-medication if appropriate.

DOCUMENTATION

Nurses' Notes

- Following epidural placement, client reports pain at 0 on scale of 0–10. Sensation absent at T-10. (Describe client positioning and any supportive intervention used to prevent injury.)

Medical Administration Record

- Anesthesia personnel will document medications on the anesthesia record. Assure that all partial narcotics doses are documented according to hospital and state and federal regulations.

Vital Signs Record

- Vital signs are recorded at greater frequency during surgery, during recovery, and anytime a client's condition may change unexpectedly because of continuously infusing medication or other reasons. Check your hospital policy for recording parameters for the anesthetized client.



▼ REAL WORLD ANECDOTES

Scenario 1

Often in surgery, it seems that everything happens at once. For the circulating nurse, many tasks must be accomplished in a short time before the procedure begins. Be aware that when clients are brought to the surgical suite they may have had antianxiety medication and may not be able to protect themselves.

The nurse received a report on Adeline, who was scheduled for abdominal hysterectomy. In the operating room, the nurse was almost ready for the case. The anesthetist was ready to perform the epidural but the scrub technician was a little late getting started. As the anesthetist helped Adeline to lie on her side, the nurse stood in front of her to protect her from falling off the edge. Just as the anesthetist began looking for a good place for insertion, the scrub technician asked the nurse to tie her gown. The nurse moved away from the table “just for a second.” Adeline began to fall, but the quick action of the anesthetist prevented her from falling to the floor. The nurse learned the hard way that clients must never be left unattended, even for a moment.

Scenario 2

Don, a 68-year-old client, had an epidural catheter placed for client-controlled analgesia following an exploratory laparotomy. Over the evening, he kept complaining of pain, even though he was using the patient-controlled analgesia correctly. His nurse checked the equipment several times and was considering requesting an increased dosage rate of pain medication. When the family came to visit, the daughter noticed that the catheter had pulled out of her father and was lying in the bedclothes. The sweat from his skin and the friction of the bedsheets had caused the tape to roll and the catheter to become dislodged. He had been medicating the bed all afternoon. The nurse needed to check the epidural catheter as well as the pump and the client. (See Figures 8-25-5 and 8-25-6.)



Figure 8-25-5 Check the epidural catheter to make sure it has not become dislodged.



Figure 8-25-6 Check the pump to make sure it is functioning correctly.

> CRITICAL THINKING SKILL

Introduction

Positioning is important during epidural catheter placement. The anesthesia practitioner must navigate

the structures of the spine by the feel of the needle. Recall that the spaces in the spine open up as the client bends.

Possible Scenario

Mario is a large man. He is scheduled for hernia surgery and has elected to have an epidural for surgery and postoperative pain control. Mario has a protruding abdomen and cannot seem to bend in the middle when instructed to do so.

Possible Outcome

If Mario is still unable to bend sufficiently, the anesthetist may elect to have Mario sit up for catheter insertion.

Prevention

Try to help Mario understand the need to bend. It may help to demonstrate “bending in the middle” for Mario. Try to think of analogies for an arched back.

▼ VARIATIONS



Geriatric Variations:

- Older clients may overestimate their ability to tolerate pain, or have expectations that they can “bear up.”
- Visual, hearing, and cognitive impairments might interfere with accurate assessment of side effects and pain control.
- Older client may have more complex medication regimens, and may have greater responses to medications, including opioids. Careful assessment of potential medication interactions is important.



Pediatric Variations:

- Educate parents about the epidural catheter and the type and effects of medications being delivered.
- Educate parents about the child’s mobility. Tell them that the child can be out of bed, if the medical condition permits. Assist the parent to position and hold the child without accidentally dislodging the epidural catheter.



Home Care Variations:

- Home care clients with long-term epidural catheters for pain control or medication administration must be monitored on a continuous basis to adjust dosages and assess for potential complications.
- Home care clients should have telephone access to health care providers for consultation and know what to do in case complications arise.



Long-Term Care Variations:

- Long-term assessment of the epidural catheter should include regular monitoring for signs of infection, the need for dosage adjustment for pain control, or signs of fibrotic encapsulation, which may reduce the therapeutic effect of drugs.
- Know what alternatives for pain control are available to the client if the catheter must be removed. Discuss with the client.



Pregnancy Variations:

- When assisting during the placement of an epidural for labor or cesarean section, it is imperative the assistant be competent in FHR monitoring. Appropriate response is critical if the FHR displays signs of distress (i.e., bradycardia, late decelerations) or if labor unexpectedly progresses to birth. The anesthesia personnel should be prepared to abandon the procedure in the instances cited. It is imperative for the assistant to be mindful of the effect of regional anesthesia on the progress of labor in addition to the physical effects on the mother and fetus.
- Never place the mother in a supine position, regardless of desirability for anesthesia efficacy.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The client requires oxygen because of profound hypotension. You cannot find a face mask anywhere.

Ask Yourself:

How do I prevent this error?

Prevention:

Make sure that all emergency equipment is available and functional.

> NURSING TIPS

- Do not attempt to do other duties while assisting with epidural placement. If there are competing demands, insist on extra personnel. (For example, in surgery do not count sponges or pour liquids when client is positioned.) Client safety must be your first concern.
- Maintain proper body mechanics during the procedure as you may need to hold your position for a prolonged time.
- If anesthesia personnel ask the client to bend, it is sometimes helpful to ask the client to arch like a “Halloween cat.”

Skin Integrity and Wound Care

- Skill 9-1** Bandaging
- Skill 9-2** Applying a Dry Dressing
- Skill 9-3** Applying a Wet to Damp Dressing (Wet to Dry to Moist Dressing)
- Skill 9-4** Applying a Transparent Dressing
- Skill 9-5** Applying a Pressure Bandage
- Skill 9-6** Changing Dressings around Therapeutic Puncture Sites
- Skill 9-7** Irrigating a Wound
- Skill 9-8** Packing a Wound
- Skill 9-9** Cleaning and Dressing a Wound with an Open Drain
- Skill 9-10** Dressing a Wound with Retention Sutures
- Skill 9-11** Obtaining a Wound Drainage Specimen for Culturing
- Skill 9-12** Maintaining a Closed Wound Drainage System
- Skill 9-13** Care of the Jackson-Pratt (JP) Drain Site and Emptying the Drain Bulb
- Skill 9-14** Removing Skin Sutures and Staples
- Skill 9-15** Preventing and Managing the Pressure Ulcer
- Skill 9-16** Managing Irritated Peristomal Skin
- Skill 9-17** Pouching a Draining Wound

SKILL 9-1

Bandaging

Patricia Abbott, RN, ARNP, MSN

KEY TERMS

Bandages	Neurovascular status
Elastic bandages	Reverse spiral bandage
Figure-eight bandage	Spiral bandage
Gauze bandages	Stump bandage
Hypovolemia	
Immobilization	



> OVERVIEW OF THE SKILL

Bandages are narrow strips of fabric, gauze, or elastic material used on wounds to aid and promote the healing process. Bandages are used to cover wounded areas, hold dressings in place, and reduce edema. Bandages may also be used to apply pressure or support to a specific area without compromising circulation, alignment, or mobility. Gauze bandages are readily available in a variety of widths, so the size of the bandage can be chosen to correspond to the size of the wound and body part involved. Another advantage of gauze is

that it is porous, which promotes healing by allowing the circulation of air.

Elastic bandages are also available in a variety of widths and have the added advantage of applying more pressure/compression because of their elastic quality. Therefore, they are used more often to prevent edema on lower extremities (see Skill 10-1 on applying elastic bandages).

Fabric bandages are not routinely used. Fabric bandages can be made, however, from many available sources. These can be used in emergency situations.

> ASSESSMENT

1. Assess the wound to be covered if a wound is involved. If there is active bleeding, the bleeding must be controlled to prevent hemorrhage and possible hypovolemia. A pressure dressing can be applied using a bandage to hold the pressure compress in place if necessary. A bandage should not be applied to a wound that does not have a dressing over the bleeding area. Immobilizing a joint or broken bone is one of the most important factors in controlling blood loss, and a properly applied bandage can aid in immobilization.
2. Assess the client's level of consciousness. This is important so that the client can report if the bandage is too tight and is possibly restricting circulation. If the client has a decreased level of consciousness, use extra caution to ascertain that the dressing is not too constricting.
3. Assess the client's skin integrity, paying special attention to the presence of edema, ecchymosis, lacerations, abrasions, any bony prominence, and the condition of the skin (dry, cracked, infected, thin). These factors will help determine what bandage products and techniques to use.
4. Assess neurovascular status. Check capillary refill, temperature, and color of the skin in the area surrounding and distal to the bandage. Check motion, sensation, and pulses. These factors will help

determine a baseline for future assessments as well as what type of bandaging product or technique to use.

> DIAGNOSIS

- 1.4.1.2.2.2 Risk for Fluid Volume Deficit
- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.4.1.1 Altered Tissue Perfusion, related to wound, skin, and structures distal to area involved
- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client does not become hypovolemic, and bleeding is controlled.
2. The wound is supported and in alignment.
3. The bandage is applied properly, with adequate anchoring and no loose or dangling ends.
4. The client does not experience pain or discomfort from the bandaging.
5. There is adequate circulation to the wound and distal body parts before, during, and after application of the bandage.
6. The client does not report any numbness or tingling.
7. The wound heals, without breakdown of skin or neurovascular status.

Equipment Needed (see Figures 9-1-2 and 9-1-3):

- Dressing for wound, if present
- Bandage, either gauze, elastic, or fabric (emergent situation)



Figure 9-1-2 Select the appropriate size bandage for the body part.

- Gloves to maintain body fluid precautions if there is the potential for body fluids
- Tape or clips to secure bandage



Estimated time to complete the skill:

5–15 minutes depending on whether a wound is involved and the complexity of the bandage, which is dependent on the body part involved

> CLIENT EDUCATION NEEDED:

1. It is important that clients understand what the nurse is doing and why the bandage is being applied (to control the bleeding, support the wound/limb, hold a dressing in place, reduce edema). If clients are part of the process, they will experience less discomfort, will be of more assistance in applying the bandage, and will be more compliant in keeping the bandage in place after the nurse has finished applying it.
2. The client should be taught the importance of having the bandage smooth to avoid any unwanted constriction.
3. The client needs to understand the importance of reporting any numbness, tingling, or discoloration of skin in the area of the bandage or distal to it.
4. Clients need to understand that they should report any drainage that has soaked through the bandage. Active bleeding needs to be controlled and reported. It is important to maintain a clean wound with less potential for secondary infection.



Figure 9-1-3 Kling gauze bandage

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | ACTION | RATIONALE |
|---|--|
| 1. Provide privacy for client, then wash hands and apply gloves. | 1. Reduces the transmission of microorganisms and ensures client comfort. |
| 2. Provide wound care as ordered or required. Determine the need for the bandage. Will it be used to: <ul style="list-style-type: none"> • Cover a wound? • Hold a dressing in place? • Apply pressure? • Support a wound/limb? • Maintain circulation? • Decrease edema? | 2. If the need is to control bleeding and the risk of hemorrhage exists, the nurse must apply a pressure dressing immediately. A clean bandage can be used to control the bleeding in emergent situations, but use a sterile dressing when available. |
| 3. Assess the neurovascular status. Check pulse, capillary refill, skin color, and warmth. Check sensation. Neurovascular status needs to be assessed at wound or area to be bandaged and body part distal to the area. | 3. If the neurovascular status is compromised, it will be necessary for the nurse to fully assess and document this prior to applying the bandage and to correct the compromised status if possible. |
| 4. Assess skin integrity. Check for dryness, fragility of skin, any apparent breakdown, and signs of bleeding or infection. | 4. If there is excessive dryness or fragility, extra care will be needed to prevent breakdown of skin. If the skin around the existing wound is already impaired as evidenced by swelling, bleeding, or infection, this breakdown must be dealt with before applying the bandage. |
| 5. Assess need for immobilization. | 5. Proper immobilization is essential for controlling bleeding, supporting the area, protecting the wound from further damage, and maintaining client comfort. |
| 6. Assess client's comfort and level of consciousness. Explain procedure to client. | 6. Makes client more comfortable and determines how aware the client is and how able the client is to understand and cooperate with the nurse during the process of bandaging. |
| 7. Gather supplies needed, based on above assessment. | 7. If the nurse knows what will be needed, the process will be more effective and time efficient. |
| 8. Apply the bandage. The technique will vary depending on the area of body to be bandaged. | 8. If the bandage is properly applied, it will be more effective in doing what it was applied for: controlling bleeding, covering the wound, applying necessary pressure or compression, reducing edema, supporting wound/limb to maintain circulation and immobilization if needed. |
| <ul style="list-style-type: none"> • Hold roll of bandage in dominant hand, with the loose end on the distal portion of the area to be bandaged (see Figure 9-1-4). This end is held with nondominant hand. | <ul style="list-style-type: none"> • Wrap with the dominant hand for dexterity. |



Figure 9-1-4 Hold the bandage in the dominant hand and loosen the end of the bandage.

- The roll of bandage is then unrolled proximally, applying slight tension as it is unrolled round the body part.
- The first two or three turns of the bandage should overlap to secure the loose end.
- The roll of bandage can be transferred from hand to hand and should be applied evenly and firmly, but caution should be taken to avoid the bandage being too tight (see Figure 9-1-5).

9. Common Bandaging Methods

- **Figure eight:** Anchor bandage at center of joint. Ascend obliquely in circular fashion around extremity above and below joint, in a figure-eight fashion, overlapping until necessary immobilization is obtained. Secure end of bandage (see Figure 9-1-7D).
- **Spiral:** Anchor bandage at distal aspect with two or three circular turns. Then proceed upward overlapping one-half to two-thirds the width of the bandage with each turn (see Figure 9-1-6). Secure end of bandage (see Figure 9-1-7B).
- **Recurrent turns (also known as the stump method):** Anchor bandage with two circular turns around proximal end of area to be bandaged. Then make a reverse turn at center front, taking roll of bandage over the distal end of the area to the center back. Then make another reverse turn and take roll of bandage over the distal end to the center front. Continue front to back with reverse turns in this fashion until the wound is covered. Then anchor with two more circular turns and secure end of bandage (see Figure 9-1-7E).



Figure 9-1-5 Wrap the bandage from distal to proximal. Do not wrap the bandage too tightly.

- Bandages are applied starting at the distal and moving toward the proximal part of the body.
- Prevents the bandage from unwrapping.
- A bandage that is uneven or too tight can create a tourniquet effect, reducing circulation, with the possibility of causing skin breakdown and nerve damage.

9.

- Used for bandaging joints and providing immobilization.
- Used to cover cylindrical body parts.
- Used to cover top of head or stump wounds.



Figure 9-1-6 Anchor bandage at the center of joint.

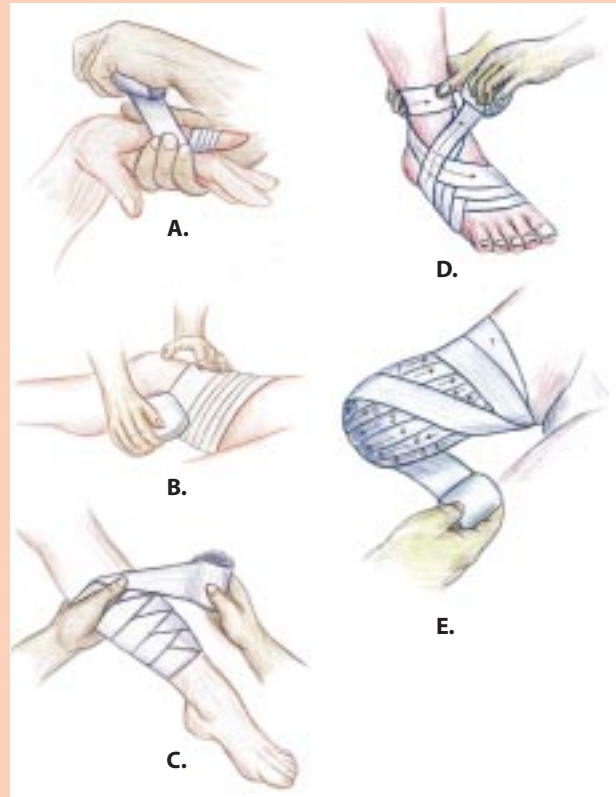


Figure 9-1-7 Common bandaging methods. **A.** *Circular turns* are wrapped around a body part several times to anchor a bandage or supply support. **B.** *Spiral turns* begin with one or two circular turns, then proceed up the body part, with each turn covering two-thirds the width of the previous turn. **C.** *Reverse spiral turns* begin with a circular turn. Then the bandage is reversed or twisted once each turn to accommodate a limb that gets larger as the bandaging progresses. **D.** *Figure-eight turns* criss-cross in the shape of a figure-eight and are used on a joint that requires movement. **E.** *Recurrent turns* are anchored with circular turns and follow a back-and-forth motion, and are completed with circular turns; used to cover a fingertip, head, or amputated stump.

- **Reverse spiral:** Anchor bandage at distal border with 2–3 turns. Advance roll of bandage proximally at about a 30° angle. Halfway through each turn, fold bandage toward the nurse and continue in a downward fashion. Continue bandaging proximally in this manner until the area to be bandaged is covered. Secure the end of the bandage (see Figure 9-1-7C).

- Used to cover cone-shaped body parts, such as the forearm and lower leg.

10. Remove and appropriately dispose of gloves and wash hands.

10. Reduces the transmission of microorganisms.

> EVALUATION

- Check the bandage for wrinkles. Wrinkles create areas of increased pressure, and can lead to skin breakdown.
- Assess the distal part of the wound to ascertain neurovascular status. Check for skin temperature, pulses, color, motion, and sensation.

- Whenever possible, it is advisable to leave the distal area free of bandages to assess neurovascular status (fingers, toes are easily observed if left open).
- Assess degree of immobilization if that was the desired outcome.
- Assess client's level of comfort and understanding of care of bandage.

> DOCUMENTATION

Nurses' Notes

- Record the need for the bandage.
- Record the condition of the wound/area to be bandaged prior to the bandaging.
- Record the type of material used and the technique used.
- Record the neurovascular status of the wound before, immediately after, and 20 minutes after the bandage was applied.
- Record the client's comfort level.



▼ REAL WORLD ANECDOTES

Joe is a 36-year-old painter who fell off of his painting platform 2 hours prior to arriving in the emergency room. He is complaining of left elbow pain and bleeding. He is holding a towel on the wound, which is not actively bleeding at the time of arrival. Joe is alert and oriented, and his vital signs are stable. He has decreased range of motion of his left elbow and arm. It is determined that he needs an x-ray. The nurse checks the wound and determines that with a proper bandage, it will be safe for Joe to go to x-ray prior to having the laceration sutured. A light-pressure, sterile dressing is applied over the wound. The nurse then proceeds to bandage the wound and limb to keep the dressing in place, which will control bleeding and immobilize the elbow. The nurse applies a figure-eight bandage with 2.5 cm gauze over the dressing, checking neurovascular status prior to applying the bandage. After she is done she asks Joe if he has any numbness or tingling in the arm and fingers distal to the wound. Capillary refill is checked and appears to be brisk. His radial and ulnar pulses are full and intact. When Joe returns from x-ray, the bandage is reassessed. The bandage is now wrinkled and has been reapplied tightly, causing some intermittent tingling in Joe's left fingers. The bandage is removed to improve circulation and so the wound can be further assessed and sutured as necessary.

> CRITICAL THINKING SKILL

Introduction

A nurse's timely assessment prevented well-intentioned first aid interventions from increasing the victim's injuries.

Possible Scenario

You are out hiking on your day off. A climber has fallen from a rock ledge and is unconscious with a head injury and an obviously fractured left arm. A fellow climber has taken appropriate first aid measures, which include splinting the arm very tightly.

Possible Outcome

Because this climber is unconscious, he cannot report the tingling and numbness in his fingers. His neurovascular status could become compromised. You assess his neurovascular status, adjust the splint, and return your

attention to his head injury while awaiting the search-and-rescue team.

Prevention

If the bone was broken and the joint had not been immobilized, the climber could have had further trauma to the area and increased bleeding, thus increasing his risk of hypovolemia. In this case, a splint was applied along with the bandage to ensure proper alignment as well as immobilization.

It is always necessary to evaluate and reevaluate the neurovascular status of the wound and the area distal to the affected area.

Proper bandaging in this scenario applied pressure to a bleeding wound; kept the dressing in place; reduced edema; helped to support, immobilize, and align the limb; and helped to reduce the pain that the climber was experiencing.

▼ VARIATIONS



Geriatric Variations:

- *Normal increased fragility of skin in elderly clients can make skin more likely to break down. Apply dressing with less pressure.*
- *Less resilient cardiovascular status may increase the risk of hypovolemia, so the bleeding must be closely watched.*



Pediatric Variations:

- *Be aware of increased movement and the fact that a child may take off the bandage. A child's bandage needs to be more secure (but not tighter) than an adult's.*
- *Explaining what you are doing is very helpful and helps to decrease the child's anxiety.*



Home Care Variations:

- *Make sure the care provider knows where to purchase supplies, if needed. Research available options for cost and location prior to the home care visit.*
- *A plastic storage bin with a lid will help keep bandage supplies together, clean, and dry in the home setting.*
- *Store liquids in a different container to reduce the chance of spillage and contamination of the sterile dressings.*
- *Teach the client or home caregiver to frequently launder reusable bandages, such as Ace wraps or stockinette, to keep them clean.*



Long-Term Care Variations:

- *Discuss alternatives to taping and removing tape several times a day if the bandage will be in place for the long term. Mesh net, ties, or a light Ace wrap may be solutions that will be easier on the skin surrounding the bandage.*
- *Choose the lightest tape that will do the job. Check for allergies to the tape, which do not necessarily show up immediately but may appear over the long term.*
- *Teach the client the proper techniques and allow as much bandaging self-care as possible to promote a sense of independence and control.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The bandage slips out of place.

Ask Yourself:

How do I prevent this error?

Prevention:

Select the proper bandage for the area. Make sure the bandage is not too loose.

Possible Error:

The bandage impairs circulation distal to the site.

Ask Yourself:

How do I prevent this error?

Prevention:

Do not apply the bandage too tightly. Select a bandage large enough to cover the area without applying too much pressure. If a circular or spiral wrap is used, make sure it is applied from distal to proximal and has not been wrapped too tightly.

> NURSING TIPS

- Assess need for a bandage, the wound, and the area involved before attempting to bandage to determine the technique that will be best suited to the situation.
- When applying a bandage, hold the rolled bandage so that it unrolls from the bottom of the roll (see Figure 9-1-4) making application easier.
- Gather all needed supplies before starting.
- Explain what you are doing and why to the client.

SKILL 9-2

Applying a Dry Dressing

Gayle Crawford, RN, BSN

KEY TERMS

ABD pad
Biohazard
Dressing
4 × 4 Gauze pad
Incision

Normal saline
Surgical incision
Surgical wound
Suture



> OVERVIEW OF THE SKILL

A closed surgical wound can be described as a wound that was caused, revised, or debrided by a surgical intervention. Closed wounds are generally categorized as clean. They may be closed with sutures, staples, or tapes. The general purpose of the closed wound dressing is to cover and protect as well as absorb the minimal drainage that may occur with this type of wound. Dressing care may vary according to the surgeon's preference and agency or institutional policy. General guidelines for the closed surgical wound dressing will be covered in this skill.

As there are different types of wounds, there are different approaches to wound care. Wound care agents, including povidone iodine, hydrogen perox-

ide, Dakin's solution, or other cleaning solutions may need to be avoided, diluted, or used sparingly according to institutional policy. Cleaning solutions can dry the wound and interfere with wound healing at the cellular level. Although they reduce the risk of infection, frequent application may not be necessary. In many cases, sterile normal saline, sterile water, or pH neutral solutions will be adequate to cleanse the wound. It is important for nurses practicing in the profession to follow agency guidelines, observe the preferences of the physician or qualified practitioner, and to review recent research and published information on the optimal care for the type of wound being treated.

> ASSESSMENT

1. Assess the client's comfort level postoperatively upon arrival from the operating room, prior to wound care, and as needed throughout the post-operative course. Surgical wounds are painful. If the client is made comfortable with appropriate pain medications and positioning, there will be better tissue gas exchange from deep breathing, coughing, and early ambulation, thereby promoting healing of tissues. The clients will be more cooperative and less anxious during dressing changes if they are comfortable.
2. Assess the external appearance of the initial post-operative dressing and subsequent dressings. The initial dressing may need to be reinforced. Excess saturation with drainage, blood, or other bodily fluids, dislodgement, or anything unusual about the dressing should be brought to the attention of the physician or qualified practitioner. The appearance of the external portion of the dressing provides information about needed supplies.
3. Assess the appearance of the wound and drains once the dressing is removed. Inspection of the

wound is important for assessment of the skin and tissues and for determining dressing supply needs. Assessment includes noting signs of infection as evidenced by redness, swelling, foul odor, amount of drainage, color of wound exudate (yellow and viscous would indicate purulent) or unusual pain or tenderness; signs of tissue trauma as evidenced by swelling or ecchymosis; evidence of bleeding or leakage of tissue fluids from the site; and the position of indwelling catheters, drainage tubes, and the sutures or stabilizing devices closing the wound and supporting the drains.

4. Assess the client's understanding about the post-operative care of the surgical wound site. It is important to take into consideration the client's ability to understand verbal and written instructions and the cultural and social variations that may affect the delivery of health care and client/family education.

> DIAGNOSIS

- 1.6.2.1.2.2 Impaired Skin Integrity
- 1.6.2.1 Impaired Tissue Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The site will be inspected.
2. The initial postoperative dressing will be reinforced until changed by the physician or qualified practitioner.
3. The site will have the appropriate dressing applied.
4. The client/family will verbalize and/or demonstrate understanding and the ability, if indicated, to perform the dressing change and associated wound care of the surgical wound site.

Equipment Needed (see Figure 9-2-2):

- Clean exam gloves
- Container for proper disposal of soiled dressing
- Sterile 4 × 4 gauze pads
- Washcloth (optional)
- ABD pads (optional)
- 2-inch tape (foam or paper)



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Review where and how to obtain additional supplies.
2. Review how to properly dispose of contaminated dressings.
3. Review discharge instructions which should include how to care for the dressing at home, and when and who to call if the client experiences problems with the dressing change or wound care.
4. Review problems that might occur during dressing changes, including fever, bleeding, infected wound, and pain management.



Figure 9-2-2 Gauze sponges, clean gloves, tape, and povidone-iodine are used to change a dry dressing.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Gather supplies.
2. Provide privacy; draw curtains; close door.
3. Explain procedure to client.

RATIONALE

1. Promotes a smooth work flow.
2. Maintains client comfort and privacy while body is exposed during procedure.
3. Provides information about the procedure.

continues

4. Wash hands.
5. Apply clean exam gloves.
6. Remove dressing and place in appropriate receptacle. Remove soiled gloves with contaminated surfaces inward and discard in appropriate receptacle and apply clean gloves.
7. Assess the appearance of the undressed wound bed for healing.
8. Cleanse the skin around the incision if necessary with a clean, warm, wet washcloth.
 - If the suture line requires cleansing, it should be done gently. Use normal saline, half-strength hydrogen peroxide, or Betadine swab (consult orders of physician or qualified practitioner and/or hospital policy regarding antiseptic agents) and cotton-tip applicators using a rolling motion.
 - Used applicators should not be reintroduced into the sterile solution (see Figure 9-2-3).
4. Reduces the transmission of microorganisms.
5. Infection control and protection from body fluids.
6. Dressings and gloves soiled with body fluids are considered contaminated and subject to biohazard disposal in the correct manner per institution protocol.

It is standard for the surgeon to do the first postoperative dressing change. The initial dressing is maintained for 24–48 hours postoperatively, unless conditions of the dressing call for contacting the physician or qualified practitioner for a dressing change order. Until the removal of the initial dressing, the nurse will reinforce the dressing as needed.

The frequency of the dressing change is dependent upon the needs of the wound and the preference of the physician or qualified practitioner. This will usually be specified in the orders.
7. Assess for signs of redness, foul odor, swelling, irritation, drainage, dehiscence, bleeding, or skin breakdown.
8. Dried blood or drainage on the surrounding skin can be an irritant and a medium for microbes.
 - The suture line itself should not be disturbed unnecessarily.
 - Reintroduction of the soiled applicator into sterile solution will contaminate the solution.



Figure 9-2-3 Clean the suture lines gently, if necessary.



Figure 9-2-4 Apply 4 × 4 gauze pads, folded in half. Tape the gauze in place.

- | | |
|---|---|
| <p>9. Remove used exam gloves.</p> <p>10. Wash hands.</p> <p>11. Set up supplies.</p> <p>12. Apply a new pair of clean exam gloves.</p> <p>13. Grasping just the edges, apply a new dressing using 4 × 4 gauze pads folded in half to the 2 × 4 size. Place the folded gauze pad lengthwise on wound and tape lightly or apply tubular mesh for those with sensitive skin (see Figure 9-2-4). Initial the dressing, date and time it was changed.
Optional: An ABD pad may be applied on top of the dressing for added protection over sutures or for client comfort.</p> <p>14. Remove gloves and dispose of appropriately, then wash hands.</p> <p>15. Conduct client/family education about the dressing, which may include teaching the dressing technique to the client/family.</p> | <p>9. Exam gloves used to remove the old dressing are considered dirty and should be removed and discarded appropriately.</p> <p>10. Hands should be washed prior to setting up dressing supplies to reduce the transmission of microorganisms.</p> <p>11. Following removal of the dressing, you will have a better idea of what supplies are needed and in what amount.</p> <p>12. This is considered to be a clean procedure after the initial dressing is removed if the skin margins are approximated with the skin closures.</p> <p>13. A light dressing of 4 × 4 pads may be the only dressing that is needed to protect the incision from clothing or to collect a small amount of tissue drainage. This maintains a record of the dressing change for the next nurse.</p> <p>14. Reduces the transmission of microorganisms.</p> <p>15. Educates the client/family and prepares for discharge.</p> |
|---|---|

> EVALUATION

- Assess client comfort level during dressing change procedure.
- Determine whether the client was safe during the dressing change with regard to bed height and position.
- Determine whether the client's privacy was protected during the dressing change.
- Assess whether the correct supplies were brought in for the dressing change and whether any modifications need to be made to the dressing change.
- Determine the effectiveness of client/family education by having the client/family return demon-

strate the dressing or verbally review the steps of the dressing.

> DOCUMENTATION

Nurses' Notes

Documentation should include the following:

- Date and time dressing done
- Brief description of the wound site
- Brief description of the site care done and dressing applied
- Client comfort before and after dressing change
- Client/family education done and evaluation of the teaching



▼ REAL WORLD ANECDOTES

Josh is a 13-year-old who had an emergency appendectomy. He has stayed overnight on the short stay unit. On rounds, the surgery resident removes the postoperative dressing and inspects the wound, which measures about 3 inches in the right lower quadrant. The wound is stapled and appears clean with no redness present. The resident tells Josh and his mom that the wound can be left open. A postoperative appointment is made to have the staples removed the following week. Josh gets dressed and notices that the staples are being irritated by his clothing. You suggest a light dressing of a folded 4 × 4 and paper tape. You wash your hands, apply clean gloves, and place the dressing to the incision. In addition to their basic postoperative discharge teaching, you review with Josh and his mom the dressing care for the closed wound. They are provided with enough supplies for one dressing a day until the followup appointment.

> CRITICAL THINKING SKILL

Introduction

It is appropriate to intervene when you observe a potentially risky situation.

Possible Scenario

You are on morning rounds with the surgery team on your unit. You observe the first-year resident forget to wash her hands or apply exam gloves before removing the initial wound dressing.

Possible Outcome

The result could be transmission of bacteria to the wound from the resident's unwashed hands, transmission of bacteria from the wound or dressing to the resident's hands, or potential exposure of the resident to body fluids.

Prevention

Refer the resident to the institutional policy for body substance precautions.

Remind her to wash her hands before the next client contact and offer her exam gloves.

▼ VARIATIONS



Geriatric Variations:

- Elderly people have thin skin, which can be sensitive to tape and solutions. Special attention should be given to the skin when removing the dressing.
- Elderly clients often live alone and may need home health care to assist with dressings.



Pediatric Variations:

- Remind all children who are old enough to understand not to touch the dressing site or play with the drainage tubes. Make sure that the dressing is secure and the small child cannot easily pull or dislodge a drain.
- Demonstration of wound care on a doll or stuffed animal may be appropriate for younger children.
- Young children will require explanation that their wound will heal and does not mean that their body part is missing or that their insides will leak out of the wound.
- Older children can be taught to participate in self-care of dressings. Special bright stickers, bright Band-Aids, or brightly colored wrap (Coban) are options for securing and decorating children's wound dressings.



Home Care Variations:

- Where and how to obtain additional supplies should be reviewed with the client/family.
- Review proper disposal of contaminated dressings.
- Discharge instructions need to include how to care for the dressing at home and when and who to call if the client experiences problems with the dressing change or wound care.
- Problems that might occur should be reviewed with the client/family and include fever, bleeding, infected wound, and pain management during dressing changes.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Special supplies are most likely not going to be needed for the clean, closed surgical wound other than gauze 4 × 4 or 2 × 2 pads and tape.*
- *Review with the long-term care facility the physician's or qualified practitioner's preference for wound care, as the facility may have to special order or replace with equivalent supplies. If necessary, provide the client with a 3-day supply until supplies can be obtained by the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You apply a dressing to a clean, closed abdominal surgical wound on a young man with quite a bit of abdominal hair. The next day you inspect the wound and find it very difficult to remove the dressing without causing pain to the client because the hair is stuck to the tape.

Ask Yourself:

How do I prevent this error?

Prevention:

Instead of tape, consider using Montgomery straps, tubular mesh, or other nonadhesive methods to secure the dressing. If tape is used, first remove the hair from the area to be taped.

> NURSING TIPS

- Dressing changes to clean, closed wounds are very simple and require minimal supplies.
- Don't overdress the wound.
- Check the room for supplies before bringing more into the room.
- Order specially needed supplies in advance of the procedure; don't wait until the last minute.
- Client/family education and preparation for discharge begins upon admission.

SKILL 9-3

Applying a Wet to Damp Dressing (Wet to Dry to Moist Dressing)

Gayle Crawford, RN, BSN

KEY TERMS

Acetic acid
Debridement
Debris

Dehiscence
Povidone-iodine
Purulent



> OVERVIEW OF THE SKILL

The purpose of a wet to damp dressing (also known as a wet to dry or wet to moist dressing) is to cover and protect the wound, collect exudate, promote healing, and promote light surface debridement. The decision to apply a wet to damp dressing will depend on the wound bed, type of tissue and presence of eschar, amount of exudate, stage of wound healing, state of surrounding tissue, and the presence of infection.

Wound healing is promoted by a warm, moist environment; however, it is imperative to avoid moisture on the surface of the dressing. A wet external dressing can act as a wick with the external environment, drawing contamination into the wound. Gentle debridement of a red wound is accomplished with a wet to damp dressing. One must be careful not to apply a dressing so wet that it ends up macerating the sur-

rounding good tissue. This type of dressing is, however, contraindicated in black eschar wounds, where the eschar represents full-thickness tissue destruction, because bacteria will multiply under such a dressing.

The wet to damp or moist dressing consists of gauze, applied wet and allowed to become “near dry” before the next dressing change. Specifics of the wet to damp dressings vary according to the preferences of the surgeon and wound specialist, institutional policy, and outcome measurement standards used to evaluate the effectiveness of the dressing. Current research regarding dressing types and tracking wound outcomes should be reviewed periodically to help make the best dressing treatment choices in the clinical setting. General guidelines for a simple wet to damp or wet to moist dressing are covered in this skill.

> ASSESSMENT

1. Assess the client’s comfort level to assess the need for medication prior to the dressing change. Clients will be more cooperative and less anxious during dressing changes if they are comfortable.
2. Assess the external appearance of the dressing to evaluate dressing adequacy as well as needed supplies.
3. Assess the appearance of the wound and drains once the dressing is removed, noting redness, swelling, purulent drainage, or ecchymosis to

determine the condition of the wound and the effectiveness of the wet to damp dressing.

4. Assess the client’s understanding regarding the dressing changes and wound care to determine any client teaching needed.

> DIAGNOSIS

- 1.6.2.1.2.2 Impaired Skin Integrity
- 1.6.2.1 Impaired Tissue Integrity
- 1.2.1.1 Risk for Infection

> **PLANNING**

Expected Outcomes:

1. The site will be inspected.
2. The site will have the appropriate dressing applied.
3. The client/family will verbalize and/or demonstrate understanding and the ability, if indicated, to perform the dressing change and associated wound care of the surgical wound site.

Equipment Needed (see Figure 9-3-2):

- Clean exam gloves
- Container for proper disposal of soiled dressing
- Sterile gloves
- Moisture-proof gown (optional)
- Sterile towel
- Normal saline or ordered solution
- Sterile bowl
- Sterile 4 × 4 gauze pads, multiple
- Cover sponges or fluffs (optional)
- ABD dressing pads
- 2-inch tape (foam or paper)
- Tubular mesh (optional)
- Montgomery straps (optional)

> **CLIENT EDUCATION NEEDED:**

1. Where and how to obtain additional supplies should be reviewed with the client/family.
2. Review proper disposal of contaminated dressings.
3. Discharge instructions need to include how to care for the dressing at home and when and who to call if the client experiences problems with the dressing change or wound care.
4. Problems that might occur should be reviewed with client/family and include fever, bleeding, infected wound, and pain management during dressing changes.
5. Encourage hand washing before and after dressing changes, site care, or emptying of drainage collection devices.



Figure 9-3-2 Sterile bandages, sterile saline, sterile field, and sterile scissors are used to create a wet to damp or moist dressing.



Estimated time to complete the skill:
15–20 minutes

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Review order of physician or qualified practitioner for wound care and gather supplies. 2. Provide privacy; draw curtains; close door. 3. Explain procedure to client. 4. Wash hands. 5. Apply clean exam gloves, a moisture-proof gown, mask, and eye protection, if needed. | <ol style="list-style-type: none"> 1. Promotes a smooth work flow. 2. Maintains client comfort and privacy while body is exposed during procedure. 3. Provides information about the procedure. 4. Reduces the transmission of microorganisms. 5. Provides infection control and protection from body fluids. If there is copious drainage or the wound is infected, a gown, a mask, and eye protection should be worn. A mask will also help the nurse if the drainage is foul smelling. |
|--|--|

continues

6. Assess need for pain medication. Pain is rated on a scale from 0 (lowest) to 10 (greatest). Assess need based on quality, pain pattern, location, and last pain medication received.
7. Inform client that the dressing is going to be removed.
8. Remove wet to damp dressing noting number of gauze pads used and place in appropriate receptacle (see Figure 9-3-3).



Figure 9-3-3 Carefully remove the old dressing, allowing the old dressing to debride the wound as you pull it away.

9. Observe the undressed wound for healing (granulation and approximation of edges), signs of infection (inflammation, edema, warmth, pain), and drainage.
10. Cleanse the skin around the incision if necessary with a clean, warm, wet washcloth.
11. Remove used exam gloves.
12. Wash hands.

6. Removal of a wet to damp or moist dressing may be painful to the client, so careful assessment of pain medication needs prior to the dressing change is important.
7. This helps prepare client and alleviates anxiety.
8. The dressing should be removed slowly yet deliberately. It is not recommended to moisten the dressing with saline because this defeats the purpose of the debriding and cleaning action. If it is found that the dressing is extremely dry and removal will result in injury, a small amount of saline to loosen that portion of the dressing is indicated (see Figure 9-3-4). To counteract the problem of an extremely dry dressing, increase the wetness of the dressing or increase the frequency of the dressing change. Count the number of gauze pads so you know how many to use when replacing the dressing.



Figure 9-3-4 If the dressing is too dry and removing it will cause injury, use a small amount of saline to loosen the portion of the dressing that adheres too tightly to the wound.

9. Allows for evaluation of effectiveness of treatment.
10. Dried blood or drainage on the surrounding skin can be an irritant and a medium for microbes.
11. Exam gloves used to remove the old dressing are considered dirty and should be removed and discarded appropriately.
12. Reduces the transmission of microorganisms.

- 13.** Set up supplies in a sterile field, including pouring ordered solutions into appropriate containers if indicated for the dressing change (see Figure 9-3-5).



Figure 9-3-5 Place the gauze on the wound.

- 13.** Following removal of the dressing, you will have a better idea of what supplies are needed and in what amount.



Figure 9-3-6 Wrap the wet gauze with an external dressing of dry gauze bandages.

- 14.** Apply sterile gloves.

- 15.** Place gauze or packing material to be moistened in the bowl with the normal saline or other solution.

- Wring gauze or packing of saline until damp.
- Gently place damp gauze over the area (see Figure 9-3-5).

- 16.** Apply external dressing of dry 4 × 4 gauze pads, cover sponges, fluffs, or ABD pads.
- Secure dressing in place with tape, Montgomery straps, or tubular mesh (see Figure 9-3-6).

- 17.** Remove gloves and wash hands.

- 14.** This is a sterile dressing change.

- 15.** If a solution is not specified, then normal saline is used. Wounds that are considered dirty or contaminated may have special solutions ordered by the physician or qualified practitioner to moisten the wound packing. Alternate solutions are a dilute povidone-iodine solution and a dilute acetic acid solution. Follow institutional guidelines.

- Avoid overwringing of the dressing to prevent excessive drying. The dressing should be wet to damp depending upon the depth and size of the wound and the interval of the dressing change.
- Dresses the wound.

- 16.** The external dressing is determined by the size and shape of the wound.

- Tape for short-term dressings in clients who are not sensitive to adhesives is the method of choice for securing dressings. For long-term dressings or for those who are sensitive to tape, use Montgomery straps or tubular mesh.

Tubular mesh is a nice alternative to hold the dressing in place because tape is not involved—the mesh is simply pulled up or down to accommodate the dressing change.

- 17.** Reduces the transmission of microorganisms. Be sure to discard gloves in appropriate receptacle.

18. Mark the dressing with the date and time it was changed. Initial the dressing.

19. Conduct client/family education about the dressing, which may include teaching the dressing technique to the client/family.

18. This maintains a record of the dressing change for the next nurse and provides for continuity of care.

19. Educates the client/family and prepares for discharge.

> EVALUATION

- The site was inspected.
- The site has the appropriate dressing applied.
- The client/family verbalized or demonstrated understanding and the ability, if necessary, to perform the dressing change and associated wound care of the surgical wound site.

> DOCUMENTATION

Nurses' Notes

- Administration of pain medication before dressing change
- Date and time dressing done
- Brief description of the wound site
- Brief description of the site care done and dressing applied
- Client comfort before and after dressing change
- Client/family education done and evaluation of the teaching



▼ REAL WORLD ANECDOTES

Mrs. Gold is a 63-year-old woman who was admitted to the emergency room with a temperature of 103°F, chills, and abdominal pain not adequately controlled with her postoperative pain medication. She is 7 days post a total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH/BSO) for uterine carcinoma. She was discharged from the hospital 48 hours ago. Her physical exam reveals an elderly woman in pain; she is guarding her abdomen, which is tender to the touch. Her incision is red, with the erythema extending beyond the incision line by 1.5 cm along the length of the wound. Beneath the Steri-strips, there is evidence of wound dehiscence and purulent drainage at the lower 2 cm of the wound. An IV is started; blood, urine, and wound cultures are taken; and a chest x-ray is obtained. Mrs. Gold is started on a broad spectrum antibiotic intravenously. She is taken to the operating room where her wound is opened and irrigated. Postoperatively, Mrs. Gold's dressing change order reads: "wet to damp dressing changes q 8 h, teach client to do dressing."

The plan in the chart is for Mrs. Gold to be discharged home in 48 hours with an open wound and do dressing changes b.i.d., with a follow-up appointment in 1 week with the surgeon. Mrs. Gold has a stated allergy to tape. Montgomery straps are applied over hydrocolloid patches (Duoderm) to avoid using tape to secure the dressing. Mr. Gold was identified as the one who will be doing the dressing. He is instructed to use sterile technique. The dressing consists of three packages of sterile 4 × 4 gauze pads, which are moistened with sterile normal saline; these are then packed into the wound.

The wet gauze pads are then covered with two packages of dry 4 × 4 pads and two ABD pads.

The dressing is held securely by the Montgomery straps using safety pins and rubber bands. Mr. Gold demonstrates competence in performing the sterile dressing change.

He is given 48 hours of dressing supplies and instructed where to obtain additional dressing supplies in the community. A visiting nurse referral is completed to assess wound healing and to offer support for Mr. Gold in his role as caregiver.

> CRITICAL THINKING SKILL

Introduction

Planning ahead can save anxiety and frustration during the dressing change.

Possible Scenario

You have arrived to do a wet to damp dressing change on a client who has a large abdominal wound. You apply your sterile gloves and proceed with the dressing

change and suddenly realize that you have not opened the bottle of sterile normal saline.

Possible Outcome

The dressing change is delayed as you remove your sterile gloves, pour the normal saline into the bowl, and go to the supply area to get another pair of sterile gloves. The client becomes more anxious.

Prevention

There are many steps to most dressing changes and reviewing the steps ahead of time will minimize the chance of interruptions due to missed steps. You could also ask a visitor to open the saline and pour it into the container for you.

▼ VARIATIONS



Geriatric Variations:

- *Elderly people have thin skin, which can be sensitive to tape and solutions.*
- *Special attention should be given to the skin when removing the dressing.*
- *Elderly clients often live alone and may require home health care to assist with dressings changes that need to be done in the home setting.*



Pediatric Variations:

- *Remind all children who are old enough to understand not to touch the dressing site. Make sure that the dressing is secure and the small child cannot easily pull or dislodge the dressing.*
- *Demonstration of the wound care on a doll or stuffed animal may be appropriate for younger children.*
- *Young children will require explanation that their wound will heal and does not mean that their body part is missing or that their insides will leak out of the wound.*
- *Older children can be taught to participate in self-care of dressings.*
- *Special bright stickers, bright Band-Aids, or brightly colored wrap (Coban) are options for securing and decorating children's wound dressings.*



Home Care Variations:

- *Where and how to obtain additional supplies should be reviewed with the client/family.*
- *Review proper disposal of contaminated dressings.*
- *Discharge instructions need to include how to care for the dressing at home and when and who to call if the client experiences problems with the dressing change or wound care.*
- *Problems that might occur should be reviewed with client/family and include fever, bleeding, infected wound, and pain management during dressing changes.*



Long-Term Care Variations:

- *Special supplies may need to be ordered. A dressing change order may need to be written by the attending physician or qualified practitioner at the facility.*
- *A review of the specific dressing change procedure may need to be presented to the staff caring for the client at the long-term care facility along with aspects of the home care and geriatric variations above.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You have just applied a dressing and taped it in place when the client gets up out of bed to ambulate and the dressing falls out onto the floor.

▼COMMON ERRORS—ASK YOURSELF *continued*

Ask Yourself:

How do I prevent this error?

Prevention:

Prior to placing the bandage, consider how to hold it in place. Assess for skin condition, size of wound area, location, and types of wrap available.

Possible Error:

You have applied your sterile gloves and you grab the container of normal saline and pour the solution into the sterile bowl and suddenly realize that you have contaminated your sterile gloves by touching the unsterile exterior of the normal saline container.

Ask Yourself:

How do I prevent this error?

Prevention:

Mentally review the sequence. If you are concerned about remembering the proper sequence of steps, write notes to remind yourself.

> NURSING TIPS

- Dressing changes require organization to be done efficiently. Gather data about the dressing change from the following:
 - Shift report
 - Nurses who have cared for client
 - The client/family
 - Chart notes
 - Orders
 - Kardex
 - Care map, care plan
 - Observation of the dressed wound
 - Supplies already in room
- Make a list, if necessary, of needed supplies to take into the room.
- If you are going to be in a client's room for some time, let others know so that they can cover your call lights and you can devote your attention to the dressing change.
- When doing very small wet to damp dressing changes, the normal saline can be carefully poured on open packets of sterile 4 × 4 pads, bypassing the need for a sterile bowl.
- Order specially needed supplies in advance of the procedure; don't wait until the last minute.
- Client/family education and preparation for discharge begins upon admission.

SKILL 9-4

Applying a Transparent Dressing

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Clear dressing
Intravenous site dressing

Serous
Transparent dressing
Wound protection



> OVERVIEW OF THE SKILL

A transparent dressing may be used on various intravenous, surgical, or wound sites. This type of dressing allows easy visibility of the wound and serves like other dressings in preventing infection and promoting healing by retention of serous products to enhance epithelial growth. These dressings also allow for a tight seal in preventing microorganisms from entering the wound site. Transparent dressings are particularly useful over intravenous (IV) sites in that direct visualization of the

IV site is possible, allowing for immediate observation of changes, such as infiltration around the IV sites or inflammation. Transparent dressings generally do not require changes as frequently as other dressings and do not adhere to the wound. Because of their elasticity, transparent dressings will mold more easily over body parts, such as over joints, and allow clients to use the shower without removal. As with adhesive products, allergic reactions can occur.

> ASSESSMENT

1. Question the client regarding any previous reactions to adhesive products (such as latex allergy). Helps determine allergies or sensitivities that may contribute to discomfort and skin breakdown.
2. Assess the client's skin and wound site carefully before applying dressing. Affects which dressings may be used and how the procedure is performed. Establishes a baseline for future comparisons.
3. Assess the client for skin reaction to transparent dressing products (such as latex allergy). Detecting allergies or sensitivities early will alert the nurse to change dressing type and monitor closely.

> DIAGNOSIS

- 1.6.2.1.2.2 Impaired Skin Integrity
- 1.6.2.1 Impaired Tissue Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The client will have promotion of healing process.
2. The client will have no adverse reaction to adhesive material.

Equipment Needed (see Figure 9-4-2):

- Transparent dressing
- Examination gloves
- Disposable bag



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. The client should report any allergic reactions, such as itching, hives, or inflammation.
2. The client should report whether dressing edges are loose.
3. The client should report any signs of infection, such as redness, pain, or increased swelling.



Figure 9-4-2 Transparent dressings

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Review the order of the physician or qualified practitioner, agency/institutional policy, and procedure or standing order for applying a transparency dressing. Provide wound care as ordered. 2. Check the client's medical record for previous reactions to adhesives and date of last dressing change. 3. Wash hands. 4. Remove any clothes or coverings from area of dressing change and put on examination gloves. 5. Remove old dressing. Hold the client's skin taut, lift the edges of the dressing, and pull off the dressing in the direction of hair growth. If placing dressing for the first time, or with hair growth, may need to clip or cut the client's hair in area where dressing is to be applied. 6. Discard the used dressing in disposable bag. 7. Assess the area of the wound bed for healing (granulation and approximation of edges), signs of infection (inflammation, edema, warmth, pain), and drainage. 8. Remove the gloves with contaminated surfaces inward and discard in a disposable bag. 9. Reglove in clean or sterile gloves per hospital policy and dressing change requirements. | <ol style="list-style-type: none"> 1. Promotes wound healing and prevention of infection. 2. Avoids allergic reaction and assesses the need for dressing change. 3. Reduces the transmission of microorganisms. 4. Easy access to area needing dressing. Gloves reduce the transmission of microorganisms. 5. If the skin is held taut, the old dressing will pull off more easily. Following the direction of hair growth will cause less pain for the client. 6. Reduces the transmission of microorganisms. 7. Allows for evaluation of effectiveness of treatment. 8. Reduces the transmission of microorganisms. 9. Reduces the transmission of microorganisms. |
|--|---|

10. Open the package with transparent dressing.
11. Grasp the tab on the back and underside of the dressing and separate about 1 inch of the backing from the dressing (see Figure 9-4-3).



Figure 9-4-3 Remove part of the backing from the transparent dressing.

12. Place the adhesive side over the area to be covered and while holding the dressing in place with one hand, with the other hand peel the backing off from the dressing and slowly smooth out the dressing as it is moved over the site (see Figure 9-4-4).
13. Press gently and smooth out any wrinkles.
14. Reinforce any edges with tape as needed (see Figure 9-4-5).

Figure 9-4-5 Reinforce the edges of the transparent dressing with tape, if necessary, to prevent the edges from rolling up or becoming dislodged.

15. Date and initial the dressing.

10. Allows easy access to dressing.
11. Applying a small portion of the dressing first allows for better control of dressing and smoother application.



Figure 9-4-4 Place the adhesive side over the area to be covered, sliding smoothly from one side to the other.

12. If the process of placing the dressing is done in a smooth fashion and small portions at a time, less wrinkles and better adherence will occur.
13. Allows for better adherence and less risk of microorganisms entering under dressing.
14. If large dressings are used or are used over movable parts, such as joints, reinforcement may be necessary.



15. Easier communication regarding need for dressing changes. Generally standards exist requiring routine dressing changes of transparent dressing, such as every third day. Initials provide accountability and maintain a record of the dressing change for the next nurse.

> EVALUATION

- Evaluate wound healing, such as granulation of tissues and adherence of edges.
- Evaluate the wound for signs of infection.
- Observe for signs of reaction to transparent material such as itching, urticaria, or bullae formation around the dressing.

> DOCUMENTATION**Nurses' Notes**

- Document date and time of dressing change in chart and on dressing.
- Document any signs of allergic reaction or infection, such as inflammation, urticaria, pain, increased warmth, or purulent drainage.

**▼ REAL WORLD ANECDOTES**

Deon had a transparent dressing over a wound site. The nurse told Deon that he could have a shower with the transparent dressing in place. The nurse did not anticipate how hard Deon would scrub around the sensitive surgical site. The edges of the dressing peeled loose and soapy water entered the site. The site had to be cleaned and the dressing changed immediately after the shower. The wound site was monitored for infection. For subsequent showers, the nurse advised Deon to wrap the area with plastic wrap and reminded him to keep it as dry as possible.

> CRITICAL THINKING SKILL**Introduction**

You are checking IV sites on the evening shift. You note moisture under a transparent dressing over an intravenous site.

Possible Scenario

The IV may be leaking around the entry site.

Possible Outcome

First check the IV connection to see whether it is secure. If the IV is in a movable area, such as the antecubital site, reinforcement of the dressing and an arm board may be needed or the IV may need to be moved to another site.

Prevention

Place IVs in stable areas. If a client has veins that are difficult to find and the need exists to use certain IV sites, then use an arm board as needed.

▼ VARIATIONS**Geriatric Variations:**

- Older clients have skin that wrinkles easily; therefore, transparent dressings are useful. However, in application it is necessary to keep the skin taut.
- Older clients may have skin sensitivity to adhesive products and require paper tape or hypoallergenic tapes.
- Because elderly clients have thin, sensitive skin, as adhesives are removed skin may tear. In clients with very sensitive skin, the nurse may need to have alternative choices of dressings.

**Pediatric Variations:**

- Children may experience anxiety at being able to see the wound or IV. If the nurse chooses to use a transparent dressing for increased protection of the wound site, a loose gauze, mesh, or other air-permeable external cover dressing can be placed over the transparent dressing to obscure view of the wound.

▼ VARIATIONS *continued*



Home Care Variations:

- *Transparent dressings are useful in home care settings. They are generally more expensive than other dressings, and therefore, clients may request to use a different type of dressing.*
- *Teach the caregiver what the wound site should look like, what is normal, and what is not normal.*
- *Outline signs of infection, irritation, or skin breakdown.*
- *Make sure the caregiver knows whom to contact with concerns or questions.*



Long-Term Care Variations:

- *Caregivers in long-term settings may not be as familiar with dressing care as those in acute care settings. Assess and teach care providers as needed.*
- *Outline signs of infection, irritation, or skin breakdown.*
- *A dressing order will need to be written by the attending physician or qualified practitioner of the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Skin is not held taut and wrinkles occur under the dressing. This allows for entry of microorganisms, and the dressing doesn't stay in place.

Ask Yourself:

How do I prevent this error?

Prevention:

Plan ahead how you will hold the skin and apply the dressing. Get help if you need extra hands.

Possible Error:

The dressing sticks to itself while it is being opened or placed.

Ask Yourself:

How do I prevent this error?

Prevention:

Open dressing carefully. Plan ahead and visualize how the dressing will go on the site prior to opening the dressing. For technique, observe nurses with more experience using the dressings, and practice when possible.

> NURSING TIPS

- Use smooth, slow application to avoid wrinkles.
- Apply a small portion of the dressing first and create firm adhesion with the client's skin before applying the rest of the dressing.

SKILL 9-5

Applying a Pressure Bandage

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Anticoagulation
Artery
Debridement
Hypovolemic shock

Pressure dressings
Sphygmomanometer
Trendelenburg position



> OVERVIEW OF THE SKILL

Pressure dressings are used to prevent or control bleeding. Examples of wounds that require pressure dressings are those from trauma, suicide attempts, arterial puncture sites, or post debridement. The pres-

sure applied with a sterile dressing is used at the puncture site to halt bleeding. Rapid assessment and action is required. Clients with bleeding disorders are especially at risk for uncontrolled bleeding.

> ASSESSMENT

1. Observation, rapid assessment of bleeding site, and immediate action are required to **minimize blood loss**.
2. Identification of the origin of bleeding is **necessary to determine the next steps of intervention**.
3. Assessment of vital signs and general client condition is necessary to **detect early signs of shock**. If the client is bleeding profusely, hypovolemic shock may occur. Tachycardia, change in blood pressure (initially elevated, then decreased), and change in color, anxiety/restlessness, and change in level of consciousness may all be indicators of shock. Even though a decrease in blood pressure is associated with shock, initially the blood pressure may be increased as a compensatory mechanism. If the client has an underlying medical anticoagulation disorder, adjunct treatment may be necessary.

> DIAGNOSIS

- 1.4.1.1 Alteration in Tissue Perfusion
- 1.4.2.1.2.2.2 Risk for Fluid Volume Deficit

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. Bleeding is stopped.
2. Circulating blood volume is maintained and the client has no adverse systemic consequences, such as shock.
3. Underlying causes are identified and treated.
4. If there is debridement, sterile technique is used and infection is prevented.
5. If there was a suicide attempt, the client is referred for appropriate treatment.

Equipment Needed:

- Gauze compresses (usually 4 × 4) depending on amount of bleeding
- Sterile gloves
- Roll of gauze or Ace bandages
- Stethoscope
- Sphygmomanometer
- Scissors
- Tape



Estimated time to complete the skill:

Less than 5 minutes; may take longer depending on other trauma and other sites involved

> CLIENT EDUCATION NEEDED:

1. The client should understand the need for pressure.
2. The client should understand the importance of rapid response to minimize blood loss and reduce

the possibility of hypovolemic shock. The client should understand what the symptoms are for hypovolemic shock.

3. Educating the client will depend on what condition precipitated the need for the pressure dressing, underlying condition of the client, and potential complications associated with the wound, surgery, or trauma.
4. The client and caregivers should know the emergency response and treatment, especially if the client is in an at-risk occupation, or has a bleeding tendency.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands (time may not permit in emergency situations; therefore, immediately put on gloves). Apply additional protective gear including mask, eyewear, and gown, if available, if there is a risk of contact with bodily fluids.
2. Rapidly assess the wound and determine origin of bleeding—either arterial, seen as pulsating or spurting bright red blood, or venous, seen as oozing or flowing darker blood (see Figure 9-5-2).

Figure 9-5-2 Assess the wound and determine whether the bleeding is arterial or venous.

3. Call for assistance as needed. Notify physician or qualified practitioner if hemorrhage was unexpected. (Expected and potential bleeding should be prevented prior to the episode.)
4. Apply firm pressure with sterile gauze.

RATIONALE

1. Reduces the transmission of microorganisms. In emergent situations gloves will suffice because the priority is to stop bleeding and prevent complications.
2. Arterial bleeds can occur rapidly and cause hemorrhage. Venous bleeds also require quick response but don't lead to life-threatening complications as rapidly.



3. If large areas of profuse bleeding occur, assistance will be needed and medical orders will be required. If bleeding is life-threatening, the client should never be left alone.
4. Pressure will help control bleeding and decrease blood loss.

continues

5. If an extremity is involved, completely cover the wound (see Figure 9-5-3) and if gauze becomes soaked with blood, do not remove but add additional layers and maintain pressure (see Figures 9-5-4 and 9-5-5). Elevate the extremity.



Figure 9-5-3 Completely cover the wound and apply pressure.

5. Constant pressure is needed until bleeding has stopped. Elevating the extremity will reduce blood flow to the area.



Figure 9-5-4 This bandage has become saturated with blood.

Figure 9-5-5 Additional dressing must be applied and pressure maintained until the bleeding stops.



6. Apply tape firmly over site, maintaining pressure.
 7. Apply an Ace bandage or elastic wrap over the sterile dressings, snugly wrapping the elastic bandage and completely covering the wound. Use a figure-eight configuration if possible.
 8. Remove gloves and wash hands.
 9. Check the client's pulses distal to the wound.
 10. Assess the client and obtain a complete set of vital signs. Assess the client's mental status, color, warmth, and capillary refill.
6. Constant pressure is required until the bleeding has stopped.
 7. Elastic wraps allow for more pressure to remain in place for long periods of time.
 8. Reduces the transmission of microorganisms.
 9. Indicates blood flow to the distal area of an extremity.
 10. Provides an indication of early signs of hypovolemic shock or decreased tissue perfusion.

- | | |
|--|--|
| <p>11. If hemorrhage was large or unexpected, initiate intravenous fluids. Select a site and a needle size that will accommodate blood administration if it becomes necessary.</p> <p>12. Monitor vital signs and signs and symptoms associated with blood loss every 15 minutes or more often if necessary.</p> <p>13. Wash hands.</p> | <p>11. Required for replacement if large volume loss.</p> <p>12. Provides indication of ongoing cardiovascular status.</p> <p>13. Reduces the transmission of microorganisms.</p> |
|--|--|

> EVALUATION

- Evaluate blood loss and need for follow-up treatment.
- Evaluate client's response to blood loss and treatment, such as volume and blood replacement.
- Evaluate the client's emotional status.
- If there was a suicide attempt, evaluate and refer for treatment.

> DOCUMENTATION

Nurses' Notes

- Document amount of blood loss, site of blood loss, vital signs, and assessment of client during and following treatment for blood loss.
- Document type of pressure dressings used and amount of time required to stop bleeding.
- Document follow-up treatment.
- Document any education to client and family member.



▼ REAL WORLD ANECDOTES

Scenario 1

A client with severe rheumatoid arthritis was noted to have had a significant drop in hematocrit and hemoglobin in the 24-hour period following total hip surgery. Because the client was difficult to turn, dressings had been checked with the client in a recumbent position. No blood was noted on the visible part of the sheet. Because the hematocrit and hemoglobin was decreased, a more careful assessment was made regarding any blood loss. With the help of another nurse, the client was fully turned, at which point the nurse noted the pressure dressing was soaked with a bloody, serous drainage. The pressure dressing was removed and another one applied, placing a firm surface under the client. This client had probably been oozing all night without notice. This is why it is important to turn clients in positions to assess all the area of dressings and edges.

Scenario 2

A nurse was working alone in a small E.R. A client came in at about 2:00 AM complaining of diarrhea. He stopped at the admission desk and was filling out forms when he suddenly asked to use the bathroom. When he did not come out after 5 minutes, the nurse knocked on the door and went in. The client was sitting on the edge of the toilet. He was pale, diaphoretic, and complained of dizziness and nausea. There was blood in the toilet bowl, on the floor, and soaking the client's trousers.

What the client had not had time to mention was that he had undergone an outpatient surgical procedure for hemorrhoids that afternoon. He was bleeding profusely from the anus. The nurse hit the emergency help button and, with the help of the doctor, was able to hold pressure on the bleeding, using gauze pads. She held pressure until suction could be set up and the incisions resutured. The man required several units of blood, but recovered.

> CRITICAL THINKING SKILL

Introduction

Mrs. Foster had a total hip replacement 2 days ago. She is receiving a blood transfusion. When the nurse walks in to check the IV, she notes that the client appears lethargic, can barely speak, and is pale. Ten minutes after a blood transfusion was initiated, Mrs. Foster's blood pressure was 76/54. Three hours earlier it had been 106/70.

Possible Scenario

Initially the nurse stopped the blood and assessed the client for a blood transfusion reaction. The client was in a recumbent position. Her dressing, a pressure dressing with elastic tape holding it in place, was on the lateral side of her hip and leg. The dressing had been checked a half hour prior and no bleeding was noted. The nurse turned the client to the opposite side and noted a pool of blood under the client, with no evidence on the dressing. Because of the client's position and the thick elastic dressing, nothing was visible until the client was turned to the side. After the nurse quickly pulled off the dressing and assessed the site, she noted a small arterial spurt. Rapidly the nurse replaced the dressing, placed

pressure on the wound, and called for help. In obtaining more information, it was learned that the client's HemoVac had been pulled out 45 minutes prior to this episode.

Possible Outcome

The client was placed in a Trendelenburg position, oxygen was started, the hanging blood was sped up, and the physician was notified. A new pressure dressing was applied and a sandbag placed for added pressure. The client was evaluated for return to surgery or cauterization of the small arterial bleed; however, the client was able to be treated with pressure dressings, appropriate intravenous fluids, and additional blood transfusions.

Prevention

Check dressings carefully after any line or drains are pulled that approximate blood vessels. Apply new pressure dressings after drains are pulled. Turn clients in positions to assess all areas of dressings and edges. Use care when nonabsorbent materials are used that don't allow blood seepage to be recognized. In this situation the blood accumulated under the dressing and under the client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients are not able to tolerate large blood losses and may experience complications more readily than younger clients.*
- *The vascular system in elderly clients is not as readily able to compensate with constriction as it is in younger clients.*
- *Bruising may occur more readily after bleeding.*
- *A Medic Alert bracelet or necklace should be worn if the client has hemophilia or bleeding tendencies.*



Pediatric Variations:

- *It may be difficult to hold a pressure dressing in place with a crying and active child. You may require assistance.*
- *If the child is frightened, you may require the assistance of the child's parents.*
- *If a child has hemophilia or may have bleeding tendencies, it is crucial that the child always wear a Medic Alert bracelet and understand medical needs.*



Home Care Variations:

- *Teach emergency treatment of bleeding.*
- *If the client has bleeding tendencies or is on anticoagulant therapy, a Medic Alert bracelet should be worn and significant others taught emergency procedures for acute bleeding.*
- *Encourage the caregiver and other family members to take the basic Red Cross first aid course in their area.*

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Teach emergency treatment of bleeding.*
- *If the client has bleeding tendencies or is on anticoagulant therapy, a Medic Alert bracelet should be worn and significant others taught emergency procedures for acute bleeding.*
- *Make sure staff members know where first aid supplies are kept and know exactly what to do in a bleeding emergency.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

A client's bleeding is undetected.

Ask Yourself:

How do I prevent this error?

Prevention:

Be alert to changes in client vital signs, color, or complaints. Look for undetected bleeding sites.

Possible Error:

There is an undetected foreign object in wound.

Ask Yourself:

How do I prevent this error?

Prevention:

Determine the cause of the wound. Was glass or other debris involved? Prior to applying pressure, quickly assess the wound for presence of foreign objects. Request an x-ray if needed.

> NURSING TIPS

- Check all dressings sites, carefully observing all edges of the dressing for signs of bleeding.
- If a pressure dressing is in place, be sure to palpate the dressing with gloves on. Assess for any spongy or watery feel, which may indicate trapped bleeding under the dressing.
- Assess the area distal to the bleed for inadequate perfusion.
- Clients may require pressure dressings for non-emergent situations, such as following the access of the radial artery to obtain an arterial blood sample. In this situation pressure should be applied over the site for 5 minutes with sterile gauze and using gloves. Pulses and capillary refill distal to the artery should be assessed after the procedure and periodically.
- If the bleeding was unexpected and a large amount of blood was lost, the client should be monitored carefully for hypovolemic shock, placed in a Trendelenburg position, and appropriate protocol followed for hypovolemic shock.
- If bleeding occurred following debridement, pressure dressings should be applied and any seepage of blood should be outlined on the dressing to track any continued bleeding. If the dressing is in an area not readily observed, the client should be moved to enable the nurse to note any drainage leaking under the client.

SKILL 9-6

Changing Dressings around Therapeutic Puncture Sites

Gayle Crawford, RN, BSN

KEY TERMS

Biliary
Long-term venous
access device

Nephrostomy
Percutaneously



> OVERVIEW OF THE SKILL

Therapeutic puncture is a term applied to any procedure in which the client's skin is punctured for diagnostic or therapeutic purposes. As a result of the procedure, there may exist one or more puncture wound sites or an indwelling device remaining in place such as an IV catheter, percutaneous indwelling central catheter (PICC) line, triple lumen catheter (TLC), external long-term venous access device (Hickman, Broviac, Groshong catheters), or percutaneously inserted drainage tubes (biliary or nephros-

tomy). The puncture site(s) will need dressings for one or more of the following reasons: to apply temporary pressure, protect the site, contain drainage and/or secure, support and stabilize any indwelling device. The dressing may be short term (24–48 hours) for those sites that do not have an indwelling device, or the dressing may be a long-term, recurring process as with dressings around indwelling devices. Agency or institutional policy will dictate the frequency of the dressing change.

> ASSESSMENT

1. Assess the client's comfort level to determine if any premedication will be needed.
2. Assess the appearance of the therapeutic puncture site to evaluate for signs of infection, tissue trauma, or ecchymosis.
3. Assess the position and condition of any indwelling catheters, drainage tubes, and the sutures or stabilizing devices supporting the indwelling items to evaluate the patency and stability of the indwelling device.
4. Assess the client's understanding about the care of the therapeutic puncture site to determine client teaching needed.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.6.2.1 Impaired Tissue Integrity
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The therapeutic puncture site will be free from infection, redness, swelling, or ecchymosis.
2. The therapeutic puncture site will be cleaned and dressed appropriately.
3. The client will verbalize or demonstrate understanding about the therapeutic puncture site.

Equipment Needed:

Dressing Removal and Site Inspection (all therapeutic puncture sites)

- Clean exam gloves
- Container for proper disposal of soiled dressing
- Masks for nurse and client for central line care

Dressing Applications for Peripheral IV Cannulas Newly Inserted (see Figure 9-6-2)

- Clean exam gloves
- Transparent semipermeable dressing (TSM) or sterile 2 × 2 gauze pad
- Tape

Dressing Applications for PICC Line, TLC or Single Subclavian Line, and Central Venous Access Devices Needing Redressing

- Clean exam gloves
- Sterile gloves
- Masks for nurse and client
- Sterile towel
- Povidone-iodine swabs or other wound-cleaning solution and sterile swabs
- Alcohol swabs
- Hydrogen peroxide
- Small sterile container
- Sterile saline
- Sterile cotton-tip applicators
- Steri-strips (may apply only to PICC)
- TSM dressing or 2 × 2 gauze pads
- Tape

Dressing Applications for Peripherally Inserted Drainage Tubes (nephrostomy tubes, biliary tract tubes)

- Clean exam gloves
- Povidine-iodine swabs or other wound-cleaning solution and sterile swabs
- Alcohol swabs

- Small sterile container
- Sterile saline
- Sterile cotton-tip applicators
- Steri-strips
- 4 × 4 gauze pads
- Tape

Dressing Applications for Puncture Sites Following Diagnostic Procedures (angiogram, thoracentesis, paracentesis, lumbar puncture)

- Clean exam gloves
- Band-Aids
- 4 × 4 Gauze pads
- 2 × 2 Gauze pads
- Tape
- Sandbag (optional)



Estimated time to complete the skill:

2–15 minutes, depending on procedure being performed

> CLIENT EDUCATION NEEDED:

1. Teach the client or caregiver to monitor the site for pain, redness, swelling, or purulent drainage. This is especially important if the client will go home with a therapeutic device in the puncture site.



Figure 9-6-2 Transparent dressing, gauze sponges, gloves, tape, and povidone-iodine ointment

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Dressing Removal and Site Inspection (all therapeutic puncture sites)

1. Review order of physician or qualified practitioner, agency/institutional policy/procedures, or standing orders and gather supplies.
2. Provide privacy; draw curtains; close door.
3. Explain procedure to client.
4. Wash hands, and set up supplies.
5. Apply clean exam gloves and nurse and client apply mask for central line dressing removal.
6. Remove dressing and soiled gloves and place in appropriate receptacle (see Figure 9-6-3).



Figure 9-6-3 This is an example of a transparent dressing that should be removed and replaced. Note the soiled transparent dressing holding the cannula in place. Note how the edges have rolled, exposing the cannula.

1. Agency/institutional policy/procedures will dictate the frequency of changing and supplies needed. Having all your supplies in the room will increase consistency of client care.
2. Maintains client comfort and privacy while body is exposed during procedure.
3. Providing information about the procedure can help reduce client anxiety.
4. Reduces the transmission of microorganisms and promotes organization.
5. Infection control and protection from body fluids.
6. Unpin drain if needed to allow for ease of removal of the old dressing. Dressings and gloves soiled with body fluids are considered contaminated and subject to biohazard disposal in the correct manner per institution protocol.



Figure 9-6-4 Place a new transparent dressing over the cannula.

Dressing Applications for Peripheral IV Cannulas Newly Inserted

7. Place a TSM dressing (Op-site or Tegaderm) over the newly placed cannula (see Figure 9-6-4).
7. TSM dressings anchor the cannula with their adhesive properties as well as provide for visualization of the site. The dressing is left intact

8. Tape the hub of the cannula and connected tubing in place externally over the TSM dressing (see Figures 9-6-5, 9-6-6, and 9-6-7).



Figure 9-6-5 Tape the hub of the cannula and tubing in place.

8. Taping should be on top of the TSM dressing because tape is not considered sterile next to the newly placed IV cannula. Taping anchors the hub and tubing so as to avoid pulling that might lead to dislodging or phlebitis.



Figure 9-6-6 Tape is not considered to be sterile so it must be placed over the transparent dressing.

Figure 9-6-7 This cannula has been covered with a transparent dressing. The tubing has been securely taped so it will not become dislodged.



9. Document the time and date of the dressing.

9. Provides information related to when the dressing was done. This can be written on the label provided with the TSM dressing and applied to the dressing site, or it can be written on the treatment sheet or progress notes.

Dressing Applications for PICC Line, TLC or Single Subclavian Line, and Central Venous Access Devices Needing Redressing

10. Review agency/institutional policy for dressing change procedure.

10. Ensures protocol is followed.

11. Repeat Actions 1–6.

11. See Rationales 1–6.

continues

Dressing Applications for PICC Line, TLC or Single Subclavian Line, and Central Venous Access Devices Needing Redressing *continued*

12. Observe site.

- Check for complaints of pain, redness, swelling, purulent drainage, unusual tenderness, ecchymosis, or evidence of bleeding or leakage of tissue fluids from the site.
- Note the position of indwelling catheters, tubes, and the sutures or stabilizing devices supporting the indwelling items.

13. Apply sterile gloves.

14. Cleanse around line with sterile normal saline using a sterile cotton-tip applicator in a gentle rolling motion. Dry with dry applicator.

15. Cleanse around line with a povidone-iodine swab using a circular motion, moving from the center to the periphery; let it dry. Allow for a 2-minute contact with the site.

16. If povidone-iodine was used, remove dried povidone-iodine with alcohol swabs, using same circular motion as described previously. Allow alcohol to dry.

17. Apply dressing to site.

PICC Line:

- Apply new stabilizing Steri-strips if necessary.
- Apply a TSM dressing. The site may also be overwrapped with a continuous gauze wrap such as Kling or Kerlix for client comfort and protection.

Triple Lumen Catheter:

- Apply a TSM dressing. Variation may include a 2 × 2 over the site, then TSM dressing.

External Long-Term Venous Access Device, Tunneled with Cuff:

- Apply one folded 2 × 2 under the line and apply one flat 2 × 2 on top; tape dressing in place.

18. Apply necessary tape to indwelling line or tubing.

12.

- To evaluate for signs and symptoms of infection or tissue trauma.
- To evaluate the patency and stability of indwelling devices.

13. Dressing changes on central lines are sterile procedures.

14. Crusts provide a medium for growth of microbes. This step may be omitted if crusts are not present.

15. Decreases skin microbes. Chlorhexidine gluconate may be used to cleanse site if client is sensitive to povidone-iodine solution. The chlorhexidine gluconate is removed with sterile H₂O or saline.

16. Povidone-iodine solution may be irritating to the skin.

17.

- Steri-strips may often loosen after a while; to ensure stability of line, these may need to be replaced.
- TSM dressing allows for visualization of site.

- TSM dressing allows for visualization of site.

- A 2 × 2 dressing provides necessary coverage because tunneling and cuff provide barrier to retrograde migration of microbes into circulation. Dressing will wick moisture from wound.

18. Ensures stability and prevents tugging on line.

19. Conduct client/family education about the dressing, which may include teaching care of the long term venous access device.

Dressing Applications for Peripherally Inserted Drainage Tubes (nephrostomy tubes, biliary tract tubes, and similar tubes)

20. Repeat Actions 10–17.

21. Apply folded gauze under tube. Apply one or two layers of flat gauze pads on top of tube. Tape dressing securely. Variation: if body fluids from the cavity being drained are leaking from around tubing site, a protective barrier such as Duoderm may be applied around the tube to protect the skin from the drainage.

22. Apply necessary tape to tube.

23. If indicated, empty or change the drainage collection container and record the amount in the appropriate location.

24. Conduct client/family education about the dressing, which may include teaching care of the drain site to the client/family.

Dressing Applications for Puncture Sites Following Diagnostic Procedures (angiogram, thoracentesis, paracentesis, lumbar puncture, needle biopsy sites)

25. Review agency/institutional policy for dressing change procedure.

26. Repeat Actions 1–5.

27. Apply clean gloves unless sterile gloves are specifically indicated.

28. Observe site.

19. Educates the client/family and prepares for discharge.

20. See Rationales 10–17.

21. Size of gauze to use when a dressing is applied around a tube is determined by the size, location, and position of the tube. Some tubes are flat against the body and need minimal support; other tubes protrude and are stiff and need support of the dressing for client comfort and tube support.

22. Ensures stability and prevents tugging on tube.

23. Emptying of drainage collection containers is often done along with the dressing change. Documentation of the amount and nature of the drainage is an important aspect of the care of a client with indwelling drains. Removal of the drain often depends upon documentation of decreasing amount of drainage.

24. Educates the client/family and prepares for discharge.

25. The basic technique is described; however, there may be an agency/institutional policy that differs.

26. See Rationales 1–5.

27. Sterile gloves may be indicated for some clients.

28. Assessment includes noting signs of infection as evidenced by redness, swelling, purulent drainage, or unusual tenderness; signs of tissue trauma as evidenced by swelling or ecchymosis; and evidence of bleeding or leakage of tissue fluids from the site.

Dressing Applications for Puncture Sites Following Diagnostic Procedures (angiogram, thoracentesis, paracentesis, lumbar puncture, needle biopsy sites) *continued*

29. Apply dressing to site.

Lumbar Puncture:

- Band-Aid is applied following pressure to the site for a brief period.

Thoracentesis:

- Apply sterile petrolatum gauze, 4 × 4 and 2-inch tape.

Paracentesis:

- Apply several thicknesses of 4 × 4 gauze as a bulky dressing and tape to secure.

Angiography:

- A Band-Aid or 4 × 4 gauze pad is placed on the site following a period of pressure being applied to achieve homeostasis of the site. Variation: a sandbag may be ordered to be applied directly to the site.

Needle Biopsy Sites:

- Tape a Band-Aid or 2 × 2 gauze in place.

30. Conduct client/family education about the dressing and any procedure-specific activity limitations or positioning requirements.

29.

- The puncture wound is small, and a Band-Aid is sufficient.
- The dressing needs to be occlusive to air to avoid a potential pneumothorax. Two-inch foam tape works well.
- A bulky dressing is needed because often the ascitic fluid leaks from the puncture site, especially if paracentesis is done routinely.
- Involves a puncture to large vessels, usually the femoral artery or vein or the brachial artery or vein. A Band-Aid is sufficient once the artery or vein is stabilized following a period of compression. A 5-lb. sandbag may be applied for added pressure for a brief period. This is optional and determined by the institutional policy.
- A Band-Aid or 2 × 2 gauze taped in place is sufficient because the puncture sites are small.

30. Educates the client/family.

> EVALUATION

- The therapeutic puncture site remains free from infection, redness, swelling, or ecchymosis.
- The therapeutic puncture site is clean and dressed appropriately.
- The client can verbalize or demonstrate understanding about the therapeutic puncture site.

> DOCUMENTATION

Nurses' Notes

- Date and time dressing was done
- Brief description of the puncture site including any unusual findings
- Brief description of the site care done and dressing applied
- Client/family education done and evaluation



▼ REAL WORLD ANECDOTES

Mrs. Jones presented to the laboratory for routine lab work, including a protime. The nurse drew her blood and placed a cotton ball and tape dressing over the puncture site. As Mrs. Jones was putting on her coat, she noticed blood soaking through her shirt sleeve. Mrs. Jones sat down while the nurse applied pressure over the puncture site for 5 full minutes. The nurse then redressed the site with a pressure dressing and advised Mrs. Jones to monitor the dressing for bleeding and not to remove the dressing until that evening. Mrs. Jones' protime was later found to be quite elevated.

> CRITICAL THINKING SKILL

Introduction

Be aware of all potential sources of contamination in the environment.

Possible Scenario

You are doing the dressing change on a double lumen Hickman catheter placed in Mr. Beeson for chemotherapy. He had his chemotherapy 7 days ago and today his absolute neutrophil count is 450. You have applied your mask and gloves and have removed the old dressing. Mr. Beeson is happy to have you attending to him because his family lives 200 miles away and he gets lonely. He is quite talkative. You proceed to cleanse the site and suddenly realize that the client has his head turned in your direction, is not wearing a mask, and is talking over the site as you clean.

Possible Outcome

You ask the client to turn his head in the other direction and, realizing that you have an extra sterile towel opened on your sterile field, you carefully drape the client's head as you explain to him what you are doing and the rationale. With his counts down, he is at risk for developing an infection and should not be breathing on his Hickman site.

Prevention

It is important to assess the surrounding conditions during dressing changes. Clients, families, and support staff may not understand the rationale behind your actions and may inadvertently compromise the dressing change. In the preceding situation, either covering Mr. Beeson's face with a towel or having him don a mask would prevent further contamination of the site. A thorough cleaning would then be required to protect Mr. Beeson from infection.

▼ VARIATIONS



Geriatric Variations:

- Elderly people have thin skin, which can be sensitive to tape and solutions.
- Special attention should be given to the surrounding skin when removing the dressing around the exit site.
- If the skin appears to be sensitive to the iodine, this should be reported to the physician or qualified practitioner and this step eliminated.
- Elderly clients often live alone and may require home health care to assist with dressings and management of drainage tubes that need to be done in the home setting.



Pediatric Variations:

- Remind all children who are old enough to understand not to touch the therapeutic puncture site or play with the drainage tubes.
- Make sure that any tubing is secure and the small child cannot easily pull or dislodge the drain.
- Older children can be taught to care for the drainage tubes.
- Young children will require explanation that their puncture wound will heal and that their insides will not leak out of the wound.
- Special bright Band-Aids are an option to cover the puncture sites of children.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- Where and how to obtain additional supplies should be reviewed with the client/family.
- Review proper disposal of contaminated dressings.
- If the therapeutic puncture was performed as an outpatient or short stay procedure, discharge instructions need to include how to care for the puncture site at home and when and who to call if the client experiences problems with site management at home.
- Problems that might occur should be reviewed with client/family and include the following:
 - Fever
 - Bleeding, internally or externally from an angiography site
 - Leakage from paracentesis, or around biliary and nephrostomy tubes
 - Leakage and possible headache from lumbar puncture
 - Difficulty breathing from thoracentesis



Long-Term Care Variations:

- Special supplies may need to be ordered.
- A dressing change order may need to be written by the attending physician or qualified practitioner at the facility.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While dressing a newly placed IV cannula, you first secure the hub with tape that you had in your pocket, then apply the TSM dressing over the tape, compromising the sterility of the site.

Ask Yourself:

How do I prevent this error?

Prevention:

Tape the hub after placing the TSM dressing. The TSM dressing will preserve the sterility of the puncture site, preventing contamination by the tape.

> NURSING TIPS

- When dressing a newly placed IV, have all the supplies for the dressing ready to apply. Lack of planning at this phase can lead to an easily dislodged IV.
- If the physician or qualified practitioner is performing a therapeutic puncture at the bedside or in the clinic, anticipate the dressing needs so the correct dressing can be applied postprocedure.
- Familiarize yourself with the institution's policy and procedure for care of the specific puncture site.
- Before doing a dressing change for the first time around a drainage tube, review the progress notes, treatment sheet, or care map for care tips. Ask colleagues because they are a good source of information if they have cared for the client in the past; ask the client what has been comfortable with regard to the dressing. Then view the dressing, assess room for leftover unopened supplies, and gather needed supplies.
- If home care of the therapeutic puncture site is necessary, identify who is going to do the dressing or site care. If an agency referral is needed to provide for the client's dressing care needs, start this process as early as possible.

SKILL 9-7

Irrigating a Wound

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Betadine
Debris
Decubiti
Drainage

Exudate
Irrigation
Maceration



> OVERVIEW OF THE SKILL

Wound irrigation is the process of washing debris, drainage, or exudate out of the wound to promote healing. The fluid used to irrigate a wound varies depending on the physician's or qualified practitioner's orders. Fluids commonly used include normal saline, Betadine, hydrogen peroxide, acetic acid, and specially prepared antibiotic solutions. If cytotoxic solutions are used, then the area must be flushed/irrigated afterwards with normal saline. Wounds that require

irrigation also vary. They may be simple open lacerations; tunneled pressure ulcers; or complex, open abdominal wounds extending down to the abdominal fascia. Wound irrigation is a sterile procedure because the skin's integrity, the body's primary defense against infection, has been breached. The nurse must take care not to contaminate the wound, but she must also take care not to allow herself to become contaminated with wound drainage.

> ASSESSMENT

1. Assess the current dressing to determine what equipment will be needed to replace it with a clean dressing and whether the dressing has been adequate to protect the wound and contain any drainage or exudate.
2. Assess the client to determine whether he is able to understand the need for the wound irrigation and cooperate with the procedure.
3. Assess whether the client has concerns about pain or body image regarding this wound and the irrigation to determine what client teaching and support will be most effective.
4. Assess the client's environment to plan if the necessary equipment and supplies are available, including irrigant, hand washing facilities, and an adequate work area to lay out supplies and establish a sterile field.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The wound will be free of exudate, drainage, and debris.
2. The wound will be free of signs and symptoms of infection.
3. The procedure will be performed with a minimum of trauma and pain to the client.

Equipment Needed (see Figure 9-7-2):

- Sterile gloves
- Disposable gloves

- Sterile irrigation kit (basin, piston irrigation syringe, solution container)
- Irrigation solution (per physician's or qualified practitioner's order)
- Waterproof pad
- Sterile dressing material to redress the wound
- Moisture-proof container or bag for use after the irrigation procedure



Estimated time to complete the skill:
20–30 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct the client the reason for the wound irrigation, and answer any questions the client may have.
2. Explain to the client the reason for the sterile procedure and ways the client can assist in maintaining the sterile field.

3. Instruct the client to call a nurse for further assistance if the dressing becomes soaked with drainage. A dressing that is wet through can wick infectious agents through to the wound.



Figure 9-7-2 Sterile basin, sterile irrigating solution, and sterile syringes are used to irrigate a wound.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Confirm the physician's or qualified practitioner's order for wound irrigation and note the type and strength of the ordered irrigation solution.
2. Assess the client's pain level and medicate if needed with analgesic 30 minutes before procedure if the medication is to be given p.o. or I.M.
3. Explain the procedure to the client.
4. Place a waterproof pad on the bed. Assist the client onto the pad. Then assist the client into a position that will allow the irrigant to flow through the wound and into the basin from the cleanest to dirtiest area of the wound.
5. Wash hands and apply the disposable gloves; remove and discard the old dressing.
6. Assess the wound's appearance and note quality, quantity, color, and odor of drainage.
7. Remove and discard the disposable gloves, and wash hands.

RATIONALE

1. Wound irrigation is a dependent nursing action that requires a medical order stating the type of solution to be used.
2. Allows time for medication to be absorbed to increase the analgesic effect.
3. Helps to decrease the client's anxiety and increase the client's cooperation.
4. Positioning of the client and placement of a waterproof pad will decrease contamination of bed linen.
5. Reduces the transmission of microorganisms.
6. Provides assessment of the status of the wound.
7. Reduces the transmission of microorganisms.

8. Prepare the sterile irrigation tray and dressing supplies. Pour the room-temperature irrigation solution into the solution container.
9. Apply sterile gloves (and goggles if needed).
10. Position the sterile basin below the wound so the irrigant will flow from the cleanest area to the dirtiest area and into the basin.
11. Fill the piston or bulb syringe with irrigant and gently flush the wound. Hold the syringe approximately 1 inch above the wound bed to irrigate. Refill the syringe and continue to flush the wound until the solution returns clear and no exudate is noted or until the prescribed amount of fluid has been used (see Figures 9-7-3 and 9-7-4).
8. Aseptic technique is used to prevent introduction of microorganisms into the wound. Room-temperature solution reduces client discomfort.
9. Promotes sterile environment.
10. Decreases possibility of wound contamination.
11. Gently irrigating the wound decreases trauma to granulation tissue. This provides the ideal pressure for cleansing and removal of debris.



Figure 9-7-3 Gently flush the wound.



Figure 9-7-4 Hold the syringe close to the wound, but be careful not to touch the wound with the syringe.

12. Dry the edges of the wound with sterile gauze (see Figure 9-7-5).
12. Drying the edges of the wound prevents maceration of tissues due to excess moisture.

Figure 9-7-5 Dry the edges of the wound with sterile gauze.



13. Assess the wound's appearance and drainage.
14. Apply a sterile dressing. Remove sterile gloves and dispose of properly. Wash hands.
15. Document all assessment findings and actions taken.
13. Provides indication of change in wound status.
14. Application of a sterile dressing protects the wound from microorganisms.
15. Records information for evaluation.

> EVALUATION

- Assess whether the wound is free of exudate, drainage, and debris.
- Assess whether the wound is free of signs and symptoms of infection.
- Evaluate whether the procedure was performed with a minimum of trauma and pain to the client.

> DOCUMENTATION

Nurses' Notes

- Record your findings regarding the wound's appearance and quality, quantity, color, and odor of drainage.
- Note the client's tolerance of the procedure and any observations you may have noted regarding the client's body image.

Kardex

- Record any special equipment or techniques required with the client to provide the information to other staff members.



▼ REAL WORLD ANECDOTES

Mrs. Korpinen is an elderly client in a long-term care facility. She has a pressure ulcer on her right hip that extends into the muscle. The wound has started to tunnel and now extends under the skin in a 2-inch pocket. Mrs. Korpinen's doctor has ordered Betadine irrigation of the wound every shift. Nurse Ung is the charge nurse on the night shift at this facility, and 5 nights a week she irrigates Mrs. Korpinen's wound. She uses a large amount of Betadine and makes sure the pocketed area is completely irrigated with the solution then flushed with normal saline. She has noted that when she returns from her days off that the pocketed area of Mrs. Korpinen's wound is filled with pus and the irrigation takes much longer to return clear of exudate. Upon investigation Nurse Ung discovers that the other nurses performing this procedure "irrigate" the wound by pouring Betadine over the exposed open area. She carefully and tactfully explains the need to take the time to irrigate the pocketed area underneath the skin in order to heal Mrs. Korpinen's wound.

> CRITICAL THINKING SKILL

Introduction

Thoughtful client assessment and careful procedure planning can prevent serious complications.

Possible Scenario

Mrs. Abelson has a large midline abdominal surgical incision. The upper end of the incision is draining purulent fluid. Her doctor has ordered irrigation of the area and a dressing change every 8 hours. As you prepare to perform the procedure, you note that Mrs. Abelson is sitting propped up in bed with several pillows. Upon checking her chart you find that she has emphysema and cannot lie flat in bed. The area to be irrigated is at the top of the incision, nearest Mrs. Abelson's xiphoid process.

Possible Outcome

- If you lay Mrs. Abelson flat and turn her on her side so the irrigant won't drain into the rest of the inci-

sion, the drainage will not contaminate the incision, but Mrs. Abelson will probably not tolerate this position and could go into respiratory distress.

- If you allow Mrs. Abelson to remain sitting and place the bowl for irrigant in her lap, allowing the irrigant to bathe the entire incision, Mrs. Abelson will be able to breathe, but her entire surgical incision will be contaminated with whatever is causing the purulent drainage. Because the incision goes through to the abdomen, contaminating the entire length of the incision increases the chance of the infection traveling to the peritoneal cavity.

Prevention

Have another staff member apply sterile gloves and hold the bowl to catch the irrigant directly under the area to be irrigated. This allows Mrs. Abelson to continue to sit up and prevents contamination of the rest of the incision.

▼ VARIATIONS



Geriatric Variations:

- *Be aware that an elderly client may not be able to hear your instructions, see what you are doing, or remember the education you have provided. Be ready to explain the procedure step by step, answer questions, and encourage the client to participate in the care.*



Pediatric Variations:

- *A child's skin is tender and may react to solutions that are used routinely on adults. Be aware of any potential allergic-type reactions or topical allergies.*



Home Care Variations:

- *Clients with slow-healing wounds are often sent home to be cared for. The nurse is often in the position of teaching the client or a caregiver how to perform the irrigation and dressing change. She should periodically assess the irrigation and dressing change to ensure it is still being done correctly.*



Long-Term Care Variations:

- *Clients with long-term wounds need to plan a regular schedule of wound care and a clear method to document the progress of healing and signs of infection.*
- *An irrigation order and dressing change order will need to be written by the attending physician or qualified practitioner of the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Being too aggressive or not aggressive enough with the irrigation.

Ask Yourself:

How do I prevent this error?

Prevention:

Aggressively irrigating the wound in an effort to remove all tissue debris risks damaging fresh tissue that is just starting to granulate on the walls of the wound. Irrigating the wound too gently risks not removing infected debris, thus prolonging the client's recovery and risking infection. Before irrigating the wound, assess the amount of drainage, the condition of the wound, and the stage of healing. With inflammation present, granulation cannot take place, so a more aggressive approach would be appropriate. If the wound contains mostly pink tissue with small amounts of tissue debris, granulation and healing are progressing and a more gentle irrigation is called for.

> NURSING TIPS

- Always ask the client if he or she has a preferred way of doing the irrigation that has worked in the past without difficulties. Many clients have developed their own shortcuts and in turn educate the nurse on an easier way to irrigate.
- Be sure the irrigant is at room temperature or ideally body temperature to avoid traumatizing the granulating tissues and avoid client discomfort.
- A small wound can be irrigated with a syringe and solution poured into a sterile specimen cup.

SKILL 9-8

Packing a Wound

Gayle Crawford, RN, BSN, and Karrin Johnson, RN

KEY TERMS

Alginate	Necrotic
Dead space	Packing
Debride	Secondary intention
Exudate	Tunneled
Gauze	Undermined
Hydrocolloids	
Hydrophilic polyurethane foams	



> OVERVIEW OF THE SKILL

Dressings are placed on wounds to accomplish a number of goals ranging from aesthetic comfort for the client to immobilizing and protecting the wound area. Wounds like ulcers and open surgical incisions are generally left open to heal by tissue granulation from the edges of the wound. This is known as healing by secondary intention. Wounds that heal by secondary intention may have copious exudate, necrotic or infected tissue on the surface, tunneling, or may be in high pressure or low circulation sites. These types of wounds are often “packed” as part of the dressing process. Dressing a wound using packing material is done primarily to protect an open wound from contamination, absorb drainage, protect from mechanical injury, fill dead space, and debride the wound.

There are many new dressings on the market specifically designed for packing and caring for wounds that are healing by secondary intention. Traditionally, gauze has been used to pack wounds.

Gauze

Gauze has a number of advantages as a packing material. It is inexpensive as well as versatile. It can be used to fill dead space, protect the wound from contamination and injury, absorb drainage, and debride necrotic and infected debris. It is easily applied and easily removed. It is readily available in most settings

and it requires no special handling. While gauze is versatile and multifunctional, it often doesn't perform any one specific function well. While gauze will debride necrotic tissue, it also removes newly granulated tissue. Gauze can provide some protection from contamination, but studies have shown that bacteria can penetrate 64 thicknesses of gauze. Gauze does absorb drainage, but it can absorb so much drainage that the wound surface becomes desiccated, slowing healing. Gauze will fill dead space but if packed too tightly can restrict blood flow and oxygenation at the wound surface.

Hydrocolloids

Hydrocolloids are a synthetic material available as a powder or paste. This type of dressing material can be used to fill dead space in a wound and to maintain a moist healing environment. While hydrocolloids are absorptive, they can be overwhelmed with drainage in wounds with large amounts of exudate. Hydrocolloid pastes or powders may be inappropriate packing for tunneled areas or areas that may be difficult to cleanse of packing material during dressing changes.

Alginates

Alginates are derived from brown seaweed and are highly absorptive. This type of material is available as

a pad or in the form of a rope. Alginates can be used to fill dead space and to absorb wound drainage.

Hydrophilic Polyurethane

Hydrophilic polyurethane foams are available in sheets or as a filler. Foam can be used to fill dead space, absorb drainage, and maintain a moist wound

environment. Foam may require a secondary gauze dressing.

The primary goals in packing a wound are to protect, absorb, fill, or debride the wound. The wound packing material used should be chosen based on the reasons for packing the wound, the availability of the packing material, and the skill level of the caregiver.

> ASSESSMENT

1. Assess the dressing currently in place to determine effectiveness of the current regimen.
2. Assess the client's comfort level to determine whether the client will need medication prior to the dressing change.
3. Assess the client's understanding regarding the wound, the healing process, and the reason for this particular type of dressing to determine whether any client teaching is needed.
4. Assess the wound for infection, necrotic tissue, exudate, tunneling, circulation, and tissue granulation to determine the effectiveness of the current care regimen.
5. Assess the wound size and depth to determine wound healing and effectiveness of the current care regimen.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2 Altered Protection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 7.1.1 Body Image Disturbance
- 8.1.1 Knowledge Deficit, related to wound care
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The wound will not exhibit signs or symptoms of infection.
2. The client will experience a minimum of pain and trauma related to the wound and wound care.
3. The client will understand the reason for the current wound care regimen.
4. If the wound is to be cared for at home, the client or the client's caregiver will be able to demonstrate appropriate wound care and explain the reasons for the wound care regimen.
5. The wound will measurably heal.
6. Wound drainage is adequately absorbed.

Equipment Needed:

- Gloves (gown, goggles, and mask prn)
- Sterile gloves
- Tape (Montgomery straps or stockinette)
- Gauze or other wound packing material (see Figure 9-8-2)
- Biohazard waste receptacle
- Dressing material to cover the packing
- Cotton-tip applicators, sterile
- Tweezers or forceps, sterile
- Normal saline



Estimated time to complete the skill:

15–30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the reasons for packing the wound and for the use of the chosen packing material.
2. Explain the need to avoid pressure at the wound site.
3. Explain the need to keep the exterior of the dressings dry.
4. Emphasize to the client not to lie on the wounded area, even if it is the client's preferred way to lie.



Figure 9-8-2 Wound packing gauze

5. Have clients rate their pain on a 1–10 scale during the wound packing procedure.
6. Encourage clients to tell you when they are experiencing pain so you can provide appropriate pain relief prior to the procedure.
7. Encourage the client or family members to watch and assist with the dressing change, especially if they will be performing the dressing change at home.
8. Some clients may be uncomfortable with knowing that dressings and gauze are being placed inside of them. Encourage the client to talk about feelings and concerns, and provide emotional and educational support.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Provide for client privacy.
3. Assemble dressing change material at bedside (see Figure 9-8-3).



Figure 9-8-3 Assemble dressing change material.

4. Apply gloves.
5. Remove the old dressing, noting the integrity of the old dressing and the way it was applied (see Figures 9-8-4 and 9-8-5).



Figure 9-8-5 Examine the old dressing as it is removed. Note what dressings were applied, in what order, and assess the effectiveness of the old dressing.

1. Reduces the transmission of microorganisms.
2. Promotes client comfort and cooperation.
3. Prevents a break in technique during the dressing change.



Figure 9-8-4 Carefully remove the old dressing.

4. Reduces the transmission of microorganisms.
5. If the old dressing adequately contained wound drainage, debrided the wound, or performed the necessary function, use it as a template for applying the new dressing. If it was not adequate, evaluate and implement ways to improve the dressing.



Figure 9-8-6 Apply gloves.

6. Dispose of the old dressing in the appropriate receptacle.
7. Remove gloves with contaminated surfaces inward and dispose of them appropriately.
8. Open and prepare the dressing materials. If this is a sterile dressing change, establish a sterile field for the dressing materials.
9. Apply sterile gloves or a clean set of disposable gloves (see Figure 9-8-6).
10. Inspect the wound (see Figure 9-8-7). Using the cotton-tip applicator as a measuring tool, gently measure the depth, width, length, depth of undermining, and depth of tunneling of the wound.
6. Reduces the transmission of microorganisms.
7. Prevents contamination of the new dressing material.
8. Prevents breaks in technique during the dressing change.
9. Reduces the transmission of microorganisms.
10. Documents progress in healing. Gentle measurement will prevent damage to any new tissue granulation.



Figure 9-8-7 Inspect the wound. Gently probe the length and depth, and assess for tunneling and undermining in the wound.



Figure 9-8-8 Gently pack the wound.

11. Cleanse, irrigate, or treat the wound according to the prescribed wound regimen (these skills are taught elsewhere).
12. Using the information you obtained while removing the old dressing, gently place the prescribed packing material into the wound (see Figure 9-8-8).
13. If the wound packing is for debridement, be sure the packing material contacts all the surfaces to be debrided (see Figure 9-8-9).
14. If gauze is being used to absorb drainage, fluff the gauze prior to packing.
15. Pack all tunneled areas, being sure not to pack too tightly (see Figure 9-8-10).
11. Promotes wound healing.
12. Gentle packing will prevent damage to any new tissue.
13. Contacting all surfaces to be debrided will increase effectiveness of the wound packing.
14. Fluffing increases moisture absorption and helps the gauze conform to the ulcer surface.
15. Packing tunneled areas helps to prevent mechanical injury to the newly granulated tissue. Packing too tightly impairs circulation to the area and slows healing.



Figure 9-8-9 Make sure the packing reaches all the surfaces that need to be debrided.



Figure 9-8-10 Place packing into all tunneled areas.

- 16.** If the packing material requires a secondary dressing to hold it in place, apply that now (see Figure 9-8-11).



Figure 9-8-11 Apply an external dressing over the packing, if needed to hold the packing in place.

- 16.** Protects the dressing from external contamination and holds the packing material in place.



Figure 9-8-12 Stockinette is being used to secure the dressing in place.

- 17.** Using tape, Montgomery straps, or stockinette, secure the dressing in place (see Figure 9-8-12).

- 17.** Secures the dressings in place. If the dressing is being changed frequently, Montgomery straps or stockinette may be a preferable method of securing the dressing to prevent skin damage from tape.

- 18.** Dispose of any waste appropriately.

- 18.** Reduces the transmission of microorganisms.

- 19.** Remove gloves and dispose of properly.

- 19.** Standard precautions.

- 20.** Remove any bedding soiled by drainage, remove any foul-smelling dressing material, freshen the air if necessary.

- 20.** Promotes client comfort.

- 21.** Wash hands.

- 21.** Reduces the transmission of microorganisms.

> EVALUATION

- The wound does not exhibit signs or symptoms of infection.
- The client experienced a minimum of pain and trauma related to the wound and wound care.
- The client understands the reason for the current wound care regimen.
- If the wound is to be cared for at home, the client or the client's caregiver is able to demonstrate ap-

appropriate wound care and explain the reasons for the wound care regimen.

- The wound has measurably healed.

> DOCUMENTATION

Nurses' Notes

- Document the time and date of the dressing change.
- Note the size and depth measurements you made during the dressing change.
- Indicate any changes in the wound condition you observed, including an increase or decrease in drainage or purulence, changes in the size or shape of the wound, odor, or necrosis.
- Note the condition of the client's skin surrounding the wound, including any tape blisters or tissue maceration.
- Record any questions or concerns the client expressed regarding the wound or the dressing change.



▼ REAL WORLD ANECDOTES

Mrs. Harmston was a bedridden client in a long-term care facility. She had an undermined pressure ulcer on her right hip, which was to be irrigated and packed three times per day. Every night, when the night shift nurse changed Mrs. Harmston's dressing, she noted that the previous shift packed only the visible open area of the pressure ulcer with a small amount of gauze. The undermined area was not packed and contained a large amount of purulent drainage. The night shift nurse routinely took the time to irrigate all portions of the pressure ulcer, especially the undermined area, and she gently packed the undermined area with gauze moistened with sterile saline. During morning report she noted the way she had treated Mrs. Harmston's pressure ulcer but refrained from criticizing the previous nurse. She later discovered that the day shift also packed and irrigated only the visible portion of Mrs. Harmston's wound. Despite only one careful dressing change a day, Mrs. Harmston's wound drainage and general appearance would improve for a few days and the night shift nurse was happy to see the progress. However, when she would return from her two days off, she would be discouraged to note that Mrs. Harmston's ulcer was once again filled with purulent drainage and only barely packed. Unwilling to compromise her client's care, the night shift nurse reported the inadequate dressing changes being performed during the day shift. The problem was addressed, and as time went on, Mrs. Harmston's wound did improve.

> CRITICAL THINKING SKILL

Introduction

Investigate the unusual to avoid the unexpected.

Possible Scenario

You are changing the dressing on a pressure sore with undermining and tunneling. You have cared for this client in the past and are familiar with this wound. While removing the old gauze packing, you realize that you can't find any gauze tail at the opening to the tunneled area.

Possible Outcome

After poking around at the entrance to the tunneled area, you decide that the previous nurse did not pack this area. You pack the tunneled area with gauze, making sure to leave a tail for easy removal later. Over the course of the next few days, the tunneled area of this wound becomes increasingly purulent and starts to drain foul-smelling exudate. Determined to find the cause of this new drainage, you probe the tunneled area

with cotton-tip applicators and tweezers. Using a flashlight and tweezers to hold the tunnel open, you see what appears to be matted gauze deep in the tunneled wound. Further exploration with the tweezers and flashlight reveals an old 4 × 4 that had gotten pushed deep into the tunneled area and had provided a breeding ground for infection. Removing the gauze resulted in some excoriation of the wound surface, providing an excellent entry point for the infection. The client developed a septic infection and had to be placed on a course of intravenous antibiotics. The wound healing was severely delayed because of the infection and the damage from removing the gauze.

Prevention

When packing a wound, especially in tunneled and undermined areas that are difficult to see, be sure to leave a means of removing the packing. Think ahead to the next nurse who will be caring for this client and place the packing the way you would want to find it for ease of removal.

▼ VARIATIONS



Geriatric Variations:

- *Don't pack the wound too tightly. Elderly clients may already have compromised circulation and packing the wound tightly will impair it even further.*
- *Be aware of the condition of the client's skin surrounding the wound. Elderly clients are at high risk of skin breakdown, and tape, frequent handling, and drainage or antiseptic solutions from the wound care can cause further breakdown.*



Pediatric Variations:

- *Children may need to be restrained to prevent them from interfering with the dressing.*



Home Care Variations:

- *Be sure to dispose of soiled dressings appropriately.*
- *Monitor the client's or caregiver's dressing change technique periodically. If caregivers do not completely understand the reasons for each step, they might become careless in performing the dressing change.*
- *Educate the caregiver and the client regarding the need to avoid pressure on the wound site. Even if it doesn't hurt to lie on the site, pressure can compromise wound healing.*



Long-Term Care Variations:

- *The client's primary caregiver in a long-term setting may not be a licensed person. Be sure that the primary caregiver is aware of how to care for the dressing and the signs and symptoms to report to the licensed staff.*
- *Teach the caregivers not to turn a client onto the wounded area.*
- *Emphasize to the client not to lie on the wounded area, even if it is the client's preferred way to lie.*
- *A dressing change order will need to be written by the attending physician or qualified practitioner of the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The wound is packed too tightly.

Ask Yourself:

How do I prevent this error.

Prevention:

Packing the wound tightly will allow for more drainage absorption and does reduce dead space more completely. But packing the wound tightly also compromises circulation to the wound surface, which slows new tissue growth and healing. If gauze is used to tightly pack the wound, it can cause mechanical injury to the wound surface as well. Be sure to pack the wound well enough to fill the dead space and absorb drainage but not so tightly that circulation is compromised. If wound drainage is overwhelming the dressings, change the dressing more often or change the packing to a more absorbent material rather than trying to pack in more dressings.

> NURSING TIPS

- If the old packing material is adhered to the wound surface, moisten the packing with sterile saline. This allows easier removal and helps prevent damage to any new tissue.
- Be sure to assess whether the client will require pre-medication for the dressing change. Client cooperation and understanding improves greatly if the client is not focused on the pain.
- If the wound is large, odoriferous, or otherwise unpleasant, don't indicate disgust or displeasure during the procedure. The client is already painfully aware of the wound and may interpret your expression of disgust personally. The wound is a part of the client and the client is always treated with respect.
- When packing tunneled areas, be sure to leave a piece of gauze or other packing material visible and easy to reach with forceps or tweezers to facilitate removal of the packing material.
- Use cotton-tip applicators to gently push the packing material into tunneled or undermined areas of the wound.
- Don't perform complex, painful, or odoriferous dressing changes near mealtimes.

SKILL 9-9

Cleaning and Dressing a Wound with an Open Drain

Gayle Crawford, RN, BSN

KEY TERMS

Biliary	Purulent
Cover sponge	Red rubber catheter
Drain sponge	Sanguineous
Exit site	Serosanguineous
Gastrointestinal	Stab wound
Penrose	



> OVERVIEW OF THE SKILL

Wounds may have drains placed in them during surgery or during the healing process. The purpose of the drain is to drain sanguineous, serosanguineous, purulent, gastrointestinal or biliary drainage, or other body fluids from the surgical site or cavity. The drain may exit via a stab wound near the main incision or may exit via the incision line or open wound. Drains may be of the Jackson-Pratt or HemoVac type, exiting in a collection device that can be emptied (see Skill 9-13), or the drain may be a hollow-type drain such as a Penrose drain or rubber catheter drain that is not connected to a collection device and simply drains into a dressing.

Dressings and drain care vary according to the surgeon's preference and agency or institutional policy. This skill presents a general guideline for a wound dressing with an open drain either exiting from the incision line or exiting from a nearby stab wound and terminating in a dressing. This skill may also be used when providing care around an open drain that may be present with open wounds requiring wet to dry dressing or deep packing or wounds with retention sutures as illustrated in the accompanying photos.

> ASSESSMENT

1. Assess the client's comfort level to determine if pain medications are needed.
2. Assess the external appearance of the dressing. Reinforce the dressing if necessary. Document the initial condition of the dressing, and places additional dressing if needed to absorb drainage.
3. Assess the appearance of the wound for bleeding, intactness, drainage and the presence of drains, sutures or other devices. Helps plan care needed, and establishes a baseline for later assessments.

4. Assess the client's understanding about the postoperative care of the surgical wound site. It is important to take into consideration the client's ability to understand verbal and written instructions and the cultural and social variations that may affect the delivery of health care and client/family education.

> DIAGNOSIS

- 1.6.2.1.2.2 Impaired Skin Integrity
- 1.6.2.1 Impaired Tissue Integrity
- 1.2.1.1 Risk for Infection

> **PLANNING**

Expected Outcomes:

1. The site and drains will be inspected.
2. The site will have the appropriate dressing applied around the drains and over the wound.
3. The surgically placed drains will be monitored for proper functioning and placement.
4. The client family will verbalize or demonstrate understanding of the purpose of drains, and if required, care of the wound site.

Equipment Needed (see Figure 9-9-2):

- Clean exam gloves
- Moisture-proof gown (optional)
- Mask (optional)
- Eye protection (optional)
- Container for proper disposal of soiled dressing
- Washcloths (optional)
- Sterile gloves
- Normal saline
- Small sterile bowl (optional)
- Sterile cotton-tip applicators (optional)
- Sterile towel
- Sterile 4 × 4 gauze pads, multiple
- Precut 4 × 4 drain sponges, multiple
- ABD dressing (optional)
- Tubular mesh (optional)
- 2-inch tape (foam or paper)



Estimated time to complete the skill:

15 minutes

> **CLIENT EDUCATION NEEDED:**

1. Instruct the client how frequently the dressing should be inspected and changed.
2. Discuss how the site will heal, when drains might be removed, and how long sutures or staples will remain in place.
3. Instruct the client not to reach onto the sterile field to help with the dressing change.
4. Instruct the client to report any symptoms of pain or discomfort associated with the incision or dressing.



Figure 9-9-2 Sterile gloves, dressings, basin, and towels are used to dress a closed wound with an open drain.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Gather supplies. 2. Provide privacy; draw curtains; close door. 3. Explain procedure to client. 4. Wash hands. 5. Apply clean exam gloves, a moisture-proof gown, mask, and eye protection if needed. | <ol style="list-style-type: none"> 1. Having all of your supplies in the room will increase the consistency of client care. 2. Maintains client comfort and privacy while body is exposed during procedure. 3. Provides information about the procedure. 4. Reduces the transmission of microorganisms. 5. Infection control and protection from body fluids. If there is copious drainage or the wound is infected, a gown, a mask, and eye protection should be worn. A mask will also help the nurse if the drainage is foul smelling. |
|--|--|

continues

- Remove dressing and place in appropriate receptacle (see Figure 9-9-3).



Figure 9-9-3 Remove the old dressing.

- Observe the undressed wound. The drain may be observed to exit directly from the incision line or from a separate stab wound near the incision (see Figure 9-9-4). Ensure that the drain is securely attached to the skin to prevent it from being accidentally dislodged (see Figure 9-9-5).



Figure 9-9-5 Make sure the drain is secured to the skin so it will not be accidentally dislodged from the wound.

- Cleanse the skin around the incision if necessary with a clean, warm, wet washcloth. Do not disturb the drain or the area under the drain at this point.
- Remove used exam gloves.
- Wash hands.
- Set up supplies.

- Dressings soiled with body fluids are considered contaminated and subject to biohazard disposal in the correct manner per institution protocol.

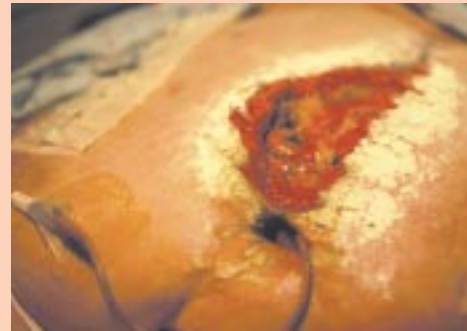


Figure 9-9-4 Observe the undressed wound and the drain.

- Allows for evaluation of effectiveness of treatment.



Figure 9-9-6 The drain is gently elevated to facilitate cleaning.

- Dried blood or drainage on the surrounding skin can be an irritant and a medium for microbes. Move the drain as little as possible to avoid dislodging or shifting the drain, and to minimize trauma to the tissues.
- Exam gloves used to remove the old dressing are considered dirty and should be removed.
- Reduces the transmission of microorganism.
- Following removal of the dressing, you will have a better idea of what supplies are needed and in what amount.

- 12.** Set up a sterile field, including pouring ordered solutions into appropriate containers, if indicated for the dressing change. Apply sterile gloves.
- 13.**
 - If necessary, cleanse the suture line using sterile normal saline or other approved cleaning solution applied with sterile cotton-tip applicators using a rolling motion.
 - Use one applicator then discard.
 - Remove excess moisture after cleansing with dry cotton-tip applicators. If the wound is open and requires wet to dry dressings, deep packing, or retention suture wound care, perform this care at this time.
- 14.** Cleanse the area under the drain. The open drain should be handled minimally. The drain may be elevated with a sterile finger or a cotton-tip applicator to facilitate cleansing as described above (see Figure 9-9-6).
- 15.** Apply needed layers of precut drain sponges around the Penrose or rubber catheter drain. Top with 1–2 layers uncut drain sponges.
- 16.** If necessary, apply a new pair of sterile gloves.
- 17.**
 - Apply external dressing of dry 4 × 4 gauze pads, cover sponges, fluffs, or ABD pads (see Figure 9-9-7).
- 12.** This is a sterile dressing change.
- 13.**
 - If the suture line is grossly bloody, it should be cleaned first. In absence of a stated preference, normal saline will not interfere with healing of the suture line and is routinely used. Cleansing should be from clean to contaminated to avoid introduction of microbes to the clean portion of the wound.
 - Once the cotton-tip applicator has been used, do not reintroduce the used applicator into the sterile solution because this will contaminate the sterile solution.
 - Excessive moisture from the cleansing may cause excoriation if left on the skin and suture line.
- 14.** If the drainage is excessive or not adequately absorbed by the dressing, the skin beneath the drain will need to be cleaned. Drainage on skin can be an irritant and a medium for microbes. The open drain is a portal of entry into the surgical site. It may or may not be sutured in place and requires care in handling to avoid spreading contaminants or dislodging.
- 15.** Precut drain sponges allow a close fit of the dressing around the drain while allowing the drainage to exit onto a maximum absorbent material. If the drain sponges are not available, 4 × 4 gauze sponges may be used in their place. They may be cut to fit around the drain or folded to fit around the drain.
- 16.** Working with drains may lead to messy gloves. The gloves should be changed prior to applying the external dressing, especially if the drainage is malodorous.
- 17.**
 - The external dressing is determined by the size and shape of the wound.



Figure 9-9-7 Apply dressing.

- Secure dressing in place with tape, Montgomery straps, or tubular mesh (see Figure 9-9-8).

18. Conduct client/family education about the dressing, which may include teaching the dressing technique to the client/family.



Figure 9-9-8 Secure dressing in place with Montgomery straps.

- Tape for short-term dressings in clients who are not sensitive to adhesives is the method of choice for securing dressings. For long-term dressings or for clients who are sensitive to tape, use Montgomery straps or tubular mesh. Tubular mesh is a nice alternative to hold the dressing in place because tape is not involved—the mesh is simply pulled up or down to accommodate the dressing change.

18. Educates the client/family and prepares for discharge.

> EVALUATION

- Assess client comfort and pain level during the dressing change procedure.
- Note the condition of the wound. Observe signs of wound healing, and signs of infection.
- Assess that the procedure went smoothly, with proper technique and correct supplies.
- Determine if any modifications need to be made to the dressing change.
- Determine the effectiveness of client/family education. If desired, have them demonstrate the dressing or verbally review the steps of the dressing change procedure.

> DOCUMENTATION

Nurses' Notes

- Record date and time the dressing was changed.
- Write a brief description of the wound and drain site.
- Note the position and condition of drains, and description of drainage.
- Write a brief description of the site care provided and dressing applied.
- Document patient comfort before and after dressing change.
- Document patient/family education provided and evaluation of the teaching.



▼ REAL WORLD ANECDOTES

Ms. Stacy is a 25-year-old woman who is recovering from a ruptured appendix and resulting peritonitis. She has a midline wound, which is closed with staples, and a 3/4-inch latex Penrose drain exiting from a stab wound in her right lower quadrant. She is having her dressing changed around the Penrose every 8 hours due to moderate amounts of purulent drainage. Upon removing the dressing, you find that the drain has slipped out of the wound. There was no suture holding the drain in

▼ REAL WORLD ANECDOTES *continued*

place. You notify the surgical resident on call and she arrives to assess the client. Because the drainage is still a moderate amount, the resident obtains a new sterile Penrose and using sterile technique replaces the drain in the tract in the stab wound. She also places a suture to hold the new drain in place. The client is instructed that the drain will be slowly advanced and removed once the drainage is minimal. The drain site is dressed with drain sponges and cover sponges, and tubular mesh secures the dressing in place.

> CRITICAL THINKING SKILL

Introduction

Skin in elderly or compromised clients may be very thin. A split or a tear can put the client at greater risk of infection.

Possible Scenario

Mr. Goff has a closed midline abdominal wound and two red rubber catheter drains sutured in place in his right upper quadrant and left upper quadrant to drain his subphrenic abscess. He has rheumatoid arthritis and is on prednisone daily. His skin is thin and friable. The

last nurse taped the wound dressing on with paper tape. You pull off the tape quickly, thinking it will cause less pain to the client, and a 1 cm circle of skin pulls off with the tape and the tissue begins to bleed.

Possible Outcome

Potential skin ulceration and infection from exposed tissue near a drain site could result.

Prevention

Remove the tape slowly. Think of using an alternate method of securing the dressing rather than tape.

▼ VARIATIONS



Geriatric Variations:

- *Elderly people have thin skin. Special protective barriers such as special creams or hydrocolloid (Duoderm) pads may need to be applied to the areas under the drains if the drainage is causing excoriation.*
- *Protect the elderly client's skin from pressure, or friction, of the drain on the skin around the wound.*
- *Elderly clients may need help with dressings and management of drainage tubes in the home setting.*



Pediatric Variations:

- *Remind all children that are old enough to understand not to touch the dressing site or play with the drainage tubes.*
- *Make sure the dressing is secure and the small child cannot easily pull or dislodge a drain.*
- *Placing a drain in a stuffed animal and allowing the child to change the dressing may be appropriate play therapy for younger children.*
- *Young children will require explanation that their wound will heal and the drain does not mean that their insides will leak out of the wound.*
- *Older children can be taught to participate in self-care of dressings.*



Home Care Variations:

- *Where and how to obtain additional supplies should be reviewed with the client/family.*
- *Review proper disposal of contaminated dressings.*
- *Discharge instructions need to include how to care for the dressing at home, when and whom to call if the client experiences problems with the dressing change or wound care. Specific instructions need to be given on what to do if the drain becomes dislodged or pulls out.*

continues

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Special supplies will need to be ordered.*
- *A dressing change order will need to be written by the attending physician or qualified practitioner of the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The drain care is done in advance of the dry dressing to the closed wound. You have drainage on your sterile gloves. You pick up a sterile 4 × 4 from your sterile field and apply it on top of the closed wound. You do not change your soiled sterile gloves before applying the closed wound dressing.

Ask Yourself:

How do I prevent this error?

Prevention:

Change gloves before completing the care of the closed wound. Be aware of what is clean and what has been contaminated, as you proceed through the dressing change.

Possible Error:

The dressing change is ordered t.i.d., 6:00 AM, 2:00 PM, and 10:00 PM. It is 1:45 PM and you are about to do a dressing change around a Penrose drain. Four packages of drain sponges have been used for each dressing. You go to gather your supplies and there are no drain sponges. Quickly you order some from the central supply department. They arrive at 2:30 PM.

Ask Yourself:

How do I prevent this error?

Prevention:

As you acquire dressings for a dressing change, note how many dressings remain in the supply. Order supplies in advance.

> NURSING TIPS

- Dressing changes require organization to be done efficiently. Gather data about the dressing change from the following:
 - Shift report
 - Nurses who have cared for client
 - The client/family
 - Chart notes
 - Orders
 - Kardex
 - Care map, care plan
 - Observation of the dressed wound
 - Supplies already in room
- Make a list, if necessary, of needed supplies to take into the room.
- If you are going to be in a client's room for some time, let others know so that they can cover your call lights and you can devote your attention to the dressing change.
- Order special needed supplies in advance of the procedure; don't wait until the last minute.
- Client/family education and preparation for discharge begins upon admission.
- Make sure the container for proper disposal of the removed dressing is nearby so that you have something to drop the dressing in immediately upon removal.

SKILL 9-10

Dressing a Wound with Retention Sutures

Gayle Crawford, RN, BSN

KEY TERMS

Abscess
Intra-abdominal
Nasogastric

Retention sutures
Ulceration



> OVERVIEW OF THE SKILL

Large wounds that are at risk for dehiscence may be closed with wires or heavy nylon or silk suture material known as retention sutures. The suture material or wires may be additionally stabilized by commercially available plastic guide devices commonly referred to as “spoons.” These devices look like bridges across the suture line. The plastic guides also protect the client’s skin from the wires or heavy suture material. Surgical wounds at risk for dehiscence are those that occur in obese individuals, in individuals who have had repeat abdominal surgeries in the same site, and clients whose wounds are at risk for delayed healing; such as dia-

betics and those who are immunosuppressed or are on steroids. Wounds with retention sutures may also have drains. Drains may be of the Jackson-Pratt or HemoVac type, exiting in a collection device that can be emptied (see Skill 9-13), or the drain may be a hollow-type drain such as a Penrose drain or rubber catheter drain that is not connected to a collection device and simply drains into the dressing (see Skill 9-9). Dressings and drain care vary according to the surgeon’s preference and agency or institutional policy. A general guideline for care of the wound with retention sutures will be covered in this skill.

> ASSESSMENT

1. Assess the client’s comfort level postoperatively upon arrival from the operating room. Determines the need for pain medications, and other comfort measures. Good pain control promotes compliance with other postoperative care regimens.
2. Assess the external appearance of the initial postoperative dressing and compare with subsequent dressings. The initial dressing may need to be reinforced if it becomes saturated with drainage. A disrupted or saturated dressing should be

brought to the attention of the physician or qualified practitioner. Inspecting the dressing helps determine what supplies will be needed (see Figure 9-10-2).

3. Assess the appearance of the wound and drains once the dressing is removed. Assess for signs of infection, tissue trauma, evidence of bleeding or leakage of tissue fluids. Note the position of indwelling catheters, drainage tubes, and the presence of sutures or stabilizing devices closing the wound and supporting the drains. Establishes a baseline for later comparisons.

4. Assess the client's understanding about the postoperative care of the surgical wound site. Determines what education and support is needed.

> DIAGNOSIS

1.6.2.1.2.1 Impaired Skin Integrity

1.6.2.1 Impaired Tissue Integrity

> PLANNING

Expected Outcomes:

1. The site will be inspected.
2. The site will have the appropriate dressing applied.
3. The surgically placed drains will be monitored for proper functioning.
4. The client/family will verbalize or demonstrate understanding and the ability, if indicated, to perform the dressing change and associated wound care of the surgical wound site.

Equipment Needed (see Figures 9-10-3 and 9-10-4):

- Clean exam gloves
- Container for proper disposal of soiled dressing
- Moisture-proof gown (optional)
- Protective eyewear (optional)
- Sterile gloves
- Approved cleaning solution
- Normal saline
- Small sterile container
- Small sterile bowl (optional)
- Sterile cotton-tip applicators
- Sterile 4 × 4 gauze pads, multiple
- ABD dressing (optional)

- 4 × 4 hydrocolloid self-adhesive pad (Duoderm), optional
- Montgomery straps (optional)
- Tubular mesh (optional)
- 2 Rolls tape (foam or paper)



Estimated time to complete the skill:
15–20 minutes

> CLIENT EDUCATION NEEDED:

1. Educate the client about the need for the retention sutures, the signs and symptoms of infection, the anticipated course of healing, and how the wound will be managed.
2. Teach the client to wash hands before and after dressing changes, site care, or emptying of drainage collection devices.



Figure 9-10-3 Dressing supplies kept in the client's room



Figure 9-10-2 A towel has been placed over an external dressing. Note how the towel has become saturated with drainage.



Figure 9-10-4 Montgomery straps


3. Make sure the client's pain is controlled prior to beginning a teaching session.
4. If family is to be involved in care, plan teaching when they are present if possible.
5. Employ the aid of an interpreter if there is a language barrier.
6. Take into consideration the client/family's cultural and social background when deciding what to teach and when eliciting feedback.
7. Use visual aids such as flip charts, models, videos, if available.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Dressing Application for Closed Surgical Wounds with Wire Retention Sutures

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Gather supplies. 2. Provide privacy; draw curtains; close door. 3. Explain procedure to client. 4. Wash hands. 5. Apply clean exam gloves. 6. Remove dressing and place in appropriate receptacle (see Figure 9-10-5). | <ol style="list-style-type: none"> 1. Avoids having to break aseptic technique. 2. Maintains client comfort and privacy while body is exposed during procedure. 3. Provides information about the procedure. 4. Reduces the transmission of microorganisms. 5. Infection control and protection from body fluids. 6. Dressings soiled with body fluids are considered contaminated and subject to biohazard disposal in the correct manner per institution protocol. |
|  | |
| <p>Figure 9-10-5 Remove the old dressing.</p> <ol style="list-style-type: none"> 7. Observe the undressed wound. 8. Optional: Cleanse the skin around the incision if necessary with a clean, warm, wet washcloth. Such cleansing would be necessary if there is dried blood or drainage around the incision.
If the suture line requires cleansing, it should be done gently. Use normal saline and/or other | <ol style="list-style-type: none"> 7. Allows for evaluation of effectiveness of treatment. 8. Dried blood or drainage on the surrounding skin can be an irritant and a medium for microbes.
The suture line itself should not be disturbed unnecessarily.
Reintroduction of the soiled applicator into sterile solution will contaminate the solution. |

continues

Dressing Application for Closed Surgical Wounds with Wire Retention Sutures

Sutures *continued*

approved cleaning solution and cotton-tip applicators using a rolling motion. Used applicators should not be reintroduced into the sterile solution.

9. Remove used exam gloves with contaminated surfaces inward and discard in appropriate container.
10. Wash hands.
11. Set up supplies.
12. Set up a sterile field, including pouring ordered solutions into appropriate containers, if indicated for the dressing change. Apply sterile gloves.
13. Gently cleanse the suture line and areas around the retention sutures and plastic guard devices using sterile normal saline or other approved cleaning solution applied with sterile cotton-tip applicators using a rolling motion. Use one applicator, then discard. Remove excess moisture after cleansing with dry cotton-tip applicators. If not applying the optional hydrocolloid dressing, proceed to Action 15.
14. **Optional:** Hydrocolloid self-adhesive dressing: Apply a hydrocolloid self-adhesive pad cut to size under each plastic guard that is resting directly on the skin.
9. Exam gloves used to remove the old dressing are considered dirty and should be removed.
10. Reduces the transmission of microorganisms.
11. Following removal of the dressing, you will have a better idea of what supplies are needed and in what amount.
12. This is a sterile dressing change.
13. Retention sutures are pliable metallic strands or heavy gauge nylon or silk suture material that runs horizontal under a vertical incision. The exiting retention sutures are then stabilized in a plastic guard device that lies directly over the wound. Retention sutures are often used on large wounds that are prone to dehiscence (see Overview of the Skill). Some wounds with retention sutures may have areas of minimal dehiscence present and require small wet to wet or wet to dry dressing changes along with the care of the retention sutures. Blood and drainage can be an irritant and a medium for microbes and should be removed from the incision line, exit sites of the retention sutures, and plastic guard devices supporting the retention sutures. Normal saline will not interfere with healing of the suture line and may be used. The surgeon should be contacted regarding her preference for actual suture line care.
14. Skin irritation and breakdown may occur beneath the plastic guard device resting on the skin on each side of the incision line. The application of a skin protective barrier will serve to prevent or minimize breakdown of the healthy, intact skin. Abdominal distention secondary to fluid retention or bowel inactivity may result in

15. Apply a new dressing to incision line. This will require tucking dry or wet (in the case of a wet to dry or wet to wet dressing) 4 × 4 pads folded to 2 × 4 dimension beneath the retention sutures. If necessary, apply a new pair of sterile gloves.

16. Apply external dressing of dry 4 × 4 gauze pads, cover sponges, fluffs, or ABD pads (see Figure 9-10-6).

Secure dressing in place with tape, Montgomery straps, or tubular mesh (see Figure 9-10-7).



Figure 9-10-6 Apply ABD pads as external dressing.

17. Conduct client/family education about the dressing, which may include teaching the dressing technique to the client/family.

the retention sutures and plastic guards being pressed more tightly against the skin and wound. The physician or qualified practitioner should be notified if the retention sutures appear to be excessively tight.

15. If the drainage is excessive and gloves are grossly soiled, apply a new pair prior to completing the dressing to avoid contaminating the suture line.

16. The external dressing is determined by the size and shape of the wound. Tape may be an option; however, due to the size of most wounds requiring retention sutures, Montgomery straps, tubular mesh, or an abdominal binder with Velcro closures are the best alternatives to securing large dressings used over retention sutures.

Tubular mesh and abdominal binders are a nice alternative to hold the dressing in place because adhesive application is not involved.



Figure 9-10-7 Secure dressings in place.

17. Educates the client/family and prepares for discharge.

> EVALUATION

- The wound and retention sutures have been assessed, and their condition documented.
- The site has an appropriate dressing applied.
- The surgically placed drains are open and draining fluid.
- The client/family understands the purpose of the sutures, the dressings, and how to provide wound care of the surgical wound site, if applicable.

> DOCUMENTATION

Nurses' Notes

- Record date and time the retention sutures were inspected and the dressing changed.
- Write a brief description of the wound, sutures, and retention sutures.
- Note the condition and position of the sutures.
- Document any risk factors that might affect wound healing, such as obesity or poor skin condition.



▼ REAL WORLD ANECDOTES

Mr. Russell is a 39-year-old man who is 5 days postoperative for an exploratory laparotomy for a recurring intra-abdominal abscess. The client had gastric bypass surgery 3 years ago which did not reduce his obesity. Because of the client's large size of 152 kg and history of diabetes and recurrent abdominal surgeries, the surgeon has placed retention sutures for wound closure intermittently spaced with nylon sutures. During the first 72 hours after surgery, Mr. Russell experienced fluid retention and abdominal distention. The plastic guards supporting the retention sutures were pressed tightly against the abdominal skin. With the ensuing postoperative diureses and a nasogastric tube connected to low continuous suction, his distention resolved. A wound and skin assessment revealed skin ulcerations beneath the plastic guard devices and crusting around the retention wire exit sites.

The skin under each plastic guard and around each exiting retention suture is cleansed with approved cleaning solution and rinsed with normal saline and dried. Hydrocolloid patches (Duoderm) are applied to the ulcerated areas under the plastic guards, and gauze 2 × 2 pads are applied to the areas under the plastic guards that are not ulcerated. Below the last retention suture, the inferior portion of the wound was left open and a wet to dry dressing is being done every 8 hours. The remaining suture line is cleansed of crusts using approved cleaning solution as needed. Dry 4 × 4 gauze pads are folded lengthwise along the suture line, with the gauze tucked under the plastic guards as necessary. Two ABD pads are applied on top and the dressing is secured with Montgomery straps.

> CRITICAL THINKING SKILL

Introduction

Assessing, but not intervening to reduce pressure from a retention suture guard allowed a pressure ulcer to develop.

Possible Scenario

You observe that the skin is pressed tightly against the plastic guards of the retention sutures. The rest of the suture line is clean and dry and approximated. After a visual inspection of the wound, you apply a dry gauze dressing on top of the wound. The next shift finds an ulceration under one of the plastic guards.

Possible Outcome

Plastic guards pressing tightly against the skin can cause ulceration of the skin.

Prevention

The skin beneath the plastic guards should always be cleansed using an approved cleaning solution and a cotton-tip applicator, rinsed with normal saline, and dried. The physician or qualified practitioner should be notified if the plastic guards appear to be pressing too tightly against the client's skin.

▼ VARIATIONS



Geriatric Variations:

- Elderly people have thin skin, which can tear. Do not tug at the skin when removing the dressing. Assess the skin carefully after removing the dressing.
- Elderly clients may require assistance with wound management in the home setting.



Pediatric Variations:

- Make sure that the dressing is secure and the small child does not have access to the retention sutures.
- Demonstrate retention sutures on a doll or stuffed animal.
- Teach older children how to participate in placing dressings over retention sutures.



Home Care Variations:

- Advise the client/family on how to obtain additional dressing supplies.
- Make sure the client/family follows proper disposal of contaminated dressings. Make sure they have appropriate disposal materials available.

▼ VARIATIONS *continued*

- *Wounds with retention sutures can be complex and difficult to heal. Make sure the client knows who to contact for questions and assistance with wound care. Make sure the client understands the symptoms of infection and what to do if bleeding or dehiscence occurs. Make sure the client can obtain adequate pain control during dressing changes.*



Long-Term Care Variations:

- *Special supplies necessary to dress large wounds may not be available in the long-term care setting. A review of the specific dressing change procedure may need to be presented to the staff caring for the client at the long-term care facility.*
- *A dressing change order will need to be written by the attending physician or qualified practitioner of the facility.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You have applied your sterile gloves and are ready to proceed with the dressing change when you notice that you did not bring enough gauze 4 × 4 pads into the client's room, necessitating removal of sterile gloves, leaving the room, and obtaining more supplies.

Ask Yourself:

How do I prevent this error?

Prevention:

Perfect your organizational skills. Assess what will be needed and bring the proper supplies to the client. Open wound care supplies prior to applying sterile gloves.

Possible Error:

You are teaching a dressing change to a young Hispanic woman who will be caring for her husband at home. She demonstrates basic conversational English skills. You proceed to explain the dressing change using medical terms. You assume she understands. Her return demonstration the next day indicates she did not understand.

Ask Yourself:

How do I prevent this error?

Prevention:

You may need to employ the aid of an interpreter when giving care or instructions to a client or family member whose first language is not English.

> NURSING TIPS

- Dressing changes require organization to be done efficiently. Gather data about the dressing change from the following:
 - Shift report
 - Nurses who have cared for client
 - The client/family
 - Chart notes
 - Orders
 - Kardex
 - Care map, care plan
 - Observation of the dressed wound
 - Supplies already in room
- Make a list, if necessary, of needed supplies to take into the room.
- If you are going to be in a client's room for some time, let others know so that they can cover your call lights and you can devote your attention to the dressing change.

SKILL 9-11

Obtaining a Wound Drainage Specimen for Culturing

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Ampule
Anaerobic
Bacteria
Culture
Eschar

Exudates
Inflammatory
Medium
Nosocomial
Pathogens



> OVERVIEW OF THE SKILL

Bacterial wound contamination is one of the most common causes of altered wound healing. A surgical wound can become infected with microorganisms preoperatively, intraoperatively, or postoperatively. During the preoperative period, the wound may become exposed to pathogens because of the manner in which the wound was infected, such as in traumatic injuries. Nicks or abrasions created during preoperative shaving may also be a source of pathogens. The risk for intraoperative exposure to pathogens increases when the respiratory, gastrointestinal, genitourinary, and oropharyngeal tracts are opened. Non-

surgical wounds from trauma, pressure ulcers, or disease can become infected as well.

If the amount of bacteria in the wound is sufficient or the client's immune defenses are compromised, clinical infection may result and become apparent 2–11 days postoperatively. Infection slows healing by prolonging the inflammatory phase of healing, competing for nutrients, and producing chemicals and enzymes that are damaging to the tissues. Identifying when a wound is contaminated and the infectious agent is an important step in wound healing.

> ASSESSMENT

1. Assess the wound and the surrounding tissues for signs of infection. Check for heat, redness, inflammation, and drainage. Check the color and consistency of the drainage. Check the smell and color of the wound. **Allows for intervention to detect and treat infection.**
2. Assess the client's overall status, including vital signs, for signs of infection such as fever, chills, or elevated white blood cell count (WBC). **Allows for intervention to detect and treat infection.**

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 7.1.1 Body Image Disturbance

> PLANNING

Expected Outcomes:

1. The wound culture will be collected with a minimum of pain and trauma to the client.

- The wound culture will be representative of the flora present in the wound, without contamination by flora outside the wound.

Equipment Needed (see Figure 9-11-2):

- Disposable gloves
- Sterile gloves and dressing supplies
- Normal saline and irrigation tray
- Culture tube and swab
- Moisture-proof container or bag



Estimated time to complete the skill:
15 minutes

> CLIENT EDUCATION NEEDED:

- Explain to the client the reason the wound culture is being collected and how the procedure will be done.

- Be aware of verbal and nonverbal communication indicating the client is concerned that he may be dirty or contaminated. Provide teaching and support to the client and family as needed.
- Teach the client to wash his hands frequently, especially after coming in contact with the wound or wound drainage.



Figure 9-11-2 Sterile culture tube and swab

IMPLEMENTATION—ACTION/RATIONALE

ACTION

- Wash hands, apply disposable gloves, and remove old dressing. Place old dressing in moisture-proof container, and remove and discard gloves. Wash hands again.
- Open the dressing supplies using sterile technique, and apply gloves.
- Assess the wound's appearance; note quality, quantity, color, and odor of discharge.
- Irrigate the wound with normal saline prior to culturing the wound; do not irrigate with antiseptic.
- Using a sterile gauze pad, absorb the excess saline, then discard the pad.
- Remove the culture tube from the packaging (see Figure 9-11-3). Remove the culture swab

RATIONALE

- Reduces the transmission of microorganisms. Makes the wound accessible for obtaining the culture.
- Maintains sterile environment.
- Provides assessment of the amount and character of the wound's drainage prior to irrigation. Reddened areas and heavy drainage suggest infection.
- Irrigation decreases the risk of culturing normal flora and other exudates such as protein; irrigating with an antiseptic prior to culturing may destroy the bacteria.
- Removal of excess irrigant prevents maceration of tissue due to excess moisture.
- Decreases the chance of collecting superficial skin microorganisms.

continues



Figure 9-11-3 Remove the culture tube from the packaging.



Figure 9-11-4 Roll the swab over the area to be cultured.

from the culture tube and gently roll the swab over the granulation tissue. Avoid eschar and wound edges (see Figure 9-11-4).

7. Replace the swab into the culture tube, being careful not to touch the swab to the outside of the tube. Recap the tube. Crush the ampule of medium located in the bottom or cap of the tube (see Figure 9-11-5).

7. Avoids contamination with microorganisms. Releases the medium to surround the swab.



Figure 9-11-5 Crush the ampule to release the medium inside the culture tube.

8. Remove gloves, wash hands, and apply sterile gloves. Dress the wound with sterile dressing.
9. Label the specimen and arrange to transport the specimen to the laboratory according to agency policy.
10. Remove gloves and wash hands.
11. Document all assessment findings and actions taken. Document that a specimen was obtained.

8. Prevents contamination of the wound.
9. Ensures proper handling of specimen.
10. Reduces the transmission of microorganisms.
11. Records information for evaluation and promotes continuity of care.

> EVALUATION

- Assess whether the wound culture was collected with a minimum of pain and trauma to the client.
- Determine whether the wound culture is representative of the flora present in the wound, without contamination by other bacteria.

> DOCUMENTATION

Nurses' Notes

- Document the time and method of collection of the culture, and what was done with the specimen.

Lab Requisition Forms

- The lab slip must be filled out with the client's information as well as the time and date the specimen was col-

lected, location of the culture, and the requested tests. Often there are duplicate numbered or coded labels on the lab slips. One copy is to be placed in the chart.



▼ REAL WORLD ANECDOTES

Mrs. Smith has advanced stage ovarian cancer. She was admitted to the hospital for wound care for an ulceration on her coccyx. The ulceration required frequent dressing changes and while a client in the hospital, Mrs. Smith developed an infection in the wound. Cultures revealed that the infection was a particularly resistant strain of staph. This same strain had been found in a wound in another part of the hospital. Her physicians determined that Mrs. Smith was suffering from a nosocomial infection, probably due to poor hand washing on the part of a caregiver. A barrage of multiple antibiotics failed to destroy the infection. Mrs. Smith's doctors wanted to send her home with home care nurses and instructions regarding her wound care. Unfortunately, Mrs. Smith's daughter suffered from a congenital heart defect and Mrs. Smith's doctors felt that the infection was a hazard to the daughter's health. Mrs. Smith was told that while she could return home she would not be able to see her daughter due to the danger of infection. Citing exhaustion and discouragement with this latest setback as well as her poor prognosis, Mrs. Smith arranged for a guardian for her daughter and then refused any further antibiotic therapy. Shortly thereafter she developed a systemic infection from this same resistant bacteria and within weeks she died without ever having the chance to see her daughter one last time.

> CRITICAL THINKING SKILL

Introduction

Know the proper technique for culturing a wound to get accurate results.

Possible Scenario

You are assisting another nurse in changing a dressing. You note that she has the equipment present to collect a wound specimen for a sensitivity analysis. The nurse removes the dressing and starts to cleanse the wound according to the physician's orders for this client. Part of the cleansing routine is to irrigate the wound with an antibiotic solution. After she has finished cleaning the wound, just prior to placing a clean dry dressing over the wound, the nurse uses the culture swab sticks to obtain a specimen to send to the lab.

Possible Outcome

- The specimen returns no growth despite clinical observations that would indicate an infection.

- The specimen returns with growth of one type of bacteria. Even after being treated for that type of bacteria, the wound continues to appear infected.
- The specimen returns with bacterial growth that is resistant to the antibiotic solution used to irrigate the wound.

Prevention

All of the preceding outcomes could be hazardous to the client's recovery. By irrigating the wound with an antibiotic solution prior to obtaining the culture specimen, the nurse has potentially altered the lab results. She has potentially destroyed many of the bacteria that are causing the infection; therefore, the culture will not accurately represent the flora of the wound. The culture should be taken prior to placing anything in the wound that would alter the flora. Any antibiotics used in the wound or that the client is receiving systemically should be noted on the lab slip.

▼ VARIATIONS



Geriatric Variations:

- Explain the procedure step-by-step to clients who cannot hear or see well so they know what you are doing.
- Enlist help if needed to hold an older or debilitated client in position so you can obtain a proper culture.

continues

▼ VARIATIONS *continued*



Pediatric Variations:

- Explain to the child in age-appropriate terms what the culture procedure is for.
- Allow older children to assist in positioning and watch the procedure if they wish.
- Answer questions and reassure the child that the procedure will not hurt any more than the normal dressing change.



Home Care Variations:

- When conducting a home care visit, make sure you know where to send the culture after you have collected it. Will it be picked up by the lab? Will you or a caregiver be responsible for delivery to a location? Will the lab be open, or do you need to make special arrangements?
- Make sure you bring the correct equipment to the visit. A cotton-tip applicator and a sandwich bag will not provide the appropriate sterile culture receptacle.
- Make sure that the culture can be sent without excessive delay.



Long-Term Care Variations:

- If the long-term facility does not stock the necessary equipment, make sure you know where to obtain the culture tubes and where to deliver the specimen before you approach the
- A culture order must be written by the attending physician or qualified practitioner of the facility.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The swab is contaminated either before or after obtaining the specimen.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the swab touches only sterile items and the area to be cultured. Touching anything else will cause the test to be invalid and require a fresh specimen to be obtained. This increases cost to the client and wastes nursing time.

> NURSING TIPS

- Don't irrigate the wound with anything except sterile saline or sterile water prior to obtaining the specimen.
- Be aware of what you are doing while holding the culture swab. Touching the swab to anything but the area to be cultured and sterile surfaces contaminates the swab and invalidates the test.
- In anaerobic cultures be sure the specimen is immersed in the medium at the bottom of the tube.

SKILL 9-12

Maintaining a Closed Wound Drainage System

Sharon Aronovitch, RN, PhD, CETN

KEY TERMS

Draining wound
Enterocutaneous
fistula

Fistula
High output fistula
Low output fistula



> OVERVIEW OF THE SKILL

Closed wound drainage systems are used whenever the drainage from a wound is greater than 100 cc in 24 hours. Closed wound drainage systems create a vacuum environment providing suction to remove the drainage from the wound environment. Small amounts of drainage are often contained using a Jackson-Pratt system (see Skill 9-13). Larger amounts of drainage are contained by using a HemoVac system (see Figure 9-12-2) or a catheter connected directly to wall suction.



Figure 9-12-2 Wound drainage reservoir

> ASSESSMENT

1. Identify the type and amount of drainage coming from the wound. This will allow the nurse to determine which type of system (i.e., ostomy appliance vs. a suction system) is required.
2. Inspect the condition of the skin surrounding the wound. Alterations in skin integrity will prohibit a closed drainage system from adhering to the skin.
3. Measure the dimensions of the wound or determine the type of drainage system previously used prior to obtaining a closed drainage system from central supply. This will alleviate the problem of obtaining the wrong equipment.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.6.2.1.2.1 Skin Integrity Impairment
- 1.1.2.2 Nutrition Alteration: Less than Body Requirements
- 1.4.1.2.2.1 Fluid Volume Deficit
- 1.2.1.1 Risk for Infection
- 3.1.2 Social Isolation

> PLANNING

Expected Outcomes:

1. The skin around the wound will be protected from wound drainage.
2. Wound drainage will be contained in the drainage system.
3. Odor from the wound will be controlled.
4. The wound drainage system will not decrease the client's comfort.
5. Wound drainage will be accurately measured and documented.
6. The wound drainage system will not decrease the client's mobility.
7. The wound drainage system will cost less than frequent dressing changes.

Equipment Needed (see Figures 9-12-3 and 9-12-4):

- Gauze pads, 4 × 4
- Normal saline
- Gloves
- HemoVac drain or red rubber catheter (avoid use of a latex drain if client has a known or suspected history of latex allergy/sensitivity)
- Suction equipment



Figure 9-12-3 Gauze, gloves, catheter, measuring guide, pencil, scissors, and cleaning solution

- Protective eyewear
- Transparent film or Steri-drape (obtained from OR)
- Scissors
- Pen or pencil
- Measuring guide



Estimated time to complete the skill:
15–30 minutes

> CLIENT EDUCATION NEEDED:

1. Teach the client how to disconnect from the suction apparatus to ambulate.
2. Instruct the client to inform the nurse whenever there appears to be drainage from the closed wound drainage system. This is an indication that the system needs to be removed and reapplied.
3. Provide the client with a list of equipment and product numbers and a list of retailers where supplies can be purchased.
4. Educate the client regarding reasons and situations when she should call the physician or qualified practitioner, and/or wound care nurse expert. If necessary, provide the client with a written list.



Figure 9-12-4 Jackson-Pratt and HemoVac drainage systems

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Assess client's level of comfort and/or pain prior to beginning procedure.
2. Medicate client for pain, if needed.
3. Wash hands.

RATIONALE

1. Performing a dressing change may increase client's current pain level.
2. Promotes client comfort.
3. Reduces the transmission of microorganisms.

4. Assemble equipment.
5. Open sterile packages of gauze, suction catheter, and transparent film or Steri-drape.
6. Apply clean gloves and remove old dressing, placing it in an appropriate receptacle.
7. Change to a new pair of clean or sterile gloves (see Figure 9-12-5). The choice of gloves is determined by institutional policy.



Figure 9-12-5 Open a new package of sterile gloves and apply them.

8. Moisten several packages of gauze with normal saline (see Figure 9-12-6).
9. Cleanse wound bed with moistened (NS) gauze pads (see Figure 9-12-7).



Figure 9-12-7 Clean the wound bed with moistened gauze.

10. Lay drain/catheter over the fistula site in wound bed.
11. Open moistened gauze pads and lay them in the wound bed over the drain.
12. Cover the entire wound with the transparent film, Steri-drape, or other occlusive dressing (see Figure 9-12-8).

4. Ensures that all equipment is ready to use.
5. Ensures that all equipment is ready to use.
6. Clean technique is appropriate for removing old dressings.
7. Practices aseptic technique.



Figure 9-12-6 Moisten gauze with normal saline.

8. Preparing work materials will decrease exposure time of wound to the environment.
9. Removes wound debris, which could impede wound healing.



Figure 9-12-8 Cover the wound with an occlusive dressing to seal the wound environment.

10. Provides for adequate removal of fistula drainage.
11. Maintains moist wound healing.
12. Provides a sealed wound environment.

13. Attach drain/catheter to intermittent low wall suction.
14. Empty and record drainage from suction apparatus at least every 8 hours (see Figure 9-12-9).

Figure 9-12-9 Empty the collection container and record the amount of drainage.

13. Provides suction removal of fistula drainage from wound environment.
14. Maintains accurate intake and output.



15. Change dressing system as needed depending on intactness of seal.

15. Maintains an adequate seal for suctioning of wound drainage.

> EVALUATION

- The dressing is adhering to the site well, and has a good vacuum seal.
- Drainage is contained within the system. There is no leakage to the surrounding skin, and minimal odor from the wound.
- The pouch is emptied of wound drainage at least every 2 hours, if not attached to a bedside drainage bag. The amount of drainage must be measured and documented.
- The client remains comfortable and mobile with the closed drainage system in place.

> DOCUMENTATION

Nurses' Notes

- Document assessment of periwound skin.
- Record wound dimensions (length, width, depth).
- Note color and amount of drainage.
- Document periwound skin care if alteration in skin integrity was noted.
- Describe type of closed wound system applied.



▼ REAL WORLD ANECDOTES

A client developed a fistula at the site of a previous drain following exploratory surgery for intestinal obstruction, which resulted in an ileostomy. The client had a history of bladder cancer with a continent urinary diversion. As the fistula output increased, the ileostomy output decreased. Skin irritation was prevented by immediately applying a drainable ostomy appliance when drainage began to occur from the drain stab wound. As the drainage from this enteric fistula increased beyond 100 cc in 24 hours, the pouching system was changed to a urinary appliance attached to a bedside drainage bag.

> CRITICAL THINKING SKILL

Introduction

The client is experiencing a postoperative complication secondary to an enterocutaneous fistula.

Possible Scenario

A 65-year-old female with a history of abdominal pain following lysis of adhesions and removal of a benign ovarian mass develops drainage from the midline inci-

sion. Within 7 days post-op, the midline incision dehisces and large amounts of dark green drainage appear on the incisional dressing.

Dressing changes are initially done using gauze and changed every 30–90 minutes. The client's periwound skin is beginning to become excoriated.

Possible Outcome

The wound was not healing well. The nature and amount of wound drainage from the surgical wound should have alerted the nurse to the immediate need for further assessment. This client was at risk for wound infection, further dehiscence, or evisceration of the wound, and further skin breakdown around the wound.

Prevention

The nurse consults with the wound care nurse expert for assistance in managing this complex wound. The nurse expert proceeds to apply a closed wound drainage system utilizing suction after completing a thorough assessment of the client's wound environment.

The nurse should immediately notify the physician of the change in the client's status. The second nursing action is to apply a closed wound drainage system to quantify the amount of drainage. This action will allow for continued monitoring of the client's fluid status.

▼ VARIATIONS



Geriatric Variations:

- *If elderly clients are confused, they may pull at dressings or tubes. Watch for signs that this is occurring.*
- *Increased monitoring of the client, and changes in the dressing may be indicated.*
- *The elderly may have thinner, more delicate skin, which may be more prone to breakdown and more sensitive to tapes and adhesives.*



Pediatric Variations:

- *Have a parent in the room to support and distract the child while drainage system care is being performed.*



Home Care Variations:

- *When discharging a client with a newly healed fistula or wound, teach the client how to continue to care for the wound at home, if additional care is needed.*
- *Teach the client the signs and symptoms of infection.*
- *Teach the client how to tell what is normal redness and tenderness and what needs further evaluation.*



Long-Term Care Variations:

- *Some wounds are very slow to heal. Be especially watchful for signs of infection if the wound remains open for many weeks.*
- *Consider the long-term effects of constant dressings on the surrounding skin.*
- *Consider the long-term effects of restrictions in position or prolonged immobility that may develop as the wound fails to heal normally.*
- *Watch for signs of further skin breakdown due to immobility.*
- *A client with a slow-healing wound may feel an increased sense of helplessness and depression.*
- *A dressing change order will need to be written by the attending physician or qualified practitioner of the facility.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The closed wound drainage system is too small for the wound's dimensions.

Ask Yourself:

How do I prevent this error?

Prevention:

Measure the dimensions of the wound prior to the application of the drainage system. If this error occurs, remove the leaking appliance and remeasure the wound dimensions before reapplying the closed wound drainage system.

> NURSING TIPS

- Recognize that all draining wounds are not the same. Each wound must be treated individually, which requires that the nurse assess the dimensions, type and amount of drainage, and the periwound skin's condition.
- Client teaching is easily incorporated into the care of the draining wound by encouraging the client to be your assistant during the application process.
- Use of a closed drainage system on a draining wound will increase the client's comfort level and thereby the client's participation in self-care activities.
- Costs to the client and the health care institution are reduced when draining wounds are maintained in a closed wound system. The cost reduction is realized in a decreased use of sterile dressings, linen changes, pain medication used by the client, and nursing time.

SKILL 9-13

Care of the Jackson-Pratt (JP) Drain Site and Emptying the Drain Bulb

Gayle Crawford, RN, BSN

KEY TERMS

Axillary
Compression
Drainage
Drainage bulb

Dressing
Exit site
Purulent



> OVERVIEW OF THE SKILL

Jackson-Pratt (JP) or similar drains are placed surgically to allow for draining of body fluids postoperatively. The drain ends in a bulb that compresses to allow

for creation of gentle suction, thereby enhancing the flow of the fluid from the operative site. The drains may be in place for 24 hours to several weeks.

> ASSESSMENT

1. Assess the client's understanding about the drain care procedure. It is important to take into consideration the client's ability to understand verbal and written instructions and the client's cultural and social background.
2. Assess the external appearance of the dressed drain exit site, drain, and bulb. Assessment of the external appearance of the dressing is important for determining dressing supply needs and for noting effectiveness of the closed drainage system.
3. Assess the drain exit site once the dressing is removed. Assessment should include noting any signs of infection, excessive drainage from around the drain, normal position of the drain, or sutures that are loose or not intact.
4. Assess the client/family response to the drain care procedure. Assessment of the client's response is necessary for determining client/family readiness for involvement with the drain care procedure.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1 Impaired Tissue Integrity
- 1.6.2.1.2.1 Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. The JP drain exit site will be inspected.
2. The JP drain site will be cleansed and redressed.
3. The external JP system will be inspected for proper functioning.
4. The JP drainage bulb will be emptied.
5. The client/family will verbalize and/or demonstrate understanding about the drain care procedure.
6. The drain site will remain free of infection.
7. The client will not experience excess discomfort due to drain site inspection or care.

Equipment Needed (see Figure 9-13-2):

- Clean exam gloves
- Container for collecting and measuring the drain output
- Iodine swabs
- Approved cleaning solution
- Normal saline
- Sterile 4 × 4 gauze pads or split drain dressings
- Sterile cotton-tip applicators
- Tape



Estimated time to complete the skill:

15 minutes

> CLIENT EDUCATION NEEDED:

1. Make sure the client is comfortable prior to teaching.
2. If family members are to be involved, plan to teach when they are present if possible.
3. Encourage hand washing before and after dressing change and bulb emptying.

4. Clients need to have a written set of instructions to take home with them.
5. Make sure the client has supplies to get started doing the dressing change at home and is knowledgeable about how and where to obtain additional supplies.
6. Make sure the client knows who to contact for the postoperative visit, signs of infection, a dislodged drain, or a malfunctioning system.
7. Have the client record all drainage output and bring totals to the postoperative visit to the physician or qualified practitioner.



Figure 9-13-2 Wound drainage reservoir and Jackson-Pratt drainage system

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Review order of physician or qualified practitioner, agency/institutional policy and procedure, or standing order for drain care.
2. Gather supplies.
3. Provide privacy; draw curtains; close door.
4. Explain procedure to client/family.
5. Wash hands, and set up supplies.
6. Apply clean exam gloves.

1. The basic technique is described here. Check for an agency/institutional policy or the physician's or qualified practitioner's specific orders.
2. Ensures that all supplies are ready and prevents interruption during the procedure.
3. Maintains client comfort and privacy while body is exposed during procedure.
4. Provides information about the procedure, allows for feedback, helps alleviate client anxiety, and promotes cooperation.
5. Reduces the transmission of microorganisms and promotes organization.
6. Provides infection control and protection from body fluids.

7. Unpin drain tube from gown or clothing. Remove old dressing and dispose in appropriate waste location.
 8. Assess site.
 9.
 - Cleanse around drain with approved cleaning solution using sterile cotton-tip applicator, using gentle rolling motion of the applicator around the wound edge.
 - Cleanse away from the drain exit site. Do not roll one applicator more than halfway around the exit site. Use as many applicators as needed to clean the site. Dry with dry applicators.
 10. Avoid contamination of the swabs and solutions. Do not dip the swabs into the solution container. Pour a small amount of the solution into a cup. Do not redip a used swab in the solution.
 11.
 - Make sure the client is not allergic to iodine.
 - Cleanse around drain with an iodine swab and let it dry. (This will depend on institutional policy.)
 12. If necessary, apply new, clean exam gloves.
 13. Apply a single folded 4×4 under drain and another folded 4×4 on top and tape in place.
 14. Secure drain tube to dressing. To do this, tape a loop of the drain on the dressing. Then secure to gown/clothing by creating a tape tab on the drain and pinning to gown/clothing.
 15. Assess the bulb for contents and compression.
7. Unpin to allow for ease of removal of the old dressing. Dressings soiled with body fluids are considered contaminated and subject to bio-hazard disposal in the correct manner per institution protocol.
 8. Checks for signs of infection; ascertains that the sutures that secure tube to skin are intact; checks the placement of the drain and that tubing is not kinked.
 9.
 - If there are crusts, this is an effective removal technique. This step may be omitted if crusts are not present.
 - Reduces the transmission of microorganisms.
 10. Reduces the transmission of microorganisms.
 11.
 - Prevents client injury.
 - Decreases skin microbes that could migrate retrograde along drain into wound. Iodine ointment may also be applied around the drain following Action 8.
 12. Iodine ointment or solution might be on gloves and can lead to sticky gloves. Clean gloves are needed for this procedure as site is swabbed with applicators and only margins of 4×4 pads are touched with gloves when applied.
 13. Collects potential drainage and protects site.
 14. Minimizes the potential for dislodging the drain.
 15. The bulb should be emptied when it is one-half to two-thirds full. The bulb needs to be

16. To empty the bulb, wash hands, set up supplies, and apply gloves, if the bulb was not emptied in conjunction with the dressing change.
17. Apply the iodine swab to the spout of the drainage collection bulb. Allow a 2 minute contact. Alternately, wipe the spout with alcohol, depending on institutional policy.
18. Remove the cap to the spout, being careful not to touch the tip of the spout cap or the spout to anything (see Figure 9-13-3).



Figure 9-13-3 Remove the cap to the collection bulb spout.

19. Pour the drainage collected in the drain bulb into the measuring container. Use a small calibrated cup, such as a urine specimen cup (see Figure 9-13-4).
20. Once emptied, while the cap is still off and the system is open, squeeze the bulb and while compressed reapply the cap to the spout (see Figure 9-13-5).

Figure 9-13-5 Squeeze the bulb and reapply the cap to the spout while the bulb is compressed.

compressed to maintain suction in the closed system. The fluid in the JP drain system is red immediately post-op up to about 24 hours, then changes to light red 1–3 days post-op, then changes to straw colored.

16. Reduces the transmission of microorganisms and promotes organization.
17. Decreases the microbes on the spout, thereby minimizing introduction into the closed system.
18. See Rationale 17.



Figure 9-13-4 Pour the drainage into a measuring container.

19. Measures the drainage for intake and output.
20. Functioning of the system is dependent upon a compressed bulb. If the bulb is compressed with the cap in place, the drainage contents in the tubing will be forced retrograde into the wound and could potentially introduce microbes into the wound. Also, the bulb will not maintain its compression if squeezed when closed.



- | | |
|--|--|
| <p>21. Wipe an iodine swab around the spout. Alternatively, wipe the spout with alcohol, depending on institutional policy.</p> <p>22. Record the drainage on the Intake and Output sheet and dispose of the drainage.</p> <p>23. Remove and properly dispose of gloves and wash hands.</p> | <p>21. Maintains a line of antimicrobial defense at a portal of entrance to the system.</p> <p>22. When the drainage is less than 30 cc, the drain is generally removed.</p> <p>23. Promotes clean technique, and reduces the transmission of microorganisms.</p> |
|--|--|

> EVALUATION

- The JP drain site was cleansed and properly redressed.
- The drain exit site was free of crusts and signs of infection.
- The sutures securing the drain in place were intact.
- The closed drainage system terminating in the bulb collection device was intact and functioning properly.
- The JP drain and/or bulb was properly secured to the client's gown or clothing.
- The amount and character of the drainage in the bulb was measured and documented.
- The frequency of the dressing change or bulb emptying procedure was assessed and adjusted if necessary.
- If applicable, the client/family was given instructions on the site care and emptying of the bulb as described above.
- The client remained comfortable during the procedure.

> DOCUMENTATION

Nurses' Notes

- Date and time the exit site dressing change and emptying of the bulb occurred
- Appearance of the exit site
- Amount and character of the drainage
- Client/family education that took place, their level of understanding, and nursing observations of the return demonstration of the exit site care and emptying of the bulb
- Any contacts with the physician or qualified practitioner and the reason for the contact



▼ REAL WORLD ANECDOTES

Mrs. Johnson is a 63-year-old woman who had a left axillary node dissection and lumpectomy of her left breast the previous day. While reaching for the phone, her JP drain becomes caught on the bed rail. She experiences a sharp pain in her left axillary region and puts on her call light. The nurse caring for Mrs. Johnson finds her holding her right hand over her left axillary area. She says, "I think something is wrong here; I felt a sharp pain as I reached for the phone." The nurse looks at the drain exit site to find that the sutures have torn from the skin and the JP drain tubing appears to have advanced about 2 cm. The system remains intact with a compressed bulb. There is a small amount of blood oozing from where the sutures were torn loose. The drain was temporarily secured with Steri-strips, a new dressing was applied, and Mrs. Johnson was reassured that the system was intact. Pain medication was offered and the doctor was notified of the incident.

> CRITICAL THINKING SKILL

Introduction

Caring for the heart and mind as well as the body is a critical nursing challenge.

Possible Scenario

While working as a student nurse on a medical-surgical floor, you are assigned to care for a 30-year-old woman who has just had a right mastectomy for breast cancer.

She needs to learn about her JP drainage system. You approach her to teach her the technical care of the JP drain and she bursts into tears. Feeling uncomfortable and not sure what to say, you excuse yourself and promise to return later.

Possible Outcome

The client's emotional needs are neglected. She remains upset and does not want to even speak about, or look at, her JP drainage system.

Prevention

It is usual for breast surgery clients to have JP drains in place postoperatively up to 1 week. It is not uncommon for women to have an emotional episode related to the loss of a breast while they are in the hospital. The nurse has the responsibility to recognize the loss and offer the client the chance to verbalize her feelings and concerns about the loss and changes in body image. Once the client has had a chance to verbalize her feelings, the nurse can begin to review the care of the JP drainage system with the client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly people have thin skin, which can be sensitive to tape and solutions.*
- *Special attention should be given to the surrounding skin when removing the dressing around the exit site. If the skin appears to be sensitive to the iodine, this should be reported to the physician or qualified practitioner and this step eliminated.*
- *Elderly clients often live alone and may need home health care to assist with the care of the JP drainage system.*



Pediatric Variations:

- *Remind all children not to touch the exit site or play with the bulb.*
- *Make sure the tubing is secure and the small child cannot pull or dislodge the drain.*
- *Older children can be taught to care for the JP drainage system.*
- *Elbow restraints may be necessary for younger children to prevent them from pulling on the drain site.*



Home Care Variations:

- *Where and how to obtain additional supplies should be reviewed with the client/family.*
- *Review proper disposal of contaminated dressings.*



Long-Term Care Variations:

- *Special supplies may need to be ordered.*
- *A dressing change order may need to be written by the attending physician or qualified practitioner at the facility.*
- *A review of the above procedure may need to be presented to the staff caring for the client because they may not know how to care for a JP drainage system.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While you are removing the client's gown, she feels a tug at her skin and you realize you did not unpin the tubing from the gown.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Remember to unpin the tube. Assess the client carefully before attempting any procedure that might dislodge tubes or drains.

Possible Error:

You complete your care and place a clean gown on the client, but you forget to pin the drainage tube to the gown.

Ask Yourself:

How do I prevent this error?

Prevention:

Remember to pin the tube. If the client were to ambulate with the drainage bulb filled with fluid, the drain would become dislodged. Assess all tubes and drains on a regular basis to make sure they are properly secured.

Possible Error:

You forget to compress the bulb after emptying.

Ask Yourself:

How do I prevent this error?

Prevention:

Review the basics of the JP tube, including the need to compress the bulb for a suction source. Ask for assistance if necessary.

> NURSING TIPS

- Assess the room for supplies before gathering additional supplies.
- Make sure to record all drainage because drain removal is based upon declining amount of drainage.
- Iodine can build up on the spout of the bulb. This may need to periodically be removed with an alcohol pad and lightly reapplied.
- If the client is going home with a drain in place, encourage the client to wear older blouses or shirts because of the iodine and potential soiling from the drainage.
- If the bulb does not retain its compression, there is most likely an air leak in the system or the bulb may need to be replaced.
- Empty the bulb any time it is half full because the suction created is better with an empty bulb. This may be every 2–3 hours postoperatively if there is lots of drainage.

SKILL 9-14

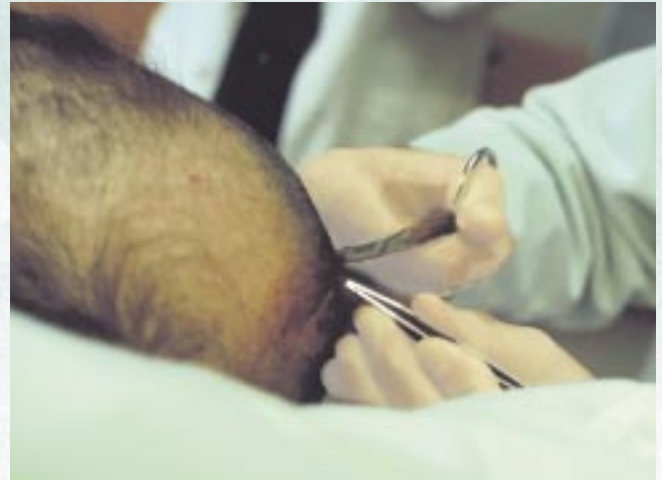
Removing Skin Sutures and Staples

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Dehiscence
Incisions
Staple removal
Staples

Stitches
Suture removal
Sutures



> OVERVIEW OF THE SKILL

Sutures and staples are a surgical means of closing a wound by sewing, wiring, or stapling the edges of the wound together. Most wounds are sutured in layers to maintain alignment of the tissues and reduce scarring. Sutures are generally removed 7–10 days after surgery, depending on where the wound is located and how well it is healing. Suture removal requires a physician's or nurse practitioner's orders. Timing is important because sutures left in too long can increase the risk of infection and irritation from a foreign substance.

Sutures placed deep within the tissue layers are made of absorbable materials. Surface sutures are made of wire, nylon, or cotton. Continuous sutures are made with one thread, tied at the beginning and end of the suture line. Interrupted sutures are tied individually. Staples are used for large incision areas where the risk of dehiscence is greater, such as in sternotomies, in clients with increased adipose tissue, abdominal areas, and wounds that fail to heal or adhere.

> ASSESSMENT

1. Assess the wound to determine whether the edges are approximate and healing. In deep wounds, palpate around the suture site for edema or any evidence of failure of tissue to adhere below the skin's surface.
2. Assess for any signs of infection, such as increased warmth, redness, exudate or drainage, and pain.
3. Assess for any conditions that impede the healing process, such as age, immunosuppression, diabetes, obesity, smoking, radiation, poor cellular nutrition, infection, and deep wounds.

> DIAGNOSIS

- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.2.1.1 Risk for Infection
- 9.1.1 Pain, related to suture removal
- 6.1.1.1 Impaired Physical Mobility, related to fear of dehiscence

> PLANNING

Expected Outcomes:

1. The wound is healing, with the edges of the wound well-approximated.

2. There is no redness or signs of infection.
3. There is an absence of pain.

Equipment Needed (see Figure 9-14-2):

- Suture removal kit or sterile forceps with sterile suture removal scissors
- Gauze size as appropriate for wound area to be covered
- Biohazard bag or appropriate waterproof disposable bag
- Sterile saline, prepackaged antiseptic swabs, or gauze for cleaning if appropriate
- Examination gloves
- Sterile gloves if dressings are to be applied
- Adhesive strips or butterfly adhesive tape as needed
- Sterile gauze to wipe stitches or sutures from forceps and scissors



Estimated time to complete the skill:
Varies with type of wound, location, and need for cleaning and dressing—anywhere from 10–20 minutes

> CLIENT EDUCATION NEEDED:

1. Client should be taught to check for signs of infection, such as redness, pain, and increased warmth.

2. Assess body temperature daily at home for appropriate period of time depending on wound.
3. If deep wound with internal sutures, observe for swelling or increased pain over the incision area.
4. If staples have been used, instruct the client to protect the area with a pillow when coughing.
5. If sutures or staples were used in abdominal wounds, instruct the client to avoid any lifting for up to 6 weeks.
6. If the client is sent home with sutures, teach how to assess for infection and set up appointment for suture removal. Let the client know that timing is important.



Figure 9-14-2 Suture removal supplies, including sterile saline, gloves, tweezers, scissors, gauze, and swabs

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Assess the wound to determine whether the edges of the wound are well-approximated and healing has occurred (see Figure 9-14-3).
3. Ascertain whether the client has had sutures removed before. If not, explain the procedure.
4. Close the door and curtains around the client's bed.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Physicians and qualified practitioners often have standing orders for sutures to be removed at a specified date. If the wound is not well-healed, sutures should be left in place longer and the physician or qualified practitioner notified.
3. Explanation can help reduce anxiety.
4. Provides for privacy.

continues



Figure 9-14-3 Inspect the wound to determine if the edges are well-approximated and healing.

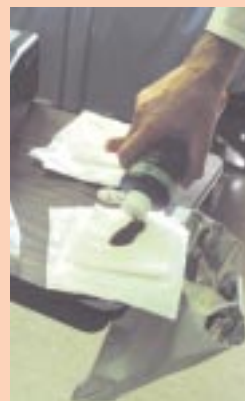


Figure 9-14-4 Apply a cleaning solution to a sterile gauze pad.

5. Raise the bed to a comfortable level.
 6. Position the client for comfort with easy access and visibility of the suture line.
 7. Drape the client so that only the suture area is exposed.
 8. Open the suture removal kit, and assemble any supplies needed within easy access on a clean surface.
 9. Apply clean gloves to remove the old dressing and place it in a disposable bag.
 10. Remove gloves and rewash hands.
 11. If dressings are to be used, assemble equipment and supplies on sterile field.
 12.
 - Apply sterile gloves according to institutional policy.
 - Clean the incision with saline-soaked gauze pads, antiseptic swabs, or as per institutional policy (see Figures 9-14-4 and 9-14-5).
 13. When removing an interrupted suture, hold forceps in your nondominant hand and grasp the suture near the knot (see Figure 9-14-6).
5. Facilitates the procedure and provides for proper body mechanics for the nurse.
 6. Facilitates removal of the sutures and allows for careful observation of suture line.
 7. Provides for privacy.
 8. Facilitates removal of sutures.
 9. Protects the client from transmission of microorganisms and protects the staff. Universal precautions protocol.
 10. Reduces the transmission of microorganisms.
 11. Protects patient from microorganisms.
 12.
 - Protects the incision from microorganisms on the nurse's hands. Protects the nurse from possible contact with bodily fluids. Glove application policies vary for specific procedures. Nurses need to keep up to date with wound research and follow the guidelines of the institution where they practice.
 - Various opinions exist regarding use of cleansing solutions for wound care.
 13. Pulls the suture up and away from the client's skin.



Figure 9-14-5 Clean the incision.



Figure 9-14-6 Hold forceps in your nondominant hand and grasp the suture near the knot.

- 14.** Place the curved edge of the scissors under the suture or near the knot (see Figure 9-14-7).



Figure 9-14-7 Hold the scissors in your dominant hand. Place the curved edge of the scissors under the suture.



Figure 9-14-8 Reassess the suture line. Make sure the skin is still approximated and all sutures have been removed.

- 15.** Cut the suture close to the skin where the suture emerges from the skin (not in the middle). Pull the long end and remove it in one piece.
- 16.** If the client has a continuous suture, cut both the first and second suture before removing them.
- 17.** Some policies require the removal of every other suture, with the remaining sutures removed at a later time. Assess the suture line to ensure that the edges remain approximated.
- 18.** Discard the sutures onto the gauze squares as they are removed and then place the gauze squares in the disposable bag when all of the sutures have been removed.
- 19.** Assess the suture line to ensure that the edges remain approximated and that all sutures have been removed (see Figure 9-14-8).
- 14.** Facilitates clipping of the suture.
- 15.** Facilitates suture removal. Cutting close to the skin avoids pulling large amounts of contaminated suture through tissue.
- 16.** Facilitates suture removal without traumatizing the incision line.
- 17.** Any dehiscence should be detected early, and every other suture can be left in place.
- 18.** Decreases the transmission of microorganisms and follows universal precaution protocol.
- 19.** Detects early signs of dehiscence. Ensures that sutures do not remain in the skin when they are no longer needed.

- 20.** Apply adhesive strips or butterfly tape adhesive strips across the suture line to secure the edges. The amount of reinforcement varies depending on the adherence of the suture line and the length of the suture line. Adhesive skin closures may be placed 1 inch apart or closer together.
- 21.** Dispose of the soiled equipment.
- 22.** Remove gloves and wash hands.
- 23.** If removing staples:
- Repeat Actions 2–12.
 - Use a staple extractor to remove every other staple. Place the lower tip of staple remover under the staple and squeeze the handles together. The ends of the staple will extract from the skin. Move the staple away from the skin surface and release the staple into a disposal container. Assess the wound for adherence. Move on to the next staple if the skin is adhered well.
 - Repeat Actions 20–22.
- 20.** If the suture line pulls apart a little after the sutures are removed, adhesive skin closures can be used to reinforce the suture line.
- 21.** Reduces odors in the client's room and reduces the transmission of microorganisms.
- 22.** Reduces the transmission of microorganisms.
- 23.**
- Prepares for staple removal.
 - When removing staples, it is best to remove every other staple and assess wound adherence before removing all staples. A staple extractor is designed to remove the staple with a minimum of discomfort and trauma to the surrounding skin and tissue.
 - See Rationales 20–22.

> EVALUATION

- The procedure was performed with a minimum of pain and trauma to the client.
- The wound is intact, edges are adhered, and there are no signs of infection or drainage.

> DOCUMENTATION

Nurses' Notes

- Document procedure and findings at wound site, such as redness, pain, or drainage.
- Document the time sutures were removed.
- Document follow-up instructions and client teaching provided.



▼ REAL WORLD ANECDOTES

A client came back to the nurse after having his stitches removed because the suture line was red-dened. The nurse explained that he might have slight redness around sutures due to irritation and not infection. He noted that the suture line was in an area where the client's waistband was irritating the skin.

> CRITICAL THINKING SKILL

Introduction

Follow a procedure only when it is safe and correct to do so.

Possible Scenario

An obese client had an abdominal surgery 7 days ago. Her suture line looks clean; however, she is complaining of abdominal pain around the incision site.

Possible Outcome

Rather than remove any stitches, the nurse palpates the wound site for edema and possible poor internal healing. She reports her findings. The client is diagnosed with both dehiscence and peritonitis related to surgery.

Prevention

Assess clients carefully who may be at risk for failure to heal. Carefully inspect the site for healing before removing sutures or staples. Internal wound healing may not have occurred.

▼ VARIATIONS**Geriatric Variations:**

- *Elderly clients heal more slowly and sutures may need to remain in place for a longer period of time.*
- *Elderly clients may have increased risk of failure to heal or infection due to other medical diagnoses, such as diabetes or cancer.*
- *Poor nutrition in an elderly client may slow wound healing.*

**Pediatric Variations:**

- *Children may need a covering over stitches so they do not pick at sutures.*

**Home Care Variations:**

- *Teach the client to assess the wound site, and set up an appointment for suture removal.*
- *Teach the client how to assess the site after suture removal.*
- *Remind the client and home caregiver not to remove the stitches early or at home, even if the wound appears healed. Plan and facilitate their return to the appropriate care provider as needed.*

**Long-Term Care Variations:**

- *Staff in long-term care facilities may not encounter many opportunities for suture removal, and may need to review the procedure. Make sure the proper equipment is available, and the person who will receive the order to remove the sutures is comfortable with the procedure.*
- *Identify an alternate provider for suture removal if necessary.*
- *Review the procedure with the appropriate staff if necessary.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

Sutures are removed too early.

Ask Yourself:

How do I prevent this error?

Prevention:

To avoid early removal, review when the sutures were placed. Consider factors that may slow healing. Examine the wound to determine whether healing has occurred. Instruct the client not to remove sutures independently. If the wound edges gape or separate when a suture is removed, do not continue. Place a Steri-strip over the suture site holding the wound edges together, document your findings, and notify the appropriate physician, physician's assistant, or nurse practitioner.

To avoid late removal, actively follow up with clients who do not return for appointments. Stress the need to return for suture removal, and identify with the client where to go (i.e., E.R. clinic, nurse practitioner, health center) to get sutures removed.

> NURSING TIPS

- Avoid pulling sutures back through the skin. Sutures beneath the skin surface are sterile, while those that are visible are contaminated. Pulling sutures through tissue introduces a risk of infection. Cut the suture as close to the skin as possible on one side and pull it through the skin from the other side
- Obese clients may not heal as well because adipose tissue has decreased circulation.
- Clients with compromised circulation will not heal as well and may require butterfly strips after sutures are removed. Check carefully that adherence has occurred before removing sutures. If staples are used, the physician or qualified practitioner may request that every other staple be left in place until adherence is present.
- Many clean surgical sites may not require cleaning with antiseptic solutions or dressings.
- Know policies of facilities and practitioner preference. Keep up to date with current research regarding wound care.
- Dressing, fabric, or bedsheets over the incision area may cause irritation.

SKILL 9-15

Preventing and Managing the Pressure Ulcer

Kimberly Hudson, RN, BSN

KEY TERMS

Bedsore	Decubitus ulcers
Bony prominences	Pressure sores
Decubiti	Pressure ulcers



> OVERVIEW OF THE SKILL

Pressure ulcers are “localized areas of tissue necrosis that develop when soft tissue is compressed between a bony prominence and an external surface for a prolonged period of time” (National Pressure Ulcer Advisory Panel, 1992). Pressure ulcers have also been called bedsore, pressure sores, decubitus ulcers, and dermal ulcers. Certain clients have a greater risk of developing pressure ulcers. The best intervention for pressure ulcers is prevention. However, once developed, the nurse needs to treat the underlying cause by providing quality nursing care and following the physician’s or qualified practitioner’s orders for the individually prescribed treatment. Prescribed treatment will vary according to the client’s disease process and response. Agency policy would also need to be considered. (See Table 9-15-1.)

Table 9-15-1 Stages of Pressure Ulcers

STAGE 1

Nonblanchable erythema, redness that remains present over an area under pressure 30 minutes after pressure source is removed. Epidermis remains intact.

STAGE 2

Epidermis is broken, superficial lesion, no measurable depth. Partial-thickness skin loss.

STAGE 3

Full-thickness skin loss down through the dermis; may include subcutaneous tissue; may undermine adjacent skin.

STAGE 4

Full-thickness skin loss extending into supportive structures, such as muscle, tendon, and bone; may undermine and have various sinus tracts.

> ASSESSMENT

1. Assess client’s level of mobility. Clients who are paralyzed or have their mobility restricted (either physically or chemically) are not able to reposition themselves independently. Therefore, they are at risk for prolonged pressure against their bony prominences.
2. Assess client’s control over bowel and bladder. Clients who are incontinent would be at risk for experiencing a moist, bacteria-saturated environment against their skin, making them prone to skin breakdowns and infection.
3. Assess client’s sensation. Clients with peripheral neuropathy or loss of sensation are unable to feel discomfort from prolonged pressure.

4. Assess client's nutritional status by monitoring serum albumin levels and glucose levels. Clients with low serum albumin levels are experiencing malnutrition by a lack of protein. A low protein level is not conducive to wound healing. Likewise, clients with high glucose levels will experience poor wound healing.
5. Assess client's hemoglobin and hematocrit levels. Clients with low hemoglobin and hematocrit levels lack tissue oxygenation and perfusion of nutrients required for wound healing.
6. Assess client's temperature. Clients with elevated temperatures have increased metabolic needs and absorb nutrients at an increased rate.
7. Assess client's weight. Clients who lack nutrition will experience weight, muscle, and tissue loss. This loss decreases the amount of padding between skin and bone, causing an increase in pressure on the skin from the bony prominence.
8. Assess client's hydration level. Clients with dehydration have a decrease in tissue elasticity and skin turgor, causing them to be more at risk for pressure ulcers.
9. Assess client for edema. Clients with edema don't tolerate pressure and friction and are more prone to skin breakdown.
10. Assess whether the client has equipment or material that is in prolonged contact with skin. Equipment such as endotracheal tubes, nasogastric (NG) tubes, and Foley catheters that are in contact with skin can be a source of pressure. Material such as tape can also be a source of constant pressure (i.e., if tape was too tight on tip of nose for NG tube).
11. Assess client's skin for early signs of breakdown/progression of tissue healing. Clients need to have their skin monitored for prevention of and healing of pressure ulcers.

> DIAGNOSIS

- 1.1.2.2 Altered Nutrition: Less than Body Requirements
- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.1 Impaired Skin Integrity
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 5.2.1 Ineffective Management of Therapeutic Regimen (individuals)
- 6.1.1.1 Impaired Physical Mobility
- 7.1.1 Body Image Disturbance
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client will not experience a disruption of skin integrity.
2. The client will benefit from wound care and pressure reducing supportive measures to begin tissue healing.
3. The client will experience regular turning and passive range of motion (ROM).
4. The client will have an increase in nutrition to meet metabolic demands.
5. The client will not experience an increase in white blood count (WBC) or other signs or symptoms of infection.
6. The client will be pain free.
7. The client will develop positive coping mechanisms in dealing with the pressure ulcer.
8. The client will verbalize and return demonstrate the proper techniques in preventing pressure ulcers.

Equipment Needed (see Figure 9-15-2):

For Prevention of the Pressure Ulcer

- Pillows
- Rolled-up blankets or towels
- Egg-crate mattress
- Specialty beds if ordered by physician or qualified practitioner
- Heel and elbow protectors
- Lotion or powder as needed
- Soap and water

For Care of the Pressure Ulcer

- Dressings as ordered by physician or qualified practitioner



Figure 9-15-2 Padded heel protectors

- Wound care solutions as ordered by physician or qualified practitioner (Dakin's, normal saline, Betadine, half-strength hydrogen peroxide or other approved cleaning solution)



Estimated time to complete the skill:

**Prevention of the Pressure Ulcer
10 minutes**

**Care of the Pressure Ulcer
Varies with the degree of skin
involvement and specific
physician's or qualified
practitioner's orders**

> CLIENT EDUCATION NEEDED:

1. Teach clients to change position as often as they can and use supportive devices between their bones (i.e., put a pillow or towel between their knees when lying on their side). This will keep pressure off of bony prominences.
2. Teach client to increase nutrition and fluids as tolerated if not contraindicated by the client's physician or qualified practitioner. This will increase healing to the body.
3. Teach the client to follow physician's or qualified practitioner's directions for the care of the pressure ulcer if applicable. Request assistance with dressing changes if needed.
4. If client is diabetic, inform client that a greater need to provide good foot care exists.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Check the physician's or qualified practitioner's order for specific positioning of client and dressing change instructions.
2. Gather all of the equipment you will need.
3. Identify the client and explain the procedure to the client.
4. Wash hands.
5. Provide for client privacy and apply gloves.
6. Adjust the bed to your level and lower the side rail nearest you without leaving client unattended.
7. Assess client's risk for developing pressure ulcers by using the Braden Scale or similar risk chart (see Figure 9-15-3).

1. Due to the client's medical condition, the physician or qualified practitioner may want the client in a specific position and/or may have ordered dressing changes for pressure ulcer.
2. Having all of your equipment in the room will increase the consistency of client care.
3. Providing explanations to the client will employ their cooperation and provide time for client education.
4. Reduces the transmission of microorganisms.
5. Shows respect for client's privacy. Gloves protect both client and nurse from potential body fluid contact.
6. Adjusting the bed to your level will make the procedure easier on your back. Lowering the side rails will allow you closer contact with your client to provide care.
7. Informs you as to the extent of client education of risk factors and what preventive care needs to be instituted immediately.

continues

Client's name	Evaluator's name	
Sensory perception Ability to respond meaningfully to pressure-related discomfort	1. Completely limited: Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation, OR limited ability to feel pain over most of body surface.	2. Very limited: Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness, OR has a sensory impairment that limits the ability to feel pain or discomfort over 1/2 of the body.
Moisture Degree to which skin is exposed to moisture	1. Constantly moist: Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time client is moved or turned.	2. Moist: Skin is often but not always moist; linen must be changed at least once a shift.
Activity Degree of physical activity	1. Bedfast: Confined to bed.	2. Chairfast: Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.
Mobility Ability to change and control body position	1. Completely immobile: Does not make even slight changes in body or extremity position without assistance.	2. Very limited: Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.
Nutrition Usual food intake pattern	1. Very poor: Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement, OR is NPO and/or maintained on clear liquids or IV for more than 5 days.	2. Probably inadequate: Rarely eats a complete meal and generally eats only about 1/2 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement, OR receives less than optimum amount of liquid diet or tube feeding.
Friction and shear	1. Problem: Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures, or agitation leads to almost constant friction.	2. Potential problem: Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.

Figure 9-15-3 Braden Scale for predicting pressure ulcer risk (*continues*)

- | | |
|--|--|
| <p>8. Assess client's skin over all pressure points, such as sacrum (see Figure 9-15-4), ischial tuberosities, feet, heels (see Figure 9-15-5), elbows (see Figure 9-15-6), back of head.</p> <p>9. Assess other sites for potential areas of pressure points.</p> <p>10. Change client's position (refer to Skills 4-3 and 4-4).</p> | <p>8. A reddened area in light-skinned clients and a bluish or purple area in dark-skinned clients indicates that the tissue was under pressure.</p> <p>9. Other potential sites and causes of pressure include the NG tube and tape on tip of nose, IV dressing tape, a Foley catheter touching labia or taped area of skin, endotracheal tube and tape, and side rails touching skin.</p> <p>10. Refer to Skills 4-3 and 4-4.</p> |
|--|--|

		Dates of assessment
<p>3. Slightly limited: Responds to verbal commands but cannot always communicate discomfort or need to be turned, OR has some sensory impairment that limits ability to feel pain or discomfort in 1 or 2 extremities.</p> <p>3. Occasionally moist: Skin is occasionally moist, requiring an extra linen change approximately once a day.</p> <p>3. Walks occasionally: Walks occasionally during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.</p> <p>3. Slightly limited: Makes frequent though slight changes in body or extremity position independently.</p> <p>3. Adequate: Eats over 1/2 of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered, OR is on a tube feeding or TPN regimen, which probably meets most of nutritional needs.</p> <p>3. No apparent problem: Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.</p>	<p>4. No impairment: Responds to verbal commands. Has no sensory deficit that would limit ability to feel or voice pain or discomfort.</p> <p>4. Rarely moist: Skin is usually dry; linen requires changing only at routine intervals.</p> <p>4. Walks frequently: Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.</p> <p>4. No limitations: Makes major and frequent changes in position without assistance.</p> <p>4. Excellent: Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.</p>	
Total score		

Figure 9-15-3 Braden Scale for predicting pressure ulcer risk



Figure 9-15-4 Assess the sacrum.



Figure 9-15-5 Assess the feet and heels.

continues



Figure 9-15-6 Assess the elbows.



Figure 9-15-7 Special beds have air- or fluid-filled mattresses and are used to reduce the pressure on bony prominences.

11. Keep client's position at 30° or less.
12. Provide skin care if area is soiled or sweaty, but don't massage pressure points.
13. Use support devices such as special beds (see Figure 9-15-7), egg crates, pillows (see Figures 9-15-8 and 9-15-9), towels, blankets, and heel protectors (see Figure 9-15-10) to support the body.



Figure 9-15-8 Pillows are used to take the pressure off the heels and feet.



Figure 9-15-9 Pillows are used to support the hands and elbows.

11. A position of 30° or lower will limit the pressure on the sacrum.
12. Skin care keeps skin clean and dry, and new preliminary evidence documents that massaging bony prominences may actually cause deep tissue trauma.
13. Lifting the heels and elbows off of the bed will limit the pressure to these areas. Also providing support between the legs will limit the pressure.
14. Perform dressing change to a pressure ulcer as ordered or per agency policy (see Figures 9-15-11, 9-15-12, and 9-15-13), remembering aseptic or sterile technique.
15. Return side rail to the upright position and lower the bed (see Figure 9-15-13).
16. Remove gloves and wash hands.
14. Providing wound care to existing pressure ulcers will facilitate wound healing and begin to protect the client from a potential infection.
15. Provides for client safety.
16. Reduces the transmission of microorganisms.



Figure 9-15-10 These heel protectors guard the heel from pressure and friction.



Figure 9-15-11 This client's heels and feet have been protected from pressure with a special bed and pillow support. An existing pressure ulcer wound on the right foot has been cleaned and dressed.



Figure 9-15-12 Performing a dressing change on a large pressure ulcer.



Figure 9-15-13 After the client is properly positioned, remember to raise the side rails and lower the bed before leaving the bedside.

17. Document appearance of pressure points and/or ulcers, including skin care and wound care provided and position changes.

18. Create an every-2-hours turning schedule if one is not available.

17. Provides a picture of skin surface and interventions instituted to prevent pressure points and/or provide for tissue healing.

18. A turning schedule helps to promote more compliance to preventive measures to providing care.

> EVALUATION

- Evaluate the client's skin as it relates to the Braden Scale or similar scale that documents the client's specific risk factors.
- Evaluate and describe the pressure points of the client.
- Evaluate and describe other areas that may be potential pressure points of the client.
- Evaluate the client's ability to tolerate head of bed less than 30°.
- Evaluate the client's understanding of position changes.
- Evaluate the frequency of the need for hygiene care in the client.

- Evaluate the effectiveness of the pressure relief devices.
- Evaluate and describe the skin area involved and the progress of tissue healing.

> DOCUMENTATION

Nurses' Notes

- Describe in detail what the pressure area/ulcer looked like, noting its location, color, size, shape, drainage, and depth of tissue involved.
- Describe what procedure was done (wound care), what solutions or skin care were used, and how it

was done, noting either aseptic or sterile techniques as per orders.

- Describe the client's response to the procedure and how the client tolerated it.
- Document what interventions are done to decrease/limit pressure to bony prominences.
- Document client education about risk factors and prevention of pressure ulcers and client's understanding of this education.

Medication Administration Record

- Document wound care medications or solutions.
- Document whether any preprocedural pain medications were given for the client's comfort.



▼ REAL WORLD ANECDOTES

Mr. Grecco was a thin, elderly male. He lived independently in his home, shopped for himself, and worked in the garden during the day. Every evening, he sat and watched television in his favorite chair. Upon a routine clinic visit, the nurse noticed the skin on his elbows was reddened and starting to break down. Mr. Grecco's favorite chair had wooden armrests. When he sat for 4–6 hours at a time, the skin on his elbow was compressing against the armrest. The nurse realized that even a mobile, active person is susceptible to skin breakdown.

> CRITICAL THINKING SKILL

Introduction

Pressure sores can develop in unexpected places. Assess the whole client when determining pressure sore risk.

Possible Scenario

Mrs. McFaraday is an obese client in your nursing care facility. When she is awake, she is very active and agitated much of the time. This keeps her sweaty. She waves her arms around and lifts herself off of the wheelchair several times an hour. You do not consider her at risk for pressure sores.

Possible Outcome

One day the nursing assistant bathing Mrs. McFaraday reports that she had developed an open sore in the folds

between her abdomen. You realize that, although Mrs. McFaraday is active, she is always leaning forward in her chair. This is a pressure sore.

Prevention

Although pressure sores frequently develop over bony prominences, they can also develop where obesity, poor skin condition, friction, and moisture come together, such as the folds of Mrs. McFaraday's abdomen. Keeping the skin clean and dry, allowing air circulation, relieving pressure, and dusting with cornstarch were all interventions that could have helped Mrs. McFaraday avoid this complication.

▼ VARIATIONS



Geriatric Variations:

The elderly experience the following effects of aging, making them more prone to develop pressure ulcers:

- *Less tissue between skin and bone*
- *Dehydration*
- *Malnutrition*
- *Loss of bowel and bladder control*
- *Limited mobility*
- *Limited vision and/or fine motor skills to treat skin conditions*
- *Slower wound healing*
- *An increased risk for injuries*

▼ VARIATIONS *continued*



Pediatric Variations:

- *Young children are dependent upon others for nutrition and skin care, and may be more vulnerable to skin breakdown when these areas have been neglected.*
- *Children are very mobile and do not stay in one position for very long. A child with a medical or psychiatric condition which restricts their mobility must be assessed for the risk of developing pressure ulcers.*
- *Active children may need extra measures to keep wound care dressings or protective padding in place.*
- *Young children may not be able to communicate discomfort or pain. Careful assessment of skin condition, and identification of risks for skin breakdown, is very important.*



Home Care Variations:

- *Be creative in finding ways to devise homemade padding for bony prominences.*
- *Make sure the caregiver understands the need to assess for skin breakdown.*
- *Teach the caregiver proper skin care techniques.*
- *Remind the caregiver that pressure sores or bedsores can often develop when the client is not in bed.*
- *Remind the caregiver not to “scrub” skin areas susceptible to breakdown. The added friction can contribute to skin breakdown.*



Long-Term Care Variations:

- *Teach clients to self-manage prevention of bedsores as much as possible.*
- *Repositioning themselves, massaging the skin around (not over) bony prominences, keeping their skin clean and dry, and reporting pressure areas that they need assistance in relieving will all help protect from skin breakdown.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not following specific positioning orders.

Ask Yourself:

How do I prevent this error?

Prevention:

Due to the client's medical condition, the physician or qualified practitioner may want the client in a certain position (i.e., “head of bed up 30° at all times,” “elevate right arm continuously,” “flat on back for 24 hours”). The nurse must tailor positioning changes, provide padding, and relieve pressure points so that positioning guidelines can be followed without increasing the risk for skin breakdown.

Possible Error:

The client has an allergic reaction to a medication or solution used in wound care.

Ask Yourself:

How do I prevent this error?

Prevention:

Knowing what the client's allergies are will dictate what solutions the physician or qualified practitioner is able to order for wound care (i.e., if the client is allergic to Betadine, the physician or qualified practitioner would

continues

▼COMMON ERRORS—ASK YOURSELF *continued*

need to order another solution for wound care). Also, using a lot of Betadine in wound care is not a good idea because Betadine contains iodine, which may cause thyrotoxicosis when absorbed in high amounts.

Possible Error:

The client does not change position enough to relieve pressure over bony prominences. The skin over several bony prominences starts to break down.

Ask Yourself:

How do I prevent this error?

Prevention:

If the client is unable to, or just not changing positions frequently enough, the nurse would need to assess the client's knowledge about changing positions and provide client education and movement as needed (i.e., a post-operative client may just be afraid to move or may need pain medication to help move more frequently). Also, the client may need to be educated about risk factors for developing pressure ulcers and ways to decrease risks.

> NURSING TIPS

- Look at the client's skin, especially the pressure areas, at least every 2 hours and reposition the client as often as you can.
- Use towels, washcloths, gloves filled with water or ice (if the client is not allergic to latex), pillows, and blankets to keep pressure off of bony prominences. Cover the glove with ice in it with a washcloth to prevent an ice burn to the skin.
- Do not massage the skin over the site. Recent research has discouraged massaging the area due to the potential to cause deep tissue trauma.
- Look for pressure ulcers in unexpected places such as under any area that has tape on it, including the nasogastric tube, IV dressing, and wound dressing. Also inspect the back of the head, ears, and the elbows.
- When taking dressings off of a pressure ulcer, note the sequence and size/type of dressings used so you can repeat the sequence when reapplying the dressings. Be familiar with the physician's or qualified practitioner's order.

SKILL 9-16

Managing Irritated Peristomal Skin

Sharon Aronovitch, RN, PhD, CETN

KEY TERMS

Denuded epithelium **Peristomal irritation**
Maceration **Skin irritation**
Peristomal hyperplasia



> OVERVIEW OF THE SKILL

This skill covers the management of irritated, denuded, or macerated peristomal skin for those clients with either a bowel or urinary diversion.

Skin irritation can have several causes. The most common cause of skin irritation for someone with an ostomy is leakage of urine/stool onto the skin when the stoma pattern is cut too large. Clients with ostomies can develop fungal infections underneath the wafer of their ostomy system. Urine changes to ammonia, a skin irritant, when exposed to air. Exposure to digestive enzymes, stool, chemicals, or soaps can cause irritation. Mechanical trauma from tape, adhesives, improper removal of protective barriers, friction, pressure, or

shearing can cause irritation. Moisture and heat can promote irritation. Finally, allergic reactions may develop to products used to clean, protect, or adhere appliances to the skin surrounding the stoma.

Irritated peristomal skin can make caring for the stoma more difficult, increase the hassle of the stoma and appliance, and cause pain at the site. Irritated skin may increase the sense of frustration, depression, or anxiety about the stoma and increase the difficulty of adjusting to a changed body image. Finally, irritated skin increases the negative impact that the stoma and its care has on an individual's daily life.

> ASSESSMENT

1. Inspect the stoma for color and appearance. This will allow the nurse to determine the viability and direction (retracted, orifice pointing downward toward skin) of the stoma.
2. Inspect the condition of the skin surrounding the stoma. Alterations in skin integrity will prohibit an ostomy appliance system from adhering to the skin.
3. Measure the dimensions of the stoma prior to obtaining an ostomy appliance system from central supply. This will alleviate the problem of obtaining equipment that is the wrong size.

> DIAGNOSIS

- 1.2.1.1 Risk for Infection
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 7.1.1 Body Image Disturbance

> PLANNING

Expected Outcomes:

1. Client exhibits improved or healed areas of affected peristomal skin.
2. Client reports increased comfort.

3. Client is able to identify and report factors which lead to skin breakdown and discuss ways to prevent skin breakdown from recurring.
4. Client is able to demonstrate skin care regime.
5. Client voices feelings about change in body image.

Equipment Needed (see Figure 9-16-2):

- Clean washcloth or 4 × 4 gauze pads
- Warm tap water
- Appropriate urinary or drainable ostomy appliance
- Scissors

- Pen or pencil
- Clean gloves
- Pectin powder (i.e., Stomahesive Powder, Premium Powder)
- Pectin paste (i.e., Stomahesive Paste, Premium Paste)
- Skin sealant (i.e., Skin Prep, 3M No Sting™)



Estimated time to complete the skill:
15–20 minutes



Figure 9-16-2 4 × 4 gauze sponges, gloves, scissors, and marking pen

> CLIENT EDUCATION NEEDED:

1. Instruct the client on the use of skin care products to heal irritated or denuded peristomal skin.
2. Instruct client on pouch application, including frequency of change. Most pouching systems can be maintained for a minimum of 3 days to a maximum of 7 days.
3. Instruct client on changes in skin condition to report to wound/ostomy care nurse (ET nurse).
4. Provide client with a list of equipment and product numbers and a list of retailers where supplies can be purchased.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Assemble appropriate ostomy pouch and wafer, pectin paste, pectin powder, and skin sealant. | 2. Ensures that all equipment is ready to use. |
| 3. Apply clean gloves. | 3. Practices clean technique. |
| 4. Empty pouch of stool/urine, if present (see Figure 9-16-3). Remove current ostomy appliance (see Figure 9-16-4). | 4. This prevents contamination of surrounding environment if stool/urine accidentally leaks from appliance when removed from client's skin. |
| 5. Dispose of appliance in appropriate waste container. | 5. Practices infection control principles. |
| 6. Wash hands. | 6. Reduces the transmission of microorganisms. |
| 7. Apply clean gloves. | 7. Practices clean technique. |
| 8. Cleanse stoma and skin with warm tap water. Pat dry. | 8. Gentle care of the stoma prevents injury to the mucosa, which has no nerve endings and is very friable. |



Figure 9-16-3 Empty the drainage pouch of stool and urine.



Figure 9-16-4 Remove the ostomy appliance.

9. Measure stoma using a measuring guide for appropriate length and width of stoma at base (where skin meets stoma) (see Figure 9-16-5).

9. Correct measurement of the stoma's dimensions will ensure a good fit of the ostomy appliance without excess skin at the base of the stoma exposed to stool/urine.

Figure 9-16-5 Measuring guide used to determine the length and width of the stoma



10. Place gauze pad over orifice of stoma to wick stool/urine while you are preparing the wafer and pouch for application.

10. Using something to wick stool/urine away from the skin will ensure a good seal of the wafer to the client's skin.

11. Trace pattern onto paper backing of wafer.

11. It is important to trace the measurements of the stoma and not "eyeball" the stoma measurements. Inaccurate pattern size will result in either laceration of the stoma by the wafer or maceration of peristomal skin from constant contact with stool/urine.

12. Cut wafer as traced.

12. Accurately cutting the traced pattern will ensure a snug fit.

13. Attach clean pouch to wafer. Make sure port closure is closed or tail closure is attached. Set aside.

13. Preattaching the pouch to the wafer will save time and prevent stool from leaking underneath the wafer during application process.

14. Sprinkle a light coating of pectin powder onto the irritated, weepy peristomal skin.

14. The pectin powder will absorb the peristomal drainage.

- | | |
|---|--|
| <p>15. Brush off any excess pectin powder using a gauze pad.</p> <p>16. Dab the skin sealant over the pectin powder. Allow to dry.</p> <p>17. Remove gauze pad from orifice of stoma.</p> <p>18. Remove paper backing from wafer and place on skin with stoma centered in cutout opening of wafer.</p> <p>19. Apply a ring of pectin paste onto the sticky side of wafer at the edge of opening cut for the stoma.</p> <p>20. Cover edges of wafer with hypoallergenic tape (optional).</p> <p>21. Wash hands.</p> | <p>15. Prevents caking of any excess pectin powder.</p> <p>16. Dabbing the skin sealant will allow the pectin powder to remain where it was originally applied. The skin sealant creates an invisible bandage.</p> <p>17. It is easier to see the stoma.</p> <p>18. Paper backing needs to be removed from wafer for it to adhere to the skin.</p> <p>19. The paste will caulk between the base of stoma and wafer, creating a tighter seal.</p> <p>20. This ensures that the edges of the wafer will not adhere to client's clothing.</p> <p>21. Reduces the transmission of microorganisms.</p> |
|---|--|

> EVALUATION

- Check secureness of adhesion to client's skin immediately following application of the ostomy appliance.
- Assess client comfort.
- Assess client's understanding of self-care of the ostomy.

> DOCUMENTATION

Nurses' Notes

- Describe and document assessment of peristomal skin.
- Describe and document assessment of stoma.
- Record stoma measurements (length, width, height).
- Note color and amount of drainage.
- Describe what was done for peristomal skin care.
- Note type of ostomy pouch applied.



▼ REAL WORLD ANECDOTES

A 45-year-old female has recently had a temporary loop ileostomy and ileoanal anastomosis for familial polyposis. She is 2 weeks post-op and is complaining of frequent appliance changes due to leakage of stool beneath the wafer. Examination of peristomal skin reveals dimpling of the stoma at 3 o'clock and a deep skin crease when she sits. The peristomal skin is severely irritated from 2 o'clock to 6 o'clock without loss of epithelium. A consult is arranged with the Enterostomal therapy/ostomy for evaluation of the current pouching system.

> CRITICAL THINKING SKILL

Introduction

The client is 3 weeks post-op from creation of a temporary loop ileostomy and ileoanal anastomosis with J pouch.

Possible Scenario

The client is a 23-year-old male with a history of ulcerative colitis who elected to have removal of the colon

with creation of a temporary loop ileostomy and ileoanal anastomosis with J pouch. He is now complaining of severe burning of the skin around the stoma, and the appliance needs to be changed every 12–24 hours.

Removal of the appliance reveals severely denuded peristomal skin from 3 o'clock to 10 o'clock that extends for 1 inch from the base of the stoma outward. The lower portion of the stoma is noted to be flush to the skin.

Possible Outcome

The astute nurse realizes that this client needs to have the fitting of his appliance reassessed by the ET/ostomy nurse and arranges an immediate consult. The second action to be taken by the nurse is to treat the irritated skin with pectin powder and dab over it a nonsting skin sealant before reapplying the client's ostomy pouch.

Prevention

This problem can be prevented by encouraging and arranging for the client to be seen by the ET/ostomy nurse specialist, who is well-versed in the various methods of managing complicated ostomies and skin care needs.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients often have vision difficulties. Make sure the person caring for the stoma can see the stoma and can see well enough to assess and apply the appropriate-size wafer to the stoma.*
- *Elderly skin can be very fragile. Tearing or shearing forces, reactions to tape, or reactions to the contents of the bowel remaining on the skin can cause increased irritation.*



Pediatric Variations:

- *If the child is participating in the care of the stoma and the changing of the appliance, remind the child it is best not to “rush” the job. Remind the child to remove any adhesives carefully, rinse any soap from the site, and report any signs of irritation early.*
- *Adolescence is a time of increased needs for privacy and concerns about body image. It may be difficult for an adolescent to ask for help or education about caring for the stoma. It may be tempting for the adolescent to ignore signs of growing irritation for fear of losing a sense of control over stoma care.*



Home Care Variations:

- *Teach the client and other care providers in the home how to detect and remedy peristomal skin irritations, including those caused by improper wafer size, tape allergies, or skin trauma.*
- *Make sure the home care setting has the facilities and equipment to adequately clean and manage the stoma. Interventions may include helping the client seek sources of supplies, arranging to have plumbing fixed, and verifying adequate laundry facilities.*



Long-Term Care Variations:

- *Encourage the client to manage stoma care as much as possible.*
- *Long-term care facilities may not have the staffing levels for prolonged or intensive wound care procedures. This can both contribute to peristomal skin irritation and delay healing. A clear, comprehensive assessment of wound care needs, including time involved, supplies needed, and knowledge of the appropriate care procedure, can help the facility plan the care needed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The appliance chosen is appropriate in size for the ostomy, but the peristomal skin has deep creases, causing effluent to leak beneath the wafer.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Consult with the ET/ostomy nurse specialist as soon as there is evidence of atypical appearance to skin surrounding stoma. Obtain an appliance with convexity or use pectin paste to caulk between stoma and wafer. If the error does occur, remove the leaking appliance and caulk the area between the stoma and wafer with pectin paste. Consult the ET/ostomy nurse specialist.

> NURSING TIPS

- Recognize that all stomas are not the same. Each stoma must be treated individually, which requires that the nurse assess the dimensions and location in relation to the client's body movements (i.e., sitting, bending) and the peristomal skin's condition.
- Client teaching is easily incorporated into the care of the ostomy by encouraging the client to be your assistant during the application process.
- Use of an ostomy appliance that is intact, comfortable, and easy to use will increase the client's comfort level and thereby the client's participation in self-care activities.
- Costs to the client and the health care institution are reduced when simplistic ostomy care is provided and an intact seal can be maintained for a minimum of 3 days.

SKILL 9-17

Pouching a Draining Wound

Sharon Aronovitch, RN, PhD, CETN

KEY TERMS

Drainage system
Enterocutaneous fistula
Enterostomy
Fistula

High output fistula
Low output fistula
Wafer
Wound management



> OVERVIEW OF THE SKILL

A draining wound is pouched whenever the drainage from a wound is greater than 100 cc in 24 hours. It is an alternative to gauze dressings. Pouching a draining wound results in fewer dressing changes, allows more accurate measurement of drainage, and protects the surrounding skin from the drainage. It reduces the

odor, mess, and contamination from saturated dressings. The most common method to pouch a draining wound is to use an ostomy appliance or a pouching system designed specifically to accommodate various sizes of draining wounds.

> ASSESSMENT

1. Identify the type and amount of drainage coming from the wound. This will allow the nurse to determine which type of appliance (i.e., urinary or bowel pouch) or wound collector is required.
2. Inspect the condition of the skin surrounding the wound. Alterations in skin integrity will prohibit a closed drainage system from adhering to the skin.
3. Measure the dimensions of the wound prior to obtaining a closed drainage system from central supply. This will alleviate the problem of obtaining equipment that is the wrong size.

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.6.2.1.2.1 Impaired Skin Integrity

- 7.1.1 Body Image Disturbance
- 1.1.2.2 Altered Nutrition: Less than Body Requirements
- 1.4.1.2.2.1 Fluid Volume Deficit
- 1.2.1.1 Risk for Infection
- 3.1.2 Social Isolation

> PLANNING

Expected Outcomes:

1. The skin around the wound will be protected from contact with the drainage, and will not breakdown or become infected.
2. The drainage from the wound will be contained in the pouch.
3. Odor from the wound will be minimized.
4. The pouch will not increase the client's discomfort.

5. The pouch will facilitate accurate measurement of wound drainage.
6. The pouch will not decrease the client's mobility.

Equipment Needed (see Figures 9-17-2A–D):

- Clean washcloth or 4 × 4 gauze pads
- Normal saline
- Appropriate ostomy appliance (fecal or urinary) or wound drainage collector and wafer



Estimated time to complete the skill:

This is dependent on the type of draining wound being pouched and its location. A simple draining wound can be pouched in 15 minutes. A more complex wound requiring the expertise of a wound care nurse expert may take up to 60 minutes to pouch.



Figure 9-17-2A Gloves, wash cloth, wafer, gauze, scissors, and marking pen



Figure 9-17-2C Wafers

- Scissors
- Pen or pencil
- Measuring guide

> CLIENT EDUCATION NEEDED:

1. Teach the client about pouch application, including frequency of change. Most enterostomies are able to be maintained with a pouching system for a minimum of 24 hours to a maximum of 5 days.
2. Instruct the client to report changes in drainage or skin condition to physician, qualified practitioner, or wound/ostomy care nurse.
3. Client should be provided with a list of equipment and product numbers and a list of retailers where supplies can be purchased.



Figure 9-17-2B Ostomy appliances



Figure 9-17-2D Measuring guides used to determine the length and width of the wound

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Assemble appropriate pouch and wafer.
3. Apply clean gloves.
4. Remove current appliance, after emptying pouch of drainage, if present (see Figures 9-17-3 and 9-17-4). Remember to measure drainage for intake and output record (see Figure 9-17-5).

1. Reduces the transmission of microorganisms.
2. Ensures that all equipment is ready to use.
3. Practices clean technique.
4. This prevents contamination of surrounding environment if contents of pouch accidentally leak from appliance when removed from client's skin.



Figure 9-17-3 Remove the current appliance, gently peeling back the wafer.



Figure 9-17-4 The appliance is almost completely removed. Note the wafer and appliance peeled away from the skin.

Figure 9-17-5 Measure the drainage for the intake and output record.



5. Dispose of appliance in appropriate waste container.
6. Wash hands.
7. Apply clean gloves.
8. Cleanse periwound area with normal saline on 4 × 4 gauze. Pat dry. (See Figure 9-17-6.)

5. Practices infection control.
6. Reduces the transmission of microorganisms.
7. Practices clean technique.
8. Gentle care of the periwound area prevents injury to skin.

continues



Figure 9-17-6 Clean the stoma area and pat dry.



Figure 9-17-7 Place the wafer on the skin, centering the cutout hole over the fistula opening.

9. Measure fistula/wound opening using a measuring guide for appropriate length and width of fistula, adding an additional $\frac{1}{8}$ inch clearance from edge of fistula.
 10. Place gauze pad over orifice of fistula to wick drainage while you are preparing the wafer and pouch for application.
 11. Trace pattern onto paper backing of wafer.
 12. Cut wafer as traced.
 13. Remove gauze pad from orifice of fistula.
 14. Attach clean pouch to wafer, then wafer to skin. Alternatively, attach wafer to skin then pouch to wafer depending on hospital policy.
 15. To attach wafer to skin, remove paper backing from wafer and place on skin (see Figure 9-17-7). Center the cutout hole of the wafer over the fistula opening.
 16. To attach pouch to wafer, make sure port closure of pouch is closed or tail closure is attached, remove adhesive backing, and place on wafer (see Figures 9-17-8 and 9-17-9).
9. Correct measurement of the fistula's dimensions will ensure a good fit of the ostomy appliance without excess skin being exposed to drainage.
 10. Using something to wick drainage away from the skin will ensure a good seal of the wafer to the client's skin.
 11. It is important to trace the measurements of the fistula and not "eyeball" the fistula measurements. Inaccurate pattern size will result in either leakage of drainage beneath the wafer or maceration of periwound skin from constant contact with the drainage.
 12. Accurately cutting the traced pattern will ensure a snug fit.
 13. It is easier to see the fistula opening for accurate placing of the wafer.
 14. Preattaching the pouch to the wafer will save time and prevent drainage from leaking underneath the wafer during application process. Attaching the wafer first allows better visualization of the placement of the wafer.
 15. Paper backing needs to be removed from wafer for it to adhere to skin.
 16. This will prevent leakage of pouch contents onto client's skin and/or clothing.



Figure 9-17-8 Remove the adhesive backing from the pouch.

17. Cover exposed areas of the wafer with hypoallergenic tape.

18. Wash hands.



Figure 9-17-9 Place the pouch on the wafer.

17. This ensures that the edges of the wafer will not adhere to client's clothing.

18. Reduces the transmission of microorganisms.

> EVALUATION

- Check secureness of adhesion to client's skin within first 2 hours following application.
- Check the amount of wound drainage in the pouch at least every 2 hours. Empty as necessary.
- Assess for pain or discomfort from the pouch or wound.

> DOCUMENTATION

Nurses' Notes

- Assessment of periwound skin
- Wound dimensions (length, width, depth)
- Color and amount of drainage
- Periwound skin care if alteration in skin integrity was noted
- Type of pouch applied



▼ REAL WORLD ANECDOTES

A home health care nurse learned a valuable lesson when she “pre-cut” half a dozen wafers to save steps during later visits. The size of the fistula changed over time, and the nurse had to throw out the precut supplies, and order new wafers.

> CRITICAL THINKING SKILL

Introduction

The client is experiencing a postoperative complication secondary to cancer therapy for recurrent rectal cancer.

Possible Scenario

A 65-year-old female with a history of previous pelvic radiation is 3 days status post an abdominal perineal resection (permanent colostomy) and ileal conduit for recurrent rectal cancer with metastasis to cervix. The nurse caring for the client notices that there is increased drainage on the surgical dressing. The urinary output from the ileal conduit has decreased within the past 12 hours. The nurse should immediately notify the physician of the change in the client's status.

Possible Outcome

If the nurse is not astute enough to pick up the correlation between decreased urinary output and increased drainage from the surgical wound, the client is at potential risk for wound infection and alteration in the periwound environment.

Prevention

The second nursing action is to apply a closed wound drainage system (i.e., urinary ostomy pouch attached to bedside drainage) to quantify the amount of drainage. This action will allow for continued monitoring of the client's fluid status.

▼ VARIATIONS



Geriatric Variations:

- *If a client has arthritic hands, it is best to use either a one-piece appliance that is precut or a two-piece appliance that is adaptive to decreases in hand dexterity.*
- *Make sure the client can see and hear your teaching instructions. Ask for feedback to assess whether the client heard and understood the procedure.*
- *If the client needs assistance, instruct a willing family member or caregiver on the procedure.*



Pediatric Variations:

- *A pouch located near a child's groin will need an appliance that is very flexible and can bend with the client's movement and play without becoming nonadherent.*



Home Care Variations:

- *Make sure the client has the necessary supplies and facilities to clean and change the pouch.*
- *Changes in body image from a draining wound could cause the client to withdraw from social situations or even become isolated in the home. As the home care nurse entering the home, you are in a unique position to assess psychosocial needs and changes resulting from the changes in body image.*



Long-Term Care Variations:

- *Consider the ongoing stress of a slowly healing or draining wound, and the potential changes to body image large scars and marks will cause even after they have healed.*
- *Connect the client with support groups or further assessment if needed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Part of the wafer sticks to the patients gown or bed linen, dislodging the pouch.

Ask Yourself:

How do I prevent this error?

Prevention:

Check the application for comfort before leaving the client's bedside. Make sure sticky areas are covered with hypoallergenic tape, if necessary.

> NURSING TIPS

- Recognize that all draining wounds are not the same. Each wound must be treated individually, which requires that the nurse assess the dimensions, type and amount of drainage, and the periwound skin's condition.
- Client teaching is easily incorporated into the care of the draining wound by encouraging the client to be your assistant during the application process.
- Use of a closed drainage system on a draining wound will increase the client's comfort level and thereby the client's participation in self-care activities.
- Costs to the client and the health care institution are reduced when draining wounds are maintained in a closed wound system. The cost reduction is realized in a decrease in the use of sterile dressings, linen changes, pain medication used by the client, and nursing time.

Immobilization and Support

- Skill 10-1** Applying an Elastic Bandage
- Skill 10-2** Applying a Splint
- Skill 10-3** Applying an Arm Sling
- Skill 10-4** Applying Antiembolic Stockings
- Skill 10-5** Applying a Pneumatic Compression Device
- Skill 10-6** Applying Abdominal, T-, or Breast Binders
- Skill 10-7** Applying Skin Traction—Adhesive and Nonadhesive
- Skill 10-8** Assisting with the Insertion of Pins or Nails
- Skill 10-9** Maintaining Traction
- Skill 10-10** Assisting with Casting—Plaster and Fiberglass
- Skill 10-11** Cast Care and Comfort
- Skill 10-12** Cast Bivalving and Windowing
- Skill 10-13** Cast Removal
- Skill 10-14** Assisting with a Continuous Passive Motion Device
- Skill 10-15** Assisting with Crutches, Cane, or Walker

SKILL 10-1

Applying an Elastic Bandage

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Bandages	Reverse
Compression wraps	Spiral
Elastic bandage	Splitting
Elastic wrap	Traction
Overlap	Varicose veins



> OVERVIEW OF THE SKILL

Elastic bandages or wraps are used to secure dressings in place, immobilize joints, decrease swelling, maintain circulation, support or immobilize a body part, stabilize an extremity, or secure equipment, such as traction, to a body part. Elastic bandages can be used on any body part and to apply compression to any area, with the exception of the neck. The type and size

will vary with the body part or area to be covered. Elastic bandages are often used on the lower extremities to prevent edema and to support varicose veins. Elastic bandages can also be used to support the knee, ankle, elbow, and wrist for conditions such as strains and sprains. They can also be used to support fractured ribs.

> ASSESSMENT

1. Check the client's skin integrity to establish a baseline. Inspect the site to be bandaged. Indications of edema, abrasions, discoloration, or bony prominences need to be noted prior to bandaging. **These assessments will affect the type of bandage used, and how the bandage is placed (see Figure 10-1-2).**
2. Assess circulation. Inspect skin temperature, color, pulses, and sensation of body parts to be covered **to determine a baseline neurovascular status.**
3. Assess for the presence of a wound. If a dressing is to be applied under an elastic bandage, assess that wound prior to application of elastic bandage. **Determines if the bandage will put pressure on the wound, or compromise the sterile wound dressing.** Make sure there is a sterile bandage between the elastic bandage and an open wound.

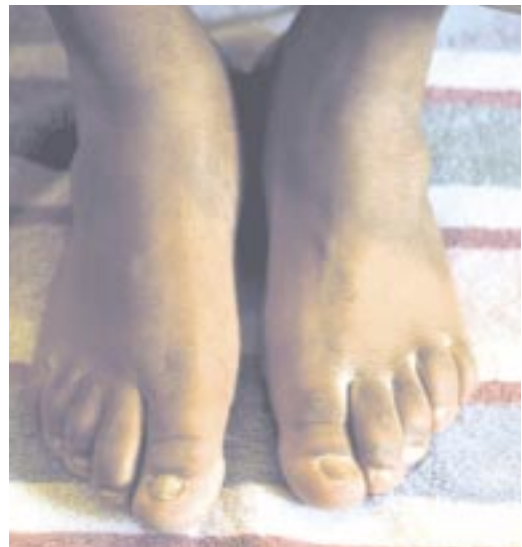


Figure 10-1-2 Examine the site to assess the condition of the skin and to determine the size and type of bandage needed.

> DIAGNOSIS

- 1.4.1.1 Altered Tissue Perfusion
- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain

> PLANNING**Expected Outcomes:**

1. The client will have decreased edema.
2. The client will have decreased pain.
3. The client's body will be supported and in good alignment.
4. The client will not experience tingling or numbness distal to the elastic bandage.
5. The client will have good perfusion in parts distal to the elastic bandage.
6. The bandage will be properly anchored and the ends secured with no looseness or stricture.

Equipment Needed (see Figure 10-1-3):

- Elastic bandage
- Gloves, if body fluids or wounds are involved
- Dressings, as appropriate, if covering open wounds
- Clips or tape to secure bandage in place



Estimated time to complete the skill:
10 minutes for elastic wrap; if dressing change is involved, more time will be needed depending on the type of wound

> CLIENT EDUCATION NEEDED:

1. Client understands the purpose of the elastic bandage, e.g., for support, to decrease edema, or to secure dressing in place.
2. Client understands the need to keep bandage smooth, wrinkle free, and avoid constriction.
3. Client understands the need to report any tingling, numbness, discoloration, or any increased pain.
4. Client understands the need to report any oozing of blood through the elastic bandage.
5. Client understands the need to report cool extremity, blanching, or mottling.



Figure 10-1-3 Elastic bandages

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Assess size of material needed and gather materials (see Figure 10-1-4). Elastic bandages are available in 2, 2½, 3, 4, 6, and 8 inch widths. Lengths are usually available in 3 yards.
2. Wash hands.
3. Explain purpose and need for bandages to client.

RATIONALE

1. Provides appropriate support, which will depend on the purpose, injury, or stabilization required.
2. Reduces the transmission of microorganisms.
3. The purpose can be for support, alignment, decreasing edema, or securing dressings in place. It is necessary that clients understand the need to keep bandages in place. Facilitates cooperation.

continues



Figure 10-1-4 Remove material from packaging and set the clips aside where they may be easily reached.



Figure 10-1-5 Hold the bandage in the dominant hand and anchor the end of the bandage against the skin with the nondominant hand.

4. Assess the skin to be covered for redness, swelling, or open lesions. Assess that the client is in a correct position for application, e.g., if supporting a fracture, arm, or other body part, it must be correctly aligned. If elastic wrap is for edema of the lower extremity or for varicose veins, the client's leg must be elevated.

5. Apply the bandage. The technique varies according to the body part to be covered and the purpose of the bandage.
- Hold roll of elastic bandage in dominant hand and use the other hand to lightly hold beginning of bandage at distal body part (see Figure 10-1-5). Continue transferring from hand to hand as bandage is wrapped (see Figure 10-1-6). Toes or fingertips must be visible to allow follow-up assessment. Apply bandage from distal point toward proximal boundary using variety of turns to cover various shapes of body parts (see Figure 10-1-7). Unroll and very slightly stretch bandage, overlap turns, and secure first bandage before applying additional rolls. Apply additional rolls without exposing any skin surface.
 - If the legs and feet are to be covered, wrap the foot initially. Use a figure-eight pattern, leaving the toes exposed. Continue wrapping the leg in a figure-eight pattern until all the wrap is used (see Figure 10-1-8).
 - A figure-eight pattern is also useful to cover and immobilize joints (see Figure 10-1-9).
 - Use a circular pattern to bandage digits or wrists.
 - Use spiral turns to apply a bandage to cover areas such as slender wrists or the forearms.

4. Avoids increasing injury or infection. Avoids improper alignment and promotes healing. Promotes decrease in edema or proper support for varicose veins.

5. Proper application maintains consistent bandage tension, conforms to body part, promotes stabilization of body part, and promotes venous return.



Figure 10-1-6 Apply the bandage from the distal to proximal area. You may transfer the bandage from hand to hand as you wrap.



Figure 10-1-7 Wrap the bandage up the limb. Keep the toes visible to allow assessment of circulation.



Figure 10-1-8 Continue until the entire elastic bandage is used.



Figure 10-1-9 The bandage is wrapped using the figure-eight method.

- If securing equipment in place, such as Buck's traction, use a circular pattern around the leg and traction.
- Spiral reverse turns are used to cover parts of the body that are the shape of an inverted cone, such as the thigh or forearm.
- Recurrent turns are used to bandage the head or the stump of an amputated limb.

6. Secure in place with tape, pins or hooks provided with bandage (see Figure 10-1-10).

6. Prevents loose ends and unraveling of dressing.

Figure 10-1-10 Secure the bandage with clips. When applying clips be careful they do not scratch the skin.



- 7.** Check that no wrinkles are present and if so smooth out.
- Check that no constrictive areas are present.
 - If an elastic wrap is used for arm support see Skill 10-2, Applying a Splint, and Skill 10-3, Applying an Arm Sling.
 - If elastic wrap is used for traction, see Skill 10-7, Applying Noninvasive Traction, and Skill 10-9, Maintaining Traction.

7. Prevents skin breakdown and decreased circulation.

8. Wash hands.

8. Reduces the transmission of microorganisms.

> EVALUATION

- The client has decreased edema.
- The client has decreased pain.
- The client's body is supported and in good alignment.

- The client does not experience tingling or numbness distal to the elastic bandage.
- The client has good perfusion in parts distal to the elastic bandage.
- The bandage is properly anchored and the ends secured with no looseness or stricture.

> DOCUMENTATION

Nurses' Notes

- Document procedure, type of wrap, and reason for wrapping.
- Document assessment of color, movement, warmth, and sensation initially, and 20 minutes later.
- Document distal pulses, if applicable.
- Document vital signs, if needed, in acute injury situation.



▼ REAL WORLD ANECDOTES

Chai recently attended an in-service seminar given by a nurse with 20 years of experience in an orthopedic clinic. Chai learned about several problems with elastic bandages, or Ace wraps, commonly seen in both inpatient and outpatient settings. The most serious problem is when a client develops tingling in the fingers or toes if the bandage was wrapped too tightly. This can also occur if swelling continues after the bandage is placed. It is often seen when clients rewrap their own bandages at home.

Younger clients especially will move around extensively and disrupt the smoothness of the bandage, which can lead to variations in pressure. The friction of the bedsheets can also disrupt the smoothness of elastic bandages. If the elastic bandage becomes wrinkled, skin tissue injury can occur at the points of compression. Sometimes a client will have a wound and dressing under the elastic wrap. If the dressing is inadequate or not changed often enough, oozing is noted through the elastic wrap. The wrap becomes contaminated with wound exudate and must be cleaned. The wound is not protected against infection, because bacteria can enter the wound.

> CRITICAL THINKING SKILL

Introduction

Assessment after the bandage is applied must consider all possible complications of the injury.

Possible Scenario

A client is admitted to the unit after a motor vehicle accident. He fractured his leg. His leg is wrapped in an elastic bandage. He rings his call light, and complains of deep throbbing pain in his calf.

Possible Outcome

The nurse rewraps the leg, and explains to the client that fractures are painful. She offers medications. The client continues to develop a deep venous thrombosis as a result of the injury.

Prevention

The nurse needed to listen to the client's complaints of pain. She should have done a thorough assessment, including assessing the leg for deep venous thrombosis by checking for pain, warmth, redness, discoloration, or a positive Homans' sign.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients have very frail skin and may find elastic bandages useful in enabling the healing process.
- Elderly clients may find more comfort and added support from elastic bandages than from elastic stockings for varicose veins because elastic stockings may roll at the top and are difficult to put on.
- Elderly clients usually require assistance with elastic bandages.



Pediatric Variations:

- Children often do not like feeling constricted, therefore assess frequently if the child plays with the bandage.
- A younger child can assist with the procedure by holding the clips used to secure the bandage, by counting and feeling the toes or fingers, or by counting the number of "wraps" taken.
- If the bandage does not stay on during active play, extra tape or clips can be used.
- If the parents will be rewrapping the bandage, teach them how to assess neurovascular status, the basics of hand washing, and keeping the bandage clean.
- Remind parents not to wrap the bandage "extra tight" in an effort to keep it in place.

▼ VARIATIONS *continued*

- *Younger clients may not be able to complain of pain or tingling. These clients need extra careful assessment.*
- *An older child or adolescent can be taught how to rewrap the bandage. This teaching must include how to assess neurovascular status, and the basics of hand washing, and keeping the bandage clean.*



Home Care Variations:

- *Some clients find elastic bandages more useful than stockings and less expensive.*
- *Put bandages in a mesh “delicates” laundry bag before putting them in the washing machine. This keeps them from getting twisted and tangled in the laundry. Also, bandages may be hand-washed in the sink and rolled between towels to dry.*
- *Make sure a client is not using a bandage that is too large or too small for the limb being treated. Bandages that are too small will constrict circulation and will not stay in place. Bandages that are too large will not properly support the injured limb.*



Long-Term Care Variations:

- *Some clients find elastic bandages more useful than stockings and less expensive.*
- *Put bandages in a mesh “delicates” laundry bag before putting them in the washing machine. This keeps them from getting twisted and tangled in the laundry. Also, bandages may be hand-washed in the sink and rolled between towels to dry.*
- *Make sure a client is not using a bandage that is too large or too small for the limb being treated. Bandages that are too small will constrict circulation and will not stay in place. Bandages that are too large will not properly support the injured limb.*
- *Elastic bandages lose their elasticity over time. Replace as needed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The bandage is wrapped too tightly or too loosely.

Ask Yourself:

How do I prevent this error?

Prevention:

Use a steady, gentle stretch as you wrap the bandage. Do not tug at a bandage that is too short to cover an area. Add a second bandage if needed. Keep pins and clips within reach so you can anchor the bandage when you finish the wrap.

Possible Error:

Edges are not overlapped properly.

Ask Yourself:

How do I prevent this error?

Prevention:

Pay attention to the wrapping process. Visualize ahead where the next wrap will go. If you run out of bandage before you run out of limb to cover, add a second bandage.

> NURSING TIPS

- Gently stretch the bandage as you apply it to make sure it is secure.
- If wounds are involved, check under bandages periodically.

SKILL 10-2

Applying a Splint

Patricia Abbott, RN, MSN, ARNP

KEY TERMS

Anatomical
position/alignment
Dislocation
Fracture

Immobilization
Neurovascular status
Splint



> OVERVIEW OF THE SKILL

Splinting is the process of applying a rigid device to a limb, joint, or wound to prevent movement of displaced or injured areas (see Figure 10-2-2). Splinting is used primarily for immobilization of broken bones or dislocated joints in emergent situations and to prevent movement in the injured area after the extent of the injury is known in nonemergent situations. When a fractured or dislocated area has been correctly immobilized, the splint allows complete rest of the injured area in the anatomically correct position (see Figure 10-2-3). This facilitates proper and complete healing. A properly applied splint is also important in controlling blood loss and

pain. If a fracture with sharp bone ends is not immobilized, further tissue trauma, blood loss, and pain will occur.

A splint can be made from any rigid material, from a stick to plaster or fiberglass, or a premade aluminum padded splint can be used. Ideally the material should be light, straight, and rigid enough not to change shape if the client moves. It is very important that the splint be long enough to extend beyond the joint distal to the involved area. If the injury is close to the proximal joint, that joint should also be immobilized to avoid movement in the injured area. The splint should be as wide as the area being immobi-



Figure 10-2-2 Applying an air splint to immobilize an injured wrist



Figure 10-2-3 After surgery, a splint is applied to maintain the position of the limb.

lized. For client comfort, and to avoid further trauma, padding is recommended on the side next to the client's skin. This is also of benefit if the area swells, as

the padding will reduce interference with circulation. Splints are held in place with bandages (see Skill 10-1, Applying an Elastic Bandage), velcro straps, or tape.

Table 10-2-1 Types of Splints and Their Indications

TYPE OF SPLINT	INDICATION
• <i>Volar splint</i>	Sprains of the wrist or soft tissue injuries
• <i>Dorsal splint</i>	Sprains of the wrist or soft tissue injuries
• <i>Radial gutter splint</i>	Immobilization of the second or third finger
• <i>Thumb spica splint</i>	Immobilization of the thumb
• <i>Ulnar gutter splint</i>	Immobilization of the third or fourth finger
• <i>Sugar tong splint</i>	Immobilization of the wrist and the elbow, for fractures of the proximal forearm and elbow
• <i>Anteroposterior splint</i>	Fracture of the distal forearm
• <i>Posterior long arm splint</i>	Injuries around the elbow and the forearm
• <i>Posterior short leg</i>	Ankle injuries
• <i>Sugar tong or stirrup short leg</i>	Ankle injuries (either sprains or fractures)
• <i>Posterior gutter—long leg</i>	Knee and upper tibia or fibula injuries

> ASSESSMENT

1. Assess the area that the splint is to be applied to. Check for bleeding, raw bone ends, or debris. Note if the site is in correct alignment. Do not attempt to align a suspected fracture when splinting. **Affects how the splint will be applied, or if the procedure is contraindicated.**
2. Assess the client's skin integrity, paying special attention to the presence of an open fracture, edema, ecchymosis, lacerations, abrasions, and the condition of the skin (dry, cracked, infected, thin). **Alerts to possible complications such as skin breakdown and infection.**
3. Assess the neurovascular status. Circulation can be assessed by checking capillary refill in the distal area, and by checking the skin temperature and color. The neurovascular status can be assessed by asking the client, if he is conscious, if there is any numbness or tingling in the involved area or distal to it, and by actually checking sensation. **Provides baseline for future assessments.**
4. Assess the client's level of pain and how he is dealing with it. **Pain can cause the client to thrash around, which could cause increased tissue trauma and bleeding.**

> DIAGNOSIS

- 1.6.1.3 Risk for Trauma
- 1.6.1.5 Risk for Disuse Syndrome
- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client will not experience unnecessary pain.
2. The client will not sustain further tissue damage and blood loss.
3. The injury will be well supported and immobilized in correct anatomic alignment.
4. There will be adequate circulation to the wound and distal body part.
5. The client will not experience any skin breakdown as a result of the splinting.
6. The client will verbalize an understanding regarding care of the injured area and use of the splint.

Equipment Needed:

- Dressing for wound, if present
- Gloves
- Padding for under splint (webril or gauze)

- Appropriate splint (see Figure 10-2-4)
- Elastic bandage, Ace wrap, Velcro straps, or tape to hold splint in place



Figure 10-2-4 Abduction splint



Estimated time to complete the skill:

15–30 minutes depending on whether there is a wound involved and the complexity of the splint, which is dependent on the body part involved

> CLIENT EDUCATION NEEDED:

1. Explain to the client that the splint will impair his mobility.
2. Reinforce the need to report any numbness, tingling, or cool skin distal to the splint.
3. Explain to the client that the splint needs to remain dry and in place until a health care provider has removed it.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Assess the need for a dressing if there is an open wound. 3. Check the physician or qualified practitioner's orders to see what kind of splint was ordered. This skill will concentrate on removable, pre-formed splints. Splints made of fiberglass or plaster are applied using the same technique found in Skill 10-10, Assisting with Casting—Plaster and Fiberglass, and Skill 10-12, Cast Bivalving and Windowing. 4. Measure the area to be splinted according to the manufacturer's instructions. Be aware that some splints are made for the right or left side. 5. Apply the splint according to the manufacturer's instructions. Generally this will involve sliding the splint over the area to be immobilized (see Figures 10-2-5 and 10-2-6), and securing it with an elastic bandage, tape, or Velcro straps (see Figures 10-2-7 and 10-2-8). 6. Check the neurovascular status of the area distal to the splint. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Decreases the risk of blood loss or infection. 3. The splint will vary depending on the area to be splinted and the type of injury. 4. The correct size splint will aid healing and help prevent skin damage and ulceration. 5. Correct application is important to avoid further damage to the area as well as to promote healing. 6. Splints can compromise the neurovascular status of extremities that are distal to them. This should be checked often and taught to the client. |
|---|--|



Figure 10-2-5 Align the splint with the limb to be immobilized.



Figure 10-2-6 Slide the splint on to the area to be immobilized.



Figure 10-2-7 Secure the splint with attached fasteners, tape, or Velcro.



Figure 10-2-8 Assess the neurovascular status of the area distal to the splint. Make sure the splint provides adequate support for the injured area.

7. If the client will be taking the splint off and reapplying it at home, instruct him regarding the use and care of the splint. Be sure he can perform the skill on his own prior to discharge.
 8. Check the neurovascular status of the area distal to the splint prior to discharging the client.
 9. Wash hands.
7. Client education is important to promote compliance and healing.
 8. Neurovascular compromise is not always immediately apparent and must be checked often.
 9. Reduces the transmission of microorganisms.

> EVALUATION

- The client did not experience unnecessary pain.
- The client did not sustain further tissue damage and blood loss.
- The injury is well-supported and immobilized in correct anatomic alignment.
- There is adequate circulation to the wound and distal body part.
- The client did not experience any skin breakdown as a result of the splinting.
- The client has verbalized understanding regarding care of the injured area and use of the splint.

> DOCUMENTATION

Nurses' Notes

- Record the reason the splint was applied and the area the splint was applied to as well as the type of splint that was placed.
- Be sure to note if it was right or left, if indicated.
- Note the condition of the client's skin prior to placing the splint.
- Note the neurovascular status of the area distal to the splint both before and after placement.
- Check and note the neurovascular status prior to discharging the client.
- Record any client teaching that was done.



▼ REAL WORLD ANECDOTES

Mrs. Phum presented to the emergency room complaining of severe pain in her right wrist. The doctor noted that she was wearing a splint on her wrist. He noticed that it was designed for clients with carpal tunnel syndrome. Mrs. Phum spoke very little English and her daughter interpreted the doctor's questions. The doctor asked Mrs. Phum when her wrist pain started and who had recommended the splint she was wearing. Mrs. Phum noted that her wrist had started to hurt after she had fallen and used her right hand to break her fall. Her daughter was out of town and Mrs. Phum had been unable to see a physician. When her wrist continued to hurt after several days she purchased a splint she saw at a garage sale. She had been wearing it for a week but the pain had not improved. When Mrs. Phum's daughter returned she questioned her mother about the splint and her wrist, and immediately brought her to the emergency room. X-rays showed that Mrs. Phum's wrist had been fractured. Because of the delay in treatment and the improper splint, her wrist had started to heal in misalignment. The fracture that might have been treated with a simple cast would now require a much more complex procedure to align and set the bones.

> CRITICAL THINKING SKILL

Introduction

Client education is an essential part of nursing care.

Possible Scenario

Betty is a 34-year-old lab technician who fell and hurt her left ankle while jogging. She presents to the emergency room for evaluation. There are no obvious fractures or dislocations and she is stable so she is sent in a wheelchair for an x-ray. The x-ray reveals that she has a distal fibular fracture with no misalignment. She needs a posterior splint and to follow up with orthopedics for further evaluation. During the application of the splint, Betty becomes very agitated and moves around a great deal, making it difficult to size and properly apply the splint. After the posterior leg splint is put on and she is being discharged, she complains of numbness and tingling of her toes below the splint that you just applied.

Possible Outcome

You reassure Betty that she should put her leg up and ice it when she gets home. This will reduce the swelling and the splint will feel much better. Betty stays home for two days, with her leg elevated and iced, taking her prescribed pain pills. Her foot is still numb and her toes are white, but she assumes that is the way it should be. When she sees her orthopedic doctor two days after the incident he notes that Betty seems to have nerve damage in her left foot.

Prevention

Betty needed to be educated and included in the process of the splint application to ensure that she would remain cooperative. Her pain status and how she was managing the pain needed to be assessed prior to and during the process. The importance of a good fit to avoid interference with blood flow to the area and the neurovascular status cannot be overstressed. The neurovascular status needs to be evaluated before, during, and after the process.

▼ VARIATIONS



Geriatric Variations:

- Pay special attention to the condition of the skin and the neurovascular status because these areas can be compromised in the elderly. Their skin is more easily broken down, so they need to be checked more often when in the splint.
- If the client has a compromised mental status, it is important to have someone check on the client and ascertain that he get follow-up care.
- It is often difficult for the elderly to walk with crutches, so a wheelchair or walker may be needed.

▼ VARIATIONS *continued*



Pediatric Variations:

- *Children tend to move a great deal more when anxious, so it is important to include them in the process as much as possible, to get the best splint application possible.*
- *Children need someone to check the splint often to ensure there is no compromise to the neurovascular system.*
- *Children will need help with mobility while in the splint.*



Home Care Variations:

- *Clients who will be wearing a splint at home must be taught to watch for signs and symptoms of neurovascular compromise.*



Long-Term Care Variations:

- *Clients who wear a splint regularly must be sure to check for ongoing fit and wear and tear on the appliance.*
- *Fit and appliance wear should be checked by a professional at regular intervals.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Using a splint designed for the opposite extremity.

Ask Yourself:

How do I prevent this error?

Prevention:

Yes, there are differences in the splints made for a right hand or foot and ones made for a left hand or foot, so it is crucial that you are familiar with the splints and orthopedic appliances used in your facility. Physicians and qualified practitioners have preferences and familiarizing yourself with those appliances can increase your efficiency and decrease the number of errors and problems.

> NURSING TIPS

- Be sure the distal portion of the extremity is exposed for neurovascular assessment.
- Check and document the client's neurovascular status before, during, and after applying the splint.
- Familiarize yourself with the splints and appliances available in your facility. Know what they are supposed to look like and how they work both on and off the client.

SKILL 10-3

Applying an Arm Sling

Patricia Abbott, RN, MSN, ARNP

KEY TERMS

Neurovascular status	Triangular sling
Range of motion	Waist strap
Sling	



> OVERVIEW OF THE SKILL

A sling is used to support an injured upper extremity. Slings are used to immobilize an injured arm or shoulder due to sprain, strain, dislocation, or fracture. Slings are used to prevent dependent edema, control pain, promote rest to aide healing, and, if a fracture is present, to hold the upper extremity in the correct anatomical position. Slings are often used after an arm has been casted, to avoid unnecessary pull on the neck and shoulders from the weight of the cast. In an emergent situation slings are used as first aid to prevent further tissue damage, bleeding, and to control pain. Slings are also used to hold dressings in place.

Slings can be made of various materials. In the emergent situation any large triangular piece of fabric can be used. In the nonemergent situation commercially made slings are generally used. These are usually made from sturdy canvas, which forms a sleeve that fits around the client's injured limb, with a supporting strap that is padded and fits around the neck. Some slings also have a strap that fits around the client's waist to further immobilize the upper arm, in particular the shoulder.

> ASSESSMENT

1. Assess the arm, shoulder, and clavicle that is to have the sling applied. In an emergent situation, any possibility of a neck injury would preclude the use of a sling. **In a nonemergent situation assess for any other deformities or injuries that might preclude the use of an arm sling.**
2. Assess the client's skin integrity on the entire upper extremity and the neck, the sling is supported by the neck strap. If a triangular bandage is used as the sling, extra padding in the neck area will make the sling more comfortable, and may prevent skin breakdown. Extra padding on a **manu-**
- factured sling may be used as well for client comfort (see Figure 10-3-2).
3. Assess the client's level of consciousness to determine how he will tolerate the process of applying the sling and how he will deal with it after it is applied. **If the client is noncompliant, the waist strap may be necessary to establish the needed immobilization.**
4. Assess the client's level of pain. **If the client is having a great deal of pain, he may move around more, which could cause further tissue damage, bleeding, and improper immobilization.**

> DIAGNOSIS

- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.6.1.5 Risk for Disuse Syndrome
- 6.1.1.1 Impaired Physical Mobility
- 5.2.1 Ineffective Management of Therapeutic Regimen
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client will not experience any unnecessary pain.
2. The procedure will be performed with a minimum of trauma to the client.
3. The injured area is adequately supported to allow healing in proper alignment.
4. The client will not experience any skin breakdown or neurovascular damage as a result of the arm sling.

Equipment Needed:

- Dressing for wound(s) if needed
- Sling: either large triangular piece of cloth or pre-made sling
- Padding, if needed



Estimated time to complete the skill:

5 minutes



Figure 10-3-2 Extra padding around the neck area will make the sling more comfortable for the client.

> CLIENT EDUCATION NEEDED:

1. Teach the client how to put on and remove the sling if he will be wearing it at home.
2. Be sure the client understands not to let his hand droop down below the level of the elbow to prevent swelling and edema in the hand.
3. Unless otherwise ordered by the physician or qualified practitioner, teach the client to remove the sling once or twice a day to perform range of motion exercises.
4. Have the client or the caregiver perform a return demonstration of placing and removing the sling.
5. Teach the client how to check the neurovascular status of his fingers and hand. Instruct him to notify his physician or qualified practitioner if he notes any impairment.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.

Applying the Triangular Sling Used in Emergent Situations and for Brief Periods of Time

2. Place the affected arm across the client's chest with the fingers higher than the hand and the hand higher than the elbow. Flex the elbow to 90°.
3. Place the base of the triangle under the client's wrist with the apex of the triangle under the

RATIONALE

1. Reduces the transmission of microorganisms.
2. Keeping the hand above the elbow will prevent edema, which could compromise the client's neurovascular status.
3. Allows for proper positioning of the sling.

continues

Applying the Triangular Sling Used in Emergent Situations and for Brief Periods of Time *continued*

client's elbow. The endpoints at the base of the triangle should be pointing up and down, one on the client's unaffected shoulder and the other on his knee.

4. Pull the point at the client's knee up over the affected arm to meet with the point on his unaffected shoulder. Tie the two points together with a square knot at the client's unaffected shoulder.
5. Fold the apex of the triangle neatly around the affected elbow and secure it with a safety pin.
6. Pad any areas where the sling presses against soft tissues, such as the neck, axilla, or around a cast.
7. Have the client sit up or stand, if indicated, and check the alignment of the arm. The elbow should be enclosed, the fingers exposed, and the knot at the side of the neck, not in back. The client's hand should be above the level of his elbow.
4. Avoids pressure from the knot on the neck.
5. Provides elbow support and holds the arm in alignment.
6. Helps prevent skin breakdown in pressure areas.
7. Be sure to check alignment when the arm is in the position it will be held in most often.

Applying a Manufactured Sling Most Commonly Used when Immobilization will be Needed for a Long-Term Treatment

8. Position the sling next to the arm. Read the manufacturer's directions if you are unclear how to lay out the sling in the proper position (see Figure 10-3-3).
8. Allows for a smooth procedure.



Figure 10-3-3 Align the sling next to the arm in the correct position.



Figure 10-3-4 Support the arm and gently guide the arm into the sleeve of the sling.

9. Support the arm as you guide it into the sleeve (see Figure 10-3-4).
9. Places sling with a minimum of discomfort.

10. Adjust the shoulder strap. The straps should be snug but not tight, the hand should be held above the level of the elbow. The sling should be the proper length to expose the fingers (see Figure 10-3-5).

Figure 10-3-5 Adjust the shoulder strap. Make sure the fingers are exposed and the hand is positioned higher than the elbow when the sling is resting comfortably on the shoulder.

10. Ensures proper alignment of the arm as well as client comfort.



11. Adjust the waist strap. If the client has a shoulder injury the waist strap will be needed to provide further immobilization.

11. Allows for client comfort.

12. If the client will be wearing the sling while at home, teach him or his caregiver to apply and remove the sling.

12. Education promotes compliance and faster healing.

13. Wash hands.

13. Reduces the transmission of microorganisms.

> EVALUATION

- The client did not experience any unnecessary pain.
- The procedure was performed with a minimum of trauma to the client.
- The affected arm is adequately supported to allow healing in proper alignment.
- The client is not experiencing any skin breakdown or neurovascular damage as a result of the arm sling.

> DOCUMENTATION

Nurses' Notes

- Record the reason a sling was required and the type of sling applied. Note the condition of the client's arm, including neurovascular status, prior to placement of the sling.
- Note the neurovascular status of the client's arm after placement of the sling.
- Record the client's comfort level and understanding of the instructions received regarding care of the arm and placement of the sling.



▼ REAL WORLD ANECDOTES

While working nights in a long-term care facility, a confused client fell, striking her upper arm on the toilet. The charge nurse was called to the scene. The client was trying to get up despite two assistants trying to keep her still. She was holding her upper arm, which was obviously dislocated. The charge nurse sent one of the assistants to call for an ambulance. The client continued to struggle to return to bed. Rather than cause more damage to the client's arm, the second assistant helped the client back to bed while the nurse supported the client's arm in alignment. When the client was safely in bed, the nurse sent the second assistant for a triangle bandage. As they waited for the ambulance, the nurse applied a sling to the client's arm and attempted to calm and reassure the client.

> CRITICAL THINKING SKILL

Introduction

The proper equipment in the correct size is essential to good care.

Possible Scenario

You are working in the infirmary at a summer camp. During the initial check-in you notice one of the campers is wearing an arm sling. His left forearm is in a cast and the cast is in the sling. Upon questioning the child he gives you a note from his doctor. The note indicates that the boy had recently sustained a hairline fracture of the wrist but that he would be able to participate in most camp activities as long as he wears his sling. Upon closer examination you note that the boy's fingers have good capillary return but they are a little cool. You also note that the sling the boy is wearing extends well past the end of his fingers. When you ask about the sling, you are told that the clinic did not have a small sling so they used a larger one instead. You can see that the sling is so large it is not holding the boy's hand above his elbow. Additionally his fingers are hidden from view for neurovascular assessment. Because

the boy had not been wearing the cast very long and the possibility of bumping and injuring his arm is increased at camp, you are concerned that you cannot tell at a glance if the boy's fingers are pale or swollen. You are reluctant to allow the boy to stay at camp with the oversized sling, but his parents have already left and he is obviously looking forward to camping.

Potential Outcome

You resolve the dilemma by replacing the oversized sling with a triangle bandage sling. You carefully adjust the size of the triangle bandage so it will support the boy's arm in proper alignment and will allow the boy's fingers to be visible for inspection. When the boy's fingers started to swell after a particularly vigorous day, you had the boy elevate his hand and arm and put ice on it. The swelling went down in his fingers and the boy was able to finish out the week at camp.

Prevention

In areas that serve a specialized population, equipment of the proper size and variety should be on hand.

▼ VARIATIONS



Geriatric Variations:

- Older people often have thin, fragile skin. Extra care must be taken to pad the pressure points to prevent skin breakdown.



Pediatric Variations:

- Young children may need a strap around the waist to ensure immobilization, because young children tend to thrash around when in pain.



Home Care Variations:

- Home care clients need to be assessed regularly for compliance. Check that they are wearing their sling and be sure they are wearing the sling in a manner that actually provides support.



Long-Term Care Variations:

- Long-term care clients need to be reassessed regularly regarding their ongoing need for a sling. They also need to be reevaluated for fit because people can gain and lose weight over time, perhaps requiring a different size sling.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Allowing the hand to fall below the level of the elbow.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure that the sling fits properly and keep the hand elevated above the level of the elbow. Teach the client about the need to keep the hand elevated to prevent venous pooling and edema.

> NURSING TIPS

- Have the client demonstrate applying and removing the sling if he will be doing it at home.
- Assess the client's ability to perform the skill prior to discharge.
- Check neurovascular status before and after applying the sling.

SKILL 10-4

Applying Antiembotic Stockings

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Antiembotic
Antiembotic stockings
Deep venous
thrombosis

Elastic stockings or
hose
Stockings
TED® hose



> OVERVIEW OF THE SKILL

Antiembotic hose, also called TED hose or elasticized stockings, are used to promote circulation by compression and are useful to prevent thrombophlebitis. They are used on the legs of a client after surgery, in

clients who are immobile and, in clients who have vascular disorders such as thrombophlebitis, varicose veins, and other conditions of impaired circulation of the lower extremities.

> ASSESSMENT

1. Assess the condition of the client's lower extremities, noting edema, color, temperature, intact skin, ulcers, or infections. **Establishes a baseline for comparison** (see Figure 10-4-2).
2. Assess the quality and equality of peripheral pulses in the legs (either dorsalis pedis or posterior tibial pulses) to **determine circulatory status**.
3. Assess the client's understanding of the reasons for, and the use of, the antiembolic stockings to **determine the amount of client teaching required**.
4. Assess the client for signs and symptoms of deep vein thrombosis such as a positive Homans' sign and increased calf size to **determine the appropriateness of the TED hose placement**.

> DIAGNOSIS

- 1.6.2.1 Skin Integrity
- 1.4.1.1 Alteration in Circulation and Perfusion
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. The client will not experience any signs or symptoms of deep venous thrombosis or thrombophlebitis.



Figure 10-4-2 Assess the condition of the lower extremity prior to applying the antiembolic stocking.

2. The client's venous return will be improved.
3. The client's popliteal, posterior tibial, and dorsalis pedis pulses will remain intact while stockings are in place.
4. The client will have good circulation while stockings are in place, as evidenced by warm skin temperature, capillary return is within normal limits, sensation is present, and no edema is present in both extremities.

Equipment Needed (see Figure 10-4-3):

- Antiembolic stockings and package directions
- Powder or cornstarch (if client is not allergic)
- Tape measure



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Client understands the purpose of antiembolic stockings.
2. Client understands that stockings must be in place and free of wrinkles to avoid skin breakdown and constraints of circulation.



Figure 10-4-3 Antiembolic stockings and tape measure

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Review the orders with the client, including the reason for the stockings and the type of stockings ordered, e.g., knee or thigh high.
3. Explain the purpose of stockings and the procedure to the client.
4. With the client in a supine position in bed, measure the client's leg for the correct size:
 - Thigh-high stockings: from Achilles tendon to the gluteal fold, circumference of the midthigh
 - Below the knee stockings: from the Achilles tendon to the popliteal fold, circumference of the midcalf
5. Compare the obtained measurements with the package insert to ascertain proper size.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Facilitates compliance.
3. Clients who understand the purpose may better comply with use.
4. Supine position encourages venous return and decreases swelling thereby allowing accurate measurement for size of stockings.
5. Correct size is essential for stockings to apply the appropriate pressure for adequate venous return without compromise to circulation.

continues

6. Evenly apply talc or cornstarch on the client's leg and feet if client is not allergic to such substances.
7. Apply stockings. The best time to apply stockings is early in the morning, before the client gets out of bed or immediately after surgery. Keep client in supine position until stockings are applied.
8. Open the package and turn stockings inside out over hand and arm. Place hand deep enough inside a stocking to grasp the stocking toe.
9. Using the hand inside the stocking, hold onto the client's toes. Invert the stocking with the other hand and pull it over the hand and the client's toes. Release toes.
10. Hold each side of the stocking and pull it from the client's toes to the heel in one motion.
11. Continuing to hold each side of the stockings, firmly pull the stocking up by using the thumbs to guide the stockings upward over the ankles and up the client's leg (see Figures 10-4-4 and 10-4-5).
6. The use of talc or cornstarch allows for smoother appliance of stockings; however, clients may be allergic to powders. Powders also absorb moisture.
7. Feet are less swollen in the morning because the feet have been in a nondependent position during the night and most venous return has occurred. This, of course, is not the case in a client who has been up frequently during the night.
8. Because stockings contain strong elastic, application can be difficult if not initiated from the bottom up and if stockings are not turned inside out. Wrinkles in stockings can also occur if a systematic approach is not used for application.
9. See Rationale 8.
10. See Rationale 8.
11. See Rationale 8.



Figure 10-4-4 Place the stocking over the client's toes and foot.

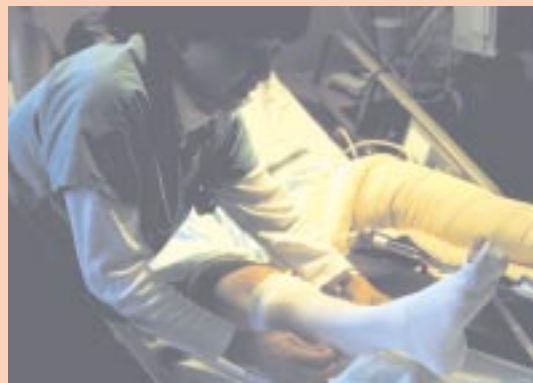


Figure 10-4-5 Pull the stocking smoothly and evenly up the client's leg.

12. Repeat with the other leg, if necessary.
13. Smooth and remove any wrinkles in the stockings and smooth over (see Figure 10-4-6).
12. See Rationale 8.
13. Wrinkles can create skin breakdown and constrict the circulation.

Figure 10-4-6 Smooth out any wrinkles and make sure the toes are comfortable.



14. Wash hands.

14. Reduces the transmission of microorganisms.

> EVALUATION

- The client has not experienced any signs or symptoms of deep venous thrombosis or thrombophlebitis.
- The client's venous return is improved.
- The client's popliteal, posterior tibial, and dorsalis pedis pulses remain intact while stockings are in place.
- The client has good circulation while stockings are in place, as evidenced by warm skin temperature, capillary return within normal limits, sensation within normal limits, and no edema in either extremities.

> DOCUMENTATION

Nurses' Notes

- Document use of stockings.
- Document skin integrity, any presence of venous problems, and circulatory status of extremities.
- Document equality of pedal pulses.
- Document size and length of stockings.



▼ REAL WORLD ANECDOTES

Mrs. Gooch is a home care patient who wears antiembolic stockings to control lower leg edema. While making a home care visit the nurse noted that Mrs. Gooch's edema was worse. The nurse questioned Mrs. Gooch about any changes in diet or medication that might account for this, but Mrs. Gooch denied doing anything different. When the nurse asked Mrs. Gooch if she was wearing her antiembolic stockings, Mrs. Gooch stated that she was wearing them although she had removed them prior to the nurse's arrival to facilitate the visit. Noticing an indented circle around Mrs. Gooch's upper calf, the nurse asked Mrs. Gooch to apply her stockings while she observed. Mrs. Gooch successfully applied the stockings but, because they were too long, Mrs. Gooch then rolled the top band of the stockings down just below her knees. The rolled band corresponded to the indented area on Mrs. Gooch's leg. The nurse explained the need for stockings that fit correctly. She noted that rolling the tops of the stockings down interfered with venous return, leading to increased edema. The nurse measured Mrs. Gooch's legs and wrote the measurements out for Mrs. Gooch so she could obtain a pair of stockings in the correct size.

> CRITICAL THINKING SKILL

Introduction

Application of antiembolic stockings takes some planning.

Possible Scenario

A client has antiembolic stockings ordered; however, he has been up in the chair for several hours. His legs and ankles are swollen with edema.

Possible Outcome

Getting the stockings on will be an arduous task for both the nurse and the client. If the client's experience with the stockings is very negative, future compliance could be poor.

Prevention

To prevent this experience from being unpleasant for both the client and the nurse, have the client lie in bed for one hour before applying stockings. Apply cornstarch to the client's legs and feet. Remind the client to apply the stockings in the morning, before getting up in the chair.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients who have not used stockings in the past may find them uncomfortable and not keep stockings in place.*
- *Because elderly clients often have dry skin they may find stockings irritating to use.*
- *Many elderly clients may have poor circulation in the extremities and, therefore, need to be assessed more frequently for compromised circulation and skin breakdown.*
- *Because of the strength of the elastic in the stockings, elderly clients generally need help with using stockings or need another person to put them on.*



Pediatric Variations:

- *Elasticized stockings are generally not used in children.*



Home Care Variations:

- *Long-term use of stockings requires reinforcement of the problems of wrinkles, loosely fitted stocking, and/or stockings that roll and cause restricted circulation.*
- *Stockings need to be washed every few days and, therefore, more than one pair is needed.*
- *Clients should be encouraged to remove stockings at least twice a day and clean feet and legs.*
- *Clients and their family should be taught how to apply and remove the stockings and how to assess circulation.*



Long-Term Care Variations:

- *Long-term use of stockings requires reinforcement of the problems of wrinkles, loosely fitted stocking, and/or stockings that roll and cause restricted circulation.*
- *Stockings need to be washed every few days and, therefore, more than one pair is needed.*
- *Clients should be encouraged to remove stockings at least twice a day and clean feet and legs.*
- *Clients and their family should be taught how to apply and remove the stockings and how to assess circulation.*
- *Stockings will stretch after long-term use and therefore, size should be assessed periodically.*
- *Reinstruction may be necessary to reinforce problems associated with wrinkles and rolling of stockings.*
- *Clients may become careless with using stockings over long periods; therefore, reinforce purpose and proper use.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client's stockings are the wrong size.

Ask Yourself:

How do I prevent this error?

Prevention:

Measure the client's legs according to the manufacturer's instructions. After applying the stockings, check the fit. Check later with client to verify stocking fit.

> NURSING TIPS

- Check stockings for proper placement at least every two hours or more often if needed.
- Stocking may roll and cause constrictions. Readjust periodically.
- Check lower extremities for circulatory status.
- If the client has peripheral vascular disease, check with the physician or qualified practitioner to ascertain that antiembolic stockings are not contraindicated.
- Remove stockings daily and have client exercise feet and toes.

SKILL 10-5

Applying a Pneumatic Compression Device

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Arterial insufficiency **Sequential compression devices**
Deep vein thrombosis **Sequential compression devices**
Edema **Venous stasis**
Pneumatic compression devices



> OVERVIEW OF THE SKILL

Pneumatic compression devices (PCD), also known as sequential compression devices (SCD), are used to minimize lower extremity venous stasis. They are used in clients who are immobile for an extended period of time and who are at risk of developing deep venous thrombosis as well as in clients with lower extremity edema. Cuffs or stockings that inflate and de-

flate at alternating intervals are applied to the lower extremities. The stockings inflate in a sequence that promotes blood flow back to the heart and decreases pooling of the blood in the lower extremities. Because the cuffs cause compression of vessels they are contraindicated in disorders of arterial insufficiency and preexisting venous thrombosis.

> ASSESSMENT

1. Assess the condition of the client's lower extremities, noting edema, color, temperature, intact skin, ulcers, or infections. **Establishes a baseline for comparison.**
2. Assess the quality and equality of peripheral pulses in the legs (either dorsalis pedis or posterior tibial pulses) **to determine circulatory status.**
3. Assess the client's understanding of the reasons for, and the use of, sequential compression devices **to determine the amount of client teaching required.**
4. Assess the client for signs and symptoms of deep vein thrombosis such as a positive Homans' sign and increased calf size **to determine the appropriateness of the sequential compression device placement.**

> DIAGNOSIS

- 1.6.2.1.2.1 Risk for Impaired Skin Integrity
6.1.1.1 Impaired Physical Mobility

> PLANNING

Expected Outcomes:

1. The client's venous circulation will be improved as evidenced by a circulatory assessment.
2. The client will not develop deep venous thrombosis as evidenced by the lack of Homan's sign and the lack of redness or swelling in the extremity.
3. The client's skin will remain intact.

Equipment Needed (see Figure 10-5-2A-C):

- Pneumatic sequential compression device and accompanying stockings
- Electrical outlet
- Tape measure



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the client that the compression device must be worn while lying down.
2. Demonstrate the correct method of putting the compression device on. Be sure to explain that the device must be snug but not so tight that it compromises circulation.
3. Reinforce the need for leg exercises to promote venous return despite the use of the compression device.
4. Educate the client to notify the nurse if he develops pain or tenderness in his calf or leg.



Figure 10-5-2A Antiembolic stockings and tape measure



Figure 10-5-2B Pneumatic compression device



Figure 10-5-2C Pneumatic cuffs

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Explain procedure to client.
3. Measure the leg according to manufacturer's recommendations.
4. Check that pneumatic cuffs match the mechanical unit (see Figure 10-5-3).
5. Check if the client is wearing elastic stockings, and if so, check for wrinkles and folds.
6. Palpate both dorsalis pedis and posterior tibia pulses for presence and equality.
 - Perform baseline neurovascular assessment comparing both feet for color, movement, and sensation (see Figures 10-5-4 and 10-5-5).

RATIONALE

1. Reduces the transmission of microorganisms.
2. Client understanding promotes compliance.
3. Stockings must be appropriate size to stay in place.
4. If equipment is mismatched, a malfunction is likely.
5. Wrinkles and folds under pressure can cause skin breakdown.
6. Need to assess the lower extremities for contraindications to compression device use. If contraindications are noted the physician or qualified practitioner should be notified prior to placing the device.



Figure 10-5-3 Make sure the correct size and type of pneumatic cuffs have been selected. If a client is wearing elastic stockings, make sure folds and wrinkles are smoothed out and toes are comfortable. The stocking in this photo needs to be adjusted.



Figure 10-5-4 Perform a neurovascular assessment.



Figure 10-5-5 Check feet for pulse, warmth, color, movement, and sensation.



Figure 10-5-6 Position the cuff under the client's leg and wrap the cuff around the client's leg.

- Note if the client has evidence of skin irritation or breakdown, signs of infection, or arterial insufficiency (diminished pulses, loss of pedal and popliteal pulses, numbness, loss of hair on the legs, pain during exercise, leg pallor, or numbness).

7. Position the cuff flat on the bed next to the client's leg. Most manufacturers have markings for the position of the ankle and popliteal areas.
8. Place the client's leg directly in the center of the cuff with the back of the client's knee aligned with the opening in the back of the cuff (see Figure 10-5-6).
9. Wrap the cuff around the client's leg with the opening in the front of the cuff over the client's knee (see Figure 10-5-7).
10. Secure the cuff with the Velcro attachments, making sure two fingers fit between the client's leg and the cuff at both the ankle and knee.
7. Positioning is important for fit so that stockings will stay in place and function properly.
8. Proper positioning allows the cuff to stay in place and function properly.
9. Proper positioning allows the cuff to stay in place and function properly.
10. Allows for expansion during inflation, while not slipping out of position during deflation.



Figure 10-5-7 Secure the cuff in place.



Figure 10-5-8 Attach the cuff to the pneumatic compression device.

11. Attach the cuff to the mechanical unit. Most manufacturers have arrows that line up on the mechanical unit tubing and the tubing on the cuff (see Figure 10-5-8).
12. Turn the unit on and watch the movement of the cuff for one cycle to ensure proper inflation and deflation (see Figure 10-5-9).

11. If tubing is not tightly connected, the cuff will not properly inflate.
12. It is important to watch for inflation and deflation because airleaks will cause the cuff to malfunction.

Figure 10-5-9 Observe the unit for one complete cycle of inflation and deflation.



13. At regular intervals (at least every four hours) unplug the unit and remove the cuff after deflation.
 - Inspect the skin and provide skin care.
 - Perform a neurovascular assessment including CSM (color, sensation, and movement) and temperature of the skin, pulses, and capillary refill of the distal extremities.
 - Compare both extremities and compare with baseline assessment.
 - Avoid vigorous rubbing and massaging.

13. The plastic of the compression cuff can decrease air circulation to the skin leading to skin breakdown, especially in elderly clients. Inspecting the extremities at regular intervals is essential because deep venous thrombosis can occur even with the use of the compression cuff.

14. Wash hands.

14. Reduces the transmission of microorganisms.

> EVALUATION

- The client does not exhibit any signs or symptoms of deep vein thrombosis.
- The skin on the client's lower extremities is intact.
- The circulation to the client's lower extremities is not compromised.

> DOCUMENTATION

Nurses' Notes

- The first time the compression device is placed document the size and type of cuff used, all findings regarding deep vein thrombosis and circulatory impairment, and the client's tolerance regarding the use of the device in the narrative notes.
- Document subsequent assessments and any changes you have noted.



▼ REAL WORLD ANECDOTES

During her change of shift assessment at 7:30 AM, the nurse noted that Mrs. Rhinehart's pneumatic compression stockings were bunched down around her ankles, rendering them ineffective. The nurse removed the compression stockings, assessed Mrs. Rhinehart's lower extremities and replaced the compression device in the proper position. As she was serving Mrs. Rhinehart's breakfast the nurse noted that the compression stockings had slipped down around Mrs. Rhinehart's ankles again. Puzzled, she assessed Mrs. Rhinehart's legs and replaced the compression stockings. When the nurse returned to Mrs. Rhinehart's room to assist her with her bed bath she noted that Mrs. Rhinehart was not in bed. The nurse found Mrs. Rhinehart in the bathroom having a cigarette, despite orders for strict bed rest. The nurse noted that Mrs. Rhinehart's compression stockings were once more dangling around her ankles. The nurse assisted Mrs. Rhinehart back to bed and educated her regarding the need to stay in bed according to orders. The nurse also contacted Mrs. Rhinehart's physician regarding a prescription for a smoking cessation aid.

> CRITICAL THINKING SKILL

Introduction

Careful client assessment can prevent serious problems.

Possible Scenario

You are in Mrs. Flowers' room to put on her PCD. As you smooth the elastic stockings she will be wearing underneath the device, to remove any wrinkles, she complains of pain in her left calf.

Possible Outcome

You assure Mrs. Flowers that she is just a little stiff from being in bed. You proceed to rub the area to relieve the pain. Mrs. Flowers begins to complain of

shortness of breath and becomes cyanotic. You immediately request assistance and Mrs. Flowers is treated emergently. After she has been treated and transferred to the intensive care unit, you are told that Mrs. Flowers had deep vein thrombosis in her left calf and apparently a portion of the clot had broken off and migrated to her lungs.

Prevention

You should have stopped to assess her condition. You would have detected that she had developed deep venous thrombosis. Instruct Mrs. Flowers to remain in bed while you notify her physician regarding this new finding.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have wasting of the extremities and it is essential to carefully measure for size.
- Elderly clients who are not active may complain of pain with dorsiflexion due to stiff ankles. These clients may not have a positive Homans' sign. Therefore, if the client has pain with dorsiflexion, check the back of the calf for redness, lumps, hardness, and increased size of calf of leg.



Pediatric Variations:

- The sequential compression device is rarely used on children.
- On occasion it may be used to mobilize edema that has pooled in an extremity. If this is the case, a child must be watched very closely for fluid overload because their tolerances are so much lower than adults.

continues

▼ VARIATIONS *continued*



Home Care Variations:

- *Pneumatic compression devices may be used in the home with clients who suffer from stasis pooling of fluids in their extremities.*
- *These clients generally suffer from congestive heart failure or some other fluid sensitive disorder. They must be watched closely for fluid overload when the device is first being used.*
- *These clients may have several gallons of water pooled in the lower extremities and the sudden fluid shift could send them into cardiac failure.*



Long-Term Care Variations:

- *You should assess the equipment periodically for wear and tear.*
- *Pinhole leaks in the compression device can render it useless.*
- *If the plastic is stretched beyond elasticity from use, the stocking portion of the device must be replaced.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The compression stockings do not seem to be inflating properly.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the equipment is in good working order before starting the procedure. Is the machine turned on? Are the compression stockings connected properly to the machine? Are there any tears or holes in the compression stockings?

> NURSING TIPS

- Compression stockings may become loose when clients are restless and move in bed. Approximately every two hours check that stockings are tight enough and properly positioned.
- Check skin integrity and circulation every 4–8 hours.
- Be sure to monitor for deep vein thrombosis and fluid overload.

SKILL 10-6

Applying Abdominal, T-, or Breast Binders

Cheryl L. Cooke, RN, MN, and Valerie Coxon, RN, PhD

KEY TERMS

Abdominal binders	Breast engorgement
Bandages and dressings	Breastfeed
Binders	Lactation
Bra	Scultetus
Breast binders	Suppression
	T-binders



> OVERVIEW OF THE SKILL

In the past, abdominal binders were primarily used to provide support and comfort for an incision following abdominal surgical procedures. Today binders are most often used to hold dressings in place, to support soft tissue, or to suppress lactation. Single and double T-binders hold rectal or perineal dressings in place. Abdominal binders support the abdomen and hold abdominal dressings in place. Stretch net binders are not designed for support, but simply to hold dressings in place. Scultetus binders are multitailed binders that are wrapped tail tucked under tail to support the abdomen. They are not often used today.

A breast binder or a tight bra is used as a non-pharmacologic device to aid in lactation suppression. The binder is placed over the breast to prevent breast and nipple stimulation. The support offered by binders and bras prevents the let-down reflex and discourages milk flow. Ice packs are used in conjunction with breast binders to relieve discomfort associated with breast engorgement.

Proper placement of any binder is essential for optimum comfort and effect. The binder must be smooth, must be the right size for the client, must not interfere with circulation, and must not put too much pressure on the bound area.

> ASSESSMENT

1. Assess the reason the binder is needed to determine the correct binder and correct placement.
2. Assess the client's skin condition for rashes, inflammation, open areas, or dressings to provide a baseline for future assessments.
3. Assess and measure the client to determine what size binder will be needed.
4. Assess for any special circumstances that may affect the placement of the binder such as dressings,

tubing, catheters or IV lines to determine a plan for binder placement.

5. Assess the client's understanding of the reasons for the binder and the method of placing the binder to determine how much client teaching will be needed.

> DIAGNOSIS

- 6.5.1.2.1 Interrupted Breastfeeding
- 6.1.1.1 Impaired Physical Mobility

> PLANNING**Expected Outcomes:**

1. For breast binder, lactation will be suppressed.
2. Binder will provide support for dressings or soft tissue.
3. Binder will not be too tight, or compress the skin.
4. T-binder in a male patient will not compress the testicles.
5. Client will assist in the placement of the binder as much as possible.

Equipment Needed (see Figure 10-6-2):

- Correct binder for intended purpose
- Safety pins or fasteners



Estimated time to complete the skill:
5–10 minutes

> CLIENT EDUCATION NEEDED:

1. Explain to the breast binder client that lactation may continue for up to 16 days.
2. If safety pins are used as fasteners, pin the binder in a place where, if the pins inadvertently open, the client can reach them easily.
3. Advise the breast binder client that, for adequate suppression and support, the binder should be worn 24 hours a day.

4. With a breast binder, allow the client to express her concerns regarding the cessation of lactation. It is important for her to voice questions or concerns, and to receive satisfactory response.
5. With a breast binder, remind clients of the signs and symptoms of both breast engorgement and mastitis.
6. Remind the client that if breathing is difficult with a binder on, the binder should be adjusted for a more comfortable fit.
7. Discuss the signs and symptoms of skin breakdown, and encourage the client to report signs of skin irritation. Encourage the client to examine the skin beneath the binder each day that the binder is in use.



Figure 10-6-2 Scultetus binder

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE****Bra Binder**

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Assist the client to a sitting position. | <ol style="list-style-type: none"> 2. Sitting will allow ease in placement of the bra. If not possible, turn client side-to-side while applying bra. |
| <ol style="list-style-type: none"> 3. Apply bra, adjusting for a snug fit. | <ol style="list-style-type: none"> 3. The tightness of the bra will be instrumental in adequate lactation suppression. |
| <ol style="list-style-type: none"> 4. Adjust if necessary. Be sure that breast binder is not restricting breathing or causing skin irritation. | <ol style="list-style-type: none"> 4. Bra binders that are too tight may make breathing difficult and/or may contribute to skin irritation or breakdown. |

5. Add use of adjunctive treatments (e.g., ice packs, analgesics) for additional comfort, if needed.
6. Wash hands.

Other Binders

7. Wash hands.
8. Choose correct binder. If a stretch net binder is being used, select the correct circumference, and cut length to fit.
9. Help the client into the proper position to place the binder.
 - For abdominal binders, the client should lie supine and lift the hips, or alternatively, position the client on one side, and roll the client onto the binder (see Figure 10-6-3). For stretch net binders, slide the net over the head and neck, or slide the net up from the feet, depending on which is easier for the client.
 - For T-binders, select a single-tail binder for a female, a double-tail binder for a male.
 - Have the client lift the hips or alternatively, position the client on one side, and roll the client onto the binder.
 - Place the waistband at the waist, with the single or double tails pointing downward along the spine.



Figure 10-6-4 Wrap the binder snugly around the waist.

10. Wrap the abdominal binder snugly around client's waist, starting from the lower abdomen and working upward (see Figures 10-6-4 and 10-6-5).
 - Bring the tail(s) of the T-binder up between the client's legs. For the male, one tail should

5. If breasts are engorged, adjunctive treatment may be required to increase client's level of comfort.

6. Reduces the transmission of microorganisms.

7. Reduces the transmission of microorganisms.

8. Select the correct binder for the job. The correct size will make the binder most effective.

9. Applying binders can be awkward if the client is not positioned correctly.



Figure 10-6-3 Place the binder under the client.



Figure 10-6-5 Secure the lower abdomen first and work upward.

10. Correct application allows the client to get the most benefit from the binder.

Other Binders *continued*

be placed on each side of the testicles. Join tails to the waistband and secure.

- Stretch net binders should be adjusted to cover the dressings they will be holding in place.

11. Secure binders with fasteners. If the binder does not have Velcro fasteners, secure with safety pins. Stretch net binders cling and stretch over the body part and do not need additional fastening (see Figure 10-6-6). Check for snug fit.

Figure 10-6-6 Stretch net binders are flexible and elastic. They cling and stretch over the body part that needs to be covered. In this case, the stretch net binder will be used to hold sterile dressings over the wound.



11. Fasteners will keep binder in place. Be sure that all fasteners are closed securely to prevent possible client injury.

12. Adjust if necessary. Be sure that binders are not restricting breathing or circulation (see Figure 10-6-7). Be sure that sterile dressings are in place between the binder and any wound (see Figure 10-6-8).



Figure 10-6-7 Assess the client to be sure the binder does not restrict breathing or circulation.

12. Binders that are too tight may make breathing difficult, and may contribute to skin irritation or breakdown. Binders are generally not sterile, so sterile dressings must be in place over the wound.



Figure 10-6-8 If a stretch net binder is used to cover a wound, make sure a sterile dressing is in place between the binder and the wound.

13. Wash hands.

13. Reduces transmission of microorganisms.

> EVALUATION

- For breast binder, lactation is suppressed.
- Binder provides support for dressings or soft tissue.
- Binder is not too tight and does not compress the skin.
- T-binder on a male client does not compress the testicles.

- Client assists in the placement of the binder as much as possible.

> DOCUMENTATION**Nurses' Notes**

- Document the time, date, and type of binder.
- Document any difficulty that the client experienced with the procedure.



▼ REAL WORLD ANECDOTES

A nurse went to apply an abdominal binder to a very obese man recovering from an exploratory laparotomy. It took extensive struggling to move the equipment and visitors from the bedside, position the bed, roll the man to his side, and place the binder. When he rolled back to the supine position, the nurse began to adjust and fasten the binder. She then discovered that it was 6 inches too short to go around his middle. She had to start over. In her hurry, the nurse guessed at the correct size binder for this client, but was incorrect.

> CRITICAL THINKING SKILL

Introduction

Your client, a 13-year-old primipara, is complaining of sore, heavy breasts on postpartum day 2. You offer her a breast binder for comfort, but as you start to explain how it is applied, she bursts into tears. She states that she has tried to breastfeed, but her boyfriend (the baby's father) does not want her to continue. She is anxious and indecisive. What do you do?

Possible Scenario

Now is *not* a good time to discuss the need for a breast binder, because this client has not made up her mind regarding breastfeeding. This is a critical moment for additional nursing assessment. This client has psychosocial needs surrounding the birth of the child, changes to her relationship, and changes to her body. A visit by a psychosocial care provider may answer ques-

tions that she and her partner have regarding breastfeeding and other issues related to the pregnancy.

Possible Outcome

Your timely nursing intervention allows the client and her boyfriend to discuss their fears and uncertainties regarding the baby and the decision to breastfeed. Later that day, you continue with education regarding the breast binder and other methods to reduce discomfort.

Prevention

The stress of having a child, especially among very young mothers, may precipitate distress related to breastfeeding and/or the need for lactation suppression. Be alert for verbal and nonverbal cues and practice therapeutic communication as needed.

▼ VARIATIONS



Geriatric Variations:

- If the elderly client is confused, try to avoid using safety pins to fasten binders.
- If safety pins are required, cover them with tape or dressing to discourage the client from unfastening the binder or sticking himself with the pins.



Pediatric Variations:

- Stretch net binders may need to be taped in place to help younger or more active children avoid dislodging the bandage underneath.
- When applying a stretch net binder, consider bringing another piece of stretch net in a smaller size so the child can "bandage" a doll or favorite toy.
- In young children, try to avoid using safety pins. If safety pins must be used, cover them with tape or a dressing to discourage the child from opening the pin.



Home Care Variations:

- When considering the use of breast binders, the decision to suppress lactation may be made after the client leaves the facility, or during a home birth, where the client is not admitted postpartum. The nurse may be advised of the desire for lactation suppression while the client is in the outpatient setting. In these cases, instructions may be given over the phone.
- The use of a bra binder may be more appropriate and easier for the client to manage in a home setting.

▼ VARIATIONS *continued*

- Rather than use a commercially manufactured breast binder, it may be more cost effective to encourage the client to use a sports bra or other snug-fitting bra from home. • Abdominal and T-binders can be improvised in the home care setting, using readily available materials, such as safety pins, Velcro, elastic webbing, and strong smooth material, such as cotton or muslin. Make sure the binder is large enough to bind the area without undue constriction.
- Make two or three binders, if they will be used for more than a day, so one may be worn while the others are laundered.



Long-Term Care Variations:

- Make sure any binders are checked regularly for comfort, skin irritation, shifting of the binder, or constriction of the area under the binder.
- If applicable, encourage the client to self-examine the skin beneath the binder each day that the binder is in use.
- If a client requires a binder for long-term use, teach the client to apply it and monitor it, if possible, to encourage independence and self-care.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The binder does not fit.

Ask Yourself:

How do I prevent this error?

Prevention:

Take the extra time to measure the binder and the client before you begin the procedure. Be sure the binder is large enough for the client but small enough to provide the necessary support.

> NURSING TIPS

- There are commercially made breast binders that can be ordered from medical or surgical supply companies. However, these may be a more costly alternative to using a bra binder or other type of breast binder.
- A good bra often provides both lactation suppression and support.
- If abdominal binders are used, periodically assess for tightness and adjust if the binder impedes respiration.
- Use a bra binder if the client does not have another individual at home to help her apply other types of breast binders.
- If the stretch net binder rolls when the client moves about in bed, consider taping it to the skin with paper tape in one or two strategic places.

SKILL 10-7

Applying Skin Traction—Adhesive and Nonadhesive

Samuel C. Taylor, RN

KEY TERMS

Bony prominences
Lines
Muscle spasms
Neurovascular assessment

Pulley
Skin breakdown
Skin traction
Weights



> OVERVIEW OF THE SKILL

Traction is designed to align or immobilize parts of the body. Traction may be used to reduce or immobilize fractures or to reduce muscle spasms. Traction is applied using weight or force to gently pull on the body parts. There are two basic types of traction—skin traction and skeletal traction. This skill deals with the application, use, and evaluation of various types of skin traction.

Skin traction uses the client's skin as the anchor point of the weight or force. The traction is anchored to the skin using either adhesive tapes, Velcro straps, or a fitted brace. Some types of skin traction employ a brace or other rigid garment to apply gentle force to the client's body. Others use weights, ropes, and pulleys to apply force to the client's body.

Traction often requires specialized equipment for support and proper alignment. Many hospitals employ technicians who are trained to set up and maintain traction equipment and to fit braces. The nurse may be called upon to measure and fit some types of traction, as well as assess and maintain traction devices.

Following are some of the more common types of skin traction:

Buck's traction: This is straight traction placed on the lower extremity to help reduce a hip

or femur fracture. Buck's traction can also reduce or prevent muscle spasms caused by a hip or femur fracture. Buck's traction can be applied with adhesive tape secured with an elastic bandage and attached to a pulley and weight. A manufactured "boot" is also available. The boot wraps around the leg and is secured with straps. It is then attached to the pulley and weight system in the same way as the adhesive traction. Care must be taken to maintain alignment and watch for any skin breakdown that may occur. Maintenance of the pulley system is very important. The line must not become tangled in the bed linen and the weights must hang freely.

Bryant's traction: This is very similar to Buck's traction and is used for reduction of femur fractures or to immobilize the hip joints in children who weigh less than 40 pounds. In Bryant's traction both the child's legs are wrapped and a spreader bar is placed to separate the limbs. Two sets of pulleys and weights are then attached overhead to lift the child's buttocks off the mattress by about 1–2 inches. This traction maintains alignment, helps reduce any fracture, and immo-

bilizes the child. Bryant's traction places the child's skin at risk in several areas. The client's back, elbow, coccyx, and head are vulnerable to skin irritation and breakdown and must be closely monitored. This position also raises concerns regarding elimination, feeding, and hydration. All these basic needs must be met, as well as the child's mental and emotional needs related to immobility, and the need for stimulation.

Russell's traction: This is a balanced traction arrangement of pulleys, lines, slings, and weights used to treat knee or hip injuries in adults and to reduce femur fractures in children. Russell's traction is applied to the client's lower leg. A sling is placed under the client's knee and two pulley and weight setups are applied to support the knee sling. Assessment of the skin is critical in this type of traction because of the possibility of skin breakdown on the coccyx, back, elbows, head, and parts of the noninjured extremity, especially the heel. Footdrop is also a risk and exercises as well as foot support should be used. A client in this type of traction is also at risk for deep vein thrombosis, respiratory complications, and constipation.

Cervical traction: Cervical traction can be applied in several different ways. Medics often apply a hard cervical collar on clients with suspected cervical injury. This type of collar is generally used only for short periods of time. Care must be taken to maintain good alignment when placing this type of collar. The soft cervical collar or Philadelphia collar is used primarily for soft tissue or ligament damage. It is often prescribed for comfort and support of the neck and head. It is not used for fracture alignment or immobiliza-

tion. Care should be taken to properly fit this collar. It can cause skin breakdown if not fitted correctly and will not provide proper support if it is too large or too small. Cervical traction can also be applied using a cloth collar attached to a weight and pulley system. It is primarily used to relieve muscle spasms and nerve compression in the neck. Neurologic assessment and skin assessment are extremely important in this type of traction due to the vulnerability of the area. The client is not usually placed in this traction for long periods of time.

Pelvic belt or girdle: This type of traction is used to relieve pain caused by muscle spasm or nerve impingement in the lower back. A girdle is placed around the client's hips and a pulley and weight system is then attached to the girdle, extending down over the foot of the bed. This maintains alignment of the back, hips, and legs and provides gentle pulling on the lower back. Pelvic traction can be used in the home setting. The nurse should reinforce client teaching regarding the proper use of this type of traction.

Humerus traction: Humeral traction is used to stabilize upper arm fractures and shoulder dislocations. The upper arm is held at a 90° angle from the body and the forearm is flexed. Traction is placed to pull on the hand and the elbow. This allows for a gentle pull to realign the fracture or dislocation.

Any client in traction is at risk for skin breakdown at the injury site and also in areas with a thin layer of skin over bony prominences such as the shoulder, back, coccyx, heels, and head. A thorough skin assessment must be performed regularly to prevent skin breakdown.

> ASSESSMENT

1. Assess skin integrity to evaluate and treat any actual or potential skin breakdown in the traction area.
2. Assess neurovascular status in the affected areas to evaluate any potential or actual neurovascular compromise.
3. Assess the client's understanding of and need for the treatment to provide any client education and support needed.

4. Assess for complications of traction and immobilization in order to determine a plan of treatment.

> DIAGNOSIS

- 9.1.1 Pain
- 6.1.1.1 Impaired Physical Mobility
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 9.3.1 Anxiety

> PLANNING**Expected Outcomes:**

1. The affected body part will have adequate neurovascular perfusion as evidenced by color, capillary refill, movement, and sensation.
2. The client will understand the reason for the traction and be able to cooperate in his care and treatment.
3. The client will experience a minimum of discomfort and trauma secondary to the traction.

Equipment Needed (see Figure 10-7-2):

- Pain medication, if necessary
- Overhead traction bars if needed
- Weights in various pounds
- Traction line and pulleys
- Skin traction device as ordered by the physician or qualified practitioner
- Adhesive traction tape and elastic bandage, if appropriate
- Razor, if needed
- Benzoin solution, if needed



Figure 10-7-2 Sandbags provide weight for traction.

> CLIENT EDUCATION NEEDED:

1. Explain the need for the traction. Discuss the continuing injury to the tissues, muscles, and blood supply that can occur without immobilization.
2. Assure the client that this is a necessary, but usually temporary, procedure that will aid in the healing process and that every measure will be taken to make the client as comfortable as possible during the procedure.
3. Explain the procedure step by step and ask questions. This will help the client anticipate what will occur. Asking questions will provide a sense of control and help alleviate anticipatory anxiety.
4. Explain that some discomfort may occur, and outline options for pain control.
5. Explain the possible complications of traction and prolonged immobilization. Teach the client to self-assess for these complications and to report them to the staff. This increases the client's sense of autonomy and control.
6. Teach the client appropriate range of motion exercises to prevent muscle atrophy as much as possible.



Estimated time to complete the skill:
30 minutes

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE****Applying Skin Traction**

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Assemble the overhead traction bars if needed (see Figure 10-7-3). | <ol style="list-style-type: none"> 2. Provides a stable foundation for the traction. |
| <ol style="list-style-type: none"> 3. Clean the skin area the traction will be applied to, assessing the area at the same time. | <ol style="list-style-type: none"> 3. Clean skin will provide a better base for adhesive traction. Clean skin is less likely to break down. |

continues

Applying Skin Traction *continued*

Figure 10-7-3 Overhead traction bars must be assembled prior to use.

4. Know the type of traction being applied. Request assistance if you are working with unfamiliar equipment (see Figure 10-7-4).

Adhesive Traction

5. Shave the area if there is a large amount of hair.
6. Apply tincture of benzoin to the area to be taped.
7. Place the adhesive traction tape on the body part to provide the appropriate direction of pull. Add any spreader bars or hooks needed to attach the tape to the traction rope and weights.
8. Wrap the body part and adhesive tape with the elastic bandage.

Nonadhesive Traction

9. Apply the traction appliance to the appropriate body part (see Figure 10-7-5).
10. Secure it with the fasteners provided (Velcro, straps and buckles, ties) (see Figures 10-7-6 and 10-7-7). If no fastener is provided, an elastic bandage may be wrapped around the appliance or adhesive tape may be used.



Figure 10-7-4 There are many types of traction devices. Understand how the device you are using works before applying traction to the client.

4. Reduces the risk of injury to the nurse or client.

5. Provides better adhesion with the skin and prevents pain from hair pulling.
6. Benzoin helps the tape stick and helps prevent skin damage from the tape. Do not use benzoin around the client's face.
7. Placing the tape in the direction of pull allows for maximum traction from the weight used.
8. Provides support for the body part and holds the adhesive tape in place.
9. Nonadhesive traction requires a halter, corset, boot, or other device for the weight to pull against.
10. Keeps the appliance in the proper position. Be sure not to fasten the appliance too loosely to benefit the client or too tightly to constrict circulation to the body part.



Figure 10-7-5 Apply the traction to the appropriate body part.



Figure 10-7-6 Secure the traction snugly to the body with fasteners provided.



Figure 10-7-7 Traction device properly applied and secured



Figure 10-7-8 Connect the client to the source of traction.

11. If the appliance is to be attached to weights, or a traction device, attach the appropriate spreader bars, hooks, or other hardware (see Figure 10-7-8).
12. Apply the amount of traction ordered for the correct amount of time.

Traction with Weights

13. Attach pulleys in the appropriate places. Be sure the pulley is in alignment with the body part and the desired direction of pull.
14. Tie the traction rope in a knot that will hold the weight without slipping.
15. Gently apply the ordered weight to the traction rope. Be sure the weights hang free.
16. Monitor the client while on traction. Assess for pain, shifting, or slipping of the traction.
17. Wash hands.

11. Provides a place to fasten the traction rope.
12. Provides the maximal therapeutic benefit.
13. Allows for appropriate body alignment.
14. Prevents the traction from being released suddenly due to slippage of the knot.
15. To apply gentle traction to the ordered body part. If the weights or rope are tangled in the bedclothes or resting on the floor, the ordered amount of traction will not be attained.
16. Ensures client safety and maximal therapeutic benefit.
17. Reduces the transmission of microorganisms.

> EVALUATION

- The affected body part has adequate neurovascular perfusion as evidenced by color, capillary refill, movement, and sensation.
- The client understands the reason for the traction and is able to cooperate in his care and treatment.
- The client experiences a minimum of discomfort and trauma secondary to the traction.

> DOCUMENTATION

Nurses' Notes

- Document the client's skin condition and neurovascular status as well as how the client is coping with the traction.
- Document any client teaching done.



▼ REAL WORLD ANECDOTES

A client was placed in a plastic cervical collar because of an injury to his neck. The client was also a heavy smoker and after being outside for a considerable amount of time he returned to the unit with his C-collar on sideways and upside down. When questioned about this he completely denied any personal adjustment of his collar and stated that the nurse on the previous shift placed him in the collar exactly this way. The client was placed on strict bed rest, more x-rays were taken and fortunately the damage was not severe and the client suffered no ill effects. This shows the need for client education, and for verification that the client understands the treatment.

> CRITICAL THINKING SKILL

Introduction

Client education is critical to client compliance.

Possible Scenario

A middle-aged female client is in pelvic traction for lower back pain. She has bathroom privileges and has been taught how to apply and remove the pelvic traction girdle by herself. Upon starting your shift you note that this client is lying in bed, watching TV without her pelvic traction. When you ask her about it she notes that her back does not hurt right now and she is tired of being pulled down in bed all of the time.

Possible Outcome

You counsel the client regarding wearing her traction whenever she is in bed. She reappplies the pelvic girdle and you gently reapply the weight to the pelvic traction.

The next time you check on the client she is once again lying in bed without her traction. She explains that she had just returned from the bathroom and was about to replace her traction. You note that she appears to have been lying in bed without her traction for some time. You assist the client to reapply the traction but you are concerned that she will remove it again after you have left the room. In report the next day you find out that this client has had an increase in lower back pain and is scheduled for a myelogram and possibly a lumbar laminectomy due to the exacerbation in her symptoms.

Prevention

Explain to the client the need for keeping the traction in place even if the symptoms have eased. The traction is probably the reason the symptoms initially decreased and discontinuing the traction could lead to a return of symptoms or possibly increased damage to the area.

▼ VARIATIONS



Geriatric Variations:

- *With older adults, skin breakdown is a concern and special emphasis is placed on checking for any redness over bony prominences. In this population special concerns regarding nutrition and elimination are important factors and have to be dealt with on an individual basis.*
- *Feelings of helplessness and hopelessness are prevalent in this age category and the need to bring in family, perhaps pastoral care, and even rehab psychology may be considered to help with this life transition to ensure a positive outcome.*

▼ VARIATIONS *continued*



Pediatric Variations:

- *With children, traction is extremely difficult because of the inability to understand their limitations and the need to remain compliant with the plan of care.*
- *Special support from the parents is essential in treatment. Generally, involvement of the parents in the decision-making process increases understanding and compliance considerably.*



Home Care Variations:

- *Clients using traction at home should be re-evaluated frequently for compliance, and proper placement and usage of the traction.*



Long-Term Care Variations:

- *Equipment used for long-term care should be examined frequently for wear and tear, and replaced promptly if worn or frayed.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client's feet are resting on the foot of the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

If the client's feet are resting on the end of the bed, or if the traction weights are resting on the floor the client is not receiving the traction ordered. Teach the client how to move up in bed safely. If the client can tolerate it, raise the foot of the bed to prevent sliding down to the foot of the bed. Be sure the client understands the importance of maintaining the full weight of the traction for the prescribed time.

> NURSING TIPS

- Get adequate help when turning any client while in traction or in a supportive brace.
- Make certain that nutrition and elimination issues are addressed; many clients become constipated because of pain medication and inactivity, adding to their discomfort.
- Adequate pain relief is essential in dealing with clients in traction. Muscle spasms and bone pain can be excruciating if the pain is not being properly addressed.
- The basic principle of traction is proper alignment. If the body part is not in alignment the pain will increase considerably. Make certain that all lines are straight, all weights are free to move, all extremities are straight and, if indicated, client should be properly supported by pillows and other supportive devices.
- Make certain that body jackets or braces are properly fitted and no skin is caught in the sides or pinched where the jacket fits together.
- Gain client compliance by taking the time to teach all the important points of dealing with traction or a brace. Listen to the client's concerns and take time to answer the client's needs.
- Recreational therapy can offer diversional activities to clients who are in traction for long periods of time.

SKILL 10-8

Assisting with the Insertion of Pins or Nails

Samuel C. Taylor, RN, and Valerie Coxon, RN, PhD

KEY TERMS

Alignment	Pins
External fixation	Skeletal traction
Fracture	Traction
Pin insertion	Weights



> OVERVIEW OF THE SKILL

Sometimes traction or fixation is applied directly to the bone using specialized equipment, such as Crutchfield tongs, Steinmann pins, or Kirschner wire, nails, or screws. Connecting traction directly to the bone immobilizes the affected bone, and/or allows more precise alignment of the fractured bone fragments. It provides a stronger steady pull, and allows longer periods of traction. Skeletal traction can be used for short-term treatment of the fracture, until it is openly reduced and internally or externally fixated during surgery. Often, traction directly to the bone is used when the skin or tissue is not intact, such as an open fracture, and casting might increase the risk of infection. There are several types of skeletal traction, including balanced suspension traction, halo traction, external fixation, and skull tongs.

External fixation uses pins implanted into the bone, and held in place by an external metal frame. Halo traction provides support for cervical injuries using pins placed in the skull, which are then attached to external metal bars fixed on a rigid chest vest. The arrangement allows client mobility while preventing flexion, extension, or rotation of the cervical spine.

The placement of the pin(s) for traction or external fixation is done by the orthopedic surgeon. A potentially serious complication with pins inserted into the bone and exiting through the skin is osteomyelitis. This occurs when infection starting at the skin moves down the pin into the tissue, and into the bone. Another consideration with pins and nails is pain associated with the fracture and with pin placement.

> ASSESSMENT

1. Assess the client's knowledge of the procedure. Answer questions regarding previous personal experiences or friends and family who have been placed in traction. **Helps provide education about the procedure.**
2. Assess knowledge base, discuss the risk of continuing injury to the tissue, muscles, and blood supply that can occur without the aid of immobilization. **Helps the client accept the need for traction.**
3. Assess the client's general health, allergies, and skin condition. Inspect the skin for evidence of atrophy, abrasions, edema, and other circulatory disturbances. **Helps to decrease the risk of skin breakdown and infection.**
4. Document the neuromuscular status of the extremity and any evidence of skin problems to **record baseline assessments.**

5. Assess the client's current level of mobility. Consider how the pins will affect the client's mobility and self-care ability. **Helps plan interventions to maintain as much independence in self-care as possible.**

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility, related to mechanical devices restricting mobility
- 1.6.1 Risk for Injury
- 7.1.1 Body Image Disturbance due to immobility

> PLANNING

Expected Outcomes:

1. Client will have pins placed under the direction of the medical caregiver.
2. Client will experience a decrease in the amount of discomfort related to the fracture.
3. Client will be able to perform activities of daily living, positioning, and communication with assistance.

Equipment Needed:

- Pain medication
- Sterile pins (see Figure 10-8-2) and a sterile pin insertion kit
- Local anesthetic obtained from the pharmacy per physician's or qualified practitioner's orders
- A topical cleanser such as povidone-iodine for cleaning the insertion site



Figure 10-8-2 Sterile pins

- Sterile drapes and clean pads to protect bed linen and maintain a sterile field
- Traction equipment if required (see Figure 10-8-3)



Estimated time to complete the skill:
30–45 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the need for the pins. Discuss the continuing injury to the tissues, muscles, and blood supply, which can occur without immobilization.
2. Assure the client that this is a necessary, but usually temporary, procedure that will aid in the healing process and that every measure will be taken to make the client as comfortable as possible during the procedure.
3. Explain the procedure step by step and ask questions. This will help the client anticipate what will occur. Asking questions will provide a sense of control and help alleviate anticipatory anxiety.
4. Explain that some discomfort may occur, and outline options for pain control.
5. Prepare the client for the procedure and explain that there will be discomfort and pain during the placement of the pin, but the pain is transitory. Discuss pain management measures.
6. Reinforce the need for frequent position changes and the need to give skin a chance to rest to reduce the risk of complications.



Figure 10-8-3 Traction equipment, pulleys, cords, and weights

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Assemble all the needed equipment at the bedside. If traction will be added, make sure equipment, such as overhead frame, pulleys and traction bars are installed on the bed frame.
2. Assess the client's skin and circulation, sensation, and movement (CSM) of extremity (see Figure 10-8-4).



Figure 10-8-4 Assess skin circulation, movement, and sensation of extremities.

3. Check orders for pain medications and local anesthetics needed for the procedure.
4. Check for drug allergies.
5. Administer systemic pain medications.
6. Wash hands. *Note:* If there is risk for contact with body fluids, gloves should be worn.
7. Adjust the bed to a comfortable working height.
8. If applicable, support extremity on pillows.
9. Physician or qualified practitioner will open pin insertion kit, administer local analgesic, and pins. Assist during the pin insertion procedure.
10. Reassure client.
11. The physician or qualified practitioner will attach the pins to traction, if appropriate. Provide help in connecting the traction line through the pulley and secure appropriate weights (see Figures 10-8-5 and 10-8-6). Make sure weights

1. Prevents interruption of procedure to fetch supplies.
2. Documents change before and after pin insertion.



Figure 10-8-5 Assist the physician or qualified practitioner to connect the traction lines to the client.

3. Administer pain medications early to have peak analgesic effect for the procedure.
4. Decreases risk of allergic reactions.
5. Provides pain relief.
6. Reduces the transmission of microorganisms.
7. Promotes proper body mechanics.
8. Ensure proper alignment.
9. Helps procedure go smoothly.
10. Reduces anxiety.
11. Slow and steady application of weights will decrease the possibility of jerking the leg and increasing pain.



Figure 10-8-6 Assist the physician or qualified practitioner to thread the traction lines through the pulleys.



Figure 10-8-7 Apply the appropriate amount of weight. Be sure the weight does not touch the floor when traction is in place.

are in good condition, and that they are securely attached to the traction line (see Figure 10-8-7) prior to applying the weight to the affected limb. Apply weight with a slow and steady increase in pull.

12. Maintain body alignment and support. Proper alignment is being met in leg traction if the traction line is in line with the leg when observed from the foot of the bed. Position pillows as needed.
13. Clean up reusable items and place sharps in proper container.
14. Recheck circulation, movement, and sensation of extremity.
15. Recheck client's comfort and need for additional pain medication.
16. Continue client teaching on how to use the overhead trapeze, if appropriate, and how to do active range of motion exercises to maintain strength and mobility in the unaffected limbs.
17. Assess the pin site and perform pin wound care every 8 hours (see Figure 10-8-8).
12. Decreases pain and discomfort. Promotes good body alignment.
13. Maintains safe environment for client and staff.
14. Document that no disruption of CSM has taken place.
15. Aids in client's overall comfort after the procedure.
16. Increases mobility and promotes independence.
17. Reduces the chances of infection.

Figure 10-8-8 Perform pin wound care every 8 hours, or as needed.



18. Wash hands.

18. Reduces the transmission of microorganisms.

> EVALUATION

- Client had pins placed, under the direction of the medical caregiver.
- Client experiences a decrease in the amount of discomfort related to the fracture.
- Client is able to perform activities of daily living, positioning, and communication, with assistance.

> DOCUMENTATION**Nurses' Notes**

- Pre- and post-evaluation of all observations previously discussed is vitally important for the oncoming shifts to give them a baseline for observations. Documenting the condition of the traction, pins, weights, as well as the client's emotional status, is important.

Medication Administration Record

- Type, amount, time, and route of pain medication used before and during pin insertion.

**▼ REAL WORLD ANECDOTES****Scenario 1**

A Steinmann pin was placed in Mrs. Harris' left femur and attached to 15 pounds of traction. She was cooperative and the procedure went well. As the days passed, Mrs. Harris became quite comfortable with the traction, so comfortable, in fact, that she declined surgery for an internal fixation operation. Mrs. Harris was told that she would have to stay in a nursing facility for several weeks while in traction or she could be discharged to home if the operation was completed. She chose to stay in traction, the bones healed, and after several weeks she was discharged from a skilled nursing facility to home. Some clients might have chosen to go home, but Mrs. Harris was more comfortable in a nursing facility. Psychosocial assessment and client education may have helped the nurse understand the reasons behind the client's unusual decision.

Scenario 2

Mr. Kang called the nurse into the room complaining that his skeletal traction weights felt heavier than before. He requested to have the traction removed for a "little while." Understanding the physician's order to maintain traction at all times, the nurse was very hesitant to perform this request. After checking Mr. Kang's leg alignment, the nurse noticed that the weights themselves had become lodged in the framework of the bed. When the client adjusted the lower unit of the bed it increased the pull on the traction line. The nurse explained to Mr. Kang that the traction could not be removed, but by freeing the weight his complaint was resolved.

Scenario 3

Mr. Jones, an older, debilitated client, was placed in halo traction and discharged to outpatient care. The client had an addiction to alcohol and was homeless. He did not keep follow-up appointments. Three weeks after being discharged, Mr. Jones was seen in the emergency room for skin breakdown over his right chest area. The physician's assistant discovered that the halo vest created the skin breakdown. The halo vest did not fit properly. The lower edge had pressed down between Mr. Jones' ribs and rubbed the skin away to expose the bone. The client was readmitted to the hospital to treat this difficult complication.

> CRITICAL THINKING SKILL

Introduction

Check the equipment prior to beginning the procedure.

Possible Scenario

The nurse gathers all the equipment at the bedside to assist the client to apply traction. During the middle of the procedure, she reaches for the weighted sandbags with eyehooks. One of the weights she has brought

to the bedside is very worn, and it tears at the connection point.

Possible Outcome

The procedure is interrupted while the nurse fetches another weight, causing anxiety and frustration for all parties.

Prevention

Make sure the equipment at the bedside is in good condition.

▼ VARIATIONS



Geriatric Variations:

- For a geriatric client, the basic traction procedure does not change. The follow-up care, however, is very important.
- General skin conditions vary with age and elderly clients become more prone to skin breakdown. Special emphasis on good skin care and frequent position changes can help prevent complications.
- Immobility is a problem that could foster a general decline in health.



Pediatric Variations:

- Older children may wish to assist with pin care.
- Younger children may need help and reminders not to touch or play with pins or traction.



Home Care Variations:

- Clients sent home after the insertion of pins need to understand pin care, and must be able to assess for signs of infection at the pin site.
- Have the home client monitor the fracture for proper alignment and skin breakdown frequently in the days following pin insertion.



Long-Term Care Variations:

- Continue to assess for infection, even at pin sites that have healed.
- Watch for skin breakdown due to pressure from traction.
- Watch for signs of decreased range of motion in unaffected limb due to prolonged decreased activity.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Client anxiety over pin insertion.

Ask Yourself:

How do I prevent this error?

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Provide the client with anti-anxiety medication if ordered. Help the client reduce anxiety by providing anticipatory guidance about the procedure. Let the client know in advance when painful parts are approaching. Have the client express his or her pain on a scale from 1 to 10. Help the client with anxiety-reducing techniques such as distraction, positive coping statements, and slow-breathing exercises.

> NURSING TIPS

- Maintenance pain medication may be different and may sustain the client over a longer period of time than initial procedure medications.
- Giving medication prior to any other procedure, i.e., bed changing, position changes, or x-rays, etc., is helpful in controlling pain problems.
- Make certain all lines of traction are not knotted or jammed in the bed or pulley and are not laying on the floor. These errors decrease the effectiveness of the procedure and may delay surgery.
- Always make certain that you have an adequate number of pillows available at all times for position changes and for comfort measures.
- Premedicate prior to the procedure and during difficult bed changes or during x-rays.
- Use of overhead traction bars aids clients in helping themselves to reposition, to sit on a bedpan, and to maintain proper alignment of the affected leg.
- Stay with the client during the procedure, even if several physicians or qualified practitioners are there observing; it is important that you pay attention to the client and not the procedure, using the trust that you have already obtained to comfort and communicate with the client.
- Evaluate anxiety frequently. Although the procedure was successful the client may still be disturbed by the immobility and sensations imposed by the traction. It is important to show the client his abilities, and not focus on the limitations.
- If halo traction is used, keep traction removal equipment at the bedside in case rapid removal of the halo vest is necessary to perform cardiopulmonary resuscitation (CPR).

SKILL 10-9

Maintaining Traction

Samuel C. Taylor, RN

KEY TERMS

Alignment	Fracture blisters
Aseptic	Lines
Baseline assessment	Movement
Bed exercises	Pain medication
Circulation	Pin care
Compartment syndrome	Sensation
	Traction



> OVERVIEW OF THE SKILL

Traction is used to hold the skeleton in the proper position for healing, to reduce pain, and to reduce deformity. Traction is the force applied to the skeleton needed to overcome the pull in the opposite direction from the muscle groups. The two most common types of traction are skin traction and skeletal traction. Skin traction is noninvasive and relatively comfortable for the client. The disadvantage is that it offers less support, and cannot be used with heavy weights. It can cause abrasions, skin irritation, and skin breakdown, and it is used only for the short term.

Skeletal traction is used when more support is needed and heavier weights are necessary to reduce the fracture and to ensure alignment of the bones. Skeletal traction is attached to the bones via wires, pins, or tongs inserted by the orthopedic physician under aseptic techniques.

Managing pain and preventing complications are two key nursing tasks in maintaining traction. The client may experience pain when traction is placed

and when changing position in bed. Good pain management is essential.

Complications related to the traction and associated decreases in mobility may occur, especially if the client is obese, cachectic, elderly, juvenile, diabetic, or smokes cigarettes. Respiratory complications, skin breakdown, nerve damage in the affected limb, and decreased circulation in the lower extremities are all possible complications of traction. Acute compartment syndrome can occur when the one or more compartments (muscles, blood vessels, and nerves supported by inelastic fascia) in the extremity fill with blood or fluid and swell. This internal edema, combined with pressure from the tight traction or other dressings, creates a tourniquet effect that starves the lower areas of the extremity of blood. This condition is serious and requires immediate intervention by the qualified practitioner to reduce the pressure on the vessels and restore circulation.

There are many types of traction but the principles of maintaining traction apply to all.

> ASSESSMENT

1. When assessing traction or preparing for the reapplication of traction, assess the client for pain, position, alignment, skin condition, overall health

considerations, circulation, sensation, and movement of the injured extremity. **This will help determine changes from baseline, and help detect any emerging complications from the traction.**

2. Assess pain location, intensity, and duration. Discuss steps the client has taken to relieve the pain. Allows pain management and client input into pain management.
3. Assess the client's position to make sure that it supports the traction.
4. Assess alignment to reduce pain and support the extremity.
5. Conduct an initial assessment of the general skin condition of the injured extremity to establish the baseline parameters prior to and during traction. It is important to record any changes in the skin color, edema, skin breakdown, erythema, or blisters.
6. Assess the client's overall health condition to aid in determining the plan of care for the client.
7. Assess sensation and movement to note any change from baseline.

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING

Expected Outcomes:

1. Client traction will be maintained for a given period of time.
2. Client will maintain body alignment while in traction.
3. Client will maintain good skin condition, circulation, and sensation in the extremity in traction.

Equipment Needed (see Figure 10-9-2):

- Pain medication
- Traction equipment



Estimated time to complete the skill:
10–15 minutes, depending on the type of traction

> CLIENT EDUCATION NEEDED:

1. Explain to the client the need for traction, the need for maintaining body alignment, and the overall care plan. If appropriate, remind the client that the traction is a temporary measure prior to surgery.
2. Teach the client to report any changes in feeling and sensation in the limb, especially increases in pain, numbness, tingling, or coldness.
3. Discuss with the client common emotional feelings that can occur with immobility, including sensory deprivation, loss of control, and decreased socialization.



Figure 10-9-2 Overhead traction bar and trapeze

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Assess circulation, sensation, and movement after the placement of the device and hourly thereafter for at least 4 hours, then every 4 hours, then every shift.
2. Wash hands.

RATIONALE

1. Allows early detection of complications.
2. Reduces the transmission of microorganisms.

3. Premedicate with analgesics if necessary. Check for allergies to medications.
4. Release traction for assessment and care only if ordered and appropriate for the type of traction and the client's condition.
5. Assess client's skin condition.
6. Assess client's circulation, sensation, and movement (see Figure 10-9-3).



Figure 10-9-3 Assess the extremity for movement.

7. Assess and correct position for proper alignment with pillows and sandbags if necessary.
8. Assess lines to be certain that none are caught in the bed frame or in the linen.
9. Assess weights to be sure that they hang freely (see Figure 10-9-4).
10. Assess trapeze and any other structural framework to make sure they are secure and properly positioned.
11. Place pillows under the extremity, if indicated and if appropriate.
12. Change the position of the client every 2 hours minimally, e.g., roll side to side and back. Support with pillows.
13. Proceed with pin care if requested by a physician or qualified practitioner after the procedure has been completed (see Figure 10-9-5).

3. Pain cannot be eliminated, but medication can reduce the discomfort.
4. Reduces the risk of accidental injury or pain from releasing traction inappropriately.
5. Complete baseline assessment is necessary for comparison after the procedure.
6. Refer to baseline assessment and, if changes are present, then notify physician or qualified practitioner immediately.



Figure 10-9-4 Make sure the traction weights hang freely.

7. Maintaining alignment is of primary importance and the basic idea behind use of traction.
8. To exert maximum effect of the traction and to maintain alignment these lines must be free.
9. Allows for effective traction.
10. Allows for safe and effective traction.
11. Helps support and maintain alignment and reduces pain and discomfort.
12. Reduces possibility of skin breakdown and aids in pulmonary toilet. Using several people to help support and turn the client will decrease pain to the client.
13. Decreases growth of organisms.



Figure 10-9-5 Perform pin care as required.

- 14. Replace traction after assessment and care, if appropriate.
- 15. Wash hands.

- 14. Continues the traction therapy.
- 15. Reduces the transmission of microorganisms.

> EVALUATION

- Client traction is maintained for a given period of time.
- Client maintains body alignment while in traction.
- Client maintains good skin condition, circulation, and sensation in the extremity in traction.

> DOCUMENTATION

Nurses' Notes

- In addition to the assessment of the client and establishment of a baseline, describe the type of traction, type of pin inserted into the bone, the amount of weights placed on the traction device, and when the procedure was completed.
- Document any medication that was given for the procedure and how effective that pain medication was in decreasing the pain.
- Document what the insertion sites look like and that pin care was completed.



▼ REAL WORLD ANECDOTES

Scenario 1

Mr. Lake was brought into the unit with multiple injuries including a fractured femur. Because he was unstable from the various injuries, surgical intervention on the fractured femur was delayed. A decision was made to immobilize the femur with 20 pounds of skeletal traction applied to a Steinmann pin placed in the distal portion of the affected femur. This would supply the force necessary to maintain alignment and support for the injury until surgery could be performed for an open reduction and internal fixation of the injury.

Scenario 2

After surgery, traction was applied to Mrs. Tang's leg. During traction, the bed was raised to the highest position to reduce stress on the back of the nurses and doctors. Soon after everyone left the room, an aide came in to help Mrs. Tang with her food tray. He lowered the bed to accommodate the overbed table. When the bed was lowered, the traction weights rested on the floor so that the client was receiving no benefit from the force of the weights. When a nurse came to check on Mrs. Tang, she discovered the problem. The nurse assessed Mrs. Tang and shortened the line to accommodate the position of the bed. She reapplied the traction. The physician's assistant was notified of the situation and the aide was advised of the need to maintain proper weights and alignment of the traction.

> CRITICAL THINKING SKILL

Introduction

Assessment is an ongoing procedure.

Possible Scenario

Mr. Dominguez was placed into traction for a lower extremity injury. The nurse was aware of the importance of monitoring the extremity for circulation, movement, and sensation. Mr. Dominguez was fine through most of the shift. The nurse checked his traction early in her shift, but she was busy attending to a number of different things the rest of the day.

Possible Outcome

Near the end of the shift, Mr. Dominguez began to request pain medication more frequently. He insisted that the medication was not effective. The nurse did not examine the extremity and instead attributed

the complaints of the client to just being “cranky” and not liking the traction. Mr. Dominguez continued to complain of increased pain but the nurse continued to ignore the problem. On routine rounds, the charge nurse assessed Mr. Dominguez and discovered edema in the leg and what appeared to be a compartment syndrome. The physician was immediately notified and the client was taken to surgery to open the compartments and reduce the pressure. The leg was ultimately saved, but tissue damage did occur, and as a result Mr. Dominguez’ stay in the hospital was extended.

Prevention

Make the appropriate assessment, notify the physician or the charge nurse, or ask a colleague for a second opinion.

▼ VARIATIONS



Geriatric Variations:

- Some pain medications have heightened effects and side effects in older clients.
- Older adult skin can be thin and fragile and thus more susceptible to breakdown.
- Older adults may become confused at night and try to remove traction or get out of bed.
- Older adults may need reminders regarding why they were put into traction and what the expected outcomes are.



Pediatric Variations:

- Pediatric clients may not be able to understand the need for traction.
- It is very difficult to explain the need to maintain position and alignment.
- Parents must understand the need for traction and be able to comfort the child without taking the child out of traction.
- Frequently children are placed in skin or boot traction instead of skeletal traction.



Home Care Variations:

- Traction is very rarely used in home care situations but the basic principles would be the same.
- For traction attached to the bedframe, a hospital bed is required.



Long-Term Care Variations:

- Traction is rarely used in most long-term care facilities because it is usually for short-term use prior to surgery. Should traction be ordered in the long-term care setting, continued care in terms of pin cleaning, maintaining alignment, and assessing skin condition is very important.
- Nutrition, immobility related assessments, and exercises in the unaffected limbs are important nursing considerations in long-term traction.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The traction is ineffective.

Ask Yourself:

How do I prevent this error?

Prevention:

Checking the line, weights, the bed frame, the linen, etc., to determine where the traction pull is being lost.

Possible Error:

The client is sliding to the foot of the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

This can make the traction ineffective. The client can be moved up in bed to maintain proper alignment and tension on the line. If appropriate, the foot of the bed may be raised to help prevent the client from sliding downward.

Possible Error:

Client refuses to change position in the bed.

Ask Yourself:

How do I prevent this error?

Prevention:

This could be due to pain, fear, or misunderstanding about the function of traction. Provide pain medications, explain the reason for traction, offer regular reminders to change position, and encourage self-care in positioning and skin assessment.

> NURSING TIPS

- Organize the traction prior to application. Having all the parts of the traction set up at the bedside will make application easier and the process smoother.
- Premedicate the client. This will aid in compliance, increase trust, and make the task easier for all participants.
- Educate the client prior to applying the traction. This helps in compliance and understanding goals.
- Perform routine pin care, or as ordered to reduce the risk of infection at the pin site, and reduce the client's length of stay.
- Assess the pin site for redness, as needed.
- Pillows can be used generously to support the fractured limb, maintain the client's position, and promote comfort.

SKILL 10-10

Assisting with Casting— Plaster and Fiberglass

Maryellen Zinsley, RN, BSN, and Valerie Coxon, RN, PhD

KEY TERMS

Compartmental syndrome
Elevation
Pain control

Plaster
Stockinette
Vascular compromise
Webril



> OVERVIEW OF THE SKILL

Casts are placed to provide stability to a fracture, dislocation, or soft-tissue injury while it heals. Casts have traditionally been made of plaster of paris, but more and more are now made with fiberglass. The physician or qualified practitioner will decide which type of cast to use, depending on many factors, including the age of the client, the reason for the cast, and the location of the cast. The primary goals of the nurse assisting with the procedure and caring for a client with a new cast are to:

- Assist the physician, qualified practitioner, or technician in rapid and correct placement of the

cast, including assembling all necessary equipment at the bedside so the cast can be applied without interruption.

- Assess and intervene to reduce pain during reduction of the fracture and placement of the cast.
- Prevent vascular compromise from swelling after the cast is placed.
- Provide intravenous access, if necessary, so the client can be medicated for pain.
- Give clear information as to what the client should expect during the procedure.

> ASSESSMENT

1. Assess the client for acute pain or anxiety to determine the need for medications or possible conscious sedation during the procedure.
2. Assess the neurovascular status of the injured area before and after the cast is applied to determine changes in status. Neurovascular checks include skin color, skin temperature, capillary refill, pulses, touch, movement, and sensation.
3. Understand the kind of injury and the type of cast being applied. Helps recognize potential complications to watch for.
4. Assess the skin that will soon be inaccessible under the cast. Note any bruising, abrasions, incisions, or

skin conditions that might contribute to discomfort, infection, drainage, or skin breakdown after the cast is applied.

5. Assess the client's understanding of the injury and the casting procedure to determine what teaching is needed.

> DIAGNOSIS

- 9.1.1 Pain
- 1.4.1.1 Altered Tissue Perfusion
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity

> PLANNING**Expected Outcomes:**

1. The cast will maintain good bone alignment.
2. A cast will be applied to the fracture rapidly with minimal pain and anxiety to the client.
3. There will be no vascular compromise to the client during or after the procedure.

Equipment Needed (see Figure 10-10-2):

- Appropriate size cotton (for plaster) or synthetic (for fiberglass) cast padding such as Webril
- Stockinette, cut approximately 6 inches longer than the part to be casted
- Appropriate size plaster or sealed fiberglass rolls
- For plaster casts: Ace wraps, two or three inch sizes, two to three rolls
- For plaster casts: bucket of warm water
- For plaster casts: roll of three to four inch tape
- Protective clothing for yourself
- Disposable gloves (nonsterile)
- Special supplies: Shoulder immobilizer for arm fractures, crutches for lower limb fractures, finger traps for arm fractures that need to be reduced



Estimated time to complete the skill:
30–60 minutes

> CLIENT EDUCATION NEEDED:

1. Instruct the client on the need to help maintain correct alignment and positioning of the affected body part during the procedure.

2. Inform the client that when the casting material is placed, it will feel warm as it sets.
3. Instruct the client not to bear weight on the cast while it is drying. Plaster casts take up to 48 hours to dry. Fiberglass casts dry in about an hour.
4. Remind the client to communicate any pain during the procedure so pain intervention can be provided.
5. Provide instruction on cast care after the procedure is completed.
6. Instruct the client receiving a plaster cast that the plaster will feel warm for several minutes as it sets, then cool for several hours as it dries.
7. After the cast is applied, provide instructions on the following: care of the cast, elevation of the affected extremity, keeping the cast dry, checking for warmth and movement of the exposed extremity, observing the color of the exposed extremity, and comfort and pain measures that can be used by the client.



Figure 10-10-2 Casting supplies, including stockinette, tape, and casting tools

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Introduce yourself to the client. Assess current vascular status.
2. Assess client's ability to communicate during the procedure.
3. Prepare all equipment.

RATIONALE

1. Makes the client aware of who is caring for them during the casting.
2. Decreases client's anxiety level, and promotes cooperation.
3. Facilitates an efficient practice.

4. Be sure all special equipment is available at the bedside or cast room.
5. Protect the bed and client, if necessary, from water and casting residue.
6. Have the client in the proper position for reduction and casting.
7. Wash hands. Wear gloves and protective clothing as needed.
8. For a plaster cast, place the plaster roll into the warm water on its end until the bubbles stop rising from the roll. Remove it from the water and squeeze gently to remove the excess water (see Figure 10-10-3). Hand the roll to the person applying the cast.
4. Facilitates an efficient practice.
5. Promotes client comfort.
6. Facilitates the casting procedure.
7. Keeps nurse's hands and uniform clean and dry while working with wet and sticky substances.
8. Preparing the plaster facilitates rapid and smooth application of the cast.



Figure 10-10-3 Place the plaster roll in warm water until it stops bubbling. Remove the plaster roll from the water and squeeze gently to remove excess moisture.



Figure 10-10-4 Position the extremity to be casted.

9. For a fiberglass cast, open the sealed fiberglass rolls as needed, and hold the package so the person applying the cast can remove the roll.
9. Facilitates rapid and smooth application of the cast.
10. Assist the person applying the cast. This person will:
 - Position the part to be casted (see Figure 10-10-4). Place stockinette over the skin (see Figure 10-10-5). Wrap the site with cast padding (see Figure 10-10-6).
 - Place the fiberglass or plaster over the fracture (see Figure 10-10-7), extending the coverage above and below the fracture site (see Figure 10-10-8).
 - Edges will be trimmed and finished and any supports or reinforcements to the cast will be applied (see Figure 10-10-9).
10. Allows rapid placement of cast.



Figure 10-10-5 Place stockinette over the skin where the casting material will be applied.



Figure 10-10-6 Apply the cast padding.



Figure 10-10-7 Apply the casting material.



Figure 10-10-8 The casting material must extend above and below the fracture site.



Figure 10-10-9 Edges are finished by pulling the first layer of stockinette back around the padding and adhering it to the fiberglass.

- | | |
|--|--|
| <p>11. Swelling may occur after the cast is placed. The cast may be bivalved, or cut in half, to allow for swelling or to allow for treatment of infection. If this is done, wrap the cast in Ace wraps to hold it in place.</p> <p>12. A window may be cut in the cast to relieve pressure or to monitor the skin at that location under the cast.</p> <p>13. Elevate cast site when complete.</p> <p>14. For plaster casts, leave the cast uncovered while it is drying.</p> <p>15. Reassess vascular status.</p> <p>16. Clean the bed and remove casting materials if needed. Check for bits of dried plaster, or fiberglass cuttings, and packaging material that could cause skin irritation.</p> <p>17. Prepare client for post reduction x-ray as necessary.</p> | <p>11. Prevents neurovascular compromise, discomfort, or infection.</p> <p>12. Prevents neurovascular compromise, discomfort, or infection.</p> <p>13. Prevents swelling.</p> <p>14. Facilitates drying process.</p> <p>15. Prevents complications.</p> <p>16. Promotes client comfort.</p> <p>17. Assesses bone alignment.</p> |
|--|--|

18. Document where cast was placed, type of cast or splint, and vascular status of the extremity.

19. Wash hands.

18. Records implementation of intervention and promotes continuity of care.

19. Reduces the transmission of microorganisms.

> EVALUATION

- The cast maintains good bone alignment.
- A cast was applied to the fracture rapidly with minimal pain and anxiety to the client.
- There is no vascular compromise to the client during or after the procedure.

> DOCUMENTATION

Nurses' Notes

- Document the type of cast and where it was applied.
- Document any medications used during the procedure.
- Document any specific aids used after the cast was applied, e.g., use of crutches or slings.
- Document client teaching. Document neurovascular status.



▼ REAL WORLD ANECDOTES

Scenario 1

A nurse was assisting in the application of a fiberglass cast on the forearm. The client was sitting on a stretcher with his forearm bent at the elbow, resting on an overbed table. As the physician wrapped the cast from the wrist downward, the nurse held the wrist tightly to support the client's hand in the proper position. The tight pressure on the soft cast pressed the fiberglass into the ulnar styloid process. When the client returned for a follow-up visit and cast change, the skin over this bony prominence had broken down.

Scenario 2

A nursing student working in the emergency room learned about the properties of plaster of Paris the hard way. Setting up for a casting session, she soaked all the rolls of plaster ahead of time and laid them out on the casting table. When the physician and client arrived for the procedure, they were rock hard.

> CRITICAL THINKING SKILL

Introduction

Nurses must be able to evaluate effective and adequate circulatory status, thus preventing vascular compromise.

Possible Scenario

A cast has been placed on the arm of an accident client newly transferred to the floor. The nurse's initial assessment showed a warm extremity, good movement of the fingers, and good capillary refill. The nurse concluded that the client had adequate circulatory status. It was a busy night, and she did not get back for a second assessment for almost three hours. By then the client was complaining of severe pain and cold fingers.

Possible Outcome

The client developed compartmental syndrome and needed surgical intervention.

Prevention

The client sustained vascular compromise to the extremity. This could have been prevented by proper elevation of the affected part after casting and placing ice on the area of the fracture. More frequent evaluation of the client's circulatory status, especially knowing that the client had a recent injury and a new cast, would have alerted the nurse to the worsening vascular status in the limb.

▼ VARIATIONS



Geriatric Variations:

- Older clients often do not have the muscle tone and/or balance to walk with crutches or support the weight of the cast for long periods. This needs to be taken into account prior to placing the cast.
- An older client may not be able to maintain the desired position during casting. Plan ahead to make position modifications, or provide extra support if necessary.
- Older clients may be more susceptible to drug toxicity and drug sensitivity because of impaired liver and renal functions. Keep this in mind when medicating for pain.



Pediatric Variations:

- Remember to do comparison x-ray views of fractures in children. Be sure you are aware of the growth plate and problems arising in fractures in the growth plate in children.
- Fiberglass casts are often used in children when possible. The bright colors and greater durability of the fiberglass cast make it a preferred choice.
- Allow the child to choose the color of his cast, if the cast is fiberglass and if different colors are available.
- A child may be more prone to “exploring,” i.e., inserting objects under the cast while it is drying. This increases the risk of skin trauma and breakdown, and can rearrange the cast padding, creating pressure points and discomfort.



Home Care Variations:

- If the client is going directly home with the cast, make sure to help him anticipate such tasks as toileting, feeding, and other self-care activities.
- Discuss clothing modifications needed to wear clothes over casted limbs. Pants and shirts can be cut up the seam, and Velcro closures can be sewn on the fabric. Loose fitting clothes made of stretchy fabrics will often go over the cast, but may be stretched out of shape over time. Remind clients that the fiberglass cast will snag nylon and finely woven knits fabrics.



Long-Term Care Variations:

- Casts should be assessed regularly for fit.
- Clients who will be wearing a long-term cast should be taught how to keep the cast dry while bathing.

> NURSING TIPS

- To promote good body mechanics, and for comfort, be sure the bed or stretcher is at a comfortable height during the procedure.
- Have all supplies prepared in advance of the cast application. Have the padding and stockinette rolls ready as well as the plaster.
- Overestimate the amount of materials to have on hand; often the person applying the cast will use extra supplies to shape or reinforce the cast.
- Be sure that sharp scissors are available to cut the plaster if needed.
- If client complains of tingling, numbness, pain, or smell at the site of the cast, report these immediately to the physician or qualified practitioner.
- Continue to talk to the client during the procedure to assess his response to the procedure and to decrease anxiety.
- If family or friends stay with the client, educate them in advance on what to expect during the procedure. Keep an eye on them for signs of dizziness or emotional upset, and assist as needed. Remind them to stay sitting down during the procedure, and to request help if they start to feel “funny.”
- Do not dispose of plaster or plaster water in a regular sink, as it can clog the plumbing. Dispose of it following institutional policy.

SKILL 10-11

Cast Care and Comfort

Kathryn Lilleby, RN

KEY TERMS

Activities of daily living
Circulation
Fiberglass cast
Movement

Neurovascular
Plaster of Paris cast
Range of motion
Sensation



> OVERVIEW OF THE SKILL

A cast is placed on a fractured or dislocated bone or soft tissue injury for six to eight weeks in order to provide stabilization while it heals. Casts are made of plaster of Paris or of fiberglass. Casts covering forearms or lower legs are called short arm or short leg casts. A long leg cast covers the entire leg and a hanging cast covers the entire arm. A body cast covers the chest and abdomen and the Minerva cast covers the chest, neck, and head with openings for the ears, face, and arms. The spica or hip spica cast covers the hips and one or both legs.

A cast should fit snugly and support the fracture. It may be changed several times during the healing

process if reduction in swelling or loss of muscle tone causes it to become too loose. During the first 24 hours after the application of a cast, edema can create a tourniquet effect and inhibit circulation to the tissue, which can cause irreversible damage. The abdominal area can also expand as a result of eating or drinking. The nurse should assess the cast site for healing and/or irritation to the skin. The skin under a cast may need special care, such as with an open wound, an infection, or a surgical incision. A window can be cut in the cast to facilitate skin care, to relieve discomfort over a bony prominence, to relieve nerve compression, or to reduce the weight of a cast.

> ASSESSMENT

1. Assess the circulation, movement, and sensation every eight hours because changes in circulation, sensation, and movement may signal the development of compartmental syndrome, a medical emergency.
2. Assess for color, temperature, edema, pain, skin irritation, capillary refill, and drainage. These changes may indicate that edema is causing restriction of circulation.
3. Assess for severe pain over bony prominences in order to prevent the risk of skin ulceration.
4. Assess the condition of the cast in order to determine need for client education.
5. Assess the skin for bruising, abrasion, or incision in order to monitor for discomfort, infection, drainage, or skin breakdown.
6. Assess the client's understanding of the cast and its care so that client education can be tailored to his needs.

> DIAGNOSIS

- 1.6.2.1 Impaired Skin Integrity
- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain
- 1.4.1.1 Altered Tissue Perfusion

> PLANNING

Expected Outcomes:

1. There will be no vascular compromise to the client while the cast is in place.
2. The cast will remain intact.
3. The client will be comfortable while the cast is in place.

Equipment Needed:

- Tape
- Pen to mark drainage
- Padding



Estimated time to complete the skill:
10 minutes

> CLIENT EDUCATION NEEDED:

1. Teach isometric exercises to prevent muscle atrophy.
2. Instruct client regarding skin care while the cast is in place.
3. Instruct the client to keep the cast dry.
4. Teach the client to report a cast that “doesn’t feel right.” Ignoring it may lead to skin breakdown.
5. Teach the client to report any foul odor because it may indicate skin breakdown or infection under the cast.
6. Use an oversized cotton glove on a forearm fiberglass cast when doing gardening or housework to keep the edges clean.
7. Never try to clean the edges of a cast or remove dirty edges because of the risk of removing the necessary padding.
8. Reassure clients that they may be able to do more activities such as tying their shoes or combing their hair as they become accustomed to the cast and as the swelling resolves.
9. Remind the client that premature removal of a cast can lead to dysfunction of the extremity and increased pain by delaying healing.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Check circulation, movement, and sensation (see Figure 10-11-2).
 - Note color and temperature of skin.
 - Pinch finger or toe and watch for capillary refill within 2 to 4 seconds.
 - Ask client to wiggle fingers or toes.
 - Ask client to tell you if he feels you touching the extremity (see Figure 10-11-3).

RATIONALE

1. Reduces the transmission of microorganisms.
2. Prevents complications such as nerve or muscle damage, skin ulceration, and pain.



Figure 10-11-2 Assess circulation, movement, and sensation in the toes.



Figure 10-11-3 Ask the client if he can feel you touching the extremities distal to the immobilized area.



Figure 10-11-4 Elevate the extremity to help relieve swelling and discomfort.

3. Assess skin.

- Tell client not to put objects under the cast.
- Use powders or creams only outside the cast.

4. Assess pain or soreness.

- Reposition the extremity q2h.
- Elevate the extremity (see Figure 10-11-4) and apply ice.

5. Assess cast for intact cotton padding. Pad or add additional padding to areas of redness or irritation (see Figure 10-11-5).



Figure 10-11-5 Add additional padding to areas where the cast is rubbing against the skin.

6. Assess cast for intact edges.

- If edges are crumbling or peeling, or if the cast has been bivalved or windowed, use tape to petal the edges (see Figure 10-11-6).
- Do not allow the cast to get wet. Teach the client how to cover the cast when bathing or showering (see Figure 10-11-7).

7. Assess safety. If client is to ambulate provide cast boot for traction (see Figure 10-11-8).

3. Prevents skin from becoming irritated or ulcerated.

- Powder inside the cast can cake and cause irritation.

4. Pain may be related to surgery or edema.

- Relieves pain over bony prominence such as wrist or ankle.

5. Wadded cotton padding may cause pressure in the cast and irritate the skin. Flattened or missing padding can cause the hard cast to abrade or irritate the skin.



Figure 10-11-6 Gently run your fingers along the inside of the cast to detect plaster crumbs or sharp edges.

6. Reduces skin irritation.

- Prevents skin irritation from pieces of plaster falling into cast.
- Wetness may cause weakness in the cast, and maceration of the skin underneath the cast.

7. Reduces risk of injury.



Figure 10-11-7 Keep the cast as dry as possible. Cover the cast with plastic wrap prior to bathing.



Figure 10-11-8 If the cast is on a lower extremity and the client will be ambulating, provide a cast boot for traction.

8. Instruct client and caregiver about symptoms to report to the physician or qualified practitioner:

- An increase in swelling.
- A tingling or burning sensation.
- An inability to move muscles around the cast.
- A foul odor around the edges of the cast.
- Any drainage, which may show through the cast.
- Any cracks or breaks in the cast.

9. Support the cast.

- Use pillows for arms and legs.
- Use a bedboard under the mattress for a spica cast.

10. Assess for infection.

- Check for foul odor under cast.
- Check for drainage on cast.
- Mark drainage and date on cast.

11. Synthetic casts should be kept dry. If the physician or qualified practitioner does permit bathing or swimming, the wet cast should be dried quickly and thoroughly. Dry the cast with a towel and then a hair dryer set on low. Dry until the padding underneath does not feel cold or damp to the skin.

12. Wash hands.

8. Prompt reporting of symptoms will decrease risk of complications such as infection or compartmental syndrome.

9. Reduces risk of complications and increases client comfort.

- Elevating the extremity decreases edema.
- Provides firm support for the large cast.

10. Early detection of infection will lead to appropriate treatment.

11. Even though the synthetic or fiberglass can be wet, wet padding underneath the cast may macerate the skin, and promote skin breakdown.

12. Reduces transmission of organisms.

> EVALUATION

- There is no vascular compromise to the client while the cast is in place.
- The cast remains intact.
- The client is comfortable while the cast is in place.

> DOCUMENTATION

Nurses' Notes

- Document condition of skin, circulation, and neurovascular assessment.



▼ REAL WORLD ANECDOTES

George was 92 years old when he fell and broke his wrist. George resisted going to the emergency room. He said, “There is nothing wrong with my arm, it just hurts a little. It will be fine tomorrow.” His wife finally talked him into having a cast put on “for just a few days.” About a week later, he was found in the garage at his workbench trying to saw it off. “I don’t need this thing on my arm,” was his response when questioned. His wife coaxed him into the house, but two days later he managed to cut it off. His wife called the doctor and they agreed that it would be fruitless to try to put on another cast. Fortunately, it was not a bad break and it seemed to heal without complication.

> CRITICAL THINKING SKILL

Introduction

Clients may complain of itching of the skin under a cast. Care should be taken to prevent skin breakdown while attempting to relieve the itching.

Possible Scenario

A man with a cast complained of itching of the skin under his short arm cast, so he tied cotton twill tape to a wire and ran it through the cast. He removed the wire and then looped the twill tape and tied the ends together. When the itching bothered him, he tugged on the tape to pull it in a circle so it would gently scratch the itchy spot.

Possible Outcome

The wire scratched his skin slightly as he pulled it through the cast and the twill tape irritated the skin more as he pulled it to relieve the itching. The skin began to break down and the padding was curled up with the tape movement.

Prevention

Clients should be instructed about what objects may or may not be allowed between the skin and the cast. Medication may be needed to control itching.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have fragile skin and need careful assessment to prevent breakdown.
- Vascular deficiency in older clients may lead to decreased circulation.
- Elderly clients benefit from lightweight casts so they can maintain balance and keep active.
- Older clients may have reduced sensation and be unable to identify pressure points.



Pediatric Variations:

- Allow children to choose the color of their fiberglass cast.
- Children may have curiosity about what can be put into the cast such as coins, straws, or Popsicle sticks.
- Infants may indicate pain in affected limb through restlessness or crying.
- Infants or young children in casts for club feet will have decreased mobility and require frequent cast changes.
- Children with spica casts will need plastic shielding over the perineum to keep the cast dry while urinating.
- Help children think about what clothes would be comfortable to wear over their cast.



Home Care Variations:

- Clients in spica casts should be turned every 2 hours to avoid pressure on skin.
- A bedboard should be placed between the frame and mattress to provide firm support.
- Assess the client with a long leg cast or spica for their ability to get in and out of small bathroom stalls, cars, or low chairs.

continues

▼ VARIATIONS *continued*

- *Keep plastic bags and rubber bands in bathroom and kitchen for “emergency” use.*
- *Do not dispose of crumbled plaster in a sink because it can clog the plumbing.*
- *Pillows or chairs should be available to elevate the affected extremity in order to prevent edema.*
- *Pants and shirts can be cut up a seam and Velcro closures sewn in to accommodate a cast.*
- *Fiberglass casts may snag nylon or finely woven fabrics.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

The cast cracks from improper drying or stress.

Ask Yourself:

How do I prevent this error?

Prevention:

Support the cast with pillows and allow it to dry uncovered. Use the palm of your hands, not the fingertips, when handling the cast in order to prevent indentations. Notify the physician or qualified practitioner immediately. Reassure the client and instruct him not to move the casted area until the physician or qualified practitioner assesses it.

> NURSING TIPS

- Place a bedboard under the mattress of a client with a spica cast to provide firm support.
- Use a pen to mark drainage on the cast and write the date and time.
- Do not use a hair dryer to speed plaster cast drying because it may cause cracks.
- Check cast protection devices such as rubber bands used around plastic bags to be sure they do not act like a tourniquet.

SKILL 10-12

Cast Bivalving and Windowing

Samuel C. Taylor, RN, and Valerie Coxon, RN, PhD

KEY TERMS

Bivalving
Cast cutter
Cast spreaders
Compartment syndrome

CSM
Edema
Flexor position
Windowing



> OVERVIEW OF THE SKILL

Bivalving, or windowing a cast, is done to improve circulation, allow for skin care, and relieve pressure, while continuing to maintain alignment of the bones for proper healing. Bivalving or windowing can occur immediately, or with an older cast on a fracture that is partially healed. Edema is very common after surgery or after a traumatic injury to a limb. During the first 24 hours after the application of a cast, edema can create a tourniquet effect and

inhibit circulation to the tissue. This can cause irreversible damage. The abdominal area can also expand as a result of eating. Sometimes the skin under a cast needs care—an open wound, an infection, or a surgical incision, for example. Finally, discomfort and skin breakdown over a bony prominence, nerve compression, and discomfort due to the weight of the cast are all reasons for bivalving or cutting a window in the cast.

> ASSESSMENT

1. After a cast has been applied, assess circulation, movement, and sensation q1 hour \times 4, q2 hour \times 4, q4 hours \times 4, then q8 hours \times 24. **Changes in circulation, sensation, and movement (CSM) may indicate the development of compartmental syndrome, which would require immediate medical attention.**
2. Assess pain, color, temperature, sensation, edema, pain, skin irritation from the cast, capillary refill and drainage. **Changes in these parameters could indicate that edema is causing a restriction in circulation.** Calling the physician or qualified practitioner immediately if any of these parameters changes significantly is crucial to prevent further tissue damage.

3. Pain that is severe and unrelieved by medication or by repositioning, and is not proportional to the severity of the injury, requires immediate investigation by the physician or qualified practitioner. **This could signal the development of a compartmental syndrome.**
4. Assess for severe pain over bony prominences (which can be a warning signal of a pressure sore), odor, or drainage on the cast. **These symptoms can indicate skin breakdown or infection under the cast.**

> DIAGNOSIS

- 9.1.1 Pain
- 1.6.2.1.2.2 Risk for Impaired Skin Integrity
- 1.4.1.1 Altered Tissue Perfusion

> PLANNING**Expected Outcome:**

1. If the purpose of the procedure is to relieve pressure, complaints and signs of pressure will diminish.
2. If the purpose of the procedure is to expose the underlying skin, then the correct area will be exposed.
3. The cast will not be cracked or damaged during the procedure.

Equipment Needed (see Figure 10-12-2):

- Cast cutter
- Cast spreaders
- Bandage scissors
- Surgical or plaster knife



Estimated time to complete the skill:
15–20 minutes

> CLIENT EDUCATION NEEDED:

1. Inform the client why the cast is being modified.
2. Explain that the cast cutter sounds and looks like a small saw, but is only a vibrating machine and will

not cut the skin or do painful damage. Explain that the scissors being used are designed not to cut the skin.

3. Demonstrate the action of the blade against the palm of your hand showing that it will not hurt. Demonstrate the scissors being used.
4. Explain that after the cast is modified, it will not harm the alignment of the fracture and will continue to give proper support so that healing will occur.



Figure 10-12-2 Cast cutter, cast spreaders, and bandage scissors

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | | |
|--|---|
| 1. Wash hands. | 1. Reduces transmission of microorganisms. |
| 2. Assess the client for intact cotton padding underneath the cast. | 2. Even though the cast cutter will not cut the skin, heat from the cutting of the plaster, and pieces of crumbling plaster can irritate the skin. |
| 3. Remind the client that the blade will not cut and the procedure will reduce the pain. | 3. Reassurance is important when the client is in pain and anxious about any procedure that involves electrical equipment, or sharp instruments next to the skin. |
| 4. Medicating the client with adequate pain medication is important. | 4. Reducing the pain may also reduce the anxiety associated with the procedure. |
| 5. Assist the client in placing the extremity in a comfortable position. | 5. Encourages the client to relax during the procedure. |
| 6. Assist in cutting the cast as requested. | 6. Establishes trust. |

7. To window a cast, use a very light touch with the cast cutter over the appropriate area. Make sure the cast is cut through (see Figure 10-12-3).



Figure 10-12-3 Use the cast cutter to cut a window out of the cast. Use a light touch, but make sure the fiberglass is cut through.

7. Bearing down too hard will cause the blade to inflict pain to the client. The cast must be cut through for the window to be removed.



Figure 10-12-4 Remove the fiberglass window.

8. Remove the window (see Figure 10-12-4).

8. Exposes the skin.

9. Cut the padding away to inspect the skin (see Figure 10-12-5).

9. Exposes the skin.



Figure 10-12-5 Cut the padding and stockinette away to inspect the skin.

10. When bivalving a cast, the technician will cut along the length of the cast on each side of the limb. Assist in using cast spreaders to spread the edges of the cast, and cut the padding underneath with bandage scissors.



Figure 10-12-6 The edges of this bivalved cast have been protected with additional padding to reduce skin irritation.

10. Aides in a clean cut.

11. Petal the edges of the new window or bivalve edges to prevent irritation (see Figure 10-12-6). If the edges of the new window will be exposed to drainage, urine, or feces, protect the edges of the window with plastic wrap.

11. Prevents skin irritation.

12. Secure the cast together with Velcro, Ace wrap, or tape (see Figures 10-12-7 and 10-12-8).

12. Maintains cast stability and immobilization of the area.



Figure 10-12-7 The window has been replaced and is held in place by tape.



Figure 10-12-8 The bivalved cast maintains immobilization of the area, but pressure has been released.

13. Wash hands.

13. Reduces the transmission of microorganisms.

> EVALUATION

- If the purpose of the procedure was to relieve pressure, complaints and signs of pressure have diminished.
- If the purpose of the procedure was to expose the underlying skin, then the correct area was exposed.
- The cast was not cracked or damaged during the procedure.

DOCUMENTATION

Nurses' Notes

- Indicate the signs and symptoms that preceded the cast cutting, and the neurovascular and skin evaluation following the event.



▼ REAL WORLD ANECDOTES

Bob fell off a ladder at work and was admitted to the hospital with a diagnosis of a right calcaneal fracture. After a lengthy operation, Bob arrived on the unit with his right foot and leg in a large plaster cast, with only his toes showing. Over the next 4 hours things went along fine. Bob had some pain but it was easily relieved by the use of prescribed medications. During the night he started complaining of increased pain that was severe and unrelenting even after taking his pain medications. Efforts to reposition his leg did not relieve this excruciating pain. Referring to the flow sheets that were started by the previous shift, it would appear that Bob's toes were cool instead of warm, which they recorded. On assessment it was noted that a disparity existed between toes on his left foot, and those on his right. When Bob was asked to move his toes, he was barely able to extend them. When the nurse extended his toes Bob cried out in agony. This was quite different from only a few hours before when he had no trouble at all moving his toes. The physician was notified and came to assess the situation. The physician decided to bivalve Bob's cast to relieve the pressure. Bob was premedicated, the procedure was explained, and the cast was bivalved. The client reported that he was much more comfortable, his toes were pink, and he continued to improve.

> CRITICAL THINKING SKILL

Introduction

Decisions regarding cast alterations must be based on all available information.

Possible Scenario

The client complained of post surgical pain in the right lower extremity, which increased significantly after

getting up to ambulate 48 hours after surgery. Assessments were made including capillary refill, ability to move toes, color of toes, temperature, drainage, etc., which all appeared to be normal and unchanged. The pain was relieved by elevation and ice. The nurse practitioner, erring on the side of caution, bivalved the cast anyway.

Possible Outcome

The cast was bivalved unnecessarily. The physician opted to replace the cast prior to the client's discharge the next day.

Prevention

Assessment must include all the information available. The surgical report, neurovascular status, fever,

pain, drainage, and the overall condition of the client must be taken into consideration to form an overall picture prior to implementing any procedure. If the pain did not subside and there were other abnormal findings upon assessment, then further investigation by the physician or nurse practitioner would have been necessary.

▼ VARIATIONS



Geriatric Variations:

- Older adults may need more reassurance that the procedure is not painful.
- More care must be taken when using the cast saw. A very light touch should be used because the skin in an older adult may be more fragile.



Pediatric Variations:

- Pediatric clients may not be able to verbally express themselves regarding increased pain when assessing a cast that may be too tight. Use of other assessment skills is imperative.
- Pediatric clients' fear of the unknown and a noisy cast saw can be extremely frightening. Having a parent to aid in comforting the child is important.
- Pediatric clients can also develop compartmental syndrome, which is why it is so important to assess these clients even more frequently than adults.



Home Care Variations:

- Instruct the client not to remove the bivalved cast without specific orders from the physician or qualified practitioner.



Long-Term Care Variations:

- In a windowed cast the exposed skin may swell through the window, causing pressure sores and circulatory compromise. Teach the client to watch for this.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Failing to reassure the client that the saw will cut the cast but not the skin.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure the client understands that the saw will not cut the skin before starting the procedure. Demonstrate on yourself to ease the client's fears. Small children may need extra assurance.

> NURSING TIPS

- Make sure cast is lined with soft material before cutting it.
- Fully describe the procedure to the client.
- Premedicate as needed.
- Familiarize yourself with all the tools and equipment prior to implementing the procedure.
- Assessment of the client is imperative.

SKILL 10-13

Cast Removal

Maryellen Zinsley, RN, BSN, and Valerie Coxon, RN, PhD

KEY TERMS

Bandage scissors
Cast removal saw

Fracture



> OVERVIEW OF THE SKILL

A cast is placed on a fracture generally for a time frame of six to eight weeks. A cast should fit snugly and support the fracture and may be changed several times during the healing process, as reductions in swelling or loss of muscle tone cause it to become loose. Removal of the cast involves taking off the cast and instructing clients what to expect when the cast is removed (and possible replacement of the cast). Assess the cast site for healing and/or irritation to the skin. If the cast is fairly new and is being replaced, as-

sess for condition, length of time the cast has been on, and the need for further client education in the care of the cast. If the cast has been replaced several times already and is now being removed permanently, the client will already be familiar with the procedures, while clients with new casts being replaced will need information on what procedures will be done. Once the case is off, check the injury site for signs of healing, continued problems, or new problems at the injury site.

> ASSESSMENT

1. Determine if the client is having the cast removed for good or if a new cast is being applied. **Knowing this information will assist you in having the proper supplies available during the cast removal and the amount of information the client will need about the procedures.**
2. Determine if there is any suspected disruption in skin integrity under the cast. **This will determine how carefully the cast needs to be removed, and what skin care will be needed. It may affect how a cast is reapplied.**
3. Determine how many weeks the fracture has been healing. **This will determine how carefully the cast needs to be removed.**

4. Determine the condition of the cast. **This will tell you how much additional client education is necessary if the cast is being replaced and was not being properly cared for.**
5. If this is a final cast removal do a range of motion and muscle strength test. **This will give you an idea of what further care and rehabilitation the client will need. The client may need assistance moving without the cast.**

> DIAGNOSIS

- 1.6.2.1 Impaired Skin Integrity
- 6.1.1.1 Impaired Physical Mobility
- 9.1.1 Pain

> PLANNING

Expected Outcomes:

1. Cast will be removed successfully from the client.
2. Client will remain safe after the removal of the cast.
3. Proper equipment will be given to the client on discharge.

Equipment Needed (see Figure 10-13-2):

- Cast removal saw
- Protective towel or waterproof pad
- Bandage scissors
- Cast splitter
- Water, washcloth, towels, basin, or sink



Figure 10-13-2 Cast cutter, cast spreaders, and bandage scissors



Estimated time to complete the skill:
5–20 minutes, depending on the size of the cast

> CLIENT EDUCATION NEEDED:

1. Educate the client that the saw is noisy.
2. Educate the client that he will feel warmth and vibration, but the saw will not cut the skin.
3. Demonstrate by holding the saw against the skin.
4. Educate the client on the need to hold the cast still.
5. Educate the client on how the affected limb will look and feel after the cast is removed. Remind the client that the skin will be pale and thin looking, hair growth may have occurred, and there might be a buildup of dead skin cells.
6. Caution the client that the area might feel tender and the muscles previously under the cast might feel weak.
7. Review cast care instructions with the client if there is any evidence of improper care or signs that the client has tampered with the cast.
8. Educate the client after cast removal on the care of the skin and the use of affected area.
9. During early stages of healing, cast manipulation may cause the injury to ache, even though it has not been painful before manipulation. Discuss pain control techniques, elevation, and restricting range of movement with the client.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| 1. Wash hands. | 1. Reduces the transmission of microorganisms. |
| 2. Introduce yourself to client and explain the planned procedure. | 2. Educates the client. |
| 3. Assess vascular status. | 3. Establish a baseline for post removal comparison. |
| 4. Assess client's ability to communicate during cast removal. | 4. Decreases client's anxiety level. |
| 5. Prepare equipment and have it at bedside. | 5. Facilitates an efficient practice. |
| 6. Prepare environment and client. | 6. Have client in proper position for cast removal. |

continues

7. Wash hands and wear protective clothing as needed.
8. Prepare client for how extremity will look after reduction. Extremity will look thinner than nonfractured site. Mobility will be less than nonfractured site.
9. Client may need to continue to use crutches or immobilizer until full mobility of extremity is regained.
10. The cast removal technician will cut the cast with the saw (see Figure 10-13-3). Support the limb in the proper position as requested.
7. Practices clean technique.
8. Prepares client for what to expect. Good client teaching.
9. Client education helps prevent reinjury of fracture.
10. Ensures a safe and smooth cut.



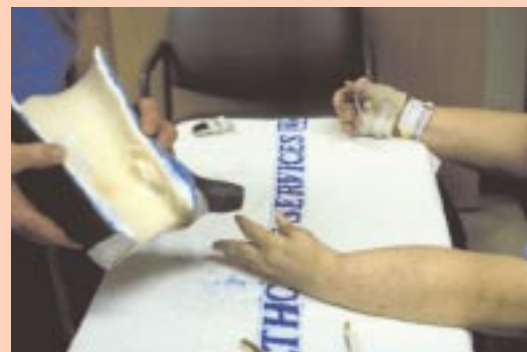
Figure 10-13-3 The cast is cut with the cast cutter down opposite sides.



Figure 10-13-4 After the cast has been split apart with the cast splitter, the padding and stockinette underneath are cut apart.

11. The cast technician will split the cast with a cast splitter, and cut the padding underneath (see Figure 10-13-4).
12. The cast technician will then pull the cast apart and remove it. Support the limb, and reassure the client, as this step can be anxiety producing and sometimes uncomfortable (see Figure 10-13-5).
11. Splitting the cast and cutting the padding allows the cast to be removed.
12. Reduces client anxiety.

Figure 10-13-5 The cast has been pulled apart and removed from the limb.



13. Assess the skin underneath the cast. Gently clean the skin with warm water. Do not rub or use friction on the skin.
14. May need to apply Ace wrap after cast removal.
13. Provides comfort, hygiene, and allows for detection of pressure sores or marks under the skin.
14. Supports injured joint.

15. Document the extremity where the cast was removed and how the extremity looks.

16. Wash hands.

15. Records implementation of intervention and promotes continuity of care.

16. Reduces the transmission of microorganisms.

> EVALUATION

- Cast was removed successfully from the client.
- Client remains safe after the removal of the cast.
- Proper equipment was given to the client on discharge.

> DOCUMENTATION

Nurses' Notes

- Document what type of cast was removed and where it was removed.
- Make a notation on how the extremity looks, its range of motion, and strength.
- Document any specific aids that the client will use after cast removal, e.g., slings, immobilizers, and crutches.



▼ REAL WORLD ANECDOTES

Jerry had a series of casts on his left wrist for 10 weeks. He was so excited about getting his cast off, he planned a full day of golf with his golfing buddies. The next day, he was back in the physician's office complaining of severe muscle pain. His left forearm hurt so badly he was sure he had refractured the bone. Like many clients, Jerry expected to have full range of motion and use of the extremity after the cast was removed. Protect your client from further injury by preventing him from full use of extremity before he is ready. Good education at cast removal time could have saved Jerry a great deal of pain and inconvenience.

> CRITICAL THINKING SKILL

Introduction

Nurses must be able to evaluate range of motion and muscle strength of an extremity.

Possible Scenario

Your client has a cast removed from his leg. You are called out of the room before you can assess the range of motion or strength of the extremity. The client decides he needs a drink of water and gets off the table.

Possible Outcome

The client falls and refractures the leg.

Prevention

Client teaching about decreased use of the fractured extremity is important. You should evaluate strength and range of motion of extremity and communicate results with the client.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may take longer to recover muscle function.*



Pediatric Variations:

- *Children will be more afraid of the cast saw and need extra support and extra time for education.*
- *Allow children to help, if possible.*
- *Allow children to keep the cast.*

continues

▼ VARIATIONS *continued*

- *The saw used to take off the cast is loud. Show it to the child before it is used. Show them how it works and the sound it makes. If possible, show the child that it will not hurt or cut them.*
- *Children may use sharp objects to scratch under the cast. Assess for this carefully.*

**Home Care Variations:**

- *Caution clients who are tempted to remove a cast at home, not to. A cast taken off too early can lead to long-term dysfunction in the limb, excess pain, and more trips to the doctor.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Not preparing the client for the sound and feel of the cast saw.

Ask Yourself:

How do I prevent this error?

Prevention:

Demonstrate the use of the saw. Explain the sight, sounds, and sensations.

> NURSING TIPS

- The saw is loud; prepare your client for its sound.
- Assure the client that the saw will not cut him.
- Save the cast, especially for children; they may want it for a souvenir.

SKILL 10-14

Assisting with a Continuous Passive Motion Device

Carla A. Bouska Lee, PhD, ARNP C, FAAN, and
Dale D. Barb, PMS, PT

KEY TERMS

Anatomical position	Range of motion
Contractures	Pressure ulcer
CPM device	Thrombophlebitis
Goniometer	
Neurovascular assessment	



> OVERVIEW OF THE SKILL

Clients recovering from surgical procedures to synovial joints, fractures, contractures, and general immobility may benefit from continuous passive motion (CPM). CPM facilitates joint range of motion (ROM), promotes wound healing, prevents formation of adhesions, decreases edema, and decreases the effects of immobility.

The parameters of the CPM device include the amount of time it is to be used each day, the amount of ROM prescribed, and the speed of passive movement generated by the unit. The CPM device includes a single-use client softgoods kit to comfortably position the involved extremity in the unit. The unit also has a stop and go switch so the client can turn off the unit if extreme discomfort is produced. There are many different types and models of CPM units avail-

able, so be sure to familiarize yourself with the softgoods kit and the control parameters of your unit before attempting to apply it to the client.

Neurovascular assessment of the client using the CPM unit is essential. This assessment confirms that the client's vascular and neural structures are not compromised by postsurgical complications, client positioning in the unit, or by excessive ROM positions during the procedure. The presence of edema in the involved extremity may greatly limit the ability of the client to achieve prescribed ROM goals. Therefore edema must be monitored and adjustments made accordingly to unit control settings. Any indications of vessel disease, thrombophlebitis, or infections must be noted and cleared with the physician or qualified practitioner prior to administration.

> ASSESSMENT

1. Assess orders for CPM usage including frequency, duration, degree of range of motion (ROM), and restrictions to ROM for the involved extremity to verify that the correct procedure is being followed.
2. Neurovascular assessment of the involved extremity prior to the start of CPM usage includes sensation, skin color, temperature, presence of pulses, and presence of edema and reflexes, especially deep tendon reflexes (DTR). Establishes a baseline for future comparisons.
3. Assess movement of the involved extremity to determine if the procedure is appropriate.
4. Pay attention to client's report of pain and discomfort. Pain assessment is helpful in reports to the physician or qualified practitioner to determine if treatment is appropriate.

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility
- 6.1.1.2 Activity Intolerance

> PLANNING**Expected Outcomes:**

1. Will facilitate joint range of motion, minimal to eventually optimal, depending on client's potential for development.
2. Will promote wound healing.
3. Will prevent formation of adhesions.
4. Edema, both peripheral and central will decrease.
5. Effects of immobility will decrease.

Equipment Needed:

- CPM device
- CPM softgoods

- Tape measure
- Goniometer



Estimated time to complete the skill:

15 minutes

> CLIENT EDUCATION NEEDED:

1. Client should understand reason for and use of CPM.
2. Client should understand plan to increase duration, speed, and ROM of CPM.
3. Client should understand use of CPM stop and go button.
4. Client should understand signs and symptoms to report related effects or changes in physical condition.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces transmission of microorganism. |
| <ol style="list-style-type: none"> 2. Explain procedure to client and instruct regarding reportable signs and symptoms or untoward effects. | <ol style="list-style-type: none"> 2. Decreases anxiety; improves client compliance and cooperation. |
| <ol style="list-style-type: none"> 3. Raise bed to comfortable working height and lower side rails. | <ol style="list-style-type: none"> 3. Protects caregiver from back injury or muscle strain. |
| <ol style="list-style-type: none"> 4. Position CPM device on the bed and install client softgoods kit to unit. For client comfort and safety make sure kit extends over metal support tubes of device. | <ol style="list-style-type: none"> 4. Protects client from skin chafing on exposed metal. |
| <ol style="list-style-type: none"> 5. Set CPM controls according to physician or qualified practitioner's order: check for ROM limitations, speed, and duration of movement. Ensure CPM stops are properly adjusted to settings. | <ol style="list-style-type: none"> 5. Provides for client safety and maximizes therapeutic outcomes. |
| <ol style="list-style-type: none"> 6. If the CPM device will be applied, measure client from the hip joint to the knee and from knee to slightly beyond the bottom of the foot. Adjust length of CPM device to correspond to upper and lower leg measurements. | <ol style="list-style-type: none"> 6. Provides for proper fit and positioning of CPM device. |
| <ol style="list-style-type: none"> 7. Affirm that CPM device is adjusted to accept appropriate extremity. | <ol style="list-style-type: none"> 7. Some CPM devices may be set up for various extremities. |

8. Position client in the middle of the bed with involved extremity slightly abducted to accommodate CPM device.
9. Place client's extremity in unit, maintaining proper anatomical placement of extremity in relation to CPM device. Align knee joint with corresponding hinge point on unit. Make sure leg is not internally or externally rotated. Best adjustment can be made with the CPM in its fully extended position (see Figure 10-14-2).



Figure 10-14-2 Make sure the knee lines up with the hinge and the leg is not internally or externally rotated.

10. Make appropriate adjustments to the foot pad so the client's foot rests comfortably against the pad and the remainder of his leg is well supported (see Figure 10-14-3).
11. Apply CPM restraining straps so that client's extremity maintains position in device. Be sure not to apply straps too snugly so that circulation will not be compromised (see Figure 10-14-4).

Figure 10-14-4 Apply the restraining strap snugly, but do not restrict circulation.

12. If you are satisfied with the CPM control settings and the client's position, start the CPM by turning the unit on. The operation of the unit should be closely monitored for the first several cycles to make sure the client is comfortable. The speed of the CPM is determined by the client's comfort. To maximize client comfort, start slowly and increase speed as client tolerates (see Figure 10-14-5).

8. Provides for proper positioning of CPM device and prevents the effects of poor or improper positioning.
9. Provides for client safety through proper positioning of involved extremity in CPM device.

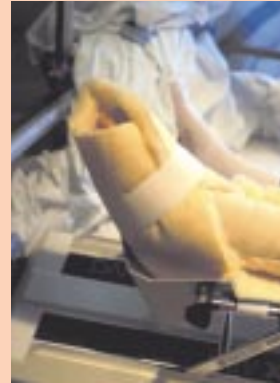
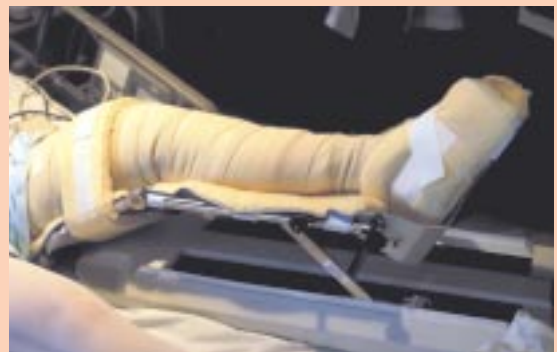


Figure 10-14-3 Adjust the foot pad so the foot rests comfortably. Add protective padding if needed.

10. Provides for client safety and comfort.
11. Provides for client safety and comfort.



12. Provides for client safety, comfort, and appropriate therapeutic outcome.



Figure 10-14-5 Observe the unit closely for the first several cycles to make sure the unit is working properly and the client is comfortable.

- | | |
|---|---|
| <p>13. The angular units on the CPM as displayed are approximate. To measure true motion of the involved extremity use a goniometer.</p> <p>14. Give the client the CPM stop and go switch so he can turn off the unit in case of extreme discomfort.</p> <p>15. Replace side rails to their upright position as well as lowering bed to starting height.</p> <p>16. Place the call light within reach of the client. Move the bedside table close to the bed and place items of frequent use within reach of the client.</p> <p>17. Wash hands.</p> <p>18. Chart the specifics of the treatment and the response of the client.</p> <p>19. Note other concurrent treatments with CPM, such as the order for embolic hose, active exercises, bed, or walking activities.</p> | <p>13. Provides for client safety, comfort, and appropriate therapeutic outcome.</p> <p>14. Provides for client safety. Provides for sense of self-care and control if untoward effects occur.</p> <p>15. Provides for client safety.</p> <p>16. Provides for client safety and comfort.</p> <p>17. Reduces the transmission of microorganism.</p> <p>18. Provides documentation of care and evidence of client response.</p> <p>19. Provides documentation of care and evidence of client response.</p> |
|---|---|

> EVALUATION

- Facilitates joint range of motion, minimal to eventually optimal, depending on client's potential for development.
- Promoted wound healing.
- Prevented formation of adhesions.
- Edema, both peripheral and central was decreased.
- Effects of immobility were decreased.

> DOCUMENTATION

Nurses' Notes

- Duration of CPM usage, including start and stop time
- CPM control parameters used, including ROM achieved
- Client's tolerance of procedure
- Neurovascular status of client's involved extremity
- Skin integrity



▼ REAL WORLD ANECDOTES

Following knee surgery, Mr. Mason was discharged home with a CPM machine to prevent adhesions and provide gentle movement. When the home health nurse stopped by the next day Mr. Mason was not using the CPM machine. When asked about it, Mr. Mason became angry, shouting about the machine not working right. He told the nurse that it was a waste of time to use it. When the nurse

▼ REAL WORLD ANECDOTES *continued*

examined the CPM machine it appeared to be in working order. The nurse then asked Mr. Mason to place his leg and knee in the machine so she could evaluate its function. Mr. Mason placed the machine correctly and turned it on. Within seconds Mr. Mason was exclaiming that the machine obviously didn't work, that it wasn't moving. While the nurse had Mr. Mason watch carefully she pointed out that the CPM machine was not supposed to provide vigorous exercise, just slow constant motion. Once Mr. Mason realized that the CPM machine was indeed working the way it was supposed to, he did use it successfully.

> CRITICAL THINKING SKILL

Introduction

Client understanding and cooperation is essential to the use of the CPM machine.

Possible Scenario

Mrs. Frank has just returned to the unit following knee surgery with orders for a CPM machine. As you place the machine and explain its purpose you note that Mrs. Frank is still sleepy. Mrs. Frank's knee and leg remain in good alignment during the routine postoperative checks and she is resting quietly. After the routine postoperative checks are completed, another patient returns from surgery, and it is several hours before you check on Mrs. Frank again. When you do return to check on Mrs. Frank you find that she has

tried to roll over in her sleep. Because she is still groggy she didn't realize the CPM machine was in place and she has twisted her leg sideways in the machine. Her leg is now out of alignment and rubbing against the hinge of the machine.

Possible Outcome

Mrs. Frank has an open area where her leg has been rubbing against the hinge resulting in a prolonged recovery time and unnecessary pain.

Prevention

Be sure the client is capable of understanding the reasons for the CPM machine and cooperating with its use. Wait until the client is more attentive or have a family member stay at the bedside to watch the client.

▼ VARIATIONS



Geriatric Variations:

- Care must be used to do a thorough assessment of conditions that might rule out utilization of CPM treatment, e.g., active clotting and possibility of exacerbation of emboli.
- With aging, neurological and concomitant neurosensory responses, including reduced sensations of pain, must be noted.
- The skin of the elderly is sensitive and more easily "gouged" so attention to skin integrity is paramount. Breaks in skin integrity naturally lead to compromised state of possible infection.



Pediatric Variations:

- Explanations of the device in understandable, analogous terms is essential to decrease anxiety in the child, such as utilizing a doll or stuffed animal to share the experience with the child.
- During the treatment, arrangements for social or creative activities that are developmentally appropriate will also facilitate the effect of the treatment, i.e., relaxed muscles improve circulation, which enhances movement.



Home Care Variations:

- Adaptations include posturing and positioning in the home based on bed heights or other reclined positions to properly administer the treatment.
- Special attention to the stability of the machinery is important.
- Skin care and attention to asepsis techniques are paramount to safe and comfortable care.

continues

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *Clients (children, adults, or the elderly) who are participants in long-term care services, must be attended to with equivalent concerns, i.e., safe, correct, effective care to provide appropriate treatment followed by proper posturing, positioning, and careful skin care.*
- *Pay attention to individual responses, e.g., sensory, motor, pain, or discomfort.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Not anatomically aligning client's knee joint properly with hinge joint of CPM.

Ask Yourself:

How do I prevent this error?

Prevention:

Align knee joint with corresponding hinge point on unit. Make sure leg is not internally or externally rotated. Best adjustment can be made with the CPM in its fully extended position.

> NURSING TIPS

- Familiarize yourself with the CPM unit prior to applying it to a client.
- Make sure client's involved extremity is correctly and comfortably positioned in CPM unit.
- Make sure client's joints correctly align with the CPM's hinge joints.
- Check control settings prior to applying CPM to client.
- Regularly monitor neurovascular status of client's involved extremity.
- Measure, such as with goniometer, the effects of care over time.

SKILL 10-15

Assisting with Crutches, Cane, or Walker

Karrin Johnson, RN

(Adapted from *Fundamentals of Nursing: Standards & Practice*, by Sue C. DeLaune and Patricia K. Ladner, 1998, Albany, NY: Delmar Publishers.)

KEY TERMS

Assistive device
Axilla
Cane

Crutches
Walker
Quad cane



> OVERVIEW OF THE SKILL

Independence is an important part of a client's recovery process. Being able to move about in the environment can spell the difference between living at home and living in a health care facility. Being able to move independently improves a client's emotional, mental, and physical well-being.

Clients who cannot safely walk unassisted can use devices designed to aid them in walking independently. The three most common devices used are crutches, canes, and walkers.

The appropriate device for each client is determined by the client's physician, qualified provider, physical therapist, or nurse. Often these caregivers work together to determine which device works best for the client. This decision is based on the client's ability to bear weight on his legs, his upper arm strength, his stamina, and the presence or absence of weakness on one side.

Crutches can be used by clients who cannot bear any weight on one leg, clients who can only bear partial weight on one leg, and clients who have full

weight bearing on both legs. There are several types of crutches available, depending on the length of time the client will require the assistance and the client's upper body strength.

A cane is used by clients who can bear weight on both legs but one leg or hip is weaker or impaired. There are several types of canes as well. The standard, straight cane is used most often. There are also canes with three or four legs on the end to increase a client's stability as he walks.

Walkers are used by clients who require more support than a cane provides. Walkers are available with or without wheels. Walkers without wheels provide the most stability but they must be lifted with each step. Walkers with wheels are somewhat less stable but a client who does not have the upper body strength to lift the walker repeatedly can push it along while walking. Mobility is an important part of everyone's life. The ability to get around can contribute greatly to a client's well-being.

> ASSESSMENT

1. Assess the reason the client requires an assistive device. Is it a long-term need or a short-term need? **This helps determine which device to use.**
2. Assess the client's physical limitations. How much weight is the client able to bear? Can he bear weight on both legs or just one? Is his upper body strength good? Does he tire easily? **Safety and comfort assessment.**

3. Assess the client's physical environment. Is he at home or in a medical facility? Is his environment suited to his assistive needs and the assistive device he will be using? Are the hallways wide enough? Well lit? Are the doorways wide enough? Do the doors swing open far enough? **Safety and comfort assessment.**
4. Assess the client's ability to understand and follow directions regarding use of an assistive device. Can he understand the instructions? Can he remember them? Has he used this device in the past? Is there a language barrier that might limit understanding? **Safety, educational, comfort, and effectiveness assessment.**

- Tape measure
- Sturdy footwear, properly fitted



Estimated time to complete the skill:
30 minutes

> DIAGNOSIS

- 6.1.1.1 Impaired Physical Mobility
1.6.1.3 Risk for Trauma
8.1.1 Knowledge Deficit, related to using assistive devices for mobility

> PLANNING

Expected Outcomes:

1. The client will be able to demonstrate safe and independent ambulation with the assistance of crutches, a cane, or a walker.
2. The client will feel confident and safe while using the assistive device.

Equipment Needed (see Figure 10-15-2):

- Gait belt
- Assistive device: crutches, cane or walker

> CLIENT EDUCATION NEEDED:

1. Reinforce teaching regarding holding a cane on the “good” side rather than the weak side.
2. Teach the client not to allow the crutch pad to rest in the axilla. This can cause damage to the client's arm.
3. If the client's walker has wheels, teach the client not to let the walker get too far ahead of his center of gravity.



Figure 10-15-2 Crutches, braces, and walkers are used to assist ambulation.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

Crutch Walking

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Inform client that you will be assisting with ambulation using crutches. 2. Assess client for strength, mobility, range of motion, visual acuity, perceptual difficulties, and balance. <i>Note:</i> The nurse and physical therapist often collaborate on this assessment. 3. Adjust crutches to fit the client. With the client supine, measure from the heel to the axilla. | <ol style="list-style-type: none"> 1. Reduces anxiety; helps increase comprehension and cooperation; promotes client autonomy. 2. Helps determine the client's capabilities and amount of assistance required. 3. Provides broad base of support for client. Space between the crutch pad and the axilla |
|---|---|

With the client standing, set the crutch position at a point 4–5 inches lateral to the client and 4–6 inches in front of the client. The crutch pad should fit 1.5–2 inches below the axilla (3-finger width) (see Figure 10-15-3). The hand grip should be adjusted to allow for the client to have elbows bent at 30° flexion.

Figure 10-15-3 Adjust the crutches to fit the client.



prevents pressure on radial nerves. The elbow flexion allows for space between the crutch pad and axilla.

4. Lower the height of the bed.
 5. Dangle the client at the side of bed for several minutes. Assess for vertigo.
 6. Instruct client on method to hold the crutches; that is, with elbows bent 30° and pad 1.5–2 inches below the axilla. Instruct client to position crutches lateral to and forward of feet. Demonstrate correct positioning.
 7. Apply the gait belt around the client's waist if balance and stability are unreliable.
 8. Assist the client to a standing position with crutches. Stand close to the client to support as needed.
4. Allows client to sit with feet on floor for stability.
 5. Allows for stabilization of blood pressure, thus preventing orthostatic hypotension.
 6. Increases client comprehension and cooperation.
 7. Provides support; promotes client safety.
 8. Standing for a few minutes will assist in preventing orthostatic hypotension.



A.



B.

Figure 10-15-4 Crutch walking, four-point gait: **A.** Moving right crutch forward and left foot forward; **B.** Moving left crutch forward and right foot forward, even with right crutch

Four-Point Gait (see Figure 10-15-4)

9. Position the crutches 4.5–6 inches to the side and in front of each foot. Move the right crutch forward 4–6 inches and move the left foot forward, even with the left crutch. Move the left
9. The four-point gait (used for partial or full weight bearing) provides greater stability. Weight bearing is on three points (two crutches and one foot or two feet and one

continues

Crutch Walking *continued*

crutch forward 4–6 inches and move the right foot forward, even with the right crutch. Repeat the four-point gait.



Figure 10-15-5 Crutch walking, three-point gait: advancing both crutches and weaker leg forward together

Three-Point Gait (see **Figure 10-15-5**)

10. Advance both crutches and the weaker leg forward together 4–6 inches. Move the stronger leg forward, even with the crutches. Repeat the three-point gait.

Two-Point Gait

11. Move the left crutch and right leg forward 4–6 inches. Move the right crutch and left leg forward 4–6 inches. Repeat the two-point gait.

Swing-Through Gait (see **Figure 10-15-6**)

12. Move both crutches forward together 4–6 inches. Move both legs forward together in a swinging motion, even with the crutches. Repeat the swing-through gait.

Walking Up Stairs

13. Stand beside and slightly behind client. Instruct client to position the crutches as if walking. Place body weight on hands. Place the strong leg on the first step. Pull the weak leg up and move the crutches up to the first step. Repeat for all steps.

Walking Down Stairs

14. Position the crutches as if walking. Place weight on the strong leg. Move the crutches down to the next lower step. Place partial

crutch) at all times. The client must be able to bear weight with both legs.



Figure 10-15-6 Crutch walking; swing-through gait

10. The three-point gait (used for partial or non-weight-bearing) provides a strong base of support. This gait can be used if the client has a weak or non-weight-bearing leg.

11. The two-point gait (used for partial weight bearing) provides a strong base of support. The client must be able to bear weight on both legs. This gait is faster than the four-point gait.

12. The swing-through gait (used for non-weight-bearing) permits a faster pace. This gait requires weight bearing on both legs, greater balance, and more strength.

13. Prevents weight bearing on the weaker leg.

14. Prevents weight bearing on the weaker leg.

weight on hands and crutches. Move the weak leg down to the step with the crutches. Put total weight on arms and crutches. Move strong leg to same step as weak leg and crutches. Repeat for all steps. A second caregiver standing behind the client holding on to the gait belt will further decrease the risk of falling.

15. Set realistic goals and opportunities for progressive ambulation using crutches.

16. Consult with a physical therapist for clients learning to walk with crutches.

17. Wash hands.

Walking with a Cane

18. Inform client that you will be assisting with ambulation using a cane.

19. Lower the height of the bed.

20. Dangle the client at the side of bed for several minutes. Assess for vertigo.

21. Assess client for strength, mobility, range of motion, visual acuity, perceptual difficulties, and balance. *Note:* The nurse and physical therapist often collaborate on this assessment.

22. Apply the gait belt around the client's waist if balance and stability are unreliable.

23. Have the client hold the cane in the hand opposite the affected leg. Explain the safety and body mechanics underlying using the cane on the strong side.

24. Have the client push himself up from the sitting position while pushing down on the bed with his arms.

25. Have the client stand at the bedside for a few moments.

26. Assess the height of the cane. With the cane placed 6 inches ahead of the client's body, the top of the cane should be at wrist level with the arm bent 25%–30% at the elbow.

15. Crutch walking takes up to 10 times the energy required for unassisted ambulation.

16. The physical therapist is the expert on the health care team for crutch-walking techniques.

17. Reduces the transmission of microorganisms.

18. Reduces anxiety; helps increase comprehension and cooperation; promotes client autonomy.

19. Allows client to sit with feet on floor for stability.

20. Allows for stabilization of blood pressure, thus preventing orthostatic hypotension.

21. Helps determine the client's capabilities and amount of assistance required.

22. Provides support; promotes client safety.

23. Promotes safety and cooperation. Promotes client autonomy. By holding the cane on the stronger side the client has more control and strength for using it.

24. Increases upper body strength.

25. Allows the client to gain balance. The nurse can check for strength and balance.

26. A 25%–30% bend at the elbow provides for better muscle strength and support than if the arm is straight.

Walking with a Cane *continued*

27. Walk to the side and slightly behind the client, holding the gait belt if needed for stability.

27. Allows the nurse to provide stability or assistance if the client needs it.

The Cane Gait

28. Move the cane and the weaker leg forward at the same time for the same distance (see Figure 10-15-7). Place weight on the weaker leg and the cane. Move the strong leg forward. Place weight on the strong leg.

28. The cane helps to provide a wide base of support for the body when the weight is on the weaker leg.



Figure 10-15-7 Move the cane and the weaker leg forward.



Figure 10-15-8 Move the walker and the weaker leg forward.

Sitting with a Cane

29. Have client turn around and back up to the chair. Have her grasp the arm of the chair with the free hand and lower herself into the chair. Be sure to place the cane out of the way but within reach.

29. The cane provides additional support for the client as she lowers herself into the chair.

30. Set realistic goals and opportunities for progressive ambulation using a cane.

30. Walking with a cane takes practice.

31. Consult with a physical therapist for clients learning to walk with a cane.

31. The physical therapist is the expert on the health care team for cane-walking techniques.

32. Wash hands.

32. Reduces the transmission of microorganisms.

Walking with a Walker

33. Inform client that you will be assisting with ambulation using a walker.

33. Reduces anxiety; helps increase comprehension and cooperation; promotes client autonomy.

34. Lower the height of the bed.

34. Allows client to sit with feet on floor for stability.

35. Dangle the client at the side of bed for several minutes. Assess for vertigo.

35. Allows for stabilization of blood pressure, thus preventing orthostatic hypotension.

- 36. Provide a robe or other covering and shoes with firm, nonslip soles.
- 37. Assess client for strength, mobility, range of motion, visual acuity, perceptual difficulties, and balance. *Note:* The nurse and physical therapist often collaborate on this assessment.
- 38. Apply the gait belt around the client's waist if balance and stability are unreliable.
- 39. Place the walker in front of the client.
- 40. Have the client push himself up from the sitting position while pushing down on the bed with his arms.
- 41. Have the client transfer his hands to the walker handgrips, one at a time.
- 42. Be sure the walker is adjusted so the handgrips are just below waist level and the client's arms are slightly bent at the elbow.
- 43. Walk to the side and slightly behind the client, holding the gait belt if needed for stability.
- 36. Provides for modesty and safety.
- 37. Helps determine the client's capabilities and amount of assistance required.
- 38. Provides support; promotes client safety.
- 39. Position the walker for use.
- 40. Increases upper body strength.
- 41. Allows the client to maintain balance while transferring his weight.
- 42. Provides maximum support from the arms while ambulating.
- 43. Allows the nurse to provide stability or assistance if the client needs it.

Walker Gait

- 44. Move the walker and the weaker leg forward at the same time (see Figure 10-15-8). Place as much weight as possible or as allowed on the weaker leg, using the arms for supporting the rest of the weight. Move the strong leg forward and shift the weight to the strong leg (see Figure 10-15-9).
- 44. Provides support for a weak or non-weight-bearing leg by using arm and upper body strength.



Figure 10-15-9 Use the arms to support the rest of the weight and move the strong leg forward.

Sitting with a Walker

- 45. Have the client turn around in front of the chair and back up until the back of his legs
- 45. Using the armrests of the chair is a more stable support than using the walker.

Walking with a Walker *continued*

touch the chair. Have him place his hands on the chair armrests, one hand at a time. He then lowers himself into the chair using the armrests for support.

- | | |
|--|---|
| <p>46. Set realistic goals and opportunities for progressive ambulation using a walker.</p> <p>47. Consult with a physical therapist for clients learning to walk with a walker.</p> <p>48. Wash hands.</p> | <p>46. Walking with a walker takes practice.</p> <p>47. The physical therapist is the expert on the health care team for walker techniques.</p> <p>48. Reduces the transmission of microorganisms.</p> |
|--|---|

> EVALUATION

- Assess if the client is able to demonstrate safe and independent ambulation with the assistance of crutches, a cane, or a walker.
- Assess if the client feels confident and safe while using the assistive device.

> DOCUMENTATION**Nurses' Notes**

- Document the type of device the client is using, the level of understanding regarding the use of the device, how far the client is able to walk using the device, and the client's response to the activity.

Kardex

- Any information that is pertinent to nurses or therapists regarding type of device or a particular client's needs should be noted.

**▼ REAL WORLD ANECDOTES**

Nurse Mwangi was doing a home follow-up with Mrs. Munson. Mrs. Munson had recently been discharged from rehabilitation following a stroke. She had one-sided weakness and had been taught to use a walker in rehab. While talking, Nurse Mwangi noted that Mrs. Munson was not using her walker. To get around in the house Mrs. Munson was holding on to furniture and the walls. The nurse noted that Mrs. Munson was quite unsteady using this method of ambulation. Upon questioning, Mrs. Munson claimed that she did not need the walker; she was doing just fine without it. The nurse found the walker folded up, leaning against the wall. She brought it out to reinforce Mrs. Munson's teaching regarding use of the walker. When the nurse handed the walker to Mrs. Munson she became angry and blurted out, "I can't use that thing. I can't even get it open." Upon further questioning, Nurse Mwangi discovered that the rehab nurses had always folded and unfolded Mrs. Munson's walker for her. After returning home, Mrs. Munson had discovered that she could not get it folded and unfolded on her own. As a result she had simply stopped using it.

Nurse Mwangi discussed several options with Mrs. Munson, including simply leaving the walker unfolded and available or possibly getting a different walker that was easier for her to manipulate.

Be sure the client really knows how to do the task. Do not mindlessly perform it for them. Do not take things at face value. Be sure to dig deep enough to get the real answer regarding a situation.

> CRITICAL THINKING SKILL

Introduction

Cane to good side not bad side.

Possible Scenario

While assisting Mr. Lujan to ambulate using his cane, you note that he is holding the cane on his weaker side.

Possible Outcome

If Mr. Lujan also has weakness in his arm on that side he is at greater risk for falling. His weaker arm will tire more easily and is more likely to give way. By keeping the cane close to the weaker foot, Mr. Lujan is using the cane as a substitute limb. This does not help strengthen the weak leg through use. It also negates

any wide-stance stabilizing effect from the cane. This is a safety concern as it puts Mr. Lujan at risk of falling.

Prevention

The cane is present to increase stability, not to act as a replacement limb. By holding the cane on the stronger side the client has more control and strength for using it. Also the client has a 3-point, wider stance with the cane and the affected leg farther apart. The wider stance promotes stability and good body mechanics.

By using the cane as a replacement limb, Mr. Lujan does not get any strengthening benefit in his weaker leg. By using the cane for stability, Mr. Lujan's weaker leg can gain strength through use.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients may not have sufficient upper body strength to lift a walker prior to each step. They may need a rolling walker.*
- *If an elderly client tends to tire easily, walkers with fold down seats built in are available so they can sit and rest whenever they need to.*
- *To foster independence, a basket or an apron with pockets on the front of a walker can help the client carry small items.*
- *Walkers outdoors pose special hazards to elderly clients. Wheels and tips can become stuck in the mud, grass, or cracks in the pavement.*



Pediatric Variations:

- *Be sure to get the correct size device for a child. Children grow quickly and they will need to be assessed more often regarding the size of the device.*
- *If a child is very young, he may revert to crawling or creeping rather than try to use a device to assist with walking. Try to make using the device fun and a treat.*
- *Children may feel more comfortable with a walker they can “customize” with decals and decorations. Make sure these do not pose a safety hazard, however.*



Home Care Variations:

- *Assess the home for narrow hallways, doorways, and steps. Advise the client regarding ways to negotiate narrow passages.*
- *Mark the front edge of steps with tape or paint so it is highly visible to clients walking with assistive devices.*
- *Advise clients to remove or fasten down throw rugs that might slide and cause the client to fall.*
- *Make sure handrails on stairs are securely fastened to the wall.*



Long-Term Care Variations:

- *Be sure to check the rubber tips on assistive devices for wear. With the rubber worn away the client is at risk of slipping and falling.*
- *Clients who use an assistive device frequently may need hand protection such as gloves or padding on the handgrip.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

Leaning on the top of the crutch with the axilla when walking.

Ask Yourself:

How do I prevent this error?

Prevention:

Clients who walk leaning on the crutch with their axilla are at risk of damage to the nerves, blood vessels, and muscles. This is called crutch palsy.

> NURSING TIPS

- Be sure there is about 2 inches or 3 fingers width of distance between the client's axilla and the top of the crutch.
- Be sure the client is holding his cane on the good side for optimal effect.
- Be sure that the client's walker is just below waist level. This allows the client's arms to be slightly bent when standing in the walker. This is a stronger arm position than with the arms totally straight.
- Check the rubber tips on all assistive devices frequently. They can become worn quickly. Worn rubber tips can lead to instability and falls.
- When measuring the height of a cane be sure the client stands erect, not hunched or bent over.
- When teaching a client to stand up prior to using a walker have him use the armrest on the chair not the walker, for support. The walker is less stable and the client could pull it over.
- Provide a robe or other covering and shoes with firm, nonslip soles to provide for modesty and safety.
- Label the client's equipment so he will not wind up with equipment measured for another person.

Special Procedures

- Skill 11-1** Administering an Electrocardiogram
- Skill 11-2** Magnetic Resonance Imaging (MRI)
- Skill 11-3** Assisting with Computed Tomography (CT) Scanning
- Skill 11-4** Assisting with a Liver Biopsy
- Skill 11-5** Assisting with a Thoracentesis
- Skill 11-6** Assisting with Abdominal Paracentesis
- Skill 11-7** Assisting with a Bone Marrow Biopsy/Aspiration
- Skill 11-8** Assisting with a Lumbar Puncture
- Skill 11-9** Assisting with Amniocentesis
- Skill 11-10** Assisting with Bronchoscopy
- Skill 11-11** Assisting with a Gastrointestinal Endoscopy
- Skill 11-12** Assisting with a Proctosigmoidoscopy
- Skill 11-13** Assisting with Arteriography
- Skill 11-14** Positron-Emission Tomography Scanning

SKILL 11-1

Administering an Electrocardiogram

Susan Boyce Gilmore, MN, RN, CCRN

KEY TERMS

ECG

Electrocardiogram

Electrode gel

Electrode paste

Electrodes

Leads

Precordial leads



> OVERVIEW OF THE SKILL

A 12-lead electrocardiogram (ECG) is the standard form of electrocardiogram used to diagnose cardiac rhythm disturbances and many types of cardiac problems such as myocardial ischemia or infarction. The ECG may reveal other cardiac structural or functional abnormalities such as hypertrophy, certain drug effects, and electrolyte abnormalities; however, other modalities exist for diagnosis of these types of abnormalities and the ECG offers only initial or screening information for these conditions.

The ECG records amplified electrical activity of the heart only and offers little information regarding contractile or hemodynamic function. It is, however, the most frequently used test of cardiac function

other than pulse and blood pressure determinations. The 12-lead ECG provides “views” of cardiac electrical activity from 12 different vantage points on the body surface. It is noninvasive and painless and can be obtained within a few minutes by a person who does not require extensive training. Interpretation of the recorded data requires an advanced level of practice. Most ECGs are obtained with a machine that provides computer-derived interpretation simultaneous with the graphed wave tracing. Thus, preliminary and usually accurate information is available immediately and is later confirmed by a cardiologist or other trained provider who “over-reads” the tracing.

> ASSESSMENT

1. Assess age, gender, and current medication history for any medications with possible cardiac or hemodynamic effects. Gather other data that may be required by unit/institution protocol (height, weight, recent blood pressure, operator identification). Reference standards are tailored to age and gender. Some medications cause abnormalities in portions of the ECG complex that must be recognized as medication effect.
2. Determine that the client is able to tolerate a supine position and that adequate exposure of chest and limbs is possible for electrode placement. **Correct siting of electrodes is enhanced by comfortable, stable position.**
3. Determine presence of neck, arm, jaw, or other pain with possible cardiac origin. **Chest or other pain may provide additional information useful in serial comparison of ECGs.**

4. Assess client need for information about the procedure purpose and requirements and ability to cooperate; that client should lie still and refrain from talking, electrode attachment, procedure lasts only a few minutes and is painless. Anxiety may be relieved by simple explanation of intent, duration, and purpose.

> DIAGNOSIS

- 8.1.1 Knowledge Deficit regarding the ECG procedure
- 9.3.1 Anxiety related to the procedure or to the diagnosis and treatment
- 1.4.2.1 Decreased Cardiac Output

> PLANNING

Expected Outcomes:

1. The client will be able to cooperate with procedure.
2. The client will not be anxious.
3. The client will be able to describe the reason for the ECG.

Equipment Needed (see Figure 11-1-2):

- Twelve-lead ECG machine with charged battery, cables and leads, graph paper
- Disposable electrodes (12)
- Electrode paste or gel
- Alcohol wipes
- Pillows
- Sheet or drape
- Towel and washcloth
- Disposable razor



Estimated time to complete the skill:

10 minutes

> CLIENT EDUCATION NEEDED:

1. Assure the client that no electrical current goes through the body from the machine.
2. Explain to the client that he will feel nothing during the procedure.
3. Instruct the client to report chest pain or other symptoms to the nurse or physician.
4. Explain to the client that he will need to be in the supine position and will need to lie still during this test.
5. Explain to client that he will need to breathe normally and refrain from talking.
6. Explain to client that it may be necessary to shave body hair at some sites where electrodes are to be placed to provide good contact.
7. Tell the client that he will have to remove his clothes from the waist up and expose his lower arms and legs but that he will be covered as much as possible during the procedure.
8. Assure the client that his privacy will be guarded.



Figure 11-1-2 Electrocardiogram machine

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Close door and curtains.
3. Explain the procedure and rationale for ECG.
4. Bring ECG machine to the bedside and open electrode packages. Since operations requirements are different for older and

RATIONALE

1. Reduces the transmission of microorganisms.
2. Provides privacy.
3. Allays anxiety and promotes cooperation.
4. Assures smooth procedure.

continues

newer equipment, review the manufacturer's instructions before proceeding.

5. Enter all demographic data into the machine (see Figure 11-1-3).



Figure 11-1-3 Enter the demographic data into the ECG machine.

6. Position the client in a supine and relaxed position and drape with a sheet.
7. Remove moisture, oil, and excess hair from site at electrode sites.
8. Apply electrode paste and attach electrodes to the chest:
 - V_1 —4th intercostal space (ICS) at right sternal border. Females: Choose a site as close to standard position as possible.
 - V_2 —4th ICS at left sternal border.
 - V_3 —Midway between V_2 and V_4 .
 - V_4 —5th ICS at midclavicular line.
 - V_5 —Left anterior axillary line at level of V_4 horizontally.
 - V_6 —Left midaxillary line at level of V_4 horizontally (see Figure 11-1-4).
9. Attach lead wires to electrodes (see Figure 11-1-5).

Figure 11-1-5 Attach the lead wires to the electrodes.

5. Ensures accurate diagnosis for correct client.



Figure 11-1-4 Attach the electrodes to the chest.

6. Provides comfort and privacy and ensures accurate ECG.
7. Promotes adherence of leads to chest and extremities.
8. Promotes proper display of ECG on paper.
 - In females, whose breast tissue obscures sternal border.
9. Ensures accurate tracing.



- | | |
|---|--|
| <p>10. Obtain tracing by following the instructions from the physician or qualified practitioner. In general, a 2.5 second strip from each lead, plus a 10-second rhythm strip is required.</p> <p>11. Inspect tracing for adequate quality.</p> <p>12. Remove leads and electrodes. Wipe paste from skin.</p> <p>13. Notify physician or qualified practitioner of abnormalities.</p> <p>14. Wash hands.</p> <p>15. Return machine and replace supplies.</p> | <p>10. Data are gathered and transferred onto paper for analysis.</p> <p>11. Muscle movements may cause “fuzzy” waveforms.</p> <p>12. Promotes comfort and hygiene, and minimizes skin irritation.</p> <p>13. Certain changes may require prompt treatment.</p> <p>14. Reduces the transmission of microorganisms.</p> <p>15. Assures equipment is ready for next use.</p> |
|---|--|

> EVALUATION

- The client tolerated the ECG procedure.
- The client is able to state purpose of ECG.
- The client is free of chest pain or other cardiac complaints.
- An accurate tracing was obtained for analysis.

> DOCUMENTATION

Nurses' Notes

- Note the date and time of the ECG.
- Describe the reason for the ECG and any significant findings.
- Record the time the tracing results were reported to the physician or qualified practitioner.

Medication Administration Record

- Note the date and time of any cardiac medication.



▼ REAL WORLD ANECDOTES

Scenario 1

Alonzo, a 73-year-old client with known coronary artery disease, hypertension, and chronic obstructive pulmonary disease, was admitted to the cardiac care unit 12 hours earlier with chest pain and pneumonia. He now notified the nurse that he was having chest pain and felt lightheaded. In assessing him, the nurse found his apical pulse to be 160 and irregular, blood pressure 134/92. He admitted that his chest pain had returned approximately 10 minutes earlier when he began to feel slightly dizzy. The nurse took an ECG, the protocol for recurrent chest pain, which confirmed a rate of 145 to 175 beats/minute, and a rhythm interpretation confirmed atrial fibrillation with premature ventricular contractions. Alonzo's physician was notified and Alonzo was given medication to control his tachycardia and dysrhythmias.

Scenario 2

Esther, a 58-year-old woman with history of non-insulin-dependent diabetes mellitus, obesity, chronic low back pain, and mild congestive heart failure, was admitted 24 hours earlier for continuous IV heparin therapy for deep vein thrombosis in her left leg. The nurse's aide now reports that Esther is sitting up in bed, is “sweaty,” and has pain in her chest and is breathing rapidly. The nurse finds that Esther is tachycardic, short of breath, and extremely diaphoretic with a blood pressure of 94/62 and pulse oximetry of 84%. Breath sounds are clear throughout all lung fields. Oxygen by

continues

▼ REAL WORLD ANECDOTES *continued*

mask is started, and a 12-lead ECG is obtained while the physician is paged. The ECG reveals sinus tachycardia, rate 132 beats/minute. Her QRS axis has changed from -30° to $+110^\circ$ and computer interpretation reveals nonspecific ST changes. The nurse reported all these findings to the physician when he arrived at the client's bedside.

> CRITICAL THINKING SKILL

Introduction

Quick response to any cardiac symptoms or complaints is essential in giving appropriate and timely treatment. Taking an ECG should be second nature to staff in emergency rooms, medical units, and cardiac care units.

Possible Scenario

A woman being treated for recently diagnosed diabetes on the medical unit had just eaten her lunch when she mentioned to the nurse that she had heartburn. She said she often got it after eating and it always went away when she reclined in her chair. The nurse noted that she looked comfortable and went to her next client.

Possible Outcome

An hour later, the client put on her call light and told the nurse that her heartburn had not disappeared as it usually did. The nurse then took her vital signs and called the doctor. He ordered an ECG and the nurse called the ECG technician. The preliminary result showed possible cardiac ischemia. When the doctor was notified, he ordered the client to be transferred to the cardiac care unit for further evaluation.

Prevention

The nurse should have listened to the client's complaint and acted immediately by calling the doctor or doing the ECG herself if the institution policy allowed it.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have difficulty laying on their back.
- Older clients with respiratory problems may have the ECG taken while sitting.
- Some clients may have had an amputation of a limb so the extremity electrodes will require adjustment of the electrode placement.
- An elderly client with surgical dressings or appliances may require repositioning of the electrodes.
- The skin of older clients may be fragile so care should be taken when applying and removing the electrodes and cleaning the skin of the gel.



Pediatric Variations:

- Infant or pediatric electrodes should be the appropriate size.
- Reassure the child that the ECG will not hurt and that it will take only a few minutes.
- Young children may need to be offered a pacifier or bottle so they can relax and breathe normally.
- Children may be distracted by a video or a story read to them.
- Careful electrode placement is essential since ECG computers recognize age and include age-appropriate algorithms used in the computer interpretation.



Home Care Variations:

- ECGs are not commonly done in the home setting; however, clients with arrhythmia or other symptoms that occur intermittently may use portable units at home. Cardiac event recorders, such as King of Hearts, or a portable ECG machine, such as a Holter monitor, record ECG data at home. Clients transmit the data over the telephone or bring the units to the facility.

▼ VARIATIONS *continued***Long-Term Care Variations:**

- *Clients in long-term care facilities may have skin or musculoskeletal disturbances that will need special attention when doing an ECG.*
- *Staff at long-term care facilities need to be trained to do ECGs.*

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

You attach the electrodes for the arms onto the legs and the electrodes for the legs onto the arms, causing a faulty interpretation.

Ask Yourself:

How do I prevent this error?

Prevention:

Read the labels or look at the color coding on each electrode and verify that they are attached to the correct extremity. If you believe the electrodes are incorrectly placed, remove the electrodes and start over again.

Possible Error:

You attach the lead wires to the wrong chest electrodes, causing a misinterpretation.

Ask Yourself:

How do I prevent this error?

Prevention:

Pay close attention to the electrodes and wires as you prepare to attach them to the client. Laying them out on the bed or client so you can see them will make it easier to identify the correct leads.

> NURSING TIPS

- Gain the client's cooperation so he will lie still and be relaxed in order to minimize artifact caused by muscle movement.
- Use diagrams and instructions for correct electrode placement.
- Palpation of ribs and intercostal spaces and visual references to clavicle and axilla are necessary to place electrodes correctly.
- Dry diaphoretic skin before the ECG since it may hinder attachment of electrodes; even one loose lead can cause the tracing to be faulty.
- Shave body hair in any area where it prevents good skin contact of the electrode.
- Attach the lead wire to button-type electrodes first so you do not have to press it into the client.
- Use the ECG machine's display messages to guide you during the ECG.
- Remember that skeletal muscle tremors interfere with detection of cardiac electrical activity and may produce artifact in the tracing.

SKILL 11-2

Magnetic Resonance Imaging (MRI)

Kathryn Lilleby, RN

KEY TERMS

Claustrophobia
Contrast medium
Electromagnet

Magnetic resonance imaging



> OVERVIEW OF THE SKILL

Magnetic resonance imaging (MRI) is a noninvasive scanning technique performed by a specially trained technologist. It allows internal organs and structures to be seen by means of magnetic forces rather than by radiation. The large electromagnet that the client is placed in senses the change in alignment of the hydrogen atoms in the body and sends this information to a computer where billions of mathematical calcu-

lations are made that produce clear images on the television monitor.

Magnetic resonance imaging is useful in the diagnosis of pathologic lesions in any organ or tissue, showing the contrast between normal and abnormal tissue, and distinguishing between white and gray matter of the brain.

> ASSESSMENT

1. Assess the client's knowledge of the purpose and plan of the procedure so he will cooperate and not be anxious.
2. Review the client's signature on the informed consent form. It is a legal requirement of the institution.
3. Assess the client's weight since the procedure is contraindicated in clients over 300 pounds.
4. Assess the client for cardiac pacemaker, aneurysm clips, and history of valve replacement or other metal objects in the body since the magnet may cause movement of metal or electronic objects.
5. Assess the client for claustrophobia since the electromagnet is a large tube that does not allow for any movement. Sedation may be necessary.
6. Assess the client for pregnancy. An MRI is contraindicated, especially in the first trimester.
7. Assess the client's ability to remain still for 30 to 90 minutes during the procedure. Movement may produce unreliable images.
8. Assess the client for allergies to dye or contrast medium to avoid an anaphylactic reaction.
9. Assess the client's veins for adequate venous access for injection of the contrast medium.

> DIAGNOSIS

- 9.3.1 Anxiety
- 9.3.2 Fear
- 8.1.1 Knowledge Deficit regarding the procedure

> PLANNING**Expected Outcomes:**

1. The client will tolerate the procedure without anxiety.
2. The client will remain still during the procedure.
3. Successful images will be obtained for diagnosis.
4. If contrast medium is used, the client will not experience a reaction to it.

Equipment Needed:

- Contrast medium ordered by physician or qualified practitioner
- Magnetic Resonance Imaging scanner



Estimated time to complete the skill:
30–90 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the procedure and how it will be performed.
2. Recommend that clients limit their fluid intake so they will not have to urinate for 60 to 90 minutes during the test.
3. The client should void just prior to the procedure since he will not be able to move during the lengthy procedure.
4. Explain to the client that no metallic objects including make-up (contains metallic particles) should be worn. Metal may be affected by the strong magnet and can disrupt the images.
5. Even though the study is painless, there may be a slight discomfort if a contrast dye is injected intravenously.
6. Tell the client that the machine will make various humming and loud thumping noises.
7. Ask the client to verbalize his knowledge and feelings about the procedure.
8. The client will be able to return home after the procedure if not hospitalized.

IMPLEMENTATION—ACTION/RATIONALE**ACTION****RATIONALE**

- | ACTION | RATIONALE |
|---|--|
| 1. Provide teaching regarding the MRI machine. | 1. Reduces anxiety and fear of unknown. |
| 2. Have client remove all metallic objects, such as watch, rings, coins, keys, hair pins, credit cards, dentures containing metal, and prostheses. | 2. Reduces artifacts on the scan. Avoids damage to some metal objects by the magnetic field. |
| 3. Instruct client to void. | 3. Ensures client comfort and avoids movement during procedure. |
| 4. Assist client onto padded table by electromagnet. <ul style="list-style-type: none"> • Secure client on table with Velcro straps. • Provide client with earplugs, intercom, or earphones. • If the head is to be scanned, place special helmet around head. | 4. Provides correct positioning for study. <ul style="list-style-type: none"> • Keeps client from moving during study. • Decreases noises of machine and provides communication between client and technologist. • Provides accurate imaging. |
| 5. Observe client for signs of claustrophobia or inability to remain still. | 5. May necessitate the administration of a sedative during the procedure. |

continues

6. If contrast medium is injected during procedure, assess for an allergic reaction.
7. Technologist performs MRI (see Figures 11-2-2 and 11-2-3):



Figure 11-2-2 The client is positioned on the padded table for the MRI.

8. After study is completed, assist client to sitting position. When client is ready, assist him to a standing position.
9. Wash hands.

6. Provides immediate treatment for a life-threatening emergency.
7. The technologist is trained to perform this procedure.



Figure 11-2-3 The MRI technologist performs the procedure.

8. Decreases risk of orthostatic hypotension.
9. Reduces the transmission of microorganisms.

> EVALUATION

- The client tolerated the procedure without anxiety.
- The client remained still during the procedure.
- Successful images were obtained for diagnosis.
- If contrast medium was used, the client did not experience a reaction to it.

> DOCUMENTATION

Nurses' Notes

- Note the date, time, length, and place the procedure was done.

- Describe the client's tolerance of the procedure.
- If contrast medium was used, describe the client's response.
- Document the client's status after the procedure.

Medication Administration Record

- Record medications administered before or during the procedure, such as diazepam (Valium) or midazolam (Versed).



▼ REAL WORLD ANECDOTES

Martha was admitted to the hospital to evaluate her abdominal pain. She had no visitors the day she was scheduled for an MRI. The nurse explained the procedure to her, but Martha confided that she was afraid of closed spaces. The nurse asked the physician for a sedative for her. After giving it to Martha, the nurse sat with her and held her hand and taught her a simple imagery exercise to practice while she was in the MRI tube.

> CRITICAL THINKING SKILL

Introduction

Metallic objects can create false images on the scan and some can even damage the magnetic fields. All jewelry,

coins, watches, keys, hair pins, credit cards, prostheses, and dentures containing metal must be removed.

Possible Scenario

A devoutly religious woman was scheduled for an MRI. She removed her watch and rings but refused to remove a metallic religious object.

Possible Outcome

She could be allowed to hold the object in her hand until she is positioned on the table and ready to be placed

into the tube. She would be assured that a relative could hold the object during the procedure and would return it to her as soon as the test was finished.

Prevention

The nurse could have discussed the reason for the removal of metallic objects in more detail after assessing the woman's beliefs.

▼ VARIATIONS**Geriatric Variations:**

- *Elderly clients who are confused may have difficulty remaining still during the procedure.*
- *Clients need to be questioned in detail about metallic objects (e.g., they may not realize a prosthesis or dentures contain metal).*

**Pediatric Variations:**

- *Children may need their parents nearby during the procedure, and this is allowed since there is no radiation exposure.*
- *Children may need to be sedated if they are not able to remain still during the procedure.*
- *Children can be shown the machine and play in it before the actual procedure in order to become familiar with it.*

**Home Care Variations:**

- *Coordination with client's primary physician or qualified practitioner may increase home care nurses' knowledge of clients' condition. Having this information will allow clients and family a greater benefit of coordinated services.*

**Long-Term Care Variations:**

- *Assure that debilitated clients have adequate nutrition, pain medications, or other symptom management.*

▼ COMMON ERRORS—ASK YOURSELF**Possible Error:**

The client was extremely agitated when he was placed in the tube.

Ask Yourself:

How do I prevent this error?

Prevention:

If the client is orientated, ask if he suffers from claustrophobia or has any fears regarding the procedure. Check with the client frequently regarding anxiety or a feeling of being closed in. If the client is frightened or confused, sedation may be necessary.

> NURSING TIPS

- Give earplugs to clients who may be uncomfortable with the noise of the electromagnet.
- Assist the client into a comfortable position using a pillow under the knees if possible.
- Assure the client that there is no danger of radiation.
- Assist the client into a comfortable position after the test.

SKILL 11-3

Assisting with Computed Tomography (CT) Scanning

Susan Boyce Gilmore, MN, RN, CCRN

KEY TERMS

Claustrophobia
Computed tomography

Contrast medium
CT scan
Enhanced CT



> OVERVIEW OF THE SKILL

Computed tomography (CT) employs a narrow beam of x-ray to sweep transverse planes or sections of the body and a computerized analysis to reconstruct images of the irradiated tissues. The x-ray beam is in motion in relation to the subject and the film or sensor; the result is a selective blurring of areas not within a specific slice of tissue and a focused image of tissue within that plane. The resulting images are sharp and detailed, considered to be far superior to images obtained by conventional x-rays. The primary purpose for the use of CT scans is to image structures or masses within body organs. The technique is useful in obtaining images of the brain, liver, lung, abdomen, chest, and certain vascular spaces. A pregnant woman may have a CT scan in her first trimester to confirm the pregnancy.

The scan is itself noninvasive but uses ionizing radiation, and some techniques include use of injected contrast agents. Because the CT scan makes multiple images, the procedure is not instantaneous like most x-rays, but takes 30 to 60 minutes to complete, depending on the tissues or organs studied and the number of “slices” to be made. A CT scan is contraindicated in clients weighing over 300 pounds.

The client must remain motionless during the imaging; sedation is sometimes used to effect the required stillness. The CT machine is large and often makes a series of clicking and whirring noises. The client is frequently immobilized and confined partially within the scanner and lies on a hard surface. The client may become claustrophobic.

> ASSESSMENT

1. Confirm client’s identity and his knowledge level concerning the procedure and purpose for the CT scan so that client teaching can be tailored to needs.
2. Determine the need for informed consent and witness the signing of the consent so that institutional and legal regulations are followed.
3. Determine the client’s ability to lie still, supine for up to 1 hour, since this position is necessary for the procedure.
4. Assess the client for feelings of claustrophobia since some clients feel confined in the scanner during the procedure.
5. Assess the client for an allergy to iodine or other contrast agents if CT is to be an “enhanced” study or contrast agents will be used so an allergic reaction will be avoided.
6. Determine if the client has a history of compromised renal function in order to avoid renal complication if contrast agents are used.

7. Assess the client’s need for sedation during procedure since anxiety or claustrophobia may prevent the client from being comfortable and able to lie still.

> DIAGNOSIS

- 7.2 Sensory/Perceptual Alterations related to confinement in the CT tube
- 8.1.1 Knowledge Deficit related to the CT procedure
- 9.3.1 Anxiety related to the procedure and confinement in the CT tube

> PLANNING

Expected Outcomes:

1. The client will cooperate during the procedure and will be free from anxiety.
2. The client will be comfortable during and after the procedure.
3. Satisfactory images will be obtained for diagnosis.
4. The client will understand the general nature of the information to be obtained and when and how he will be informed of the results of the CT scan.

Equipment Needed:

- Sterile needle and syringe for administering contrast dye if ordered
- CT scanner



Estimated time to complete the skill:
20–60 minutes

> CLIENT EDUCATION NEEDED:

1. Reassure the client that the procedure will take 30 minutes to 1 hour.

2. Inform the client that a CT scan is a noninvasive procedure unless IV contrast dye is used.
3. If a contrast agent is used, tell the client he may feel warm or flushed as injection is given and may experience a metallic or salty taste for a moment.
4. Instruct the client about the part of the body to be imaged and how long it will take.
5. Tell the client he will need to lie still in a supine position on a hard surface.
6. Stress the need for the client to lie still.
7. Tell the client that a restraint or belt will be used to hold his hips, abdomen, or head in place on the table.
8. Reassure the client that the amount of radiation used is similar to several chest x-rays.
9. Tell the client that while he is alone in the scanner, he can talk to a technician through an intercom (see Figure 11-3-2).
10. Reassure the client that his family can wait nearby.
11. Tell the client that the machine will make clicking and whirring noises.
12. Reassure the client that he will be made comfortable as soon as possible after the test.



Figure 11-3-2 Instruct the client that although he is alone in the room where the test is being performed, he can speak with the technician at any time through an intercom.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Confirm identity of client.
3. Explain procedure and rationale to client.

1. Reduces the transmission of microorganisms.
2. Essential for diagnosis and treatment decisions and client safety.
3. Allays anxiety and promotes cooperation.

continues

4. Confirm that client has signed informed consent.
5. Start IV if contrast dye is to be given.
6. Give sedation to client if ordered.
7. Arrange for transportation to radiology.
8. Instruct client on position during scan:
 - Lie still (see Figure 11-3-3).
 - Do not be afraid of whirring and clicking noises (see Figure 11-3-4).
 - Breathe deeply and relax.
4. Ensures physician or qualified practitioner has informed client of expected benefits and risks of procedure and that client has given consent.
5. Intravenous access may be necessary for CT with contrast (enhanced CT).
6. Sedation may be necessary to complete procedure, particularly for clients who are claustrophobic or have difficulty lying still.
7. This is where CT scans are performed.
8. Promotes client comfort and safety and assures accurate images.



Figure 11-3-3 Instruct the client to lie still.



Figure 11-3-4 Instruct the client to breathe deeply and relax during the procedure. Reassure the client that whirring and clicking sounds are normal.

> EVALUATION

- The client cooperated during the procedure and was free from anxiety.
- The client was comfortable during and after the procedure.
- Satisfactory images were obtained for diagnosis.
- The client understands the general nature of the information to be obtained and when and how he will be informed of the results of the CT scan.

> DOCUMENTATION

Nurses' Notes

- Document the date, time, and length of the procedure.
- Document the date and time the contrast dye was given.
- Describe the response of the client to the procedure.

Medication Administration Record

- Document the date and time sedation given.
- Document the date and time contrast dye given.



▼ REAL WORLD ANECDOTES

Randy was a high school senior when he injured his knee playing football. He was scheduled for a CT scan of his knee so his physician could plan his treatment. Randy was hearing impaired and wore hearing aids. When his nurse told him about the loud noises he might hear inside the scanner,

▼ REAL WORLD ANECDOTES *continued*

he said that he would simply remove the aids and then it would not bother him. Otherwise, the noises might be abnormally amplified. He was able to relax while in the scanner and had no need to communicate with the technician during the procedure. The nurse allowed this, but the nurse needed to discuss hand signals and how to communicate with him should an emergency situation arise.

> CRITICAL THINKING SKILL

Introduction

The reason for lying still during a CT scan is to produce clear images of the organs or structures being examined.

Possible Scenario

An elderly gentleman was scheduled for a CT scan of his abdomen. He had been confused at times but was generally cooperative. He was sent to radiology for his CT scan without the benefit of any sedation. He seemed to understand when the nurse told him about not moving when he had the test.

Possible Outcome

When the client was placed into the scanner, he immediately became agitated and tried to get out. After attempting to calm him with soothing words and touch, the nurse realized she was not successful. The nurse called his physician for an order for sedation. The test had to be postponed until he was sedated.

Prevention

A careful assessment of the client's ability to understand the procedure and need to remain still is necessary before a CT scan. Sedation can be given prior to the procedure to ensure an accurate examination.

▼ VARIATIONS



Geriatric Variations:

- *Confused elderly clients may have difficulty remaining still during the procedure.*
- *Older clients may be reluctant to voice their anxiety.*
- *Clients may have arthritis or back pain that could make them uncomfortable while lying on a hard surface.*



Pediatric Variations:

- *Children may need reassurance that their parents are nearby and can talk to them during the procedure.*
- *Allowing a child to take his favorite stuffed animal or toy with him may reduce his anxiety.*
- *Children may need to be sedated if they are not able to remain still during the procedure.*



Home Care Variations:

- *Not applicable*



Long-Term Care Variations:

- *Not applicable*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client having a CT scan was in extreme pain from a back injury.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Check the medical record for the last time pain medication was given and medicate the client to achieve pain relief and complete the CT scan when the client is more comfortable.

Possible Error:

A contrast dye was ordered for a client with an allergy to iodine.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the medical record for client's allergy history. Ask the client if he has any allergies, especially to shellfish, iodine, or dye. If he does, do not administer the contrast dye. Notify the physician or qualified practitioner and proceed with the test if it is to be done without contrast.

> NURSING TIPS

- Give earplugs to clients who may be uncomfortable with the noise of the CT scanner.
- Assure the client that the risk of radiation is the same as several routine x-rays.
- Assist the client into a comfortable position after the test.
- Monitor the client for level of consciousness, oxygenation, and hydration, particularly if contrast agents were used for the procedure.

SKILL 11-4

Assisting with a Liver Biopsy

Kathryn Lilleby, RN

KEY TERMS

Gallbladder
Hemorrhage
Intercostal space
Liver biopsy
Liver capsule
Needle biopsy

Percutaneous
Perforation
Peritonitis
Pneumothorax
Septic shock



> OVERVIEW OF THE SKILL

A liver biopsy is a test to diagnose disorders of the liver, confirm the infiltration of cancer, or assess the effects of hepatotoxic drugs. In clients with hepatitis, a biopsy can document treatment response. Most

liver biopsies are done at the bedside using a percutaneous needle to obtain the sample. The physician or qualified practitioner performs the biopsy while staff assists and supports the client.

> ASSESSMENT

1. Assess the client's knowledge of the purpose and plan of the procedure so he will cooperate and not be anxious.
2. Review the client's signature on the informed consent form. It is a legal requirement of the institution.
3. Assess the client's ability to remain still in either the supine position during the procedure and the right lateral position for 2 hours after the procedure. These positions are required in order to access the liver and control bleeding after the procedure.
4. Assess the client for his ability to cooperate and hold his breath for 15 seconds during the procedure since the liver can be accessed best while the client has exhaled.
5. Assess vital signs as baseline data in order to compare with postprocedural vital signs.
6. Review the medical record for the client's risk of bleeding, including use of anticoagulants, prothrombin time, and platelet count. These factors may affect the risk of bleeding.
7. Review the medical record for a history of allergic reactions to antiseptic or anesthetic solutions in order to avoid an allergic reaction.
8. Assess the client for massive ascites since fluid in the abdominal cavity increases the risk of laceration of the liver's surface.
9. Assess the client for pneumonia since an infection in the right pleural space could contaminate the biopsy needle as it passes through to the liver.
10. Assess the client for bleeding tendencies to determine the risk of bleeding during or after the procedure.

> DIAGNOSIS

- 9.3.1 Anxiety
- 9.3.2 Fear
- 8.1.1 Knowledge Deficit regarding the procedure
- 9.1.1 Pain
- 1.2.1.1 Risk for Infection
- 1.6.1 Risk for Injury, specifically bleeding

> PLANNING

Expected Outcomes:

1. The client will understand the rationale for the procedure and tolerate it without anxiety.
2. The client will assume the required position and remain still during and after the procedure.
3. The client will experience minimal pain.
4. There will be no bleeding or infectious complications.
5. The biopsy will be sufficient for diagnostic testing.

Equipment Needed (see Figure 11-4-2):

- Liver biopsy tray, including:
 - Antiseptic solution (povidone-iodine)
 - Gauze sponges (4 × 4)
 - Sterile towels
 - Local anesthetic solution (lidocaine)
 - Sterile syringes: two 3-ml with 23- to 25-gauge needles for anesthetic and two 10-ml for biopsy
 - Three 5-cc vials of normal saline
 - One biopsy needle
 - One number 11 scalpel
 - Specimen containers with formalin
 - Povidone-iodine ointment
 - Sterile gauze and tape
 - Gloves
- Sterile gloves
- Masks and goggles
- Pain medication or sedative as ordered (to be given before procedure)
- Absorbent pads to protect the bed

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the procedure.
2. Assure the client that the actual biopsy takes only 5 to 10 seconds.
3. The client should be told about the need for sterile technique.
4. The client should be instructed on the position to be assumed and the importance of remaining still.
5. The client should be instructed and practice breathing and holding the breath for the procedure.
6. The client should be instructed to not eat or drink anything for 6 hours *before* the biopsy or for 2 hours *after* the biopsy.
7. Encourage the client to take slow deep breaths and use imagery to promote relaxation.
8. The client should be assured that a local anesthetic will be given to dull the pain.
9. The client should be encouraged to ask questions and verbalize his fears or anxiety.
10. The client should be told that he will need to remain in bed for 6 hours after the procedure; the first 2 hours he will need to rest in the lateral position on the right side.
11. Instruct the client to report any severe pain, shortness of breath, or fever immediately.
12. The client should be instructed to refrain from coughing or straining for 4 hours after the procedure and to avoid lifting heavy objects or strenuous activities for 1 week.



Estimated time to complete the skill:
30 minutes



Figure 11-4-2 Two 10-cc syringes

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Have client void.
2. Wash hands.
3. Administer medication for sedation or pain.
4. Take vital signs and record in nurses' notes.
5. Set up sterile tray.
6. Biopsy site is midway between upper and lower borders of hepatic dullness, in 8th or 9th intercostal space. The physician or qualified practitioner may use a pen to mark this site with an "X." Assist client in maintaining correct position:
 - Have client place the right arm under head.
 - Have client place left arm at side, under head, or as instructed by the physician or qualified practitioner.
 - Advise the client to lie quietly (see Figure 11-4-3).

Figure 11-4-3 The client must lie quietly through the procedure. Make sure the client is comfortable and in the proper position prior to beginning the procedure.



7. Inform the client that the physician or qualified practitioner will ask him to hold his breath during the procedure. A typical scenario would have the client:
 - Take several deep breaths
 - Take a deep breath in
 - Blow all the air out and hold breath
 - Hold breath for 15 seconds or until the physician or qualified practitioner indicates the procedure is completed
 - Breathe normally
8. Nurse supports the client and assists the physician or qualified practitioner during the procedure:

1. Promotes client comfort.
2. Reduces the transmission of microorganisms.
3. Promotes cooperation, comfort, and remaining still during procedure.
4. Postprocedure vital signs will be compared with the baseline values.
5. Maintains sterile technique.
6. Biopsy site is midway between upper and lower borders of hepatic dullness, in 8th or 9th intercostal space. By assisting client in maintaining correct position, decreases risk of complications during procedure by misplacement of needle.
7. Breathing out places the liver in the proper position snug against the chest wall and ensures the liver and diaphragm do not move while the biopsy needle is inserted.

8.

continues

- Reassure client while explaining each step of procedure.
- Assess client's condition during the procedure.
- Coach client on breathing and holding the breath when physician or qualified practitioner is ready to insert needle.

9. Physician or qualified practitioner performs the aspiration; the nurse assists as needed as the following is done:
- Wash hands. Disinfect. Disinfect client's skin with antiseptic solution.
 - The physician or qualified practitioner will put on mask, goggles, if required by institution policy, apply sterile gloves and drape the client with sterile towels (see Figure 11-4-4).



Figure 11-4-4 Note how the sterile drape protects the biopsy site from contamination from the gown or bedding.

- The physician or qualified practitioner will inject local anesthetic to the subcutaneous tissue and the capsule of the liver and ask client when it has taken effect.
- The physician or qualified practitioner will make a small incision with a scalpel.
- The physician or qualified practitioner will ask the client to take a deep breath, exhale completely, and hold the breath. Assist the client to do this.
- The physician or qualified practitioner will insert the biopsy needle attached to a syringe through the incision and into the liver (see Figure 11-4-5).
- The physician or qualified practitioner will aspirate the liver tissue quickly and withdraw the needle. Help the client remain still and provide support and information.

- Increases client comfort and relaxation.
- Provides for treatment of a potential complication.
- Assures a successful, nontraumatic biopsy.

- 9.
- Reduces the number of microorganisms.
 - Maintains surgical asepsis.



Figure 11-4-5 The biopsy needle is inserted through the incision and into the liver.

- Provides anesthesia during the aspiration.
- Facilitates insertion of biopsy needle.
- Ensures the liver is immobilized during biopsy.
- Ensures a sample of liver tissue is obtained.
- Reassures the client while the procedure is performed.

- The physician or qualified practitioner will instruct the client to take a breath and breathe normally.
 - After removing the biopsy needle, apply pressure to the incision (see Figures 11-4-6 and 11-4-7).
 - Apply antiseptic ointment and a pressure dressing.
 - Place specimen in the sterile container with formalin (see Figures 11-4-8 and 11-4-9).
 - The physician or qualified practitioner will remove gloves and wash hands.
- Restores normal respirations.
 - Prevents bleeding at biopsy site.
 - Reduces risk of infection.
 - Allows specimen to be examined in the laboratory.
 - Prevents transmission of microorganisms.



Figure 11-4-6 After removing the needle, pressure is applied to the site.



Figure 11-4-7 Applying pressure prevents bleeding at the biopsy site.



Figure 11-4-8 The specimen is removed from the needle.



Figure 11-4-9 The specimen has been placed in a sterile container with formalin.

10. Continue to apply pressure to biopsy site:
 - Instruct client to roll onto the right side and remain in that position for 2 hours (see Figure 11-4-10).
11. Label the specimen with client's name and send specimen to laboratory.
12. Assess vital signs every 15 minutes for the first hour, every 30 minutes for the next 2 hours, then every hour for 4 hours and then every 4 hours until stable.

10. Controls bleeding
 - Ensures the liver capsule is compressed against the chest wall at the biopsy site.
11. Ensures results will be reported for correct clients.
12. Promotes early detection of a bleeding complication.



Figure 11-4-10 The client will roll on the right side and remain in that position for 2 hours to compress the liver against the chest wall at the biopsy site.

13. Apply gloves and discard used supplies appropriately.
14. Wash hands.

13. Prevents the transmission of microorganisms and accidental needle punctures.
14. Reduces the transmission of microorganisms.

> EVALUATION

- Assess the client for pain or bleeding.
- Inspect the dressing over the puncture site.
- Assess the puncture site for swelling, tenderness, or erythema.
- Monitor vital signs and notify physician or qualified practitioner if blood pressure decreases significantly.
- Observe for severe pain and notify physician or qualified practitioner.
- Observe for internal bleeding by obtaining a blood sample for a hematocrit 6 hours after the biopsy.
- Observe for complications such as perforation of the portal or hepatic vein, laceration of the liver, pneumothorax, perforation of the gallbladder, bleeding into the biliary tract, bile peritonitis, bacteremia, or septic shock.

> DOCUMENTATION

Nurses' Notes

- Note date, time, and site of the liver biopsy.
- Describe how the client tolerated the procedure.
- Document laboratory tests ordered and when specimen was sent.
- Describe the type of dressing and ointment applied.
- Record vital signs before and after the procedure.
- Document the presence of any bleeding at the site.

Medication Administration Record

- Document the date and time of pain medication or sedative.



▼ REAL WORLD ANECDOTES

Harry had noticed that his eyes were yellow so he made an appointment to see his doctor. After some baseline blood tests were done, the doctor told Harry that he needed a liver biopsy to be able to make a diagnosis and treatment plan.

Harry had never heard of sticking a needle in a liver; in fact, he had never had very many needles stuck in him at all in his 56 years. He lived simply and worked as a janitor and did not understand very much about medicine. So the nurse sat with him to explain the procedure the day before it was scheduled to be done. She had a diagram of where the liver was located and how the ribs surrounded it. Then she assured him that he would receive medication to numb the skin; however, he would probably feel some pain when the doctor did the biopsy. She told him about how to breathe during the biopsy and practiced the routine several times with him in order to see how long he could hold his breath. He was cooperative and rather interested in learning about what was going to happen to him. She gave him an illustrated booklet about the liver biopsy so he could read it at home.

The next day, Harry had the biopsy without any complications and he thanked the nurse for helping him.

> CRITICAL THINKING SKILL

Introduction

The most common but serious complication after a liver biopsy is bleeding, either externally or internally. Maintaining pressure over the biopsy site will usually prevent this from occurring.

Possible Scenario

The client was resting comfortably on his side after the biopsy was done. There was no sign of bleeding in the first 30 minutes, but the client became tired of lying on his right side so he turned over onto his left side. When the nurse came in to take his 45-minute vital signs, she noticed the gauze dressing had a large amount of

bloody drainage on it that had not been there the last time she checked.

Possible Outcome

The nurse applied direct pressure for a few minutes, applied another dressing over the old dressing, and assisted the client onto his right side again. She took his vital signs and noted that his blood pressure was slightly lower than previously. Then she reported the bleeding to the physician.

Prevention

The client should have been assessed for his understanding of the required position after the procedure and his ability to cooperate.

▼ VARIATIONS



Geriatric Variations:

- Older clients may have difficulty assuming the position necessary for the procedure. Help them by positioning with a pillow prior to the procedure and holding them in position, using proper body mechanics during the procedure.
- Older clients may have difficulty holding their breath during the biopsy and need to practice their breathing.
- Some elderly clients may have coagulation alterations that may increase their risk of bleeding after a liver biopsy.



Pediatric Variations:

- Small children or infants will probably need general anesthesia for a liver biopsy in order to remain still during the procedure.
- Children may need sedation so they will remain quiet for 6 hours after the procedure.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client is not able to hold his breath for long enough during the biopsy and takes a deep breath.

Ask Yourself:

How do I prevent this error?

Prevention:

The client should have practiced the breathing necessary for the procedure and been evaluated for how long he could hold his breath. If it is not long enough, the physician or qualified practitioner will have to determine if she can still obtain the tissue sample. She may have to pull out the needle so it does not damage the lung, gallbladder, or nearby blood vessels.

> NURSING TIPS

- Use pillows, rolled towels, or blankets to assist the client into a comfortable position.
- Remember that severe pain in the upper right quadrant or in the right shoulder could be a symptom of peritoneal hemorrhage.
- Have the client practice the breathing pattern that will be required during the biopsy.
- Monitor the client for internal bleeding.

SKILL 11-5

Assisting with a Thoracentesis

Susan Randolph, RN, MSN, CS, and
Catherine H. Kelley, RN, MSN, OCN

KEY TERMS

Dyspnea	Subcutaneous emphysema
Hemothorax	Tachycardia
Pleural cavity	Tachypnea
Pleural effusion	Thoracentesis
Pneumothorax	



> OVERVIEW OF THE SKILL

Thoracentesis is the process of inserting a large-bore needle through the chest wall into the pleural cavity, utilizing sterile technique, for the purpose of removing fluid or administering medications intrapleurally. Fluid accumulating in the pleural cavity is usually the result of infection, trauma, or a disease process such as a malignancy. Excess fluid in the pleural cavity can cause pain, dyspnea, or significant cardiopulmonary compromise resulting in a life-threatening emergency. The primary purpose of thoracentesis is either to eliminate these potential symptoms or to diagnose an effusion of unknown etiology. The need for and location of the site for thoracentesis is most commonly determined by chest x-ray, although physical examination, ultrasound, and fluoroscopy are also employed to determine the presence and location of a pleural effusion.

Fluid removed from the pleural cavity is assessed for quality and quantity as well as being analyzed

in the laboratory for features such as cell count and differential, protein, glucose, lactic dehydrogenase (LDH), and specific gravity. In the event of a suspected malignancy or infection samples are sent to cytology for definitive diagnosis.

Thoracentesis may be performed as an inpatient, emergency room, or outpatient procedure in an ambulatory clinic or physician's or qualified practitioner's office. Key to the success of the procedure is the proper positioning of the client. The client is either seated at the edge of the bed or exam table with the arm of the affected side elevated over a bedside stand or sitting straddled in a chair with arms resting on the back of the chair. Infants and small children and clients who are unable to tolerate a sitting position or are on a ventilator are usually positioned supine with the affected side elevated.

> ASSESSMENT

1. Determine the necessary pretests needed and their purpose prior to the thoracentesis. To determine the proper positioning of the client and determination of the exact location of the pleural effusion.
2. Obtain client (or power of attorney) consent per institution policy. This protects the nurse, physi-

- cian or qualified practitioner, and hospital against legal action and provides an opportunity to inform the client and family about the procedure.
3. Obtain baseline vital signs and medical history. Baseline vital signs are necessary to determine tolerance during and changes in health status following the procedure.

4. Determine client's knowledge of and prior experience with thoracentesis. **This helps determine their knowledge base to tailor their teaching. They may have a special routine that they use to prepare themselves, such as relaxation, guided imagery, or the use of transdermal numbing medication.**
5. Assess the need for sedation, premedications, or restraints. Some pediatric and adult clients may be unable to cooperate with a thoracentesis. **Proper positioning and an immobile client is important to prevent complications or damage to the lungs or other internal organs or tissue.**

> DIAGNOSIS

- 9.3.1 Anxiety related to the procedure
- 1.5.1.2 Ineffective Airway Clearance
- 1.5.1.3 Ineffective Breathing Pattern
- 1.5.1.1 Impaired Gas Exchange
- 8.1.1 Knowledge Deficit related to the procedure and/or purpose
- 1.6.1 Risk for Injury (e.g., hemothorax, pneumothorax)
- 1.2.1.1 Risk for Infection

> PLANNING

Expected Outcomes:

1. The client's pain will decrease or cease.
2. Respirations will show no evidence of distress.
3. Arterial blood gases, pulse oximetry, and other diagnostic tests will improve.
4. There will be an absence of pleural effusion on follow-up diagnostic tests.
5. The client will experience minimal discomfort with the procedure.
6. The client will not experience any complicating injury or infection related to procedure.

Equipment Needed (see Figure 11-5-2):

- Thoracentesis tray (may be disposable kit, or reusable tray from central supply). In addition, there are specific trays available for infants and small children. If a thoracentesis tray is not available in one of these prepackaged forms, then the following equipment is necessary:
 - Antiseptic solution
 - Sterile gauze sponges (4 × 4 in. and 2 × 2 in.)
 - Sterile towels and drapes

- Local anesthetic (e.g., lidocaine 1%)
- Sterile syringes and needles: two 3- to 5-ml with 23- to 25-gauge needles for administration of local anesthetic medication; two 20- to 50-ml syringes with 14- to 17-gauge needles 5 to 7 cm in length for fluid drainage
- Three-way stopcock/two-way stopcock with extension tubing
- Hemostat
- Fluid receptacle
- Sterile specimen containers
- Items needed for universal precautions (mask/face shield, gown, gloves), as needed
- Sterile gloves in appropriate size for physician or qualified practitioner and anyone assisting in the sterile field
- Laboratory specimen container with labels and requisitions (a specimen container with a preservative may be needed for biopsy purposes)
- Premedications (e.g., sedation, pain medication, cough suppressant)



Estimated time to complete the skill:
30 minutes

> CLIENT EDUCATION NEEDED:

1. Explain the purpose and approximate length of the test.
2. Review the body position the client will need to assume as well as the need to remain immobile throughout the procedure.
3. Provide an opportunity for the client to practice the position required for the procedure.



Figure 11-5-2 Thoracentesis tray, sterile gloves, and sterile water

4. Describe the sensations the client will experience with the local anesthesia as well as the pressure from the needle insertion.
5. Review all pre- and posttests required to assist the client in knowing what to expect.
6. Provide timeline to client for when to expect laboratory test results and who will communicate results.
7. Teaching relaxation or guided imagery can sometimes minimize the anxiety related to the procedure.
8. Instruct the client to void prior to the procedure.
9. Help the client determine the necessary supports needed (e.g., pillows) to assume the ideal body positioning for a thoracentesis.
10. Review need to remain immobile and not to move suddenly or cough during the thoracentesis as this could cause injury.
11. Describe routine tests (e.g., chest x-ray) and monitoring required postthoracentesis.
12. Review delayed complications of the procedure (e.g., spleen or liver perforation) and instruct client to report dyspnea, chest pain, or cough.
13. Review both early-onset and delayed complications of thoracentesis, and ask client to repeat information back to you prior to discharge from the hospital, clinic, or office. Provide written information as well.
14. Instruct client that there is usually no need to remain NPO prior to or after the procedure. If anxiety usually makes the client queasy, he may wish to not eat or to eat lightly to reduce the risk of nausea, vomiting, and aspiration during the procedure.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Wash hands before baseline assessment and as necessary throughout the prep, procedure, and follow-up. 2. Identify client, and obtain baseline assessment and medical history of client with close attention to respiratory status and vital signs. Some institutions will require an identification bracelet be placed on the client for a thoracentesis even when performed in the outpatient clinic. 3. Be sure a signed consent has been completed. 4. Review necessary pretests (e.g., x-ray) and have information available at the bedside. 5. Prepare necessary client-specific laboratory/cytology labels and requisitions. Check that the client's correct name and identification number are listed on each label and requisition. 6. Review client teaching and assess anxiety. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Prevents performing an invasive procedure on the wrong client. Provides a baseline for comparison after procedure to assess tolerance and improvement in clinical status. 3. Reduces the nurse's, physician's or qualified practitioner's, and hospital's legal risks and ensures that client has been informed of procedure and risks. 4. Enables the physician or qualified practitioner to identify the appropriate site to perform the thoracentesis. Assists the nurse in proper positioning of the client. 5. Reduces risk of incorrect labeling or handling of specimens obtained during the procedure. Sample is correctly identified with client's name and identification number. 6. Provides reinforcement of prior teaching and opportunity for anxiety-reducing techniques (e.g., relaxation, guided imagery). |
|---|--|

7. Reidentify client, assess allergy history, and premedicate as ordered.
 8. Prepare the necessary equipment and sterile field. Make sure any prepackaged trays have all necessary supplies.
 9. Employ universal precautions.
 10. Assist in client positioning:
 - Sitting at edge of bed with arms on bedside table
 - Sitting straddled on chair with arms supported by back of chair
 - Laying on unaffected side
 11. Assist throughout procedure with client positioning (see Figure 11-5-3), assessment of vital signs, client reassurance, management of supplies, and maintenance of sterile field and technique.
 - The physician or qualified practitioner will perform the procedure. (See Figures 11-5-4 to 11-5-7.)
7. Ensures medication is administered to the proper client and that there is no history of allergic reaction to the medication. Premedications for a thoracentesis are usually for either sedation, pain control, or cough-suppressant purposes.
 8. Provides a safe, organized approach to the procedure and prevents introduction of microorganisms into the pleural cavity.
 9. Reduces transmission of pathogens between client and health care team.
 10. Ensures that the diaphragm is dependent. Facilitates access to pleural cavity through intercostal spaces.
 11. Decreases risk of complications (e.g., client moving, sterile field becoming contaminated) and monitors client's tolerance.

Figure 11-5-3 The client is positioned on the unaffected side. The nurse assists the client to maintain the proper position.



Figure 11-5-4 The site is cleaned with povidone-iodine solution.



Figure 11-5-5 The needle is inserted.



Figure 11-5-6 Fluid is removed from the pleural cavity.



Figure 11-5-7 The needle is stabilized as fluid is drained from the pleural cavity.

12. Upon completion of procedure:

- Apply occlusive dressing to thoracentesis site.
- Position client in comfortable position on unaffected side.
- Appropriately dispose of contaminated disposable and reusable supplies and equipment.
- Label and send out specimens for testing as ordered.

13. Assess client for complications.

14. Wash hands.

12.

- Prevents the entry of air into the pleural cavity.
- Bedrest is recommended for at least 1 hour following a thoracentesis.
- Practice infection control and proper disposal of contaminated items.
- Ensures availability of laboratory data necessary to evaluate client's health status.

13. Helps detect complications early.

14. Reduces the transmission of microorganisms.

> EVALUATION

- The client's pain decreased or ceased.
- Respirations show no evidence of distress.
- Arterial blood gases, pulse oximetry, and other diagnostic tests improved.
- There is an absence of pleural effusion on follow-up diagnostic tests.
- The client experienced a minimal amount of discomfort during the procedure.
- The client has not experienced any complicating injury or infection related to the procedure.

> DOCUMENTATION

Nurses' Notes

- Record pre- and postassessments, including vital signs and other physiologic parameters.
- Document the length of and tolerance to the procedure.
- Describe the location of and dressing placed after the thoracentesis.

- Describe the color, quantity, and quality of fluid obtained from the pleural cavity.
- Describe the color, quality, and quantity of fluid on the postthoracentesis dressing.
- Document laboratory tests sent and pending.
- Record postprocedure evaluation and test completed with notation of results if known (e.g., chest x-ray).
- Record any adverse events that would indicate complications from procedure and reports given to physician or qualified practitioner and health care team members.

Medication Administration Record

- Record medications required pre, during, and postthoracentesis.

Kardex

- Record the location of and dressing required for thoracentesis.
- Document laboratory tests sent and pending.



▼ REAL WORLD ANECDOTES

Scenario 1

The nurse went into Mr. Rudder's room and began to prepare him for a thoracentesis. The physician arrived and was about to begin the procedure when none of the study results (e.g., chest x-ray) indicating a presence of a pleural cavity could be found. It took an additional 15 minutes to locate the test results to determine the most appropriate site for needle insertion, and during this time Mr. Rudder became increasingly anxious, began to hyperventilate, and fainted. The procedure had to be delayed until the client was stabilized. He required sedation and several health care team members to assist in positioning him to prevent movement during the thoracentesis when it was finally performed. The nurse needed to make sure all the information and equipment needed was available prior to beginning the procedure.

Scenario 2

Special arrangements were made to provide conscious sedation to an infant with a documented pleural effusion of unknown origin in an ambulatory operating room suite. As the physician was about to begin the procedure, he noted that an adult thoracentesis tray had been ordered, and the procedure had to be delayed until the appropriate sized needles were obtained. This interrupted the flow of the outpatient procedures scheduled, prolonged the period of time the child was sedated, and increased parental anxiety.

> CRITICAL THINKING SKILL

Introduction

A thoracentesis is an invasive procedure that requires thorough medical history as well as baseline vital signs.

Possible Scenario

An adult client presented with a pleural effusion of unknown etiology in significant respiratory distress. The nurse was informed that a thoracentesis would be required and she quickly prepared the client for the procedure. Unfortunately, neither the nurse nor the physician assessed the client for current medications, and the client was on anticoagulant therapy for a history of a mesenteric thrombus. The procedure was done.

Possible Outcome

Failure to fully assess this medical history led to significant bleeding and a potential hemothorax. The client's recovery was complicated by the incomplete assessment prior to the procedure.

Prevention

Clients undergoing a thoracentesis should have a complete medical history, including medication profile and any history of clotting abnormalities. They should have a baseline physical assessment, including vital signs.

▼ VARIATIONS



Geriatric Variations:

- Age-related changes in the muscle skeletal system (e.g., osteoporosis) might limit positioning of the geriatric client.
- Geriatric clients may have age-related changes in their respiratory status that result in ineffective breathing patterns that can compound the problems being caused by a pleural effusion.
- Evaluation of blood pressure along with pulse and respirations are important because changes in chest pressures may significantly affect cardiac function in the geriatric population.
- The geriatric client may require oxygen therapy during the procedure and may need a longer period of bed rest following a thoracentesis to adjust to the fluid shift.

continues

▼ VARIATIONS *continued*



Pediatric Variations:

- *Infants and small children may need adjustment in their positioning as well as sedation to maintain immobility.*
- *Special procedure trays are usually available for infants and very small children.*
- *Transdermal numbing medications currently available for use are often useful as initial prep of the thoracentesis site.*
- *If a child is in the hospital and is mobile, procedures should be performed in a procedure area away from the child's room to maintain the hospital room as a "safe haven."*
- *Many children may need a special toy, blanket, or parent to assist in their comfort with the procedure.*
- *The teaching involved should be directed at either the parent or guardian as well as at an age-appropriate level for the child.*



Home Care Variations:

- *Instruct the client to report any signs of dyspnea, chest pain, or cough.*
- *Review the signs and symptoms of early and delayed complications of thoracentesis.*
- *Be sure the client has a 24-hour phone number where he can access medical help.*
- *Identify if there is a working phone in the home for use if necessary.*
- *Identify the type of emergency service available in their hometown area.*
- *Clearly outline the follow-up plans and when test results can be expected.*



Long-Term Care Variations:

- *Long-term care clients may either be ventilator dependent, cognitively impaired, or elderly. In each of these scenarios, it is important to assess procedure changes required for client positioning, teaching, and geriatric considerations.*
- *It is essential to be sure all health care staff (e.g., aides) in long-term settings are trained to identify potential signs of complications.*
- *Many of the high-technology physiologic assessment tools, such as pulse oximetry and arterial blood gas monitoring, may not be available in the long-term setting; therefore careful assessment of the respiratory status is imperative.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Not monitoring for maintenance of a sterile field.

Ask Yourself:

How do I prevent this error?

Prevention:

Make all participants (physician, health care workers, and client) aware of the importance of this procedure requirement and aggressively enforce this practice.

Possible Error:

Not assessing client for tolerance to position required for procedure.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Make client positioning part of your initial assessment in preparing a client for a thoracentesis. If the client has difficulty, assist the client with positioning to determine which of the possible positions will be tolerated and support the client as necessary with pillows or other health care team members to maintain immobility during the thoracentesis.

> NURSING TIPS

- Identify that you have all the necessary pretest results, premedication orders, and a signed consent form prior to proceeding with the procedure.
 - Check all supplies to be sure you have the appropriate size thoracentesis tray, laboratory specimen tubes, and labels.
 - Assess client's tolerance to positioning requirements prior to actual procedure.
 - Inform another nurse of the procedure in progress to obtain assistance in the event of an unexpected outcome.
 - Provide comfort measures (e.g., blanket, toy) to a child and whenever possible allow parent(s) to remain with child to reduce anxiety.
 - Employ techniques that clients have utilized with past invasive procedures to decrease anxiety and promote relaxation.
- Approach the client with confidence and reassure the client that you will remain with him throughout the procedure.
 - Following the procedure, monitor the client for signs and symptoms of complications, which include:
 - Pneumothorax (shortness of breath, decreased breath sounds, decreased chest movement with inspiration, asymmetric chest wall movement, tachypnea)
 - Shock (hypotension, tachycardia, peripheral vasoconstriction)
 - Infection/sepsis (fever, chills, tachycardia, tachypnea)
 - Hemothorax (tachypnea, diminished breath sounds, dullness to percussion)
 - Subcutaneous emphysema (soft tissue swelling, crepitation palpable in affected area)

SKILL 11-6

Assisting with an Abdominal Paracentesis

Gaylene Bouska Altman, RN, PhD

KEY TERMS

Abdomen

Abdominal fluid

Ascites

Paracentesis

Peritoneal cavity



> OVERVIEW OF THE SKILL

The abdomen usually contains a minimal amount of fluid. In certain conditions, fluid can accumulate in the abdominal cavity. The abdominal paracentesis (abdominal tap) is a sterile procedure in which a needle is inserted through the abdominal wall to obtain a sample of any fluid that is present or to drain a larger volume of fluid to relieve pressure. Paracentesis is used prior to surgery, radiography, or ascites reinfusion or to remove fluid to relieve pressure on the diaphragm.

Abdominal paracentesis can be done in an office, treatment room, or the hospital. The presence

of bloody fluid after internal injury suggests internal organ bleeding. Other findings may indicate infection, a tumor, appendicitis, cirrhosis of the liver, disease of the pancreas, kidney, heart, or a damaged bowel. During abdominal paracentesis, there is a slight chance of the needle puncturing the bowel, bladder, or a blood vessel in the abdomen. If a large quantity of fluid is removed, there is a slight risk of hypotension. There is also a slight risk of infection.

> ASSESSMENT

1. Identify the purpose for the abdominal paracentesis. **This allows the nurse to anticipate effects of the abdominal paracentesis and to observe client's response.**
2. Check allergies to medications or anesthetic, bleeding problems, medications currently using, including aspirin, or if the client might be pregnant. **This will decrease the chance of complication during the abdominal paracentesis.**
3. Assess client's knowledge regarding the abdominal paracentesis. **Determines need for education and assists in identifying questions and concerns.**
4. Assess the client for bleeding tendencies to determine the risk of bleeding during and after the procedure.

> DIAGNOSIS

- 9.1.1 Pain secondary to abdominal paracentesis
- 1.4.1.2.1 Fluid Volume Excess secondary to disease process
- 1.4.1.2.2 Fluid Volume Deficit secondary to abdominal paracentesis

> PLANNING

Expected Outcomes:

1. Client will experience minimal discomfort during abdominal paracentesis procedure.

2. Client will not suffer any adverse effects such as cardiovascular distress, shock, infection, or internal bleeding following the procedure.
3. Client will experience relief of symptoms of excessive abdominal fluid, such as increased respiratory rate and decreased respiratory volume.

Equipment Needed (see Figures 11-6-2A and B):

- Disposable paracentesis tray *or* 16-gauge 3.5-inch aspiration needle
- Ampule of 1% lidocaine, 5 ml
- Needles for local anesthetic, 25 gauge, $\frac{5}{8}$ inch
- Needle, 21 gauge 1.5 inches
- Syringe, 5 ml
- Syringe, 50 ml
- Prep tray
- Prep applicators
- Sterile drapes
- Sponges
- Two-way valve
- Specimen tubes
- Drainage bag or bottles
- Adhesive bandage
- Sterile gloves
- Masks (optional)
- Biohazard bag



A.



Estimated time to complete the skill:

5–15 minutes

> CLIENT EDUCATION NEEDED:

1. Explain purpose of abdominal paracentesis and risks. Reinforce verbal teaching with written instructions.
2. Instruct the client that there will be a stinging sensation from the anesthetic and a feeling of pressure as the needle is inserted.
3. Explain positioning during procedure and ensure that client understands.
4. Explain that if a large amount of fluid is withdrawn, the client may experience dizziness or lightheadedness.
5. Client understands the need to report any changes in symptoms, such as shortness of breath, dizziness, and increased perspiration.
6. Make sure client knows who to call if any complications arise after the procedure is completed.



B.

Figure 11-6-2 A. Aspiration needle, tubing, and syringe; B. Drainage tubing

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Wash hands.
2. Ask the client if he has ever had the procedure done before. Tell the client that the procedure is usually not painful.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Paracentesis is an invasive procedure, hence clients are at increased risk for infection, especially peritonitis. This allows for conversation to

continues

- 3.** Check the physician's or qualified practitioner's order for the reason for the test and clarify diagnosis.
 - 4.** Verify that a consent form has been signed by the client.
 - 5.** Assess the client's allergic status to local anesthetics or antiseptic solutions.
 - 6.** Ask the client to void as completely as possible.
 - 7.** Measure the client's abdominal girth and weight.
 - 8.** Help the client to assume a fully supported upright position in the bed or chair, if possible. If the client can sit in a chair, support his or her feet.
 - 9.** Wash your hands again.
 - 10.** Assemble equipment. Open the sterile abdominal paracentesis tray using sterile technique, if requested by the person performing the procedure.
 - 11.** Place a blood pressure cuff on one of the client's arms (see Figure 11-6-3).
 - 12.** As the physician, qualified practitioner, or nurse practitioner performs the procedure (see Figure 11-6-4), help the client maintain position. Assist as needed.
 - 13.** Reassure the client during the procedure.
- explain the procedure, what to expect, and to clarify questions the client may have.
- 3.** By understanding the reasons, the nurse can better clarify procedure for clients. This also allows the nurse to have available the correct collection container. If the procedure is for a cell count, a test tube for a small amount of fluid will be needed to send a specimen to the laboratory.
 - 4.** This is a surgical procedure and hence requires that the client understand the potential associated risks. The consent also protects the hospital, client, physician or qualified practitioner, and nurse legally.
 - 5.** Protects the client from an avoidable allergic reaction.
 - 6.** Decreases the potential of inadvertently piercing the client's bladder. If urination is not possible, catheterization will be necessary.
 - 7.** Allows for assessment of the amount of fluid removed and serves as a comparison if fluid reaccumulates.
 - 8.** In a sitting position, the client's intestines will float away from the paracentesis site and the danger of punctured intestines will be lessened.
 - 9.** Decreases the transmission of microorganisms.
 - 10.** Maintains sterile procedure.
 - 11.** Allows you to assess the client's blood pressure continuously since the removal of excessive fluid or removal that is too fast can cause a decrease in blood pressure and potentially shock.
 - 12.** Proper positioning lessens the danger of punctured intestines.
 - 13.** Helps the client cope with the situation and reduces anxiety.



Figure 11-6-3 Place the blood pressure cuff on the arm.



Figure 11-6-4 The physician or qualified practitioner prepares to perform the procedure.

- 14.** Record the client's blood pressure readings and pulse rate at 15-minute intervals and observe the client for signs of pallor or sweating.
- 15.** When the procedure is completed, assist the client to assume a comfortable position.
- 16.** Obtain measurements of the client's abdominal girth and weight (see Figure 11-6-5).



Figure 11-6-5 Measure the abdominal girth.

- 17.** Monitor the client's vital signs, urine output, and dressing drainage or bleeding every 15 minutes 4 times or as ordered.
- 18.** Label the fluid specimen, place in biohazard bag, and send it to the laboratory as soon as possible.
- 19.** Record and describe the amount of fluid drained. Describe consistency, color, and opacity of the fluid (see Figure 11-6-6).

- 14.** Indicates if the client is experiencing vascular collapse.
- 15.** Enables the client to relax after the procedure.
- 16.** Serves as a comparison with the preparacentesis.



Figure 11-6-6 Record and describe the amount of fluid drained.

- 17.** Monitors the client for complications of shock or hemorrhage.
- 18.** If the fluid is for culture and sensitivity, overgrowth of microorganisms will occur if the fluid is allowed to sit. Label identifies specimen. Bag protects you from contact with body fluids.
- 19.** Communicates the findings to the other members of the health care team and contributes to the legal record by documenting the care given to the client.

20. Dispose of equipment according to your agency guidelines.

21. Wash hands.

22. Assess the laboratory results.

20. Decreases the transmission of microorganisms.

21. Reduces the transmission of microorganisms.

22. Based on the results, further medical intervention may be necessary.

> EVALUATION

- Client experienced minimal discomfort during abdominal paracentesis procedure.
- Client did not suffer any adverse effects such as cardiovascular distress, shock, infection, or internal bleeding following the procedure.
- Client experienced relief of symptoms of excessive abdominal fluid, such as increased respiratory rate and decreased respiratory volume.

> DOCUMENTATION

Nurses' Notes:

- Note the time the abdominal paracentesis procedure took place.
- Record the anatomical site of puncture.
- Document laboratory analysis ordered for sample of fluid.
- Document the client's response to procedure.
- Ensure the signature of the nurse assisting with the procedure is included.

- Document the specimens collected and where they were sent.
- Record the vital signs during procedure and after procedure 4 times every 15 minutes.
- Describe the pressure dressing and assessment of drainage.
- Record urinary output (may be covered in the intake and output record).
- Record abdominal girth and weight pre- and post-procedure.

Intake and Output Record

- Record urinary output.
- Record the amount of fluid removed from the abdominal cavity.

Kardex

- Record the amount of fluid removed from the abdominal cavity.
- Record the anatomical site of puncture.
- Document laboratory analysis ordered for sample of fluid.



▼ REAL WORLD ANECDOTES

Jim is to have an abdominal paracentesis this afternoon. His nurse orders the supplies, explains the procedure to him, and assists the physician with the procedure. Once the needle is removed, a dressing is placed over the puncture site. The nurse checks on Jim 10 minutes after the procedure and notes that the dressing is saturated with blood and blood is oozing from the site. Jim mentions that he has been taking aspirin regularly for an injured knee and wonders if this has anything to do with the bleeding. Although the nurse asked the client about medication usage, it was not clear to Jim that this included over-the-counter medications. It is important to obtain an in-depth, accurate health history.

> CRITICAL THINKING SKILL

Introduction

Abdominal paracentesis is sometimes performed to remove fluid from the peritoneal cavity. If a large volume of fluid is drained during abdominal paracentesis, the client may become dizzy or lightheaded.

Possible Scenario

Janet is a 48-year-old woman with metastatic breast cancer involving her liver and bones who is enrolled in the hospice program. She has noticed increasing weight and abdominal bloating and is very uncomfortable. She is going to undergo abdominal paracentesis to remove some of the fluid and relieve her abdominal pressure. During

the procedure, Janet becomes very dizzy and lightheaded. Her blood pressure has dropped from 140/80 to 100/62 after removal of one and a half liters of fluid.

Possible Outcome

The physician decides to stop the procedure for now and consider placement of a catheter into the abdomen to remove the fluid more slowly over time.

Prevention

Careful monitoring of blood pressure during removal of large volumes of fluid as well as diligent assessment of symptoms can help pick up this side effect quickly.

▼ VARIATIONS



Geriatric Variations:

- *Elderly clients tend to have slower return to normal with cardiovascular status.*
- *Elderly clients may not be able to sit for long periods; therefore, organization is critical so the procedure can be performed quickly and smoothly.*



Pediatric Variations:

- *Even small amounts of fluid can cause rapid vascular shifts.*



Home Care Variations:

- *Make sure the client knows who to contact if complications occur after returning home.*



Long-Term Care Variations:

- *Clients who experience buildup of ascites may require repeated paracentesis and are at increased risk for complications.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Adequate number of collection containers are not available for abdominal fluid collection.

Ask Yourself:

How do I prevent this error?

Prevention:

Check supplies before procedure begins. Ask physician, qualified practitioner, or nurse practitioner expected volume of fluid to be removed.

> NURSING TIPS

- Always check the equipment and supplies before the procedure begins.
- Explain the procedure thoroughly to the client to assure that he or she understands and knows what symptoms to report during the procedure.
- Client should have been NPO since midnight the night before the procedure or have been on clear liquids the morning of the procedure.
- Keep long needle out of sight if possible.
- Return within appropriate time (5 to 10 minutes) to evaluate client's response to abdominal paracentesis procedure.
- Assess for pain, dizziness, and lightheadedness. Report signs and symptoms immediately.
- Assess paracentesis site for bleeding and drainage.
- Monitor for peritonitis (increased temperature, abdominal pain, and tense abdomen) following the procedure.

SKILL 11-7

Assisting with a Bone Marrow Biopsy/Aspiration

Kathryn Lilleby, RN

KEY TERMS

Biopsy	Iliac crest
Bone marrow aspiration	Leukemia
Bone marrow biopsy	Sternum
	Stylus



> OVERVIEW OF THE SKILL

A bone marrow biopsy and a bone marrow aspiration are two distinct procedures. Bone marrow aspiration is the removal of a small amount of organic material from the medulla of certain bones by a large-bore needle. This spongy bone is where hematopoiesis (formation of blood cells) takes place. The sternum and posterior iliac crests are the most commonly used sites. A bone marrow biopsy is the removal of a core of bone marrow cells by a biopsy needle. The cells are then examined in the laboratory to describe the num-

ber, size, shape, and development of the erythrocytes and megakaryocytes. The procedure is usually performed by a physician or qualified practitioner assisted by a nurse; however, in hematology/oncology clinics, advanced practiced nurses may perform bone marrow aspirations.

The biopsy or aspiration is used to diagnose leukemia, anemia, thrombocytopenia, and other malignancies such as non-Hodgkin's lymphoma or multiple myeloma.

> ASSESSMENT

1. Assess the client's knowledge of the purpose and plan of the procedure so they will cooperate and not be anxious.
2. Review the client's signature on the informed consent form. It is a legal requirement of the institution.
3. Assess the client's ability to remain still in the supine, prone, or lateral position during the procedure. This procedure is required in order to assess the bone marrow.
4. Assess vital signs as baseline data in order to compare with postprocedural vital signs.

5. Review the medical record for the client's risk of bleeding, including use of anticoagulants, prothrombin time, and platelet count. These factors may affect the risk of bleeding.
6. Review the medical record for a history of allergic reactions to antiseptic or anesthetic solutions in order to avoid an allergic reaction.

> DIAGNOSIS

- | | |
|-------|---|
| 9.3.1 | Anxiety |
| 8.1.1 | Knowledge Deficit regarding the procedure |

- 9.1.1 Pain
- 1.6.1 Risk for Injury

> **PLANNING**

Expected Outcomes:

1. The client will understand the rationale for the procedure and tolerate it without anxiety.
2. The client will assume the required position and remain still during the procedure.
3. The client will experience minimal pain.
4. There will be no extensive bleeding or infectious complications.
5. The aspiration or biopsy will be sufficient for diagnostic testing.

Equipment Needed (see Figure 11-7-2):

- Bone marrow aspiration/biopsy tray, including:
 - Antiseptic solution (povidone-iodine)
 - Gauze sponges (4 × 4)
 - Sterile towels



Figure 11-7-2 Glass dish, syringe, gauze, tape, povidone-iodine, lidocaine, bone marrow needle, and slides

- Local anesthetic solution (lidocaine)
- Sterile syringes: two 3-ml with 23- to 25-gauge needles for anesthetic
- Two 10-ml syringes for marrow aspiration
- Two bone marrow needles with inner stylus
- One biopsy needle
- Test tubes and glass slides
- Povidone-iodine ointment
- Sterile gauze and tape or Band-Aid
- Sterile gloves
- Masks and goggles for physician or qualified practitioner and nurse, if required
- Pain medication or sedative as ordered (to be given before procedure)



Estimated time to complete the skill:
15 minutes

> **CLIENT EDUCATION NEEDED:**

1. The client should be taught the rationale for the procedure.
2. The client should be told about the need for sterile technique.
3. The client should be instructed on the position to be assumed and the importance of remaining still.
4. Encourage the client to verbalize their fears or anxiety.
5. The client should be encouraged to ask questions.
6. Assure the client that the actual aspiration takes only a minute or two.
7. Encourage the client to take slow deep breaths and use imagery to promote relaxation.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Have the client void. 2. Administer medication for sedation or pain. 3. Wash hands. 4. Set up sterile tray. | <ol style="list-style-type: none"> 1. Promotes client comfort. 2. Promotes comfort and assurance of remaining still during procedure 3. Reduces the transmission of microorganisms. 4. Maintains sterile field. |
|---|---|

continues

5. Assist client in maintaining correct position for site to be aspirated:
 - Sternum—supine
 - Posterior iliac crests—prone or side lying
 6. Reassure client while explaining each step of procedure.
 7. Assess client's condition during the procedure.
 8. Physician or qualified practitioner performs the aspiration or biopsy:
 - Select the site to be used.
 - Wash hands.
 - Put on mask, goggles if required, and sterile gloves (see Figure 11-7-3).
 - Drape client with sterile towels or drape (see Figure 11-7-4).
5. Decreases risk of complications during procedure by misplacement of needle.
 6. Increases client comfort and relaxation.
 7. Provides for treatment of a potential complication.
 8.
 - These can be the anterior or posterior iliac spines or iliac crest, body of sternum.
 - Reduces the transmission of microorganisms.
 - Maintains surgical asepsis.
 - Maintains sterile field.



Figure 11-7-3 Apply sterile gloves.

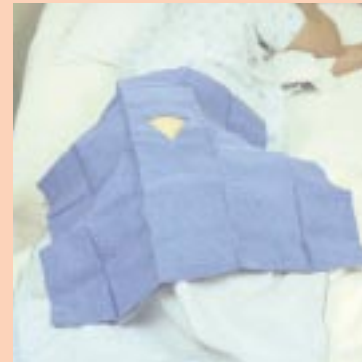


Figure 11-7-4 The posterior iliac crest draped with a sterile drape

- Disinfect client's skin with antiseptic solution (see Figure 11-7-5) and dry with cotton swab (see Figure 11-7-6).

- Maintains sterile field.



Figure 11-7-5 Disinfect the skin.



Figure 11-7-6 Dry the area with a sterile cotton swab.

- Inject local anesthetic to the site and ask client when it has taken effect (see Figure 11-7-7).
- Bone marrow aspiration: Insert the needle with inner stylus into the bone (see Figure 11-7-8), then advance the needle until it reaches the area of softer, spongy bone and remove the stylus (see Figure 11-7-9). Attach the 10-ml syringe to the needle and aspirate bone marrow (see Figure 11-7-10).



Figure 11-7-7 Inject a local anesthetic.

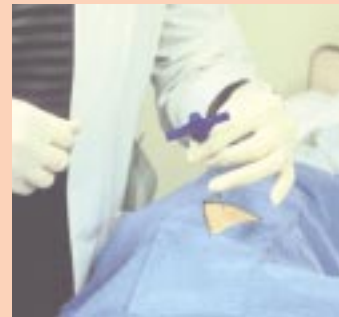


Figure 11-7-8 Insert the needle with the inner stylus into the bone.



Figure 11-7-9 Advance the needle until it reaches softer bone and remove the stylus.



Figure 11-7-10 Attach a 10-cc syringe to the needle and aspirate the sample.

- Bone marrow biopsy: Screw the core biopsy instrument into the bone and remove a plug of tissue.
- Place specimens into appropriate containers for transfer to the laboratory.
- Label specimens with client name and date.
- After removing the needle or biopsy corer, apply pressure to the puncture site (see Figure 11-7-11).
- Apply antiseptic ointment and a gauze dressing.
- Place specimen on glass slides or in a test tube.
- Remove gloves and wash hands.

9. Nurse may assist with applying pressure to the site and applying the ointment and dressing.

- Provides anesthesia during the aspiration.
- The inner stylus is stiffer than the needle and has a longer bevel to enter the bone. Approximately 1 to 2 ml of bone marrow is needed for laboratory examination.

- A long core of marrow is needed for more detailed examination.
- Certain fixatives and preparations are needed for aspirate and bone samples.
- Assures proper identification in laboratory.
- Prevents bleeding at puncture site.

- Reduces risk of infection.
- Allows specimen to be examined in the laboratory.
- Reduces the transmission of microorganisms.

9. Skills of other providers can be used.



Figure 11-7-11 After the needle is removed, apply pressure to the site.

The nurse or a technologist may prepare the slides or test tubes with the specimen and label them with client's name. Send specimens to laboratory.

- | | |
|--|---|
| <p>10. Assist client into a comfortable position.</p> <p>11. Put on gloves and discard supplies appropriately.</p> <p>12. Wash hands.</p> | <p>10. Promotes comfort after the procedure.</p> <p>11. Reduces the transmission of microorganisms and risk of accidental needle punctures.</p> <p>12. Reduces the transmission of microorganisms.</p> |
|--|---|

> EVALUATION

- The client understood the rationale for the procedure and tolerated it without anxiety.
- The client assumed the required position and remained still during the procedure.
- The client experienced minimal pain.
- There was no extensive bleeding or infectious complications.
- The aspiration or biopsy was sufficient for diagnostic testing.
- Describe the amount and color of bone marrow aspirated.
- Document laboratory tests ordered and when specimens were sent.
- Document the type of dressing and ointment applied.
- Record vital signs before and after the procedure.
- Note complications or pain.
- Note the presence of any bleeding at the site.
- Describe the condition of the skin at the site.

> DOCUMENTATION

Nurses' Notes

- Record the date, time, and site of the bone marrow aspiration or biopsy.

Medication Administration Record

- Record the date and time of pain medication or sedative.



▼ REAL WORLD ANECDOTES

Scenario 1

Jessica was 14 years old when her doctor suspected aplastic anemia. He needed to do a bone marrow biopsy to make a definitive diagnosis. Jessica had never heard of a bone marrow biopsy so her nurse calmly explained the procedure to her and her mother. Jessica asked if the puncture would hurt more or less than a blood test. The nurse honestly told her that the needle stick to give the local anesthetic

▼ REAL WORLD ANECDOTES *continued*

would be similar but that aspirating the bone marrow could be more painful. When Jessica started to cry, the nurse gave her a tissue, held her hand, and assured her that she would receive a tranquilizer to help her relax. She said that the actual aspiration usually takes only a minute or two and that her mother could be with her if she wanted.

Scenario 2

Marge was a large woman from a rural area who came to a large medical center for a bone marrow transplant for acute myelogenous leukemia. Even though she appeared to be brave, she had never been sick before and was afraid. She had some tranquilizers at home and took several pills before coming to the clinic for her test but did not tell her doctor or nurse. She was given short-acting conscious sedation before the bone marrow aspiration and suddenly became apneic. The doctors and nurse used an Ambu bag to revive her and coached her to take deep breaths while the doctor finished doing the aspiration. The nurse needed to assess if she had taken medications prior to coming to the clinic for her test.

> CRITICAL THINKING SKILL

Introduction

The prone position can be difficult for clients with respiratory compromise or joint pain.

Possible Scenario

The client was obese and had asthma that required bronchodilators at times. She became somewhat anxious before her bone marrow aspiration and was experiencing some difficulty breathing when she was asked to lay prone on the bed.

Possible Outcome

The nurse assisted the client into a laterodecubitus position with the superior leg resting in front of the inferior leg. This enabled her to breathe with more ease and it allowed the subcutaneous tissue to fall away from the iliac crest so the bone was easier to access.

Prevention

The client could have been assessed for her respiratory history, pain, and anxiety.

▼ VARIATIONS



Geriatric Variations:

- Older clients with arthritis may have difficulty assuming the position necessary for the procedure.
- Bone may be either very hard or brittle.



Pediatric Variations:

- A child could practice the procedure on a doll before his test.
- A parent should be allowed to stay with the child.
- Sedation may be necessary for young children.



Home Care Variations:

- The home health nurse who may be caring for a client after a bone marrow aspiration or biopsy procedure needs to assess for possible bleeding or infection.



Long-Term Care Variations:

- Long-term cancer clients may be immunosuppressed and require regular assessments for personal hygiene, bleeding, and infection after the procedure.

▼COMMON ERRORS—ASK YOURSELF**Possible Error:**

A young client suddenly jerks and starts crying after the physician or qualified practitioner has inserted the needle into the bone.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the client's need for sedation, effective teaching, and preparation. If the error occurs, stop the procedure and calm the client by softly assuring him. Ask his parents to comfort him. Ask the physician or qualified practitioner for sedation orders and give the medication. When the client is sedated, resume the procedure.

> NURSING TIPS

- Use pillows, rolled towels, or blankets to assist the client into a comfortable position.
- If a sternal puncture is being done, the semi-Fowler's position may be more comfortable.

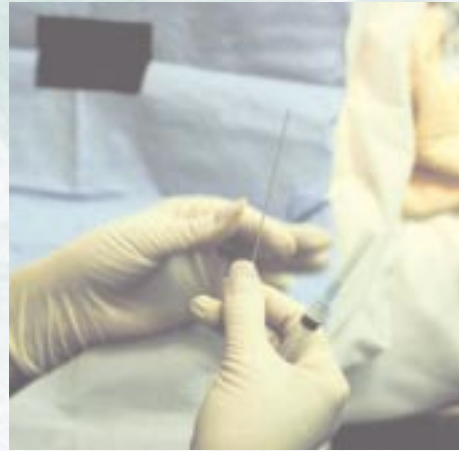
SKILL 11-8

Assisting with a Lumbar Puncture

Kathryn Lilleby, RN, PhD

KEY TERMS

Cerebral spinal fluid (CSF)	Level of consciousness
Fetal position	Lumbar puncture
Headache	Spinal cord
Increased intracranial pressure	Spinal tap
Lateral decubitus position	Vertebrae



> OVERVIEW OF THE SKILL

A lumbar puncture, also called a spinal tap or a spinal puncture, is the introduction of a needle into the subarachnoid space of the spinal column. The purposes of a lumbar puncture are to measure the pressure in the subarachnoid space, to obtain cerebral spinal fluid (CSF) for laboratory examination, or to inject anesthetic, diagnostic, or therapeutic

agents. A lumbar puncture is a useful procedure in the diagnosis of meningitis, encephalitis, brain or spinal cord tumors, and cerebral hemorrhage. The procedure is done by a physician or other qualified health care provider and the nurse is needed to assist him or her and to provide care and support of the client.

> ASSESSMENT

1. Assess the client's ability to understand and follow instructions necessary to assume and maintain the proper position to avoid trauma of the spinal canal by the needle.
2. Assess the client's musculoskeletal condition and ability to assume the lateral decubitus position necessary to place the spinal needle into the subarachnoid space.
3. Assess the ability of the client to maintain the fetal position since movement could cause injury from the spinal needle.
4. Review the medical record for signs of increased intracranial pressure or degenerative joint disease that are contraindicated in this procedure.
5. Review the medical record to see if the client has an allergy to any local anesthetic agents so the physician or qualified practitioner can avoid using that agent.
6. Check the client's signature on the informed consent form—a legal requirement for most invasive diagnostic procedures.
7. Assess the client's knowledge about the procedure in order to provide client education needed to decrease anxiety.
8. Assess vital signs and neurologic reactions of legs, specifically movement, sensation, and muscle strength, in order to compare baseline assessment with postprocedure assessment.

> DIAGNOSIS

- 9.3.1 Anxiety
- 8.1.1 Knowledge Deficit regarding the procedure

9.1.1 Pain

1.6.1 Risk for Injury

> PLANNING**Expected Outcomes:**

1. Client will understand the procedure and its rationale.
2. Client will be comfortable and not anxious.
3. There will be minimal bleeding or leakage of cerebral spinal fluid.
4. The client will not experience a postprocedure headache.
5. The test results of the CSF will be normal.

Equipment Needed:

- Lumbar puncture tray, including (see Figure 11-8-2):
 - Antiseptic solution (povidone-iodine)
 - Ten gauze sponges (4 × 4)
 - Sterile towels
 - Spinal needles of various sizes (5 to 12.5 cm long) with inner obturators
 - Alcohol swabs
 - Anesthetic agent (lidocaine)
 - Syringes (3 to 5 ml)



Figure 11-8-2 Lumbar puncture tray

- Needles ($\frac{5}{8}$ to 1½ inches, 21 to 25 gauge)
- Glass or plastic manometer with three-way stopcock
- Four test tubes
- Antiseptic ointment
- Band-Aid or 2 × 2 gauze dressing and tape
- Sterile gloves
- Straight chair
- Pillow for placing between client's knees
- Masks and goggles (optional)



Estimated time to complete the skill:

30–45 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the reason for the lumbar puncture.
2. The client should be taught how the procedure will be done and the need to remain in the fetal position without moving so that no injury will be caused by the needle.
3. The client should be assured that local anesthetic will be used but that he may experience some pain.
4. The client should also be assured that the procedure will not cause paralysis since the needle is inserted below the spinal cord.
5. The importance of laying flat after the procedure in order to prevent a headache should be stressed.
6. Provide written or illustrated instructions about the procedure.
7. A diagram can be used to show adult clients where the needle will be placed.
8. Tell the client to ask for assistance the first time they get up after the procedure.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Explain the procedure to client (see Figure 11-8-3):
 - Assume the fetal position and remain still.
 - Breathe slowly and deeply; do not cough.
 - Be aware of possible discomfort.
2. Have the client void before the procedure.

RATIONALE

1. Decreases anxiety from lack of knowledge.
 - Avoids movement of needle.
 - Prevents false reading of CSF pressure.
 - Eliminates sudden movement due to surprise pain.
2. Prevents interruption of the procedure.



Figure 11-8-3 Explain the procedure to the client and answer questions prior to beginning the procedure.



Figure 11-8-4 Turn the client on his side with his back facing you.

3. Position client in the fetal position. Turn on the side with back facing you (see Figure 11-8-4):
 - Flex head and neck (see Figure 11-8-5).
 - Bring arms and knees toward each other (see Figure 11-8-6). Have client clasp knees with hands if it helps maintain the position.
 - Place pillow between knees.



Figure 11-8-5 Flex the neck and head.

3. Allows ease of access to spinal canal.
 - Allows maximum space between vertebrae.
 - Allows maximum space between vertebrae.
 - Prevents upper leg from rolling forward.



Figure 11-8-6 Bring the knees up tightly toward the arms.

4. Expose the spine.
5. The qualified practitioner performs the following steps:
 - Wash hands, set up sterile lumbar puncture tray, and put on sterile gloves (see Figure 11-8-7).
 - Clean skin of lower spine with povidone-iodine swabs (see Figure 11-8-8).
 - Drape with sterile drape (see Figure 11-8-9).
 - Inject local anesthetic agent.
 - Insert spinal needle with inner obturator into spinal canal between L3 and L4 (see Figure 11-8-10).
 - Remove obturator and attach manometer with stopcock and read pressure on manometer as it is opened (see Figure 11-8-11).

4. Allows for cleaning and draping prior to the procedure.
5.
 - Reduces the transmission of microorganisms.
 - Reduces the transmission of microorganisms.
 - Reduces the transmission of microorganisms.
 - Reduces pain in the skin at the site.
 - Decreases the chance of trauma to the spinal cord since it ends at L2.
 - Allows CSF to flow from subarachnoid space. Manometer is calibrated in centimeters of water.

continues



Figure 11-8-7 Set up the lumbar puncture tray.



Figure 11-8-8 Clean the skin over the lower spine with povidone-iodine.



Figure 11-8-9 Cover the site with a sterile drape.



Figure 11-8-10 The physician or qualified practitioner will insert the spinal needle with inner obturator.



Figure 11-8-11 The physician or qualified practitioner will attach the manometer and read the cerebral spinal pressure.



Figure 11-8-12 After applying pressure, apply a bandage to the site.

- Turn stopcock to collect CSF.
- Inject diagnostic or therapeutic agent if indicated.
- Remove spinal needle and apply pressure on insertion site.
- Apply antiseptic ointment and Band-Aid or gauze dressing to insertion site (see Figure 11-8-12).

- Allows for laboratory examination of CSF.
- Allows direct access, bypassing the blood-brain barrier.
- Stops CSF from leaking out of spinal canal and decreases bleeding at site.
- Prevents organisms from entering skin at site.

- | | |
|--|---|
| <p>6. Nurse assists physician or qualified practitioner during lumbar puncture.</p> <ul style="list-style-type: none"> • Wash hands and have clean gloves at hand. • Assist client in maintaining fetal position. • Explain each step of the procedure as it is being performed. • Put on gloves in order to handle tubes after CSF is collected. • Label tubes with client's name, date, and test requested. Number tubes in sequence of collection. • Assist with direct pressure and application of antiseptic ointment and dressing at site. • Remove gloves and wash hands. • Assist client into a comfortable position and give instructions regarding laying flat for 4–12 hours. Client may turn side to side. • Give analgesic medication as ordered. • Encourage client to drink fluids. <p>7. Observe client during and after procedure for neurologic changes:</p> <ul style="list-style-type: none"> • Change in level of consciousness, pupil size, or reaction. • Vital signs, respiratory status. • Numbness, tingling, or pain in legs. <p>8. Wash hands.</p> | <p>6. Assistance is needed during procedure.</p> <ul style="list-style-type: none"> • Reduces the transmission of microorganisms. • Allows for placement of spinal needle. • Avoids sudden movements. • Follows OSHA guidelines for handling body fluids. • Avoids errors in testing and reporting. • Stops CSF from leaking out of spinal canal and decreases bleeding at site. • Reduces the transmission of microorganisms. • Helps client avoid postprocedure headache. • Promotes comfort after procedure. • Replaces fluid lost during procedure. <p>7.</p> <ul style="list-style-type: none"> • Detects increased intracranial pressure. • Detects increased intracranial pressure. • Detects spinal nerve irritation. <p>8. Reduces the transmission of microorganisms.</p> |
|--|---|

> EVALUATION

- The client understood the procedure and its rationale.
- The client was comfortable and not anxious.
- There was minimal bleeding or leakage of cerebral spinal fluid.
- The client did not experience a post procedure headache.
- The test results of the CSF are normal.

> DOCUMENTATION

Nurses' Notes

- Record the date and time the lumbar puncture was performed.

- Record the name of the physician or qualified practitioner.
- Describe how the client tolerated the procedure.
- Record the opening pressure.
- Note the color of CSF.
- Document the specimens sent for laboratory examination.
- Note presence of any bleeding or CSF leakage at the site.
- Document the occurrence of a headache or other pain.

Flow Sheet

- Record vital signs.
- Record neurologic signs.
- Document respiratory status before, during, and after the procedure.



▼ REAL WORLD ANECDOTES

Scenario 1

Maria was admitted to the emergency room with a severe headache and nausea. The physician wanted to perform a lumbar puncture to evaluate for the presence of infection. Maria spoke and understood only Spanish and there was no interpreter available. The nurse described the procedure by showing a picture of the position the client should assume and what would happen. She gently held her hand as she guided Maria on to her side and spoke in a calm, low voice. She stayed with her during the entire procedure to assure that Maria would not move. The nurse then helped Maria get comfortable on her back and put up the siderails to show that she should not get out of the bed.

Scenario 2

Tommy, 6 years old, was diagnosed with acute lymphoblastic leukemia. Before starting chemotherapy, his doctor needed to evaluate his central nervous system for the presence of leukemic cells so he scheduled Tommy for a lumbar puncture. Tommy was already scared of needles and tired of being poked. The nurse calmly explained the procedure using a teddy bear. She allowed Tommy time to play with the bear and act out the procedure with the bear. She showed the place on the spine that would be numbed with medicine and how important it was for him to stay very still until the doctor was finished. She assured Tommy that it would take only about 10 or 15 minutes. During the procedure, his mother helped hold his head down to his knees while Tommy held the teddy bear to his chest. He was very brave, and the nurse told him so when the doctor had finished. The support, teaching, and play therapy decreased Tommy's anxiety and improved his cooperation.

> CRITICAL THINKING SKILL

Introduction

The most important part of the lumbar puncture is maintaining the client in a fetal position so that the needle can be placed correctly and not cause trauma.

Possible Scenario

A child needs to have a diagnostic lumbar puncture due to symptoms of meningitis. She is feeling very sick and scared of all the tests she has had done. She begins to cry and hiccough right after the local anesthetic is given. She is inconsolable even by her mother.

Possible Outcome

The procedure is delayed until the child can be calmed due to the danger of trauma if the spinal needle is inserted. The nurse administers a short-acting sedative that the doctor orders and the doctor waits for it to calm the child before proceeding.

Prevention

The nurse will document the anxiety of the child and assess for anxiety before another procedure is needed. Other coping skills may be taught to the child and parents to prepare her better.

▼ VARIATIONS



Geriatric Variations:

- Client with osteoarthritic or other joint pain may find it difficult or impossible to assume the position required for the procedure.
- Older clients may have respiratory deficits that make breathing more difficult in the position they must assume.

▼ VARIATIONS *continued*



Pediatric Variations:

- A child may need sedation in order to tolerate the procedure.
- A child may benefit from having a parent hold him behind the knees and neck.
- It may be comforting for a child to hug his favorite stuffed animal while laying on his side during the procedure.



Home Care Variations:

- Home health nurses need to be advised of a client having a lumbar puncture so they can assess for possible spinal headache and neurologic damage.



Long-Term Care Variations:

- Postprocedural symptoms, such as a severe headache, can manifest hours after the procedure is completed. Nurses need to monitor debilitated clients for 24 to 48 hours. Confused clients may be unable to adequately express painful symptoms.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

The client was not assessed for their ability to assume the knee-chest position.

Ask Yourself:

How do I prevent this error?

Prevention:

When a physician or qualified practitioner orders a lumbar puncture, ask the client to demonstrate their ability to assume the position. Then assess the client and report to the physician or qualified practitioner if they are able to maintain the position.

Possible Error:

The spinal needle on the sterile tray becomes contaminated.

Ask Yourself:

How do I prevent this error?

Prevention:

Have extra spinal needles of various sizes available. So if the spinal needle becomes contaminated, you can quickly obtain another spinal needle and give it to the physician or qualified practitioner using sterile technique.

> NURSING TIPS

- Use pillows or rolled towels to position the client comfortably.
- Headaches can be treated with bedrest, an icepack applied to the head, analgesia, and forcing fluids.
- Have the tubes labeled and requisition forms prepared before the procedure.
- Keep the needles and other instruments out of sight of the client in order to decrease anxiety.
- Assess the needle insertion site for bloody drainage or CSF leakage. If there is excessive CSF leakage, the physician or qualified practitioner must be notified immediately.
- Ask the client to notify the nurse if he experiences a headache.

SKILL 11-9

Assisting with Amniocentesis

Pam Talley, MN, CNS

KEY TERMS

Amniocentesis
Fetal diagnosis
Prenatal testing

Ultrasound
Vena cava syndrome



> OVERVIEW OF THE SKILL

An amniocentesis is a procedure performed on a pregnant woman to obtain amniotic fluid for diagnostic analysis or therapeutic effects. Following a complete ultrasound examination, amniocentesis is performed using visualization by ultrasound. A needle is inserted

through the abdomen, through the uterine wall, and into a “pocket” of amniotic fluid. Amniotic fluid is then withdrawn and sent to the laboratory for analysis. Local anesthetic may or may not be used depending on the practitioner.

> ASSESSMENT

1. Assess gestational age of the baby. Care during and after amniocentesis will depend on the baby’s gestational age.
2. Ascertain family’s understanding of the reasons for the procedure. Amniocentesis is not a routine procedure.
3. Assess client’s emotional status. Often, amniocentesis is performed when a problem is suspected in either the baby or the mother.
4. Assess fetal heart rate and long-term variability before procedure to establish a baseline for monitoring changes.
5. Assess maternal vital signs to establish a baseline for monitoring changes.

- 1.4.1.2.2.2 Risk for Fluid Volume Deficit related to the procedure
- 1.2.1.1 Risk for Infection related to the procedure
- 9.3.1 Anxiety related to the uncertain outcome for the fetus

> PLANNING

Expected Outcomes:

1. The client will experience no episode of vena caval syndrome.
2. If contractions are present following amniocentesis, these will subside by 1 hour post-procedure.
3. The fetal heart rate, variability, and periodic changes will remain stable compared to baseline.
4. The family will be told when to expect a report of findings.

> DIAGNOSIS

- 1.6.1 Risk for Injury related to the invasive procedure

5. The family will discuss implications of findings to their satisfaction with their primary care provider.
6. The follow-up care, when indicated, will be arranged in a timely manner.

Equipment Needed (see Figure 11-9-2):

- Ultrasound equipment
- Amniocentesis tray with extra needles
- Sterile towels
- Sterile gloves
- Specimen containers (Check with laboratory in your institution for each test anticipated. Consider having extra containers available.)
- Pillows
- Warmed ultrasonic gel
- Towels
- Fetal monitor, if indicated, or per agency policy



Estimated time to complete the skill:
30–60 minutes (can vary due to length of time for complete ultrasound examination and performance of the amniocentesis)

> CLIENT EDUCATION NEEDED:

1. The reasons for doing an amniocentesis and the implications of having the information should be discussed by the physician or genetic counselor with clients and their families at length.
2. The physician or qualified practitioner will discuss the procedure, risks, and alternatives with the client and her family.
3. Remind the client that amniocentesis is performed with constant visualization of the needle and the baby so the needle will not hurt the baby.
4. Reassure the client that once the pocket of fluid is found, the procedure itself is quick, usually about 30 seconds.
5. Agree upon a plan for distraction or relaxation at the time of needle insertion for women who are afraid they will jump as the needle is being inserted.

6. Include the partner in the teaching and preparation for the amniocentesis and respect their level of participation or support during the procedure.
7. Mild cramping may be normal for the first 24 hours after amniocentesis. Clients should be instructed to report bleeding, cramping, loss of fluid from the vagina, or other problems.
8. Instruct the client to report cramping that does not diminish since some clients may experience mild cramping even if labor is progressing.
9. Tell the client that a small amount of leakage of fluid from the vagina may be normal but that it should be reported.
10. Results of amniocentesis tests may be available in 1 day to several days and clients should be aware of the length of time they will have to wait for the information.
11. Inform client it will be necessary to rest quietly for 30 to 60 minutes with electronic monitoring of the fetal heart rate (FHR) before leaving the health care facility.
12. Give written postprocedure instructions and write down any appointments for them as clients may have a great deal of anxiety about the results of the amniocentesis. Make sure the client understands what signs and symptoms to report since not all complications occur while the client is in the clinic.
13. Instruct the client to take acetaminophen or apply a warm pack if the needle insertion site is painful. Reassure them that the pain will resolve in a short time.



Figure 11-9-2 Amniocentesis tray includes syringes, needle, and gauze.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Wash hands.
2. Arrange amniocentesis equipment and specimen containers.
3. Position client in left lateral tilt (if greater than 20 weeks gestation) with several pillows if needed for support.
4. Provide ultrasound technologist with warm ultrasound gel.
5. When the physician or qualified practitioner is ready to start the amniocentesis, encourage the client to relax. Provide comfort as required. Individualize this for each client (see Figure 11-9-3).



Figure 11-9-3 Position the client comfortably, encourage her to relax, and answer questions prior to beginning the amniocentesis.

- Explain to the client the steps of the procedure as they are being performed.
- The ultrasound technologist will determine the fetus's position within the uterus (see Figure 11-9-4).
- While monitoring the fetus via ultrasound, the physician or qualified practitioner will insert the amniocentesis needle (see Figure 11-9-5).
- The physician or qualified practitioner will then withdraw three to four syringes of amniotic fluid (see Figure 11-9-6).

1. Reduces the transmission of microorganisms.
2. Equipment should be in a convenient arrangement for the physician or qualified practitioner, who will manage the sterile field.
3. Client will be recumbent throughout procedure. If client is greater than 20 weeks gestation, lateral tilt will prevent vena cava syndrome. Pillows will allow client to comfortably tolerate position.
4. Often, a large amount of gel is used and warmed gel is more comfortable for the client.
5. Minimizes stress response.



Figure 11-9-4 The ultrasound technologist determines the fetus' position.

- Understanding the procedure reduces client anxiety and promotes cooperation.
- Determines where the needle will be inserted to avoid damage to the fetus.
- Allows the practitioner to guide the needle and avoid the fetus.
- The amniotic fluid will be sent for analysis.



Figure 11-9-5 The physician or qualified practitioner inserts the amniocentesis needle.



Figure 11-9-6 Three to four syringes of amniotic fluid are withdrawn.

6. After the procedure, clean excess gel from the client's abdomen. Physician or qualified practitioner may apply a Band-Aid to site.
 7. Label specimens, fill in laboratory requisition form completely, and transport to laboratory according to hospital protocol.
 8. If indicated, monitor fetal heart rate (FHR) per physician's or qualified practitioner's order or hospital protocol.
 9. Ascertain that client understands signs and symptoms to report after discharge.
 10. Arrange for follow-up for parents to learn the results of the tests.
 11. Wash hands.
6. Ultrasound gel is sticky and dries to a flaky white film that may be itchy.
 7. Laboratory specimens must be handled according to hospital/clinic protocol.
 8. If the client requires FHR monitoring following amniocentesis, the nurse *must* be trained in FHR interpretation.
 9. Cramping, uterine contractions, bleeding, or loss of vaginal fluid indicate complication and should be reported. Clients can expect some mild cramping and tenderness at the insertion site.
 10. Test results may take 24 hours to several days to complete. Clients should have a date for test results to help minimize the anxiety of waiting for information.
 11. Reduces the transmission of microorganisms.

> EVALUATION

- The client tolerates the procedure with minimal, expected discomfort.
- The fetal heart rate remained within normal limits, with average long-term variability and normal periodic changes.
- Sufficient amniotic fluid was obtained for the desired tests.
- No signs of bleeding, infection, or severe cramping were noted.

> DOCUMENTATION

Nurses' Notes

- Record the date and time of the procedure.
- Record the amount and appearance of fluid.
- Document tests ordered for specimens obtained.
- Describe client tolerance of procedure (presence or absence of complications).
- Note fetal heart rate characteristics before and following procedure, if applicable.
- Document client teaching done.
- Record arrangements for follow-up visit.



▼ REAL WORLD ANECDOTES

Donna's due date was 4 weeks away. Her fundal height did not increase as expected from 2 weeks before. Her doctor sent her to the ultrasound clinic for an ultrasound examination. There was not a lot of amniotic fluid or many fetal breathing movements. Her doctor was concerned about the baby's growth and the condition of the placenta. Since the due date was still 4 weeks away, an amniocentesis was performed to ascertain fetal lung maturity. A mature lung would be indicated by amniotic fluid with a lecithin/sphingomyelin (LS) ratio of 2:1 or better with phosphatidyl glycerol (Pg) present. The ultrasound showed a pocket of fluid large enough to aspirate and that was away from the baby's face, placenta, and cord. Under ultrasound guidance, the doctor inserted the needle into the pocket of fluid. The baby moved and the doctor withdrew the needle at once before a sample was obtained. After a few minutes, the doctor tried again. When a pocket appeared, the doctor used a new needle to obtain enough fluid for an LS ratio. She performed a "shake test," which was positive for stable bubbles (probable maturity). Donna stayed in the hospital overnight on fetal monitoring in anticipation of an induction. Laboratory results showed the LS ratio was positive with Pg present. Donna's labor was complicated by frequent fetal heart rate variable decelerations relieved with intra-amniotic fluid transfusion after artificial rupture of the membranes. The baby was born with an Apgar score of 8 to 9. Examination revealed a small newborn for his gestational age.

> CRITICAL THINKING SKILL

Introduction

Sometimes tests during an amniocentesis are for a chromosome analysis to rule out Down's syndrome as a follow-up of abnormally low alpha-fetoprotein levels. Some clients may not be aware of why they are having the procedure and may not understand the implications of the test.

Possible Scenario

Anna Scott and her husband, Dale, arrive at your ultrasound clinic for a scheduled amniocentesis. You do not know her history except that Anna is 32 years old and this is her first pregnancy. Anna states she is excited to find out if the baby is a boy or a girl. During the time before the obstetrician and the ultrasound technician arrive, you talk to Anna and Dale about their pregnancy experience so far. They tell you that they had a low result on a routine test but otherwise everything in the pregnancy was just fine.

Possible Outcome

If you have reason to believe that parents do not understand the test or the implications of a procedure, bring this to the primary care provider's attention. Parents may be experiencing levels of anxiety that may make it difficult to interpret information they re-

ceive. Moreover, clients may find it difficult to ask questions of their physician. In Anna and Dale's case, you contact their physician. She thanks you for bringing this to her attention. She arranges to come early and discuss the test again with Anna and Dale. After their discussion, Anna and Dale express surprise that this test was that serious. They decide to proceed with the amniocentesis. They decide that knowing about any genetic anomaly would help them prepare emotionally for a baby with special needs and they do want to know.

Prevention

This scenario raises ethical concerns about the use of technology in pregnancy. Parents may not understand the implications of all the tests that are offered and the ways in which information obtained through certain tests may affect their choices and lives. Care providers must not assume that all parents understand the implications of technology. In addition, even though the practitioner may believe they have adequately explained a test, variables such as anxiety, cultural beliefs, or educational level may interfere or enhance a client's understanding. Using a team approach and active communication, health care professionals can enhance the client's ability to make the choices that are best for them.

▼ VARIATIONS



Geriatric Variations:

- *Not applicable.*



Pediatric Variations:

- *Adolescents dealing with a pregnancy will often be very frightened and uneducated about aspects of the pregnancy. This fear and lack of information can translate into reticence to keep appointments and to follow through with necessary care. It is important to offer nonjudgmental support and careful teaching before, during, and after the procedure.*



Home Care Variations:

- *Cramping or discomfort may be experienced for a few hours after the procedure. Instruct the client to report any unusual symptoms such as fever, chills, or excess tenderness at the puncture site.*



Long-Term Care Variations:

- *Clients with disabilities still need routine prenatal care, but this care must be modified to accommodate their disabilities. Clients in a long-term care setting due to disabilities that make independent living unfeasible, may not have access to prenatal resources available to others in the community. Use the amniocentesis appointment as an opportunity to assess the overall needs and resources available to the long-term care client.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

You have only one specimen container for the amniotic fluid and the doctor orders three separate tests.

Ask Yourself:

How do I prevent this error?

Prevention:

Before the procedure ask the physician or qualified practitioner which tests she wants done. Call the laboratory to be sure you have the correct containers. If you are short on containers, immediately obtain the correct containers and prepare them for the physician or qualified practitioner to put the fluid into the container. Label the container correctly and fill out the requisition forms before sending them to the laboratory.

> NURSING TIPS

- Use guided imagery or progressive relaxation to help minimize the client's anxiety.
- Make sure the mother is in a comfortable position with pillows to support her.
- If the client is accompanied by her partner, include the partner in conversation and position them where they may also see the ultrasound images if possible.
- Consider having the partner remain seated during the procedure in case of lightheadedness.
- Use encouragement and touch to help the client relax.
- Demonstrate your confidence in the client's ability to relax during the procedure.

SKILL 11-10

Assisting with Bronchoscopy

Patricia McDowell, RPPT

KEY TERMS

Airway
Biopsy forceps
Bronchoalveolar lavage
Bronchoscopy

Monitoring
Pneumothorax
Protected microbiology brush
Specimen collection



> OVERVIEW OF THE SKILL

Flexible fiberoptic bronchoscopy is used for direct visualization of the upper and lower respiratory tract to diagnose and manage infections, malignant, and inflammatory diseases of the lungs (see Figure 11-10-2). Flexible fiberoptic bronchoscopy may involve obtaining cell washings (bronchoalveolar lavage); the taking of tissue samples (biopsies by brushing, needles, or bites of the lung tissue); removing abnormal tissue with the use of laser; or removal of a foreign body.

Indications for Bronchoscopy

- Abnormal chest x-ray: presence of a lesion, persistent atelectasis, infiltrates in the lung fields.
- Hemoptysis
- Unexplained cough, localized wheeze, or stridor
- Need to obtain lower respiratory tract secretions or tissue for diagnostic purposes
- To assess and/or evaluate airways
- To perform difficult intubations
- To remove a foreign body

Complications

- Hypoxemia
- Hypercarbia
- Hypotension

- Laryngospasm
- Bradycardia
- Pneumothorax
- Hemoptysis
- Adverse effect of medication used before and during the bronchoscopy



Figure 11-10-2 Bronchoscopy is used to visualize the respiratory tract.

Contraindications

- Inability to adequately oxygenate the client during the bronchoscopy
- Clients with severe obstructive lung disease
- Unstable hemodynamic status
- Lack of client consent
- Recent myocardial infarction
- Unstable angina
- Hypoxemia or hypercarbia
- Low platelet count

Note: The safety of asthmatic clients during a bronchoscopy procedure is a concern, but the presence of asthma does not preclude the use of bronchoscopy.

> ASSESSMENT

1. Determine whether the client has been NPO for 4 to 8 hours. **The bronchoscopy will have to be postponed if the client has not been NPO due to the danger of aspiration.**
2. Determine the presence of a current chest x-ray and blood work (especially bleeding times). **The act of inserting the scope and obtaining the samples needed can cause bleeding, so bleeding times must be known. Viewing the chest x-ray just prior to, and during the procedure, will help obtain good samples.**
3. Assess where the procedure is to be performed (in a hospital room, or in the bronchoscopy suite) to **determine that the area is available and where to set up the equipment.**
4. Identify the drugs ordered: action, purpose, normal dosage, common side effects, time of onset and peak action, duration of action and implications. **This allows you to anticipate effects of the drug and to observe client's response.**
5. Assess the client's vital signs, including lung sounds and blood oxygen levels, **to establish baseline values.**
6. Assess the client's chart for a signed consent form **to conform with institutional and legal requirements.**
7. Assess the client's level of understanding regarding the procedure as well as the client's level of anxiety **to determine the amount and type of client teaching needed.**

> DIAGNOSIS

- | | |
|---------|---|
| 1.5.1.3 | Ineffective Breathing Pattern |
| 1.6.1.1 | Risk for Suffocation related to the procedure |
| 1.6.1.4 | Risk for Aspiration related to the procedure |
| 8.1.1 | Knowledge Deficit related to the procedure |

> PLANNING

Expected Outcomes:

1. The client will express understanding of the procedure prior to the bronchoscopy.

2. The client will tolerate the procedure with a minimum of anxiety or discomfort.
3. The purpose of the bronchoscopy will be achieved.
4. Usable samples will be obtained, correctly processed, and correctly labeled.
5. The client will not suffer any adverse effects from the procedure.

Equipment Needed (see Figure 11-10-3):

- Bronchoscope (The scope size will be determined by the physician or qualified practitioner based on the client and the procedures to be performed.)
- Light source for the bronchoscope and any related video or photographic equipment
- Brushes (cytology, protected for microbiology tissue samples)
- Specimen traps
- Syringes of various sizes for bronchoalveolar lavage, drug delivery, and needle aspiration
- Bite block (to protect the scope)
- Intubation tray
- Intravenous supplies
- Resuscitation bag
- Monitoring devices: pulse oximeter, ECG monitor, sphygmomanometer
- Oxygen delivery equipment: cannula, masks
- Suction supplies for scope and/or mouth
- Fluoroscopy equipment, including personal protection and radiation badge
- Adequate ventilation, to prevent the spread of infection
- Ultraviolet light, to prevent transmission of tuberculosis
- Cleaning, disinfection, and sterilizing equipment



Figure 11-10-3 Bronchoscope with oxygen supply line



Estimated time to complete the skill:

The time from setup to cleanup can vary with the indications for the bronchoscopy from 1–2.5 hours.

> CLIENT EDUCATION NEEDED:

1. Review the indications for the bronchoscopy.
2. Remind the client that they must be NPO at least 4 hours prior to the bronchoscopy.
3. It is a good idea to call the client the day before the bronchoscopy to instruct him not to

drive himself to the hospital and to stay NPO after midnight.

4. Explain to the client the reasons for wearing a gown and removing neck jewelry.
5. Make sure you go over what to expect post-procedure with the client and the escort or caregiver.
6. Go over hand signals to use to signal pain or discomfort when the client is unable to talk.
7. Give instructions not only verbally so the client can ask questions but also in writing. Written instructions should include what to expect, when to be concerned, what to do, who to contact, and how to contact them.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Wash hands. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. |
| <ol style="list-style-type: none"> 2. Set up for the bronchoscopy. Plug the appropriate bronchoscope in a light source and connect the suction tubing. <ul style="list-style-type: none"> • Set up an emergency oral suction. | <ol style="list-style-type: none"> 2. Setting up ahead of time helps reduce mistakes or forgotten items. Watching a nurse set up the procedure can increase the client's anxiety. <ul style="list-style-type: none"> • Decreases the risk of aspiration. It is a good idea to have an oral suction set up at all times, especially when the danger of hemoptysis is present. |
| <ol style="list-style-type: none"> 3. Draw up medication per physician's or qualified practitioner's orders and label each syringe with drug and dosage per milliliter. | <ol style="list-style-type: none"> 3. Ensures accuracy in the administration of the medication. |
| <ol style="list-style-type: none"> 4. Ready syringes of saline for the bronchoalveolar lavage and saline washes. | <ol style="list-style-type: none"> 4. Decreases the possibility of contaminating the saline and helps the bronchoscopy flow smoother. |
| <ol style="list-style-type: none"> 5. Lay out traps, biopsy forceps, cytology brushes, and protected brushes as needed. Have everything ready for an IV placement (if an outpatient; an inpatient should already have an IV). | <ol style="list-style-type: none"> 5. Provides easy access to give conscious sedation, drugs, and emergency medications. |
| <ol style="list-style-type: none"> 6. Make sure all the required paperwork is filled out and ready for the client and the physician or qualified practitioner. This should include but not be limited to bronchoscopy consent form, drug forms, and laboratory request. | <ol style="list-style-type: none"> 6. Documents procedure to prevent mistakes. |

7. Check that emergency medications and supplies are available.
8. Verify client's identity.
9. Have client put on a gown if she is an outpatient (See Figure 11-10-4).



Figure 11-10-4 Have the client put on a gown and robe.

10. Place monitoring devices for vital signs. Record baseline vital signs and continue to monitor every 5–15 minutes depending on institution policies.
11. For outpatients, confirm the presence of a family member or caregiver to provide transportation after the procedure.
12. Obtain informed consent from the client prior to the bronchoscopy procedure.
13. Start supplemental oxygen (see Figure 11-10-5).
14. Have client remove false teeth (if appropriate).
15. Give the anticholinergic agent if the doctors have ordered it. Watch the heart rate closely.
16. The physician or qualified practitioner may also want a nebulizer given with a bronchodilator diluted with lidocaine.
17. Anesthetize the nares and the throat with topical lidocaine and cocaine (see Figure 11-10-6).
18. Give first dose of IV sedation; may be required to give prn prior to and during procedure

7. Ensures that needed equipment is available.
8. Assures correct client.
9. Protects clothing; increases radiology view of chest.



Figure 11-10-5 Obtain supplemental oxygen. Administer oxygen to the client during the bronchoscopy.

10. Assesses how the client is tolerating the procedure and medications (too much/too little or adverse reactions). Monitors oxygenation status.
11. It is not safe for the client to drive for at least 6 hours after receiving sedation for the bronchoscopy.
12. Ensures that the client understands what the procedure involves and all the possible risks.
13. The suctioning during the bronchoscopy will decrease oxygenation.
14. Prevents choking, aspiration, or damage to teeth and/or scope.
15. Reduces secretions and minimizes vasovagal reflexes. Can increase the heart rate significantly.
16. Starts the numbing process and relaxes the airway, minimizing bronchospasm.
17. Helps to decrease the gag reflex and make the client more comfortable.
18. Helps the client to relax. Increases comfort level.



Figure 11-10-6 Anesthetize the nose and throat.



Figure 11-10-7 The physician or qualified practitioner passes the scope into the airway and observes the monitor.

depending on client's tolerance to the drugs and comfort level.

- 19.** Lubricate the distal end of the scope using a water-soluble lubricant.
- 20.** If you are introducing the scope orally, place a mouth guard or airway in client's mouth. Secure if possible.
- 21.** As the physician or qualified practitioner passes the scope into the airways (see Figure 11-10-7), the assistant will inject lidocaine into the scope, numbing the airways as they go. This is usually 2 cc of 2% lidocaine (no preservatives) with 3 cc of air as a push in the syringe.
- 22.** Instruct the client not to talk. If she needs something have her use the prearranged hand signals.
- 23.** Assist the physician or qualified practitioner in obtaining the type of samples needed:
 - Bronchoalveolar lavage*
 - With the scope wedged in an airway, place a large suction trap on the suction port of the scope, being careful not to touch the sterile connector ends. Reconnect the suction connecting tubing.
 - In 30-cc aliquots, introduce sterile nonbacteriostatic saline through the biopsy port into the lung.
 - Monitor the return suctioned back into the trap.
 - Repeat the preceding two bulleted actions until an adequate sample is obtained.
 - Remove the suction trap from the scope carefully. Avoid touching the connector ends and
 - 19.** Helps the passage of the scope through the airways. Any substance going into the lungs should be water soluble.
 - 20.** Maintains airway and prevents damage to scope.
 - 21.** Minimizes cough and gag reflexes. Using air to push the lidocaine through the scope helps decrease the amount of lidocaine, thus decreasing medication side effects.
 - 22.** Talking with the scope in place bruises the vocal cords and can damage them.
 - 23.**
 - Maintains sterility of trap.
 - Bacteriostatic saline would destroy the bacteria and defeat the purpose of the bronchoscopy.
 - You do not get all of the lavage back.
 - Maintains sterility of sample.

cap them off (usually done by hooking them together). Be careful with the suction when removing the trap or the sample may be lost.

Cytology brush

- Remove the brush from the package, uncoil, and make sure the brush is inside the protective sheath.
- Carefully push the brush down through the biopsy port on the scope 1 to 2 cm at a time.
- Once the brush is through the port, slowly advance it until the physician or qualified practitioner tells you to stop.
- Push the brush out and move it back and forth inside the airway 3 or 4 times.
- Pull the brush back into the protective sheath and carefully pull the brush and sheath out of the scope.
- Prepare the sample according to hospital policy. This may include cutting the brush end off and placing it in saline, rubbing the brush onto slides, or placing it in a fixative.
- If the brush is not in the protective sheath, it could damage the scope or pick up contaminants.
- Carefully advancing the brush prevents damage to the brush and the scope.
- Trying to push the brush too fast may damage the brush or scope.
- Ensures there are enough cells from the suspect area that a diagnosis may be obtained.
- Maintains sample and protects from contaminants.
- Do this quickly as cells exposed to air lose their integrity and the cell walls are destroyed, thus making them unrecognizable.

Protective brush

- Used for microbiology samples; the brush is double sheathed and has a wax plug in the end.
- Remove from packaging and carefully uncoil.
- Carefully push the brush down through the biopsy port on the scope 1–2 cm at a time.
- Once through the port slowly advance until the physician tells you to stop
- Pull the two sheaths together and push out the wax plug. Push the brush out and move it back and forth inside the airway 3 or 4 times.
- Pull the brush back into the protective sheath and carefully pull the brush and sheath out of the scope.
- Carefully advance the brush out of the sheath, and using sterile wire cutters, cut the brush end off into a sterile vial containing 1 cc of sterile nonbacteriostatic saline (or follow hospital procedure).
- Maintains sterility. The wax plug keeps contaminants from coming in contact with the brush.
- Maintains sterility.
- Trying to push brush too fast may damage brush and scope.
- Pushing the brush too fast may damage the brush or the scope.
- Ensures there are enough cells from the suspect area that a diagnosis may be obtained.
- Maintains sample and protects form contaminants.
- Maintains sterility. Bacteriostatic saline would destroy the bacteria and defeat the purpose of the bronchoscopy.

Biopsies

- Often done under fluoroscopy.
- Remove the biopsy forceps from the package, and test them while they are still looped in a circle. Testing them involves opening and closing them. If they work while in a loop, they should work well in the lungs. If they do not open and close easily, get another pair.
- Biopsy areas may be too far out into the lungs to be visualized any other way.
- Testing while still looped will let you know if they will work when they are twisted in the airway.

- The physician or qualified practitioner may want to instill 3–5 cc of a 1:10,000 solution of epinephrine at this time.
- Carefully push the closed biopsy forceps down through the biopsy port on the scope 1–2 cm at a time.
- Once through the end, slowly advance until the physician or qualified practitioner tells you to stop.
- Open the forceps and push forward; close firmly and hold when told to by the physician or qualified practitioner and give a sharp, hard tug, pulling the forceps out of the scope.
- Place biopsy in a container of formalin.
- Rinse the forceps off in alcohol if you placed them in the formalin while removing the biopsy sample. Repeat actions for another biopsy.

24. While obtaining the samples, make sure to label all of them immediately with clients name, ID number, date, time, and location in lung.

25. After the bronchoscopy, rinse the scope by suctioning approximately 240 ml of soapy water through the working channel of the scope (see Figure 11-10-8).

Figure 11-10-8 Clean the scope immediately after the bronchoscopy to prevent secretions from drying.



26. During the recovery period (at least 30 minutes), wean the client off the oxygen (if none was required prior to the procedure).

27. Remember to keep a close watch on the oxygen saturation and the vital signs.

28. When client is awake and vital signs have returned to baseline, take out the IV, and instruct

• Often used as a preventative against hemoptysis.

• Pushing the forceps down faster may bend the forceps, which then may not work correctly and could damage the scope.

• Pushing the forceps too fast may damage the forceps or the scope.

• Ensures collection of a good specimen. The client should not feel any pain.

• Preserves the tissue.

• Formalin is a carcinogen.

24. More than one sample type is taken from any given area/segment and often more than one site is used. If samples are not labeled immediately, they can be confused or mislabeled.

25. Cleaning the scope immediately ensures it will not be damaged by dried secretions.

26. The saline introduced into the lungs during the bronchoscopy can decrease the client's oxygenation. This can take several hours to be absorbed by the body. The client may also experience a low-grade fever during this time.

27. The recovering client may fall into deep sleep with a decreased respiratory rate and blood pressure.

28. There is a danger of aspiration because the airways may still be a little numb.

the client or the caregiver to withhold food and liquids for at least 2 hours after the procedure.

29. Instruct the client and/or caregiver about common side effects to expect following the bronchoscopy.
 - Outpatients should not drive for at least 6 hours after the bronchoscopy.
 - For inpatients, call a report to the floor if the physician or qualified practitioner has not already done so.
 30. Deliver samples to the various laboratories if you have not already done so.
 31. Check the scope for any leaks or damage sustained during the procedure.
 32. If there are no leaks or damage, clean the scope inside and out with soft brushes. Rinse well and sterilize.
 33. Periodic postprocedure follow-up monitoring of client condition is advisable for 24–48 hours for inpatients. Outpatients should be instructed to contact the physician or qualified practitioner regarding fever, chest pain or discomfort, dyspnea, wheezing, hemoptysis, or any new findings presenting after the procedure has been completed.
 34. Wash hands.
29. Since the sedation is in effect, it is a good idea to reinforce the verbal instructions with written ones.
 - The sedation may remain in the clients system even though the client feels awake.
 - Increases communication; provides better client care.
 30. The longer a specimen sits, the more likely it will become unusable.
 31. Moisture will damage fiberoptic fibers of the scope. Anywhere there is moisture there is the possibility of bacterial growth.
 32. If there is any particulate matter left on the scope, it is not going to be sterile after processing.
 33. Ensures continuity of care.
 34. Reduces the transmission of microorganisms.

> EVALUATION

- The client expressed understanding of the procedure prior to the bronchoscopy.
- The client tolerated the procedure with a minimum of anxiety or discomfort.
- The purpose of the bronchoscopy was achieved.
- Usable samples were obtained, correctly processed, and correctly labeled.
- The client did not suffer any adverse effects from the procedure.

> DOCUMENTATION

Nurses' Notes

- A detailed record should be kept of the procedure from the time the client is admitted to your care for

the bronchoscopy procedure, including but not limited to:

- Level of consciousness
- Medications administered, dosage route, and time of delivery
- Subjective response to procedure (e.g., pain, discomfort, dyspnea)
- Vital signs: blood pressure, respiratory rate, heart rate, rhythm, and changes in cardiac status
- SpO₂ and FIO₂
- Lavage volumes (delivered and retrieved)
- Site of biopsies and washings and tests requested on each sample
- Tidal volume, peak inspiratory pressure, adequacy of inspiratory flow, and other ventilation parameters if the subject is being mechanically ventilated.



▼ REAL WORLD ANECDOTES

Martha McPeck, a normally healthy middle-aged female, presented one evening to the emergency room with decreased level of consciousness, nearly comatose. Despite the emergency room staff's best efforts, Martha died. The emergency room doctors had not been able to determine the reason for Martha's sudden decline and demise. The coroner's investigation revealed a potentially fatal lidocaine level in Martha's blood. The morning before her death she had undergone a bronchoscopy as part of a research study. The bronchoscopy records indicated that Martha had not tolerated the procedure well. To suppress her coughing and gagging during the procedure, the physician had administered a larger than usual amount of lidocaine. Martha had apparently recovered from the bronchoscopy without complications and had been discharged to home a few hours prior to her visit to the emergency room.

Lidocaine is commonly used in many procedures and is not considered to be a dangerous drug. This case illustrates that every client is unique and underscores the need for careful assessment and teaching. Client and family members must feel comfortable calling to report any symptoms or questions they may have following discharge.

> CRITICAL THINKING SKILL

Introduction

A careful client history can help avoid complications during a procedure.

Possible Scenario

You are admitting and preparing Mr. Larson for an outpatient bronchoscopy. During the intake process you ask Mr. Larson if he has had breakfast. He denies eating prior to admission, and you proceed with the preparation for the bronchoscopy. As you are setting Mr. Larson up in the bronchoscopy chair, you notice a white chalky color on his tongue and mouth.

Possible Outcome

If you do not follow up on this finding and question Mr. Larson as to the cause of the white residue, Mr. Larson is at risk for vomiting and aspiration of the Maalox he took prior to arriving at the facility. Since he did not eat breakfast, he was experiencing heartburn and he took several doses of Maalox to combat this. In this case you did ask Mr. Larson about the white residue and Mr. Larson's bronchoscopy was delayed until later in the day.

Prevention

When questioning clients regarding eating or drinking prior to a procedure, be sure to ask about all oral intake. Clients often do not consider coffee or medications when asked about eating breakfast.

▼ VARIATIONS



Geriatric Variations:

- As people age, their metabolism slows; older clients need to be watched closely for any reaction to sedation and/or reaction to the vagal stimulation of the bronchoscopy.
- The medication dosages should also take into account the client's age.



Pediatric Variations:

- Most bronchoscopies done on children are done in surgery under general anesthesia.
- Place in lateral position postprocedure.



Home Care Variations:

- Clients who will be returning home should be instructed to contact their physician or qualified practitioner, regarding fever, chest pain or discomfort, dyspnea, wheezing, hemoptysis, or any new findings presenting after the procedure has been completed.
- Clients should not drive for at least 6 hours after the bronchoscopy.

▼ VARIATIONS *continued*



Long-Term Care Variations:

- *Periodic postprocedure follow-up monitoring of client's condition is advisable for 24 to 48 hours for clients in an institutional setting.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Specimens become mixed up and the nurse is unsure where each sample was taken.

Ask Yourself:

How do I prevent this error?

Prevention:

Specimens need to be labeled as soon as they are obtained. More than one sample type is taken from any given area/segment and often more than one site is used. If samples are not labeled immediately, they can be confused or mislabeled. If samples are not correctly identified the procedure will need to be repeated.

> NURSING TIPS

- Try to set up as much as possible before the client arrives. This helps instill confidence in the client and will make the procedure go smoother.
- Always set up for two suctions: one for the suction to the scope and one to help clear secretions from the client's oropharynx.
- Fill out as much paperwork and labels as you can before the procedure so you can quickly label all specimens as they are obtained to prevent any mix up.
- Check vital signs frequently. For some people there is a fine line between conscious and unconscious sedation. The goal is to make the client comfortable, not put him out completely, as the physician or qualified practitioner may need the client's help in obtaining samples.
- If you are assisting with or administering a topical anesthetic, remember the better the vocal cords are anesthetized, the better the client will tolerate the procedure and the less sedation will be needed. Remember that lidocaine is a drug too and it is possible to administer an overdose, so keep track of how much you are using.
- Review the side effects of the procedure with the client and caregiver, along with what needs to be done if there are any reactions. Give them a written copy of these instructions.
- Observe client for a minimum of 30 minutes post-bronchoscopy procedure. Watch for any side effects of the procedure, including:
 - Any shortness of breath, which could indicate bronchospasm or a pneumothorax
 - An adverse reaction to any of the drugs given
 - Changes in vital signs
 - Amount of coughing postprocedure and any hemoptysis

SKILL 11-11

Assisting with a Gastrointestinal Endoscopy

Nancy Unger, RN, MN, MPH

KEY TERMS

Cholangiopancreatography (ERCP)
Colonoscopy
Conscious sedation
Endoscope

Esophagogastroduodenoscopy (EGD)
Flexible sigmoidoscopy
GI-endoscopy lab



> OVERVIEW OF THE SKILL

Endoscopy is the visualization of a body organ or cavity via a lighted, flexible scope. Gastrointestinal (GI) endoscopy allows assessment of the GI tract. The scope is inserted via the rectum for a colonoscopy or sigmoidoscopy or via the mouth for an esophagogastroduodenoscopy (EGD) or endoscopic retrograde cholangiopancreatography (ERCP). After the endoscope is inserted, biopsies and pho-

tos can be taken to aid in diagnosis, foreign objects and polyps can be removed, and internal bleeding can be identified and controlled. Other procedures that can be done with the endoscope are listed in Table 11-11-1.

Clients undergoing endoscopic exams, except for a sigmoidoscopy, receive IV medications to sedate and control pain during the procedure. Use of conscious

Table 11-11-1 Endoscopic Procedures

PROCEDURE/AREA STUDIED	PREPARATION/POSITION	CLINICAL SIGNIFICANCE
Arthroscopy—examine joint structures, primarily the knee	Instruct client to fast after midnight; test is usually performed under local anesthesia, may be done under spinal or general anesthesia if surgery is necessary. Position the joint for accessibility.	Diagnose a torn meniscus, patellar, condylar, and synovial disorders; perform surgery. Also used to monitor the progression of a disease or effectiveness of therapy.
Bronchoscopy—examine the bronchus and bronchial tree	Instruct client to fast 6–12 hours before the test; test is usually done under local anesthesia. Position client supine or sitting upright.	Identify the origin of bleeding, lesions, or obstruction; collect a specimen for bacteriologic and cytologic examination (diagnosis abnormal cells); remove foreign bodies, lesions, mucous plugs, or excessive secretions.

Table 11-11-1 Endoscopic Procedures *continued*

PROCEDURE/AREA STUDIED	PREPARATION/POSITION	CLINICAL SIGNIFICANCE
Colonoscopy—examine the large intestine	Instruct client to maintain a clear liquid diet for 48 hours before the test, take the prescribed laxative the evening before the examination; place client on left side with knees flexed and drape.	Identify origin of bleeding or lesions; evaluate inflammatory and ulcerative bowel disease and recurrence of polyps or malignant lesions.
Colposcopy—examine the cervix and vagina following a positive Pap smear	No restriction on food or liquids. Place client in lithotomy position.	Evaluate abnormal cytology or grossly suspicious lesions and perform a biopsy or take photographs of suspicious lesions.
Cystoscopy (see cystourethroscopy) Cystourethroscopy—uses two instruments: a cystoscope to examine the bladder and ureter openings, urethroscope to examine the bladder neck and the urethra	Food and fluids are restricted only if the client is to receive general anesthesia; regional anesthesia is usually given. Place client in a lithotomy position.	Identify bladder lesions and urethral strictures, ulcers, inflammation, and an enlarged prostate gland.
Esophagogastroduodenoscopy (EGD)—examine the esophagus, stomach, and upper duodenum	Instruct client to fast 6–12 hours before the test. An IV tranquilizer may be given, then a local anesthetic is sprayed into the back of the throat to decrease the gag reflex (swallowing will seem difficult). Place client in a sitting position.	Identify diverticula, varices, Mallory-Weiss syndrome, esophageal rings and hiatal hernia, and esophageal and gastric stenoses. When combined with histologic and cytologic tests may indicate acute or chronic ulcers, benign or malignant tumors, and inflammatory disease.
Laparoscopy—examine the peritoneal cavity: pelvis and abdomen	Instruct client to fast 8 hours before the surgery; the test is performed either with a local or general anesthetic agent. Place the client in a lithotomy position; catheterize the client to ensure the bladder is empty (avoids puncture of the bladder during the test with the laparoscope).	Used to detect cysts; adhesions; fibroids; and infections of the uterus, fallopian tubes, and ovaries; ectopic pregnancies; liver lacerations and cirrhosis. May also be used for lysis of adhesions, ovarian biopsy, tubal sterilization, foreign body removal, and fulguration of endometriotic implants.
Proctosigmoidoscopy—three steps: 1. Digital examination to dilate the anal sphincters to detect obstruction that might hinder passage of the endoscope. 2. A sigmoidoscope to examine the distal sigmoid colon and rectum. 3. A proctoscope to examine the lower rectum and anal canal.	Instruct client according to physician or qualified practitioner orders relative to dietary restrictions and bowel preparation (these are usually based on physician or qualified practitioner preference). If the client has rectal inflammation, a local anesthetic agent is applied to decrease discomfort. Secure the client to a tilting table that rotates into horizontal and vertical positions.	Identify internal hemorrhoids, hypertrophic anal papillae, polyps, fissures, fistulae, and rectal and anal abscesses.

sedation for procedures requires frequent monitoring of vital signs, level of consciousness, oxygenation, and heart rhythms. Other than the ERCP, which is typically performed in radiology for x-ray access, most endoscopic procedures are performed in a special laboratory or clinic, often serving both inpatients and outpatients.

Nurses who work in the GI-endoscopy laboratory may be required to start IVs when indicated, give IV medications, monitor a client undergoing conscious sedation, assist the physician or qualified practitioner, prepare specimens for the laboratory, monitor clients after the procedures, and provide discharge instructions for the procedure and postsedation.

There are several physiologic and psychologic factors the nurse needs to consider in the care of the client undergoing this procedure. Prior to endoscopic exams, most clients experience some anxiety. Some willingly state that they are anxious and ask for additional information. Often clients who are anxious will have elevated blood pressures and heart rates. Preparing for the colonoscopy procedure may cause the client to be dehydrated secondary to the frequency of diarrhea stools. Low blood pressure, pale and clammy skin, tachycardia, and tachypnea may indicate the client is dry in the intravascular space.

During upper endoscopies, the risk of aspiration is a possibility secondary to conscious sedation, anes-

thetizing the back of the throat prior to passing the scope and the passage of the scope into the esophagus. Clients may exhibit gagging, restlessness, and a decrease in oxygenation if aspirating. Also, the client is unable to speak because the scope is inserted via the mouth. Assessing body language (grimacing, trying to pull at the scope) and elevation in heart rate and blood pressure can assist the nurse in identifying pain. Depending on the client's underlying medical condition, age, the procedure, and the dosage and type of medications given, the client will have an altered sensory response. Usually, the client is sleepy and unable to clearly process information. Return of the gag reflex in clients who have undergone an EGD is an indication that the medication effect is diminishing.

Although rare, there is always a risk for bleeding after the exam, particularly if biopsies were taken or polyps removed. In addition, esophageal varices may bleed. Unusual chest or abdominal pain, difficulty swallowing or moving the neck, or rectal or oral bleeding experienced by the client even after discharge should be immediately reported to the physician or qualified practitioner.

Potentially perforating the GI tract during the procedure is rare. Signs and symptoms of diagnosing a perforation would include an elevated temperature, chills, unusual chest, abdominal, or shoulder pain, abdominal tenderness, guarding, rectal or oral bleeding, and hypovolemic shock.

> ASSESSMENT

1. Assess the client's knowledge of, preparation for, anxiety level concerning, and readiness to undergo the endoscopic procedure. Accurate assessment will allow the nurse to provide more information if needed about the endoscopic procedure. Proper preparation for the exam (i.e., NPO status, laxatives, enemas) will influence whether the procedure can be performed as well as the quality of the exam.
2. Perform a brief health assessment, focusing on identifying whether a client has underlying heart, liver, or kidney disease. Specifically, it is helpful to know about implanted prosthetic devices, hepatitis, insulin-dependent and non-insulin-dependent diabetes mellitus (IDDM/NIDDM), hypertension, bleeding, seizure disorders, or pregnancy. Knowledge about the general health of the client, in addition to assessing for certain conditions, can better prepare the health practitioners to care for the

client during endoscopic exam. Clients who have diabetes, for example, should have their blood sugars monitored and be observed for hypo- or hyperglycemic reactions. Clients with a history of pulmonary and coronary disease should be monitored closely for excessive sedation or dysrhythmias during medication administration. Extra caution must be taken with the electrosurgical equipment if the client has a pacemaker. Clients with liver or kidney disease should be carefully assessed regarding the extent of their illness because their tolerance of medications may be impaired.

3. Assess for substance abuse or chemical dependencies; include the types of drugs and the last time used. Use caution in administering medications to clients who have chemical dependencies. Avoid giving Valium to alcoholics or Narcan to drug abusers.
4. Check for allergies to drugs. During most endoscopic exams, IV medications are given, which

may include fentanyl, morphine, meperidine, hydromorphone, midazolam, lorazepam, diazepam, hydroxyzine, and promethazine. Also, check for an allergy to the “caine” family if the client is undergoing an EGD because the back of the throat may be sprayed with cetacaine or other anesthetic prior to insertion of the scope.

5. Ask about current medications, specifically whether the client has taken Coumadin, aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), heparin, or other anticoagulants recently (within the last 5 days). These medications cause anticoagulation of the blood and can contribute to bleeding during the procedure, especially if biopsies are indicated.
6. Check for dentures, removable dental plates, and/or loose teeth if client is undergoing EGD and ERCP. Because the endoscope is inserted through the mouth, removal of the dentures and dental plates is essential prior to the procedure.
7. Verify plans for transportation home if client is an outpatient. For 24 hours after the completion of the procedure, it is recommended that the client does not operate moving machinery if conscious sedation was utilized.

> DIAGNOSIS

- 9.3.1 Anxiety related to pending procedure
- 9.1.1 Pain
- 1.6.1.4 Risk for Aspiration
- 1.4.1.2.2.1 Risk for Fluid Volume Deficit related to dehydration or bleeding
- 1.6.1 Risk for Injury related to perforation from the scope insertion
- 8.1.1 Knowledge Deficit related to the procedure
- 7.2 Alteration in Sensory Response related to sedation for the procedure

> PLANNING

Expected Outcomes:

1. Client will have no signs of bleeding or perforation.
2. Client will have a stable airway and respiratory status (respiratory rate and O₂ saturation within 20% of the baseline).
3. Client will have stable cardiovascular status (blood pressure and heart rate within 20% of the baseline).

4. Client will be easily aroused and able to talk.
5. Gag reflex will be intact.
6. Client will be able to move with minimal assistance.
7. At the conclusion of the procedure, client will be either transferred back to the unit or discharged to home.

Equipment Needed (see Figure 11-11-2):

- Blood pressure monitoring equipment
- Continuous pulse oximeter and cardiac monitoring
- IV start equipment
- Suction
- Emergency equipment
- IV medications, properly labeled
- Oxygen
- Endoscope and related equipment
- Gloves



Estimated time to complete the skill:
1–2 hours

> CLIENT EDUCATION NEEDED:

1. Prior to the procedure, explain preparation needed (i.e., NPO from midnight or 8 hours prior to the procedure for most endoscopy procedures; laxatives and /or enemas for lower endoscopy).
2. Explain the procedure, including when the client will be asked to move or to swallow, what sounds he may hear, how the procedure will progress, how long the procedure will take, and what sensations he may feel.
3. Explain to the client that he will be connected to monitoring equipment during the procedure to observe vital signs. Reassure the client that this is a normal part of the procedure.



Figure 11-11-2 Endoscope

4. If used, explain the use of conscious sedation and what the client will experience.
5. After the procedure, discuss discharge instructions with the client and also provide written discharge instructions. It is important that the client clearly understands instructions.
6. Explain to the client undergoing a colonoscopy or sigmoidoscopy that feelings of mild abdominal fullness or cramping after the procedure are normal.
7. Instruct the client to report symptoms of acute abdominal pain, fever, chills, or bleeding immediately.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Wash hands. 2. Check equipment, including endoscope, to be sure it is functioning. 3. Prepare for possible biopsies, polyp removal, photos. 4. Check that emergency equipment is available, including emergency medications such as naloxone (opioid antagonist) and flumazenil (benzodiazepine antagonist). 5. Verify client identification. 6. Perform brief nursing assessment. 7. Check for drug allergies or unusual reactions to medications. 8. Verify client's readiness for the procedure; include the last time the client had anything to eat or drink. Also, ask about the type of bowel prep and the results if the client is undergoing lower endoscopic exams. 9. Verify that consent for procedure is signed. | <ol style="list-style-type: none"> 1. Reduces the transmission of microorganisms. 2. Properly working equipment is essential. 3. Ideally setting up equipment is easier before the case starts because the room will be darkened during the case and the nurse may be unable to leave the client's airway. 4. Having ready access to emergency equipment will assist the nurse in providing appropriate care when necessary. 5. Ensures the correct client. 6. Provides information about the general health of the client, focusing on areas that may place a client at risk from the procedure or the medications. 7. Helps to determine which medications to give, including the dosage. 8. It is important to maintain NPO status prior to EGD and ERCP to minimize risks of aspiration since the endoscope will be inserted through the mouth after the client's throat is numb and gag reflex is suppressed. Thorough cleansing of the bowel via the prep will enable the physician or qualified practitioner to see the lining of the GI tract. 9. Clients must give consent prior to endoscopic exams. Ensures that client has been educated about procedure; also protects nurse, qualified practitioner, and institution. |
|--|--|

10. Verify client has a ride home if undergoing conscious sedation.
 11. Answer any questions.
 12. Start IV and IV fluids, if indicated.
 13. Connect to electrocardiographic, blood pressure, and oximetry monitoring systems.
 14. Check baseline vital signs, heart rhythm, respiratory rate, O₂ saturation, and level of consciousness.
 15. Start oxygen via nasal cannula or tracheostomy collar, if applicable.
 16. Wear appropriate protective garb as indicated. This may include goggles, masks, face shields, gown, and gloves.
 17. Position client on left side with head of bed as flat as tolerated (see Figure 11-11-3).
10. Clients who receive conscious sedation should not drive for approximately 24 hours as their judgment may be impaired.
 11. Often clients have questions about the exam that should be addressed prior to starting the procedure.
 12. IV site is needed for IV conscious sedation. IV fluids are usually given to clients undergoing colonoscopy because they have lost fluids during the bowel prep and are NPO. No IV site is usually needed for a flexible sigmoidoscopy because clients do not usually receive conscious sedation.
 13. Because of the immediate sedative effect of the medications, it is essential to monitor the client during conscious sedation.
 14. Establishing a baseline allows the nurse a point of comparison to better evaluate the effect of medications during the procedure.
 15. Providing supplemental oxygen during the procedure is easier if the oxygen is already in place on the client.
 16. Appropriate protective garb prevents the health professional from exposure to secretions.
 17. For the EGD, colonoscopy, and flexible sigmoidoscopy the client is positioned on the left side for better tube insertion. For the ERCP, the client begins the procedure lying on the left side but is moved onto the stomach, facing right, after the endoscope is inserted.

Figure 11-11-3 Position the client flat, lying on the left side.



continues

18. Assure client privacy and dignity during the exam.
19. For an EGD and ERCP, instruct client that the throat will be numbed either by a spray or gargle and a plastic mouthpiece inserted (see Figure 11-11-4).



Figure 11-11-4 Note the plastic mouthpiece inserted to allow the endoscope clear passage, and to protect the teeth.

20. Per the physician's or qualified practitioner's orders, administer IV medications for sedation.
21. While giving IV medications for sedation, continually monitor vital signs, O₂ saturation, heart rhythm, airway, and level of consciousness.
22. Document vital signs, O₂ saturation, and level of consciousness within 2 minutes of giving medications and at least every 15 minutes (may be more frequent as indicated) and at the end of the procedure.
23. Notify the physician or qualified practitioner of any changes in vital signs, O₂ saturation, or heart rate/rhythm that deviate more than 20% from the baseline.
24. If cautery is used, apply a grounding pad to the thigh or hip.

18. Privacy and dignity are important to maintain.
19. Numbing the throat will help minimize discomfort to the client when the endoscope is passed into the stomach. The mouthpiece allows the endoscope a clear passage to the back to the mouth, protecting the teeth.



Figure 11-11-5 The nurse is assisting with the procedure by holding the mouth guard in place.

20. Usually two types of medications are given, an opioid and a benzodiazepine, in order to sedate a client adequately to pass the endoscope.
21. Medications given for conscious sedations can adversely affect vital signs and oxygen saturation. A client's level of consciousness should decrease from an alert state to a state in which the client is sleepy but arousable and able to follow some commands.
22. Frequency and type of documentation during conscious sedation are determined by hospital policy but must be done to maintain client safety.
23. Even though the physician or qualified practitioner is in the room during the procedure, he or she may be focused on the endoscope and the monitor and not the monitoring equipment. Prompt notification of changes in vital signs, heart rhythm, and oxygenation is essential.
24. Ensures client safety.

- | | |
|--|--|
| <p>25. Assist with biopsies or other specimen as needed (see Figure 11-11-5).</p> <p>26. Following the procedure, ensure client safety by keeping side rails up until sedation has worn off, monitor airway, and assess the gag reflex (especially if upper endoscopy is performed).</p> <p>27. Document all medications given, including name, dosage, route, time, and administrator.</p> <p>28. Assess for signs of bleeding and perforation, that is, unusual abdominal pain, guarding, tenderness, rectal or oral bleeding, or hypovolemic shock.</p> <p>29. After the procedure, monitor vital signs, level of consciousness, and O₂ saturation every 15 minutes for at least 1 hour and until within 20% of the baseline readings.</p> <p>30. Provide written discharge instructions, including phone numbers of the GI clinic and appropriate staff who are able to answer questions after hours.</p> <p>31. If an outpatient, discontinue IV access prior to discharge, observe site, and apply dressing.</p> | <p>25. Often biopsies, polyps, or other tissue specimens may be obtained during the procedure.</p> <p>26. Ensures client safety.</p> <p>27. Properly documents administration.</p> <p>28. Although a rare complication, the lumen of the GI tract could have been perforated during the exam and bleeding could occur. If noted, the physician or qualified practitioner should be informed immediately.</p> <p>29. Monitoring until the effects of conscious sedation have worn off indicates when the client can safely leave the area.</p> <p>30. Written discharge instructions specific to each procedure provide the client with reference information.</p> <p>31. In outpatients, IV access is no longer needed once the procedure is completed.</p> |
|--|--|

> EVALUATION

- Monitor vital signs, oxygenation, and heart rhythm during conscious sedation to assess client's response to medications.
- Clients should meet discharge criteria:
 - Return to baseline cardiovascular and respiratory status
 - Is easily arousable; able to talk
 - Gag reflex is intact if upper endoscopy performed
 - Vital signs within 20% of the baseline recordings
- For a client who has undergone an ERCP, assess for the presence of the most common complication—acute pancreatitis. Symptoms include increasingly acute abdominal pain, nausea, vomiting, abdominal distention, and diminished or absent bowel tones.

> DOCUMENTATION

Flow Sheet

- Record the client's vital signs, before, during, and after the procedure.
- Record oxygen saturation, before, during, and after the procedure.
- Document assessments of level of consciousness.
- Note IV fluids given; include rate, type of fluid, time started, and time discontinued.

Medication Administration Record

- Record the time, name, dosage, route, and initials of administrator for any medications given to the client.

Nurses' Notes

- Describe overall tolerance to procedure, including biopsies, polypectomy, and dilation.

- Note the IV site.
- Document admission assessment for outpatient clients.
- Document health assessment for outpatient clients.
- Document escort available at discharge for outpatient clients.
- Note client allergies.
- Note current medications.
- Document preparation for procedure.
- Document the presence and handling of dentures, glasses, and other personal items.
- Document the presence of an interpreter, if needed.
- Document client teaching and time of discharge.
- Note follow-up information provided, including prescription and return appointment.



▼ REAL WORLD ANECDOTES

Scenario 1

Bob has completed an EGD 1 hour ago and is resting in the recovery area. All vital signs are stable and have returned to baseline. Bob is much more alert and is expressing a desire to leave for home. Prior to discontinuing the IV, the nurse assists Bob to a sitting position and rechecks the blood pressure, which is stable. After sitting up 3 to 4 minutes, Bob became nauseated and flushed and collapsed back on the bed. The nurse assesses Bob and rechecks the blood pressure and vital signs. The blood pressure is lower than normal, and Bob's heart rate is only in the 40s. The heart rhythm reveals a third-degree atrioventricular (AV) block with nonconducted p waves. On admission, Bob had reported that he had an AV block but it had been relatively asymptomatic. On further assessment, the nurse learns that Bob had a syncopal episode several months ago, reported to the emergency room, but received no medical treatment. After returning to bedrest, Bob reports that he feels better, but his heart rate is still in the 40s. The physician is notified and orders are received to start IV fluids, obtain a stat EKG, and notify the referring physician. After further assessment, Bob is admitted to the hospital for a cardiac work-up.

Scenario 2

In this small rural hospital, sigmoidoscopies were done in the emergency room in the quiet morning hours between 6 and 7 AM. When Mack arrived at the emergency room, his eyes were downcast, he was hunched up in his coat, and he would not make eye contact with the receptionist. The nurse, sensing his discomfort, brought him to a private room and spoke with him. He admitted that he was extremely embarrassed about the procedure and “where they would be poking around.” The prep for the procedure had been extremely embarrassing as well, as his family “knew” what he had to do, and he felt like they were watching him. The nurse reassured him that these feelings were very normal. She discussed with him the ways his privacy and dignity would be protected during the procedure and provided education about the procedure. She listened to his concerns, and together they discussed ways he could cope with his feelings and things he could do to reduce his sense of embarrassment.

> CRITICAL THINKING SKILL

Introduction

A client with end-stage renal failure and GI bleeding undergoes an EGD to isolate the source of bleeding. During the procedure, he is given too much sedation and becomes difficult to arouse.

Possible Scenario

Jim is an inpatient referred to the GI clinic to locate the source of GI bleeding manifested as tarry stools. Although the client was given shorter acting medica-

tions for the procedure, the client was difficult to arouse at the conclusion of the exam. In addition, Jim's oxygenation dropped to the high 80s. His blood pressure was also lower than normal. A bolus of normal saline was started, oxygen was increased to 4 to 5 liters per nasal cannula, the head of the bed was elevated, and naloxone was given to reverse the effects of the opioids. The nurse continues to monitor Jim's vital signs, respiratory status, and level of consciousness, administering more naloxone and possibly flumazenil IV if indicated.

Possible Outcome

Jim may not respond to naloxone, flumazenil, and increased oxygen flow rate. His vital signs may continue to worsen, prompting a need for intubation if he is unable to sustain an adequate airway. Or Jim may respond well to the naloxone and support measures, waking up enough to breathe adequately under his own power, without further medical intervention.

Prevention

Careful assessment of the client's underlying health status is very important prior to giving the client IV narcotics and sedatives. Examining the current laboratory values, re-searching medications given during prior procedures, and assessing the current medical record may provide helpful information. Also, be sure that emergency equipment and medications are readily available during the procedure.

▼ VARIATIONS



Geriatric Variations:

- Some medications are absorbed differently in older adults. You may need to use smaller amounts.
- Be sure to assess whether the older client has taken aspirin, NSAIDs, or Coumadin prior to the exam.



Pediatric Variations:

- A young pediatric endoscopy client may not be able to verbally describe symptoms that might indicate complications. Be especially vigilant when assessing for nonverbal communication of pain or distress, as well as other symptoms of perforation or sepsis.



Home Care Variations:

- This procedure is not done in the home. Clients should be taught what symptoms to watch for, including nausea, vomiting, and abdominal pain, and who to call to report symptoms and ask questions.



Long-Term Care Variations:

- Teach staff about the procedure and how to care for the client after the procedure.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Inadequate preparation for the exam by the client.

Ask Yourself:

How do I prevent this error?

Prevention:

Be sure that the client has received accurate and easily understandable preparation instructions. Provide phone numbers of the clinic and after-hour contact if the client has any questions prior to the exam. Emphasize the importance of following the instructions.

> NURSING TIPS

- Check all equipment before beginning the procedure. It is very difficult to set up equipment once the procedure has started due to the darkness of the room.
- Be sure emergency equipment and medications are available.
- Be familiar with medications commonly given and their respective antidotes.
- Wear appropriate protective gear (i.e., goggles, face shields, gown, shoe covers, and gloves as indicated).

SKILL 11-12

Assisting with a Proctosigmoidoscopy

Sharon Aronovitch, PhD, RN, CETN

KEY TERMS

Cancer

Proctoscopy

Proctosigmoidoscopy

Rectal exam

Sigmoidoscopy



> OVERVIEW OF THE SKILL

A proctosigmoidoscopy is the insertion of a rigid or flexible scope into the lower gastrointestinal tract through the anus to examine the distal sigmoid colon, rectum, and anal canal. This endoscopic examination is performed to diagnose malignant and benign tumors and for the detection of hemorrhoids, polyps, fissures, fistulas, and abscesses within the rectum and anal canal. The American Cancer Society recommends that persons over 50 years of age should have a proctosigmoidoscopy every 3 to 5 years to detect and prevent colon cancer.

The client requires enemas the night before and the day of the procedure so that the colon can be unobstructed and visualized. The most common enema is a Fleet Enema (see Skill 6-19).

Note: The nurse will be assisting the physician or qualified practitioner unless the nurse has received education and training in techniques of flexible sigmoidoscopy. Gastrointestinal nurses can only perform this procedure for the purpose of colorectal cancer screening.

> ASSESSMENT

1. Auscultate the abdomen for bowel sounds. This will allow the nurse to determine if the client is experiencing any alteration in gastrointestinal function.
2. Assess client's understanding of the procedure. This will enable the nurse to determine possible educational needs immediately prior to procedure.
3. Assess client's compliance with bowel preparation prior to the start of the procedure. This will enable the nurse to determine if the bowel is free of stool to allow visualization of colon.
4. Inspect the perianal skin. This will allow the nurse to determine if there is a preexisting alteration in skin integrity.

> DIAGNOSIS

- | | |
|-------|-----------------------------------|
| 1.6.1 | Risk for Injury |
| 9.1.1 | Pain |
| 9.3.1 | Anxiety, related to the procedure |
| 9.3.2 | Fear related to the procedure |

> PLANNING

Expected Outcomes:

1. The client will tolerate the procedure without undue fear or anxiety.
2. The client will not experience pain related to the procedure.

3. The client will not experience any injury related to the procedure.
4. The procedure will successfully visualize the client's distal colon, rectum, and anal canal.

Equipment Needed (see Figure 11-12-2):

- Rigid or flexible proctosigmoidoscope
- Water-soluble lubricant
- Clean gloves



Figure 11-12-2 Endoscope



Estimated time to complete the skill:

10–15 minutes

> CLIENT EDUCATION NEEDED:

1. Provide the client with an explanation of procedure, including any sensations the client may experience.
2. Explain the reasons for not eating or drinking after midnight the night before.
3. Instruct the client regarding the bowel preparation procedure.
4. Go over the positions the client may be asked to assume during the procedure.
5. Tell the client when he can expect the test results and who will be giving the results to him.
6. Explain rationale for the initial and follow-up examinations, if required.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

1. Obtain informed consent.
2. Wash hands.
3. Assemble equipment (see Figures 11-12-3 and 11-12-4).



Figure 11-12-3 Endoscopy procedure room with endoscopy equipment

RATIONALE

1. Invasive procedures require that the client understands the purpose, risks, benefits, and client permission.
2. Practices aseptic technique.
3. Assures that all equipment is ready to use.



Figure 11-12-4 Assemble equipment.

4. Explain procedure to client.

4. Decreases client's anxiety in relation to an invasive process.

continues

- Instruct client to undress and don hospital gown. Cover to protect privacy. Place clothes under gurney (see Figure 11-12-5) or as per hospital policy.



Figure 11-12-5 Place the client's clothes under the gurney.

- Apply monitoring equipment.
- Position client in the knee-chest position. If client is aged, weak, or ill, the left lateral Sim's position is acceptable.
- Assist or secure assistance helping the client maintain position (see Figure 11-12-6).
- Apply gloves.
- Continue to explain the procedure to the client as it progresses (see Figure 11-12-7).



Figure 11-12-7 The client is sedated but aware. The nurse explains the procedure to the client as it progresses.

- Apply lubricant to a gloved finger.
- Insert lubricated finger into rectum to check for possible obstructions prior to insertion of rectal tube.

- Keeps clothes safe and keeps clothes from interfering with procedure.



Figure 11-12-6 Note how the nurse is assisting the client to maintain the proper position.

- Allows close monitoring of the client during the procedure.
- Allows the sigmoid colon to straighten.
- Allows the procedure to proceed without interruption.
- Practices aseptic technique.
- Provides information to the sedated but aware client.



Figure 11-12-8 The endoscope is inserted in the anal canal.

- Protects fragile mucosa from injury.
- Prevents possible injury to bowel mucosa from a blind entry.

- | | |
|---|---|
| <p>13. Lubricate end of endoscope.</p> <p>14. Gently insert endoscope into anal canal and gradually increase depth of insertion into colon (see Figure 11-12-8).</p> <p>15. Examine the distal sigmoid colon, rectum, and anal canal as required (see Figure 11-12-9).</p> | <p>13. Facilitates entry of endoscope into anal canal.</p> <p>14. Facilitates slow access into colon and allows for visualization of mucosa.</p> <p>15. Completes the purpose of the exam.</p> |
|---|---|
-
- | | |
|--|---|
| <p>16. Slowly remove endoscope at completion of exam.</p> <p>17. Place endoscope in appropriate container and cleaning solution.</p> <p>18. Remove soiled gloves and place in appropriate receptacle.</p> <p>19. Wash hands.</p> | <p>16. Prevents injury to mucosa and client discomfort.</p> <p>17. Practices infection control standards.</p> <p>18. Practices infection control standards.</p> <p>19. Practices aseptic technique.</p> |
|--|---|



Figure 11-12-9 The intestinal tract is examined.

> EVALUATION

- The client tolerated the procedure without undue fear or anxiety.
- The client did not experience pain related to the procedure.
- The client did not experience any injury related to the procedure.
- The procedure successfully visualized the client's distal colon, rectum and anal canal.

> DOCUMENTATION

Nurses' Notes

- Describe client's tolerance of procedure.
- Document insertion and removal of endoscopic tube.
- Note appearance of perianal skin, if alteration was observed.
- Describe bowel mucosa, if the procedure was performed by nurse.



▼ REAL WORLD ANECDOTES

A 50-year-old white male calls into the office to schedule his annual physical and is informed that a proctosigmoidoscopy will be performed as part of his examination. He quickly becomes very agitated and anxious and starts to cancel the appointment. The receptionist keeps him on the line until the consulting nurse can speak to him about the procedure. He is still very anxious. The consulting nurse offers to fax him information and makes an appointment with him the next day to answer his questions over the phone. As a result of the nurse's supportive intervention, the client completes his exam.

> CRITICAL THINKING SKILL

Introduction

Look at a scenario in which the client is experiencing changes in bowel habits and rectal bleeding. She needs this procedure but is dissuaded by her preprocedure care.

Possible Scenario

A 50-year-old white female has been experiencing rectal bleeding on and off for 6 months that she attributes to hemorrhoids. Her physician schedules a proctosigmoidoscopy to rule out rectal cancer. The client is seen by the nurse to be instructed on bowel preparation and diet prior to the procedure.

Possible Outcome

The consultation with the nurse is less than optimal. The nurse is rushed and starts to discuss the enema regimen in the hall as she is walking with the client back to her office. She is carrying the Fleet Enema box and ges-

turing the motions of insertion. Her voice carries to other people in the hall. Once in her office, she uses jargon and hurries the meeting. The client is embarrassed and confused. The client cancels the test the next day, saying that she needs emergency dental work and will reschedule in a few months.

Prevention

An astute nurse would realize that this is the client's first experience with a proctosigmoidoscopy and that the client is fearful of a possible diagnosis of rectal cancer. The client is also experiencing knowledge deficit in relation to the procedure. Providing instruction about the procedure and the bowel preparation in a private and supportive setting helps to decrease the client's anxiety related to the procedure. By decreasing the client's anxiety, the procedure will be less uncomfortable. The client should also be told when to expect the results of the test, and her concerns should be heard and discussed.

▼ VARIATIONS



Geriatric Variations:

- Older or debilitated clients may be unable to assume the knee-chest position but can be placed in a Sim's position for the examination.



Pediatric Variations:

- Small children require different sized scopes.



Home Care Variations:

- Home care nurses must be made aware of the client's procedure so that they may reinforce teaching and be prepared for the client's having some residual diarrhea or slight bleeding after the procedure.



Long-Term Care Variations:

- Long-term facility staff must be made aware of the client's procedure so that they may reinforce teaching and be prepared for the client's having some residual diarrhea or slight bleeding after the procedure.

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

Missing the cues of the client's anxiety and/or fear level.

Ask Yourself:

How do I prevent this error?

▼COMMON ERRORS—ASK YOURSELF *continued***Prevention:**

Ask client questions appropriate to ascertaining both knowledge and comfort level for having this procedure performed (i.e., “Have you ever had this procedure done before?” “Do you understand how the doctor will be examining your colon?” “Can you repeat to me how you will be doing the bowel prep?”). Always take the time to speak with the client in an unhurried manner and use active listening skills.

> NURSING TIPS

- Use visual aids when instructing client on the procedure.
- Provide client with a quiet place to rest following the procedure.
- Provide client with written instructions on bowel preparation and signs/symptoms to call the physician or qualified practitioner.

SKILL 11-13

Assisting with Arteriography

Susan Boyce Gilmore, MN, RN, CCRN

KEY TERMS

Angiogram
Aortogram
Arteriogram

Coronary angiogram
Doppler
Vascular study



> OVERVIEW OF THE SKILL

An arteriogram is a radiologic procedure intended to provide morphologic visualization of the arterial lumen. Arteriograms are one type of angiogram (a radiologic study of blood vessels), but the terms arteriogram and angiogram are often used interchangeably. Arteriograms are usually performed by a radiologist and involve inserting an intra-arterial catheter percutaneously (see Figure 11-13-2) and advancing it with fluoroscopic visualization to a position near the arterial bed of interest. Radiopaque contrast material is injected (see Figure 11-13-3) to permit optimal visualization of the arteries (see Figure 11-13-4). Arteriograms are the most commonly used diagnostic procedures to determine the presence and extent of



Figure 11-13-2 An intra-arterial inserted percutaneously



Figure 11-13-3 Radiopaque contrast material is injected.



Figure 11-13-4 The arteries are visualized.

arterial obstruction, occlusion, aneurysm formation, or site of bleeding. However, arteriograms may be combined with therapeutic measures such as balloon dilation of a stenosed artery and/or stent insertions (intended to “splint” or hold open the problematic section of artery). Arterial circulations frequently studied with arteriographic procedures include carotid or cerebral circulations, the aorta (aortogram), renal arterial beds, the coronary circulation (coronary arteriogram or angiogram), and femoral and distal lower extremity circulations.

Because vascular disease or trauma can occur in many body areas, variations will be encountered in artery access sites and arterial beds studied. Access sites must be near the body surface and of sufficient caliber and alignment to permit passage of the catheter to the arterial bed of interest. Sites encountered are femoral arteries, brachials, and rarely, the carotid arteries. The access site variations need to be considered to determine if shaving or other site preparation is to be done by the nurse.

Postprocedure care will follow the same general guidelines, with some variations in size and amount of pressure applied and methods used to secure pressure dressings. Variations in technique to effect relative immobilization of the access site will also be seen and may include use of sandbags over accessed site (groin), along involved limb to prevent movement; use of sheets secured over knee on side of access artery and tucked firmly beneath the mattress to prevent flexion of involved leg; and use of soft restraint near ankle of involved limb to prevent flexion of hip or knee. Similar restraint devices are used for brachial access sites. Occasionally, the nurse may encounter a commercial pressure device such as Fem-stop that is used to apply pressure directly over the artery puncture site. These devices are used for only brief periods in order to bring about hemostasis and usually require specific training in application, usage, and removal. These devices are usually applied immediately postwithdrawal of the catheter and are removed prior to return of the client to the nursing unit.

> ASSESSMENT

1. Confirm the client’s identity, his knowledge level concerning the procedure, and purpose for the arteriogram. **Proper identification is a priority safety measure; client knowledge must be assessed so that a specific plan may be made to provide necessary teaching that enhances client comfort and allays anxiety.**
2. Determine the need for informed consent and the need for signatures of client and witness. **Arteriography is an invasive procedure and is associated with risks that must be explained to the client by his physician or qualified practitioner.**
3. Determine allergy or reaction to iodine or contrast agents. **Products containing iodine or similar agents are frequently used to prepare the skin over IV and artery access sites. Radiopaque contrast agents are used in the study, and the client may have to be premedicated with medications such as diphenhydramine or methylprednisolone to decrease allergic response to the contrast agents.**
4. Determine baseline vital signs, if these have not been obtained previously. **Baseline vital signs, including temperature, are necessary to determine change.**
5. Determine the presence, characteristics, and symmetry of peripheral pulses, particularly the brachials, radials, femorals, and dorsalis pedis and posterior tibial pulses. **Baseline pulse determinations are imperative for postprocedure comparisons.**
6. Determine need for baseline renal function tests [blood-urea-nitrogen (BUN) and creatinine] prior to the study. **Use of radiopaque contrast agents may be nephrotoxic, particularly to a client with existing, impaired kidney function, and special attention to hydration needs is a priority for clients with impaired renal function.**
7. Determine last oral intake of client. **Oral intake of fluids and a “light” meal is often permitted before angiography, but heavy recent intake may require a delay in the procedure if a lengthy procedure is planned or client is to be sedated, thus increasing risk of aspiration.**

> DIAGNOSIS

- | | |
|-------|---|
| 8.1.1 | Knowledge Deficit, regarding planned arteriographic procedure |
| 9.3.1 | Anxiety, related to procedure mechanics or to possible resulting diagnosis and treatment |
| 9.1.1 | Acute Pain, related to decreased perfusion secondary to arterial obstruction or insufficiency |

> PLANNING

Expected Outcomes

1. Client will be able to identify general purpose and nature of procedure.
2. Client will be able to verbalize presence of anxiety and will inform staff if he is feeling unable to cope with the anxiety or if anxiety symptoms are increasing.
3. Client will be able to verbalize any pain and obtain a level of relief that is tolerable for rest/sleep following pain interventions.

Equipment Needed:

Preprocedure

- Towel, washcloth, warm water, disposable razor (if shaving over access site is desired and site is known)
- Indelible marking pen for marking pulse sites on distal extremities (if desired)

Postprocedure

- Sand bag(s) or other mobility-restricting device such as soft restraints
- Standard monitoring equipment for vital signs, including pulse oximeter and pulse-doppler, if needed



Estimated time to complete the skill:

Preprocedure: 10–15 minutes

Postprocedure: 4–8 hours

> CLIENT EDUCATION NEEDED:

1. Inform the client that the procedure is invasive and the discomfort is similar to that of having a large IV started.
2. Inform the client that there is a relatively low level of pain, usually on placement of the vascular catheter.

3. Inform the client that the procedure is usually performed while the client is awake and able to follow simple directions, but the client may be sedated or treated with pain medications.
4. Inform client that he may feel warm or flushed at the time of dye administration and may briefly experience a metallic, salty taste.
5. Inform the client to alert persons in the room if he is experiencing pain or difficulty at any time.
6. Inform the client that he will be transported to and from the radiology department via a stretcher.
7. Inform the client that a tight, compressive bandage may be placed over the artery access site and he may have to lie with accessed site in a straight position for several hours (if located in groin area or inside the elbow).
8. Inform the client that vital signs, pulses, and the insertion site will be monitored frequently for several hours.
9. Emphasize the importance of resting with minimal flexion of involved artery access site for the prescribed number of hours following the procedure. Inform client that you will assist with back rubs, turning side to side within prescribed limits, with positioning for meals, drinking, and elimination concerns.
10. Emphasize the intake of liquids in the immediate postprocedure period (4 to 8 hours). Explain the diuretic action of the contrast materials used and the need to drink (or for IV fluids) to ensure hydration and to prevent hypotension.
11. Advise the client that assistance will be required the first few times he gets out of bed.
12. Ask the client to report any unusual sensations such as pain, numbness, or temperature variations.
13. If doppler is used to monitor pulses, either before or after the procedure, reassure the client that the equipment makes use of sound waves that are totally painless.

IMPLEMENTATION—ACTION/RATIONALE

ACTION

RATIONALE

1. Confirm identity.
2. Explain procedure and rationale for procedure.
3. Confirm the presence of a signed consent.

1. Ensures client safety.
2. Allays anxiety and promotes cooperation.
3. Ensures physician or qualified practitioner has informed client of expected benefits and risks of procedure and that client has consented.

- | | |
|---|--|
| <p>4. Confirm presence of any allergies, particularly to iodine or contrast agents, and label chart prominently.</p> <p>5. Wash hands.</p> <p>6. Clip and shave arterial access site, if site is known and part of protocol.</p> <p>7. Obtain baseline vital signs.</p> <p>8. Obtain baseline pulses, characteristics, and mark sites with X.</p> <p>9. Arrange for transport to radiology department.</p> <p>10. The procedure will be performed by a physician as follows:</p> <ul style="list-style-type: none"> • A small incision is made in the groin or the arm. • Using a fluoroscope to visualize the path, a radiopaque guidewire is inserted into the blood vessel through the skin, and threaded through the access site to the area to be examined. • A catheter is threaded over the guidewire and the guidewire is removed. • Contrast dye is injected. • After evaluating the results, the radiologist and the client's physician will decide on a course of treatment. That treatment may be done at this time and may include angioplasty or placement of a stent. Other interventions may include open heart surgery at a later time, management using medications, or continued observation. • Following the evaluation and treatment, the catheter is removed and pressure is applied to the insertion site. <p>11.</p> <ul style="list-style-type: none"> • Gather postprocedure equipment and position near client room or bed. | <p>4. Allergic reactions to contrast “dyes” are not uncommon. Premedication with diphenhydramine or methylprednisolone or use of other contrast agents may be required.</p> <p>5. Reduces the transmission of microorganisms.</p> <p>6. May be required for access and saves expensive radiology suite time.</p> <p>7. Baseline determinations are necessary for postprocedure comparisons.</p> <p>8. Baseline determinations of peripheral pulses are necessary for postprocedure comparisons; marks assist in locating pulses if client is hypotensive or complication occurs. Frequent “downstream” determination of pulses is necessary to immediately detect and treat sudden occlusions by spasm or clot or other pathologic problem.</p> <p>9. Transport should be arranged according to institution policy.</p> <p>10.</p> <ul style="list-style-type: none"> • Provides access to the artery. • Allows proper placement of the guidewire. • Guides the catheter to the area to be evaluated. • Makes the arteries and any stenosis visible on the fluoroscope. • Making the decision before the catheter is removed allows some interventions to be performed promptly. • Application of pressure prevents arterial bleeding. <p>11.</p> <ul style="list-style-type: none"> • Postprocedure care may require use of pulse oximeter, sandbags, 4 × 4 gauze, and |
|---|--|

limb-restraint devices to maintain unflexed position of limb used to access artery. Accessed limb should remain unflexed to prevent flow-obstructing clot formation, permit hemostasis, and lessen risk of complications such as pseudo-aneurysm formation.

12. Wash hands and apply gloves, as needed.

13. Obtain vital signs, level of consciousness, and a pain assessment. Assess the vascular access site and downstream circulation adequacy by performing downstream pulse checks and assessing for warmth, sensation, blanching with pressure and capillary refill.

12. Reduces the transmission of microorganisms.

13. Ensures client safety and comfort. Monitoring arterial site is vital assuring continued hemostasis. Downstream pulse checks give clues to continued adequacy of circulation beyond the manipulated segment of artery.

> EVALUATION

- The client is able to identify the general purpose for his arteriogram and describe the general nature of the procedure.
- The client is able to alert caregivers to anxiety or other distress before, during, and after the procedure.
- The client verbalizes pain and obtains relief that is tolerable for rest/sleep following interventions.

> DOCUMENTATION

Nurses' Notes

- Document vital signs pre and postprocedure.
- Note the presence of peripheral pulses, equality and strength, pre and postprocedure.
- Record the color and temperature of the client's extremities, pre and postprocedure.
- Note any site preparation.
- Record the condition of the dressing at the insertion site and any weights or pressure applied.

Medication Administration Record

- Record medications given before and after the procedure for pain or anxiety.



▼ REAL WORLD ANECDOTES

Frances Baird, a 73-year-old female, returned to the nursing unit following an aortogram and bilateral femoral arteriogram. Her blood pressure is noted to be 94/58 on admission to the unit, all pulses are palpable, 2+ , and her limbs are slightly cool but blanch with pressure and refill in less than 2 seconds. She admits "some" discomfort at the right femoral arterial access site; the dressing is dry and intact; and the femoral pulse is 2+. She has an IV saline lock in place and patent in her left forearm. She reports nausea and refuses any oral fluids. At 1 hour postreturn to the unit, all findings are unchanged, except her blood pressure is now 88/54. The nurse suspects that this hypotension may be caused by relative hypovolemia, since she gives history of little intake in 24 hours and has received a contrast agent during the arteriographic procedure. She takes only sips of water and reports nausea remains. The nurse phones the physician with a report of client condition. After obtaining an order, the nurse administers 1 liter of normal saline, begins the infusion of normal saline at approximately 100 cc/hour, medicates the client for nausea, and monitors intake and output.

> CRITICAL THINKING SKILL

Introduction

The hardest part of the procedure is often holding still afterward.

Possible Scenario

Your 71-year-old male client has just returned to the floor after an arteriogram. You check the arterial access site in his groin. The dressing is secure and a sand-

bag is in place over the dressing. He is awake but sleepy and not in the best of moods. He complains that the last time he had to lie still on his back for 8 hours his back hurt for a week from the “lousy hospital bed.” His wife and two co-workers are with him in the room, joking with him and tossing a stuffed animal back and forth. When you come back for a check in 15 minutes, the co-workers are gone. The wife is reading a magazine by the window. The client is laying on his left side, in a fetal position, snoring. The sandbag is on the floor.

Possible Outcome

You wake him and check his dressing, which is soaked with blood. You apply direct pressure and, when the bleeding has stopped, reapply the pressure dressing and

the sandbag. You notify the nurse practitioner and instruct the client and his partner on the importance of remaining supine with the leg straight. The next week, the client comes by after his outpatient visit to show you the bruise, which extends from his groin to below his knee.

Prevention

In this case, education and understanding for both the client and the partner might have improved his compliance. Recognizing and intervening to increase comfort, including distraction, positioning, wrinkle-free linen, or other padding or skin protection, may have helped him tolerate the period of inactivity. Regular reminders and supportive statements when he was complying may have helped him stay motivated to maintain this uncomfortable position.

▼ VARIATIONS



Geriatric Variations:

- Geriatric skin is thin and more fragile. Geriatric clients may have significant bruising at the insertion site.



Pediatric Variations:

- It is difficult for parents to have an invasive procedure performed on their child. Provide information and support for the parent. Base your teaching on the parents' most pressing concerns. These may include how long the procedure will last, how the child will be sedated, any pain the child may experience, and when the parent will be able to be with the child. Make sure the parents have the opportunity to ask questions directly with appropriate staff members prior to the procedure.



Home Care Variations:

- This procedure is not done in the home care setting.
- Arteriography and related procedures can cause anxiety and fear. The home care setting can provide a good opportunity for teaching and support for both the client and family members prior to the procedure.
- The caregiver should be aware of complications that may occur postprocedure. These include bleeding, reduced circulation distal to the insertion site, embolism, and bruising at the catheter insertion site.



Long-Term Care Variations:

- This procedure is not done in the long-term care setting.
- Staff providing long-term care should be aware of complications that may occur postprocedure. These include bleeding, reduced circulation distal to the insertion site, embolism, and bruising at the catheter insertion site.

▼ COMMON ERRORS—ASK YOURSELF

Common Error:

Pressure dressings may be so tight as to impede arterial flow and cause diminished pulses downstream. Or pressure dressings may be too loose, permitting “oozing” of blood from the artery into tissues and subsequent hematoma formation. Frank surface oozing of blood into dressing may be seen or frank pulsatile bleeding may be apparent.

continues

▼COMMON ERRORS—ASK YOURSELF *continued***Ask Yourself:**

How do I prevent this error?

Prevention:

Be careful when applying pressure dressings. If the dressing is found to be too tight, release some pressure caused by dressing or device while maintaining access site hemostasis and palpate/dopple for pulses again. Two persons may be necessary. Notify physician or qualified practitioner for confirmed absent or diminished pulse and document steps taken and person notified. If the dressing is too loose, treat oozing or bleeding by reapplication of direct pressure (manual) and reapplication of pressure dressing once ooze or bleeding has been controlled. Notify physician or qualified practitioner and document steps taken and person notified.

> NURSING TIPS

- Marking the site of downstream pulses prior to the procedure or on first postprocedure assessment facilitates subsequent assessments with minimal disturbance of the client. Rate the pulse (downstream) for quality according to the institution's protocol in order to ensure use of same scale in comparisons of pulse quality (0 to +4 is a common scale).
- Offer/encourage oral fluid intake with each site check/vital sign check. Offer fluid of client's preference.
- Encourage family members to stay with client while he is relatively immobilized. Use hip flexion limits and knee-gatch flexion limits on electric beds if designed controls are available on bed control panel.

SKILL 11-14

Positron-Emission Tomography Scanning

Kathryn Lilleby, RN

KEY TERMS

Glucose
Isotopes

PET

Positron-emission
tomography
scanning

Radioisotopes



> OVERVIEW OF THE SKILL

Positron-emission tomography (PET) offers a way to study the metabolism occurring in an organ, instead of just the anatomy of the organ. The PET scans are most commonly used to study the brain and the heart when an invasive procedure is not possible. In a PET scan, isotopes are injected into a client. These isotopes are absorbed into the tissue and then emit radioactivity in the form of positrons (electrons with a positive charge) that are converted into a calculation of energy emitted and a color image by a computer. A short-lived radionuclide such as oxyglucose is either inhaled by the

client or injected intravenously. When the brain is being imaged, the client may be asked to perform basic mental exercises. These help stimulate the brain.

Clients need to be able to lay still for 60 to 90 minutes for the test and might need to avoid taking certain medications and other substances such as alcohol, caffeine, sedatives, tranquilizers, or tobacco in the 24 hours prior to the test. Diabetic clients should ask their physicians or qualified practitioners about special dietary instructions for the PET scan preparation.

> ASSESSMENT

1. Assess the client's knowledge of the purpose and plan of the procedure so they will cooperate and not be anxious.
2. Review the client's signature on the informed consent form. It is a legal requirement of the institution.
3. Assess the client's use of alcohol, caffeine, sedatives, tranquilizers, or tobacco within 24 hours of the test. These substances can alter test results.
4. Assess the client's veins for adequate venous access for injection of the radioisotope.

5. Assess for the possibility of pregnancy if the client is female, as women who are pregnant should not have a PET scan.
6. Assess recent glucose intake, as PET scans use glucose uptake as a marker and the client's blood sugar must be as low as safely possible.

> DIAGNOSIS

- 9.3.1 Anxiety
- 9.3.2 Fear
- 8.1.1 Knowledge Deficit regarding the procedure

> PLANNING**Expected Outcomes:**

1. The client will tolerate the procedure without anxiety.
2. The client will maintain the required positions during the procedure.
3. Successful images will be obtained for diagnosis.
4. The client will not experience any adverse effects secondary to being NPO.

Equipment Needed (see Figure 11-14-2):

- Band-Aid or gauze dressing for IV site
- IV setup and materials, or inhaler



Estimated time to complete the skill:
60–90 minutes

> CLIENT EDUCATION NEEDED:

1. The client should be taught the rationale for the procedure and how it will be performed. Provide written or illustrated instructions about the procedure.
2. The client should be instructed not to use alcohol, caffeine, sedatives, tranquilizers, or tobacco for 24 hours before the test.
3. The client should void just prior to the procedure since he will not be able to move during the lengthy procedure.

4. The client may be asked to perform several mental exercises during a brain PET scan.
5. Prepare the client with sample questions or mental exercises he may be asked to perform if undergoing a brain PET scan.
6. Reassure the client that the test is not painful except where the IV needle is inserted.
7. Remember that the test takes 60 to 90 minutes and the client will be asked to void before it starts.
8. Explain the reason to keep the client NPO prior to the test, including IV fluids that contain glucose.
9. The client will be able to return home after the procedure if he is not hospitalized.



Figure 11-14-2 Positron-emission tomography scanner

IMPLEMENTATION—ACTION/RATIONALE**ACTION**

1. Wash hands.
2. Cover the scanner bed with a clean sheet, (see Figure 11-14-3) and prepare a pillow.

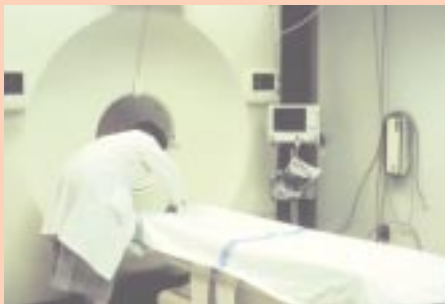


Figure 11-14-3 Cover the scanner bed with a clean sheet.

RATIONALE

1. Reduces the transmission of microorganisms.
2. Provides comfort and hygiene.



Figure 11-14-4 Radioisotope containers

3. Provide teaching regarding the PET scan and the scanner.
4. Ask client if they have used alcohol, caffeine, sedatives, tranquilizers, or tobacco in the last 24 hours. Ask the client when they last ate or drank.
5. Instruct client to void.
6. Start an IV or perform venipuncture. Do not use IV fluids that contain glucose. A small amount of radioactive material is administered through the IV or venipuncture 30-45 minutes prior to the procedure (see Figure 11-14-4). A blood sample or blood samples are collected from the other arm.
7. Assist client into the scanning bed (see Figure 11-14-5).
3. Reduces anxiety and fear of unknown.
4. These substances can alter test results.
5. Ensures client comfort and avoids movement or interruption during procedure.
6. Using glucose in the IV will alter the test results. Radioactive material enables PET images to be created. Blood samples are used to obtain information on the amount of radioactive material in the blood.
7. Provides comfort for the client and correct positioning for study.



Figure 11-14-5 Assist the client onto the scanning bed.



Figure 11-14-6 Secure the client.

8. Secure the client and apply a thermal plastic mask to reduce head movement, or other stabilizing devices, as needed or ordered (see Figure 11-14-6).
9. Administer radioactive material by inhaler or IV injection as ordered (see Figures 11-14-7 and 11-14-8).
10. The PET scan generally takes 1 to 2 hours (see Figure 11-14-9), during which time the client must lie quietly in the PET scanner.
11. If the brain is being scanned, ask the client to perform various mental exercises such as reasoning and remembering. The client's
8. Helps the client hold the proper position for long periods of the scan.
9. Orders differ for different procedures. Injections or inhalations of additional radioactive material allow the test to proceed as ordered.
10. Assures that the test is being accurately performed.
11. Measures brain activity changes as various areas of the brain are used.



Figure 11-14-7 Have additional medications or injections prepared and ready.



Figure 11-14-8 Administer additional radioactive material as required.



Figure 11-14-9 PET scan output images



Figure 11-14-10 Dispose of IV equipment and syringes in radioactive waste containers.

eyes may be covered and the client's ears plugged after the injection to minimize sensory stimulation.

- | | |
|---|---|
| <p>12. After the test is completed, remove the IVs, unless otherwise ordered by the physician or qualified practitioner, and apply gauze dressing or Band-Aid.</p> <p>13. Assist the client to a sitting and then standing position.</p> <p>14. Encourage client to drink fluids.</p> <p>15. Dispose of all IV equipment or syringes in appropriate radioactive waste containers (see Figure 11-14-10).</p> <p>16. Wash hands.</p> | <p>12. Applies pressure to prevent bleeding.</p> <p>13. Decreases risk of orthostatic hypotension.</p> <p>14. Promotes excretion of radioactive material from body.</p> <p>15. Equipment is contaminated with radioactive isotopes.</p> <p>16. Reduces the transmission of microorganisms.</p> |
|---|---|

> EVALUATION

- Evaluate client's status and comfort after the procedure.
- Assess the IV sites for bleeding or hematoma.

> DOCUMENTATION

Nurses' Notes

- Record the date, time, length, and place the procedure was done.
- Note the client's tolerance of the procedure.
- Note the client's status after the procedure.

Medication Record

- Record the date, time, and route the radioactive material was administered.



▼ REAL WORLD ANECDOTES

Mrs. Ellis is a 72-year-old woman who has had symptoms of congestive heart failure. She is not able to have an invasive procedure to check the function of her left ventricle so the physician orders a PET scan. She is scheduled to have the test at 11:00 AM. She was told not to eat breakfast prior to the PET scan and she abstains from eating. However, part of her morning routine is to take aspirin for her arthritis. She had specifically asked about aspirin and was told she could take it prior to the test. What Mrs. Ellis and the nurse did not realize was that the brand of aspirin Mrs. Ellis used contained caffeine. Mrs. Ellis reported that she had taken aspirin prior to the procedure but did not note the caffeine. The PET scan results were obviously erroneous and Mrs. Ellis had to undergo the inconvenience and expense of a second PET scan due to the error.

> CRITICAL THINKING SKILL

Introduction

Alcohol, caffeine, sedatives, tranquilizers, or tobacco ingested within 24 hours prior to the test can alter the test results due to changes in metabolism.

Possible Scenario

An older client did not understand the written instructions he was given a week before the PET scan and he took his sleeping pill as usual the night before his appointment. He did not realize that a sleeping pill was the same as a sedative or tranquilizer.

Possible Outcome

When the client was assessed by the nurse before the test, he listed all the pills he had taken in the last 24 hours, including the sleeping pill. The test was postponed until the following day and the nurse instructed him to omit that evening's dose of the sedative.

Prevention

The written instructions could have specific names of medications rather than classifications. The nurse giving the instructions could review all of his medications at the time of scheduling the test.

▼ VARIATIONS



Geriatric Variations:

- Elderly clients may have impaired hearing or vision, which might make it difficult to understand the purpose of the test and to cooperate with the test.
- Elderly clients may have poor venous access and fragile veins. Care must be taken when giving IV medications.
- Elderly clients who are restless, confused, or in pain might find it difficult to lie still, or may find the enclosed space to be too confining. If you suspect the client might have trouble cooperating for the length of the procedure, discuss this concern with the physician or qualified practitioner before beginning the test.

continues

▼ VARIATIONS *continued*



Pediatric Variations:

- Children may need distraction so they will be able to lie down for 60 to 90 minutes. Age appropriate recorded stories or music may help.
- Children may need sedation so they can relax during the procedure. Double check that this is a medication that will not alter the test results.
- Children will need careful placement of an IV so it can be used for the PET scan.
- Children may be frightened of the equipment or confined space. Take time to show the child the equipment and to explain the procedure. Answer any questions.



Home Care Variations:

- *Not applicable.*



Long-Term Care Variations:

- *Not applicable.*

▼ COMMON ERRORS—ASK YOURSELF

Possible Error:

While attempting to inject the isotope, the nurse was unable to aspirate blood. The test had to be delayed while a new IV was started.

Ask Yourself:

How do I prevent this error?

Prevention:

Assess the venous access before starting the test. Choose the optimal location to start the IV. If this error does occur, start a new IV and be sure it remains patent. A slow infusion of normal saline may be required to keep the vein open.

> NURSING TIPS

- Be sure venous access will allow for infusion of the isotope and drawing blood samples.
- Use pillows, rolled blankets, or towels to increase client comfort during the test.
- Do not use IV fluids that contain glucose as this will interfere with the test results.

REFERENCES

CHAPTER 1

- Allison, J., Tekawa, I., Ransom, L., & Adrian, A. (1986, January 18). A comparison of fecal occult-blood tests for colorectal-cancer screening. *New England Journal of Medicine*, 334, 155–159.
- American Diabetes Association. (1997). Bedside blood glucose monitoring. *Diabetes Care*, 20, (suppl. 1), S53.
- Anderson, M. D. (1996). *Fecal occult blood test useful in screening for colorectal cancer*. *Oncolog*, 41(3). <http://audumla.mdacc.tmc.edu/~oncolog/>
- Bayne, G. C. (1997). How sweet it is: Glucose monitoring equipment and interpretation. *Nurse Manager*, 28 (9), 52–54.
- Cowan, T. (1997). Blood glucose monitoring devices. *Professional Nurse*, 12 (8), 593–596.
- DeLaune, S. C., & Ladner, P. K. (1998). *Fundamentals of nursing: Standards and practice*. Albany: Delmar.
- Greendyke, R. M., & Gifford, R. F. (1996). Bedside blood glucose testing and controlling diabetes mellitus. In letters, *Laboratory Medicine*, 27 (9), 565.
- Kestel, F. (1996). What's new in blood glucose meters. *Nursing* 96, 26 (8), 24.
- Martin, S., Jensen, R., Daly, L., Jergensen, C., Johnson, M. B., & Buell, T. (1997). Comparison of two methods of bedside blood glucose screening in the NICU: Evaluation of accuracy and reliability. *Neonatal Network*, 16 (2), 39–43.
- Quinn, L. (1998). Glucose monitoring in the acutely ill patient with diabetes mellitus. *Critical Care Nursing Quarterly*, 21 (3), 85–96.
- Stenger, P., Allen, M. E., & Isius, L. (1996). Accuracy of blood glucose meters in pregnant subjects with diabetes. *Diabetes Care*, 19 (3) 268–269.

- Voss, E. M., Bina, D. M., McNeil, L. D., Johnson, M. L., & Cembrowski, G. S. (1996). Determining acceptability of blood glucose meters: Evaluating a blood glucose testing system. *Laboratory Medicine*, 27 (10), 679–682.

CHAPTER 2

- Association of Operating Room Nurses. (1990). Recommended practices: Surgical hand scrubs. *AORN Journal*, 52, 830–836.
- Blocker, W. P., Jr. (1992). Maintaining functional independence by mobilizing the aged. *Geriatrics*, 47 (1), 42–53.
- Bragg, T. L. (1996, July 1). An ergonomics program for the health care setting. *Nursing Management*, 27, 58–63.
- Charney, E., Zimmerman, K., & Walara, E. (1991). The Lifting Team. *AAOHN Journal*, 39 (5), 231–234.
- Cummins, R. O. (Ed). (1994). *Advanced cardiac life support*. Dallas, TX: American Heart Association.
- Dettenmeier, P. (1994). Emergency measures for life support. In *Clinical nursing skills & techniques* (4th ed., pp. 469–484). St. Louis, MO: Mosby.
- Garner, J. S., & Favero, M.S. (1986). CDC guideline for handwashing and hospital environmental control. *Infection Control*, 7, 231–235.
- Guildner, C. W. (1976). Resuscitation-Opening the airway: A comparative study of techniques for opening an airway obstructed by the tongue. *Journal of the American College of Emergency Physicians*, 5, 588–590.
- Kozier, B., Erb, G., Blais, K., Johnson, J. Y., & Temple, J. S. (1993). *Techniques in clinical nursing* (4th ed.,

- pp. 791–811). Redwood City, CA: Addison-Wesley Nursing.
- Larson, E. (1995). APIC guideline for handwashing and hand antisepsis in health care settings. *American Journal of Infection Control*, 23, 251–269.
- Lee, C. J., & Bullock, L. J. (1991). Determining pulse for infant CPR: Time for a change. *Mil Med.*, 156, 190–191.
- Nettina, S. M. (1996). The Lippincott manual of nursing practice (6th ed., pp. 153–164). New York: Lippincott.
- Phillips, R. (1994, July 1). Fire prevention: Improving staff readiness. *Nursing Homes*, 43 (3), 31.
- Shugrue, D. T., & Larocque, K. L. (1996, October 1). Reducing restraint use in the acute care setting. *Nursing Management*, 27 (4), 32H.

CHAPTER 3

- Baumgart, S. (1987). Current concepts and clinical strategies for managing low birth weight infants under radiant warmers. *Medical Instrumentation*, 21, 23–28.
- Dossey, B. M., Keegan, L., Guzzetta, C. E., & Kolkmeier, L. G. (1995). *Holistic nursing: A handbook for practice* (2nd ed.). Gaithersburg, MD: Aspen Publishers.
- Engebretson, J., & Wardell, D. (1993). A contemporary view of alternative healing modalities. *Nurse Practitioner*, 18 (9), 51–55.
- Ferrell-Troy, A. T., & Glick, O. J. (1993). The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain. *Archives of psychiatric nursing*, 8 (3), 184–189.
- Guided imagery speeds surgical recovery. (1996, October 1). *USA Today Magazine*, 125.
- Helman, C. G. (1994). *Culture, health and illness: An introduction for health professionals* (3rd ed.). Woburn, MA: Butterworth-Heinemann.
- Lee, Y. (1996, May 1). Wired for pleasure (Transcutaneous electrical nerve stimulation used in dentistry) (Your healthy smile). *Prevention*, 48, 47–50.
- Lowe, T. (1992). Characteristics of effective nursing interventions in the management of challenging behavior. *Journal of Advanced Nursing*, 17, 1226–1232.
- Slater, V. E. (1995). Toward an understanding of energetic healing, part 1: Energetic structures. *Journal of Holistic Nursing*, 13, 209–224.
- Slater, V. E. (1995). Toward an understanding of energetic healing, part 2: Energetic process. *Journal of Holistic Nursing*, 13, 225–238.

CHAPTER 4

- Blomqvist, C. G., & Stone, H. L. (1983). Cardiovascular adjustments to gravitational stress. In J. T. Shepard & F. M. Abboud (Eds.), *Handbook of physiology* (pp. 1025–1063). Bethesda, MD: American Physiological Society.
- Christensen, M., Funnell, M., Ehrlich, M., Fellows, E., & Floyd, J. (1991). How to care for the diabetic foot. *American Journal of Nursing*, 3, 50–56.
- Dock, W. (1944). Evil sequelae of complete bed rest. *JAMA*, 125 (16), 1083–1085.
- Doering L. (1993). The effect of positioning on hemodynamics and gas exchange in the critically ill. *American Journal of Critical Care*, 2, 208–216.
- Gift, H. C., & Redford, M. (1992). Oral health and the quality of life. *Clinical Geriatric Medicine*, 8, 673–682.
- Habershaw, G. (1993). Foot lesions in patients with diabetes: Cause, prevention and treatment. In C. R. Kahn & G. C. Weir (Eds.), *Joslin's diabetes mellitus* (13th ed., pp. 962–969). Philadelphia: Lea & Febiger.
- Helm, A., & Mazur, D. J. (1989). Death notification: Legal and ethical issues. *Dimensions of Critical Care Nursing*, 8 (6), 382–385.
- Henderson, C. T. (1988). Nutrition and malnutrition in the elderly nursing home patient. *Clinical Geriatric Medicine*, 4, 527–547.
- Hoyt, J. D., (1996, June 1) A gentle approach: Interacting with a person who is semiconscious or presumed in coma. *Issues in Law & Medicine*, 12, 71–78.
- Johnson, S. (1983). Giving emotional support to families after a patient dies. *Nursing Life*, 1, 35–36.
- Kiyak, H. A. (1981). Psychosocial factors and dental needs of the elderly. *Special Care in Dentistry*, 1 (1), 22–30.
- Leash, R. M. (1996, May 1). Death notification: Practical guidelines for health care professionals (Human interactions in critical care). *Critical Care Nursing Quarterly*, 19 (14), 21
- Leatherwood, J. (1986). Tools for educating transcultural patients. *ANNA Journal*, 13 (1), 25–27.
- MacEntee, M. I. (1992). Oral health in old age: Practical problems and practical solutions. *Probe*, 26 (3), 116–117.
- Maklebust, J., & Sieggreen, M. Y. (1996, December 1). Attacking on all fronts: How to conquer pressure ulcers (Includes continuing education test). *Nursing*, 26 (7), 34.
- Miller, E., Deets, C., Miller, R. V., (1997, February 1). Nurse call systems: Impact on nursing performance

- (Consumer-focused improvements in quality). *Journal of Nursing Care Quality*, 11 (8), 36.
- Robichaud-Ekstrand, S. (1991). Shower versus sink bath: Evaluation of heart rate, blood pressure, and subjective response of the patient with myocardial infarction. *Heart and Lung*, 20 (4), 375–382.
- Ross, H. M., (1998, October 1). Jewish tradition in death and dying. *MedSurg Nursing*, 7 (5), 275.
- Tripp-Reimer, T. (1989). Cross-cultural perspectives on patient teaching. *Nursing Clinics of North America*, 24 (3), 613–618.
- Winslow, E. H., Lane, L. D., & Gaffney, F. A. (1984). Oxygen uptake and cardiovascular responses in patients and normal adults during in-bed and out-of-bed toileting. *Journal of Cardiac Rehabilitation*, 4 (8), 348–354.
- Winslow, E. H., Lane, L. D., & Woods, R.J. (1995). Dangling: A review of relevant physiology, research, and practice. *Heart and Lung*, 24 (4), 263–272.
- ## CHAPTER 5
- Adams, T. D., & Burleson, K. W. (1992, June). Continuous quality improvement in medication error reporting system. *P & T*, 943–951.
- Bayne, T., & Bindler, R. (1988). Medication calculation skills of registered nurses. *The Journal of Continuing Education in Nursing*, 19 (6), 258–262.
- Beyea, S. C., & Nicoll, L. H. (1996, January). Back to basics: Administering IM injections the right way. *American Journal of Nursing*, 96 (1), 34–35.
- Cohen, M. R., Senders, J., & Davis, N. M. (1994, February). 12 ways to prevent medication errors. *Nursing*, 94, 34–42.
- Cronin, Y. D. (1998, June). Detecting complications of epidural analgesia. *Nursing*, 28 (2), 94
- Dolan, J. (1991). *Clinical management through the nursing process* (pp. 608–660). Philadelphia: F. A. Davis Company.
- Fiesta, J. (1998, January). Legal aspects of medication administration (Integrated delivery systems issue). *Nursing Management*, 29 (2), 22.
- Food and Drug Administration. (1992). FDA safety alert: Needlestick and other risks from hypodermic needles on secondary I.V. administration sets—piggyback and intermittent I.V. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration.
- Girotti, M. J. T., Tierney, M. G., & Brown, S. J. (1988). Medication administration errors in an adult intensive care unit. *Heart and Lung*, 16 (4), 449–453.
- Hendrickson, M., Myre, D., Johnson, D., Matlak, M., Black, R., & Sullivan, J. (1990). Postoperative analgesia in children: A prospective study of intermittent intramuscular injection versus continuous intravenous infusion of morphine. *Journal of Pediatric Surgery*, 25 (2), 185–191.
- Jagger, J., Hunt, E. H., Brand-Elnaggar, J., & Pearson, R.D. (1988). Rates of needle-stick injury caused by various devices in university hospital. *New England Journal of Medicine*, 319, 284–288.
- Keill, P., & Johnson, T. (1993). Shifting gears: Improving delivery of medications. *Journal of Nursing Quality Care*, 7 (2), 24–33.
- Kelley, W. (1997). *Textbook of internal medicine* (3rd ed, pp. 971–982). Philadelphia: Lippincott-Raven.
- Murphy, G., Lawrence, W., & Lenhard, R. (1995). *American Cancer Society textbook of clinical oncology* (2nd ed., pp. 486–501). Atlanta, GA: American Cancer Society, Inc.
- Occupational Safety and Health Administration. (1991). *Occupational exposure to bloodborne pathogens: Final rule*. (Federal Register Publication No. 64004-182) 56 (256).
- Phipps, W., Woods, N., Long, B., & Cassmeyer, V. (1991). *Medical-surgical nursing concepts and clinical practice* (4th ed., pp. 550–565). St. Louis, MO: Mosby.
- Shapiro, B. A., Warren, J., Egol, A. B., et al. (1995). Practice parameters for intravenous analgesia and sedation for adult patients in the intensive care unit: An executive summary. *Critical Care Medicine*, 23 (9), 1596–1600.
- Skobel, S. (1996). Epidural narcotic administration: What nurses should know. *Oncology Nursing Forum*, 23 (10), 1555–1560.
- ## CHAPTER 6
- Barne, D. C., & Currier, J. (1995). What's that GI tube used for? *RN*, 58 (8), 45–49.
- Carroll, P. (1996). Spotting the difference in respiratory care. *RN*, 54 (5), 26–30.
- Cooke, D. M. (1997). Bowel elimination. In A. G. Perry & P. A. Potter (Eds.), *Clinical nursing skills & techniques* (4th ed., pp. 771–786). St. Louis, MO: Mosby.
- Daly, J. (1994). Meeting bowel elimination needs. In V. B. Bolander (Ed.), *Sorensen Luckmann's Basic nursing: A psychophysiologic approach* (3rd ed., pp. 1125–1154). Philadelphia: Saunders.
- Gray, M. (1992). Assessment of patients with urinary incontinence. In D. Doughty (Ed.), *Urinary and fecal incontinence* (pp. 47–94). St. Louis, MO: Mosby Year Book.

- Hampton, B., & Bryant, R. (Eds.) (1992). *Ostomies and continent diversions: Nursing management*. St. Louis, MO: Mosby Year Book.
- Kozier, B., Erb, G., Blais, K., Johnson, J. Y., & Temple, J. S. (1993). Administering enemas. In *Techniques in clinical nursing* (4th ed., pp. 671–674). Redwood City, CA: Addison-Wesley.
- Loan, T., Magnuson, B., & Williams, S. (1998, August). Debunking six myths about enteral feeding. *Nursing*, 28 (7), 43.
- Reilly, H. (1998). Enteral feeding: An overview of indications and techniques. *British Journal of Nursing*, 7 (9), 510–521.
- Rollins, H. (1997). A nose for trouble. *Nursing Times*, 93 (49), 66–67.
- Stark, J. (1997, February). Dialysis choices: Turning the tide in acute renal failure. *Nursing*, 27 (8), 41.
- Trout, S., Dattolo, J., & Hansbrough, J. (1993, August). Catheterization: How far should you go? *RN*, 52–54.
- Wolf, Z. R. (1996). Verifying GI tube placement. *Nursing* 96, 26 (1), 10.
- ## CHAPTER 7
- Ackerman, M.N. (1993). The effect of saline prior to suctioning. *American Journal of Critical Care*, 2, 322–330.
- Colliza, D. (1995, September). Dislodged chest tube. *Nursing* 95, 25 (9), 33.
- Ecklund, M. M., & Ackerman, M. H. (1995). Ask the experts. *Critical Care Nurse*, 15 (1), 88.
- Gordon, P. A., Norton, J. M., Guerra, J. M., & Perdue, S.T. (1997). Positioning of chest tubes: Effects on pressure and drainage. *American Journal of Critical Care*, 6 (1), 33–38.
- Hagler, D. A., & Traver, G. A. (1994). Endotracheal saline and suction catheters: Sources of lower airway contamination. *American Journal of Critical Care*, 3 (6), 444–447.
- Hanly, P.J. (1992). Mechanisms and management of central sleep apnea. *Lung*, 170, 1–17.
- Macmillan, C. (1995). Nasopharyngeal suction study reveals knowledge deficit. *Nursing Times*, 91 (50), 28–30.
- McDomell, C. A. (1995). Assisting with chest tube removal. *Nursing* 95, 25 (8), 18.
- Nettina, S. M. (1996). *The Lippincott manual of nursing practice* (6th ed.). New York: Lippincott.
- Phipps, W. J., & Brucia, J. J. (1995). Management of persons with problems of the lower airway. In W. J. Phipps, V. L. Cassmeyer, J. K. Sands, & M. K. Lehman (Eds.), *Medical surgical nursing concepts and clinical practice* (5th ed., pp. 1161–1168). St. Louis, MO: Mosby.
- Rutherford, K.A. (1989). Principles and application of oximetry. *Critical Care Nursing Clinics of North America*, 1 (4), 649–657.
- Tarnoff, M., Moncure, M., et al. (1998). The value of routine posttracheostomy chest radiography. *Chest*, 113, 1647–1649.
- Weilitz, P. B. (1994). Oxygenation. In A. G. Perry & P. A. Potter (Eds.), *Clinical nursing skills & techniques* (3rd ed., pp. 377–383). St. Louis, MO: Mosby.
- Wood, C. (1998). Can nurses safely assess the need for endotracheal suction in short-term ventilated patients, instead of using routine techniques? *Intensive Critical Care Nursing*, 14 (4), 170–180.
- ## CHAPTER 8
- Baranowski, L. (1993). Central venous access devices: Current technologies, uses, and management strategies. *Journal of Intravenous Nursing*, 16, 167–193.
- Camp-Sorrell, D. (1992). Implantable ports: Everything you always wanted to know. *Journal of Intravenous Nursing*, 15, 262–273.
- Carl, J.L., Erstad, B. L., Murphy, J. E., & Slack, M. K. (1995, July). Fluid delivery from infusion pump syringes. *American Journal of Health System Pharmacists*, 52, 1428–1432.
- Driscoll, M., Buckenmyer, C., Spirk, M., & Molchany, C. (1997, December). Inserting and maintaining peripherally inserted central catheters. *MedSurg Nursing*, 6 (7), 350.
- Fitzpatrick, L., & Fitzpatrick, T. (1997, August). Blood transfusions: Keeping your patient safe. (Includes related article on blood compatibility and a continuing education test). *Nursing*, 27 (9), 34.
- Freedman, S. E., & Bosserman, G. (1993). Tunneled catheters: Technologic advances and nursing care issues. *Nursing Clinics of North America*, 28, 851–856.
- Jackson, N. (1997). Vital signs. In A. G. Perry & P. A. Potter (Eds.), *Clinical nursing skills & techniques* (4th ed., pp. 196–239). St. Louis, MO: Mosby.
- Kozier, B., Erb, G., Blais, K., Johnson, J. Y., & Temple, J. S. (1993). *Techniques in clinical nursing* (4th ed., pp. 795–797). Redwood City, CA: Addison-Wesley Nursing.
- Masoorli, S., Angeles, T., & Barbone, M. (1998, September). Danger points: How to prevent nerve injuries from venipuncture. (Includes materials for continuing education credit). *Nursing*, 28 (6), 35.

- Mathews, J., & Clementi, P. (1996, November). I.V. regulation device vs. infusion pump: A cost-savings study (intravenous infusion pump usage). *Nursing Management*, 27 (3), 32F.
- Metheny, N. (1997, October). Focusing on the dangers of D₅W (Includes continuing education test). *Nursing*, 27 (6), 55.
- Plumer, A. (1997). *Principles and practices of intravenous therapy* (6th ed.). Boston: Little, Brown, and Co.
- Prakash, R., Parley, W.W., Dikshit, K., Forrester, J., Swan, H. J. C. (1973). Hemodynamic effects of postural changes in patients with acute myocardial infarction. *Chest*, 64, 7–9.
- Ricour, C. (1989). Home TPN. *Nutrition*, 5 (5), 345–346.
- Rooke, G. A., & Bowdle, T. A. (1994, January). Syringe pumps for infusion of vasoactive drugs: Mechanical idiosyncrasies and recommended operating procedures. *Anesthesia and Analgesia*, 78 (1), 150–156.
- Syndman, D. R., Donnelly-Reidy, M., Perry, L. K., & Martin, W. J. (1987). Intravenous tubing containing burettes can be safely changed at 72-hour intervals. *Infection Control*, 8, 113–116.
- ## CHAPTER 9
- Berry, S. M., & Fischer, J. E. (1994). Enterocutaneous fistula. *Current Problems in Surgery*, 31, 473–566.
- Brown, C. D., & Zitelli, J. A. (1993). A review of topical agents for wounds and methods of wounding: Guidelines for wound management. *Journal of Dermatologic Surgery and Oncology*, 19, 732–737.
- D'Harcourt, J. B., Boverie, J. H., & Dondelinger, R. F. (1996). Percutaneous management of enterocutaneous fistula. *AJR*, 167, 33–38.
- Godden, J., & Hiley, C. (1998). Managing the patient with a chest drain. *Nursing Standard*, 12 (32), 35–39.
- Jonkman, M. E. (1989). *Epidermal wound healing between moist and dry*. (Thesis). Groningen, Netherlands: Groningen University Press.
- Leigh, I. H., & Bennet, G. (1994). Pressure ulcers: Prevalence, etiology, and treatment modalities. *American Journal of Surgery*, 167, 25S–30S.
- Ovington, L. G. (1998). The well-dressed wound: An overview of dressing types. *Wounds*, 10, (suppl. A), 1A–11A.
- Perry, A. G., & Potter, P. A. (1998). *Mosby's pocket guide series: Basic skills and procedures* (4th ed., pp. 111–137). St. Louis, MO: Mosby.
- Reiter, D. (1994). Methods and materials for wound management. *Otolaryngology—Head and Neck Surgery*, 110 (6), 550–556.
- Shea, J. D. (1975). Pressure sores: Classification and management. *Clinical Orthopaedics*, 112, 89–100.
- Skewes, S. M. (1996, October). Skin care rituals that do more harm than good. *American Journal of Nursing*, 96 (10), 33–35.
- Stevenson, T. R., Thacker, J.G., Rodeheaver, G. T., Bacchetta, C., Edgerton, M. T., & Edlich, R. F. (1976). Cleansing the traumatic wound by high pressure syringe irrigation. *Journal of the American College of Emergency Physicians*, 5, 52–59.
- Thompson, J. M., McFarland, G. K., Hirsch, J. E., & Tucker, S. M. (1997). *Mosby's clinical nursing* (4th ed., pp. 1557–1563). St. Louis, MO: Mosby.
- Whittington, K. (1995). Debunking wound myths. *RN*, 58 (8), 32–33.
- Young, T. (1997, September 25–October 8). Wound care management. Dressing selection: Use of combinations of wound dressings. *British Journal of Nursing*, 6 (17), 999–1000, 1002–1004.
- ## CHAPTER 10
- Adkins, L. M. (1997, July 17). Cast changes: Synthetic versus plaster. *Pediatric Nursing*, 23 (4), 422.
- Byrne, T., & Savas, H. (Eds.). (1996). *The traction handbook* (6th ed). Warsaw, IN: Zimmer, Inc.
- Cherry, G. W. (1990). New compression bandage for the treatment of venous leg ulcers. In M. D. Kerstein (Ed.), *New trends in wound healing for vascular surgeons* (pp. 25–29). Princeton, N.J.: Excerpta Medica and Elsevier Company.
- Delee, J.C., & Brez, D. (1994). *Orthopaedic sports medicine: Principles and practice* (Vols. 1–3). Philadelphia: Saunders.
- Kelly, D. J. (1983). The use of fiberglass as reinforcement with plaster casts. *Orthopaedic Nursing*, 2 (6), 33–36.
- Lane, P. L., & Lee, M. M. (1982). New synthetic casts: What nurses need to know. *Orthopaedic Nursing*, 1 (6), 13–20.
- Marshall, P. D., Dibble, A. K., Walters, T. H., & Lewis, D. (1992). When should a synthetic casting material be used in preference to plaster of paris? A cost analysis and guidance for casting departments. *Injury*, 23 (8), 542–544.
- Mellon, M. B. (1993). *Sports medicine secrets*. Philadelphia: Hanley & Belfus.
- Mihalko, W. M., Beaudoin, A. J., & Krause, W. R. (1989). Mechanical properties and material characteristics of orthopaedic casting material. *Journal of Orthopaedic Trauma*, 3 (1), 57–63.

- Nicoloff, A., Nehler, M., Moneta, G., & Porter, J. (1998). Compression therapy for treatment of lower extremity chronic venous insufficiency and venous stasis ulcers. In J. Bergan, & P. Gloviczki (Eds.), *Atlas of endoscopic perforator vein surgery*. London: Springer-Verlag London Limited.
- Rockwood, C. A., Green, D. P., & Bucholz, R. W. (1991). *Rockwood and Green's fractures in adults*. Philadelphia: Lippincott-Raven.
- Salmond, S. W., Mooney, N. E., & Verdisco, L. A. (Eds.) (1996). *Core curriculum for orthopaedic nursing* (3rd ed.). Pitman, NJ: National Association of Orthopaedic Nurses and Anthony J. Jannetti, Inc.
- Stevenson, M. M. (1994, September). Modified shoes and casts a good step toward relieving heel pain. *Modern Medicine*, 63, 23.
- Windsor R. E. (1991). Management of total knee arthroplasty infection. *Orthopaedic Physical Therapy Clinics of North America*, 22 (3), 531–538.
- Brown, E. W. (1996, November). Routine sigmoidoscopy may miss over half of colon cancers. *Medical Update*, 20 (1), 3.
- Hawks, J. H. (1997). Assessment of clients with gastrointestinal disorders. In J. M. Black & E. Matassarini-Jacobs (Eds.), *Medical surgical nursing: Clinical management for continuity of care* (5th ed., pp. 715–716). Philadelphia: Saunders.
- Health and public policy committee, American college of physicians. Diagnostic thoracentesis and pleural biopsy in pleural effusions. (1985). *Annals of Internal Medicine*, 103, 799–802.
- Huszar, R. (1994). *Basic dysrhythmias: Interpretation and management* (2nd ed.). St. Louis, MO: Mosby Year Book.
- Kuznar, W. (1996, June). New brain scanner may cut need for biopsies. *Modern Medicine*, 64, 24.
- Segalowitz, S. J., & Lawson, S. (1995, May). Combined angiography/angioplasty is safe for most patients. *Modern Medicine*, 63, 52.
- Shaw, S. F., & Cullen, J. P., et al. (1995, November). Anoscopy, flexible endoscopy are complementary procedures. *Modern Medicine*, 63, 42.
- Stevenson, M. M. (1996, August). Ultrafast CT may significantly alter the way physicians detect coronary artery disease. *Modern Medicine*, 64, 10.
- Wilkinson, M. M. (1990, August). Your role in needle biopsy of the liver. *RN*, 62–66.

CHAPTER 11

- A gentler detective: MRI shows promise in uncovering heart disease. (1994, March). *Prevention*, 46 (1), 30.
- Autologous bone marrow transplants for advanced breast cancer. (1995, October). (Adapted from the Journal of the National Cancer Institute, July 5, 1995). *Healthfacts*, 20 (1), 4.

INDEX

- A**
- Abdomen
 - abdominal paracentesis and, 1330–35
 - examination of, 19–20
 - Abdominal fluid, 1330–35
 - Abdominal paracentesis, 1330–35
 - ABD pad, 1098–03
 - Abduction, 475–87
 - ABO incompatibility, 985–90
 - Abscesses, 601–607, 1151–57
 - Abuse
 - potential for, controlled substances and, 637–43
 - substance, 1368
 - Access port, 869–72
 - Accucheck III, 101
 - Acetic acid
 - wet to damp dressing and, 1104–10
 - wound irrigation and, 1131
 - Acid-base balance, 1075–80
 - Acidosis
 - Ambu bag and, 878–84
 - respiratory, 1075–80
 - Activated charcoal, 219–23
 - Active/assisted range of motion (A/AROM), 475–87
 - Activity
 - assisting from bed to wheelchair, commode, or chair and, 421
 - pressure ulcers and, 1186
 - Acute compartment syndrome, 1255–60
 - Additive set, volume-control sets and, 614–19
 - Adduction, 475–87
 - Adolescents, cardiopulmonary resuscitation for, 198–202, 205
 - Adults
 - cardiopulmonary resuscitation for, 198–202, 205
 - chest thrust and, 213
 - Heimlich maneuver and, 211–12, 213
 - Aerosols, 520–25
 - Air beds, 316
 - Air compressor, nebulized medications and, 539–46
 - Air embolism, 1030
 - Air leak, 858–64
 - Air lock, 1049–55
 - Air mask bag unit (Ambu) bag, 878–84, 890–95
 - Air seal, chest drainage system specimen and, 869–72
 - Airway
 - artificial, oxygen via, 804–805
 - breathing, circulation (ABCs), 189–94, 195–208
 - bronchoscopy and, 1356–65
 - emergency management, 189–94
 - obstruction, 209–18, 885–89
 - oropharyngeal. *See* Oropharyngeal airway
 - pharyngeal, 885–89
 - Albuterol, 829–36
 - Alginate, 1136–43
 - Alignment
 - anatomical, splints and, 1212–17
 - pin insertion and, 1248–54
 - traction and, 1255–60
 - turning and positioning client and, 322–29
 - Alkalosis
 - Ambu bag and, 878–84
 - respiratory, 1075–80
 - Allen's test, 1075–80
 - Allergic reactions
 - total parenteral nutrition and, 1031
 - transfusions and, 985–90
 - Allergies, drug, 1368–69
 - Allergy testing, 547–51
 - Alveolar recruitment, 837–42
 - Alveoli, 467–74
 - Ambu bag. *See* Air mask bag unit bag
 - Ambulating a patient, proper body mechanics and, 127–36
 - Ambulation
 - assisted, 137–43
 - assisting from bed to, 227–28, 427–33
 - down stairs, 1292–93
 - and safe falling, 137–43
 - up stairs, 1292
 - Amino acids, allergic reactions to, 1031
 - Ammonia, 1193–98
 - Amniocentesis, 1350–55
 - Amniotic fluid, 1350–55
 - Anaerobic, wound drainage specimen and, 1158–62
 - Analgesia
 - epidural catheter and, 631–36, 1081–87
 - patient-controlled, 625–630, 1081–1087
 - Anaphylactic reaction, transfusions and, 985–90
 - Anaphylaxis
 - nebulized medications and, 539–46
 - transfusion reactions and, 985–90
 - Anatomical position
 - continuous passive motion device and, 1283–88
 - splints and, 1212–17
 - Anesthesia
 - epidural catheter and, 1081–87
 - postoperative care and, 459–66
 - Angiocatheter, IV solution and, 934–40
 - Angiography, coronary, 1382–88
 - Ankle
 - assessment of, 21
 - passive range of motion and, 479
 - range of motion of, 484
 - Anorexia, 775–80
 - Anterior gluteal muscle, 564–69
 - Antibacterial agents, 709–12
 - Antibiotics, 1131
 - Anticoagulation
 - pressure bandage and, 1116–21

- Anticoagulation (continued)
 shaving a client and, 398–403
- Antimicrobial agents, 122
- Antipyretics, 28–39
- Antiseptics, 709–12
- Aortography, 1382–88
- Apical pulse, 40–46, 44
- Apnea, 47–52, 878–84
- Appearance, general, physical assessment and, 2–3
- Aquathermia pads, 275–82
- Arm, passive range of motion and, 477
- Arterial blood gas (ABG), 1075–80
 mechanical ventilation and, 891
 oxygen therapy and, 800
- Arterial blood pH, 1075
- Arterial insufficiency, 1229–34
- Arterial oxygen saturation (SaO₂)
 arterial blood gas specimen and, 1075–80
 pulse oximetry and, 823–28
- Arterial saturation, blood, pulse oximetry and, 823–28
- Arterial stick, 926–33
- Arteriography, 1382–88
- Artery
 arterial blood gas specimen and, 1075–80
 pressure bandage and, 1116–21
- Arthroscopy, 1366
- Artificial airway, oxygen via, 804–805
- Artificial respiration, 195–208
- Ascites, 1330–35
- Asepsis, 717–23
 donning cap and mask and, 150–54
 infection control and, 144–49, 150–54
 sterile gloves and, 162–67
 surgical scrub and, 168–73
 traction and, 1255–60
- Aseptic technique
 contaminated items and, 155–61
 gowns and gloves and, 144–49
 infection control and, 150–54
- Aspiration
 bone marrow, 1336–42
 emergency airway management and, 189–94
 gastrostomy tube and, 672–80
 intermittent positive-pressure breathing and, 837–42
 intramuscular injection and, 558–63
 IV bolus and, 608–13
 large-bore feeding tube and, 654–59
 peripherally inserted central catheter and, 1040–48
 pulmonary therapy and postural drainage and, 819–22
 tracheostomy tube and, 922–24
- Assessment, physical, 1–119
- Assistive device
 assisting from bed to walking and, 427–33
 crutches, cane, or walker and, 1289–98
- Asthma
 continuous positive airway pressure and, 843–47
 nebulized medications and, 539–46
 peak expiratory flow rates and, 829–36
- Atelectasis
 continuous positive airway pressure and, 843–47
 controlled coughing and deep breathing and, 809–13
 incentive spirometer and, 814–18
 intermittent positive-pressure breathing and, 837–42
 postoperative exercises and, 467–74
- Auscultation
 blood pressure and, 53–60
 physical assessment and, 2–27
 pulmonary therapy and postural drainage and, 819–22
- Auscultatory gap, 53–60
- Autopsy, 488–93
- Axilla, 74
 bathing client in bed and, 351–57
 crutches and, 1289–98
 Jackson-Pratt drain site and, 1169–75
- B**
- Back, assessment of, 13–14
- Backflow valve, 601–607
- Bacteremia, 1031
- Bacteria, 1158–62
- Bag
 Ambu, 878–84
 IV, 948–53
- Balance, assisting from bed to walking and, 427–33
- Ball-and-socket joint, 480, 483
- Balloon port, 732–36
- Bandages, 1090–97
 abdominal binders and, 1235–40
 elastic, 1090–97, 1206–11
 figure-eight, 1090–97
 gauze, 1090–97
 pressure, 1116–21
 reverse, 1206–11
 reverse spiral, 1090–97
 spiral, 1090–97, 1206–11
 splitting, 1206–11
 stump, 1090–97
- Basal infusion rate, 625–30
- Baseline assessment, 2–27, 1255–60
- Basiphilic vein, 1040–48
- Bath blanket, 351–57
- Bathing a client in bed, 351–57
- Baths, sitz, 270–74
- Bed
 assisting from
 to chair, 421–26
 to commode, 421–26
 to stretcher, 415–20
 to walking, 227–28, 427–33
 to wheelchair, 227–28, 421–26
 bathing client in, 351–57
 moving client in, 330–36
 occupied, changing linens in, 316–21
 unoccupied, changing linens in, 308–15
- Bedpan, assisting with, 337–43
- Bedsore, 1183–92
- Beta 2 agonists, 539–46, 829–36
- Betadine, 1131–35
- Bifurcation, 713–16
- Biliary
 closed wounds and, 1144–50
 dressings and, 1122–30
- Bilirubin in urine, 89–95
- Binders
 abdominal, 809–13, 1235–40
 breast, 1235–40
 Scultetus, 1235–40
 stretch net, 1235–40
 T, 1235–40
- Biohazard, dry dressing and, 1098–1103
- Biopsy
 bone marrow, 1336–42
 bronchoscopy and, 1361–62
 liver, 1315–21
 needle, 1315–21
- Biopsy forceps, 1356–65
- Bladder
 irrigating of, using closed-system catheter, 724–31
 male indwelling catheter and, 693–700
 orthotopic, continent urinary diversion and, 743–48
 urinary catheter irrigation and, 717–23
- Blanket
 bath, 351–57
 hypothermia, 283–90
 thermal, 275–82, 283–90
 warming, 283–90
- Bleb, intradermal injection and, 547–51
- Bleeding. *See* Hemorrhage
- Blisters, fracture, traction and, 1255–60
- Blood
 drawing, 926–33, 1020–25
 glucose in, 101–107
 occult. *See* Occult blood
 type, 977–84
 whole, blood transfusion and, 977–84
- Blood arterial saturation, pulse oximetry and, 823–28
- Blood pressure, 53–60
- Blood pump, 977–84
- Blood warmer, 977–84

- Body language in assessment of pain, 1368
- Body mechanics
back rubs and, 404–408
and safe lifting, 127–36
- Body substance isolation, 144–49
- Bolus
cartridge system and, 620–24
intermittent, gastrostomy tube and, 676
IV, 608–13
patient-controlled analgesia and, 625–30
- Bone marrow biopsy/aspiration, 1336–42
- Bony prominences
pressure ulcers and, 1183–92
skin traction and, 1241–47
- Bowel, neurogenic, 775–80
- Bowel diversion ostomy appliance, 792–97
- Bowel movement, bedpans and, 337–43
- Brachial artery
arterial blood gas specimen and, 1075–80
auscultation method of blood pressure using, 55–57
palpation method of blood pressure using, 57–58
- Brachial pulse, 44
- Braden Scale, 1186–87
- Bradycardia, 40–46
- Bradypnea, 47–52
- Braids, cornrow, 382–89
- Breastfeeding, 1235–40
- Breasts
assessment of, 13, 74–81
engorgement of, 1235–40
examination of, 74–81
self-examination, 74–81
Tanner stage of development of, 13, 74–81
- Breathing, 47–52
controlled, 809–13
deep. *See* Deep breathing
emergency airway management and, 189
intermittent positive-pressure, 837–42
postoperative, 809–13
relaxation. *See* Relaxation breath
rescue, Heimlich maneuver and, 209–18
shortness of, 873–77
- Bronchitis, chronic, 843–47
- Bronchoalveolar lavage, 1356–65
- Bronchodilators
nebulized medications and, 539–46
peak expiratory flow rates and, 829–36
- Bronchoscopy, 1356–65, 1366
- Bronchospasm, 809–13
- Bruit, 1056–61
- Buretrol, 614–19
- Burns, moist heat and, 268
- C**
- Cachectics, 552–57
- Calibrations
weight and, 61–67
withdrawing medication from vial and, 570–75
- Calluses, hand and foot care and, 390–97
- Cancer
breast, 74–81
proctosigmoidoscopy and, 1376–81
- Cane, 1289–98
- Cannula
inner. *See* Inner cannula
nasal, 802–803
- Canthus
bathing client in bed and, 351–57
eye care and, 374–81
- Capillary puncture, 96–100
- Carbon dioxide, partial pressure of, 1075
- Cardiac arrest
cardiopulmonary resuscitation and, 195–208
endotracheal tubes and, 903–908
- Cardiac tamponade, 873
- Cardiopulmonary arrest, 878–84
- Cardiopulmonary resuscitation (CPR)
administering, 195–208
Heimlich maneuver and, 209–18
- Cardiovascular system
assessment of, 16–18
postoperative care and, 463
- Carminative solutions, 762–74
- Carotid pulse, 44
- Cartridge system, 620–24
- Cast, 1261–66
bivalving, 1273–77
care and comfort, 1267–72
removal of, 1278–82
- Catheter
Broviac, 1122
central venous. *See* Central venous catheter
closed-system, 724–31
condom, 687–92
double-lumen, 1056–61
epidural analgesia and, 631–36, 1081–87
Foley. *See* Foley catheter
Groshong, 1122
Hickman, 1122
implantable venous access device and, 1062–68
indwelling. *See* Indwelling catheter
infection and, 1031
irrigating, 717–23
IV solution and, 934–40, 948–53
over-the-needle, 934
peripherally inserted central, 1008–1012, 1040–1048
red rubber, 1144–50
retention. *See* Retention catheter
routine care of, 709–12
straight, 701–708
suction, 896–02
three-way, 724–31
triple lumen, 1122
urinary, 717–23
venous, 941–47
- Catheterization
of continent urinary diversion, 743–48
male indwelling catheter and, 693–00
noncontinent urinary diversion and, 737–42
- Cavities, 358–67
- Center of gravity
hydraulic lift and, 434–40
proper body mechanics and, 127–36
- Central parenteral nutrition (CPN), 1026–34
- Central venous catheter, 997–1002
assisting with insertion of, 991–96
central venous tubing and, 1003–1007
changing, 1003–1007
drawing blood from, 1020–25
flushing, 1008–12
hemodialysis site care and, 1056–61
implanted venous access device and, 1069–74
infusing fat emulsion through, 1026–34
infusing total parenteral nutrition through, 1026–34
removing, 1035–39
- Central venous pressure (CVP)
central venous catheter and, 991–96
measuring, 1013–19
- Central venous tubing, changing, 1003–1007
- Cephalic vein, 1040–48
- Cerebral spinal fluid (CSF), 1343–49
- Cerebrovascular accident (CVA), 960
- Cervical collar, 1241
- Cervical spine
assessment of, 12
range of motion of, 480
surgical site preparation and, 453
- Cesarean birth, 368–73
- Cetacaine, 1369
- Chart
pressure bandage and, 1119
skin sutures and staples and, 1180
- Chemical dependencies, 1368
- Chemicals
accidental poisoning and, 219–23
handwashing and, 122
- Chemotherapy, 991–96
- Chemstrip BG, 101
- Chest, assessment of, 13, 74–81
- Chest compressions, CPR and, 195–208
- Chest drainage system
disposable, 849–51

- Chest drainage system (continued)
 maintaining, 858–64
 measuring output from, 865–68
 obtaining specimen from, 869–72
 preparing, 848–57
 removing, 873–77
 reusable, 849, 851–55
- Chest physiotherapy (CPT), 819–22
- Chest pulmonary therapy and postural drainage (CPPD), 819–22
- Chest tube clamp, 874
- Chest x-ray
 chest tube removal and, 873–77
 pulmonary therapy and postural drainage and, 819–22
- Cheyne-Stokes respirations, 47–52
- Children. *See also* Infants
 accidental poisoning and, 221
 airway obstruction and, 213–15
 cardiopulmonary resuscitation for, 202–203, 204–205
- Choking, Heimlich maneuver and, 209–18
- Cholangiopancreatography, endoscopic retrograde, 1366–75
- Chronic bronchitis, 843–47
- Chronic obstructive pulmonary disease (COPD)
 continuous positive airway pressure and, 843–47
 mechanical ventilation and, 890
 oxygen therapy and, 800
- Circulation
 cast care and comfort and, 1267–72
 emergency airway management and, 189
 sensation, and movement (CSM), 1273–77
 traction and, 1255–60
- Circulatory overload, 986
- Circulatory system, 925–1087
- Circumcision, 368–73
- Citrate, reaction to, 985–90
- Claustrophobia
 computed tomography and, 1310–14
 magnetic resonance imaging and, 1306–1309
- Clean-catch, midstream urine specimen, 82–88, 737–42
- Clean-voided urine specimen, 82–88
- Closed wound
 clean, 1098
 with open drain, 1144–50
- Cold application, 291–97
- Collection bag, 693–700
- Collection port, 865–68
- Colon conduit, 737–42, 749–53
- Colonscopy, 1366–67
- Colostomy
 bowel diversion ostomy appliance and, 792–97
 stoma and, 786–91
- Colposcopy, 1367
- Comfort, patient, 235–305
- Communication, 236–44
- Compartment syndrome
 casting and, 1261–66, 1273–1277
 traction and, 1255–60
- Compatibility, transfusion reactions and, 985–90
- Compazine, 963
- Compliance, progressive muscle relaxation and, 251–57
- Compresses
 cold, 291–97
 warm, 264–69
- Compression
 chest, CPR and, 195–208
 Jackson-Pratt drain site and, 1169–75
- Compression device, pneumatic, 1229–34
- Computed tomography (CT), 1310–14
- Conduit, colon, noncontinent urinary diversion and, 737–42, 749–53
- Condyloid joint, 482, 484
- Conjunctival sac, 374–81
- Connective tissue, subcutaneous injection and, 552–57
- Conscious adult
 chest thrust and, 213
 Heimlich maneuver and, 211–12, 213
- Conscious children, airway obstruction in, 213–15
- Consciousness, level of, lumbar puncture and, 1343–49
- Consent, informed. *See* Informed consent
- Constipation
 digital removal of fecal impaction and, 775–80
 enemas and, 762–74
 rebound, enemas and, 772
- Contact lenses, 374–81
- Contaminated gowns and gloves, 144–49
- Contaminated items, removing, 155–61
- Contamination
 donning cap and mask and, 150–54
 mixing medications from two vials into one syringe and, 582–88
 sterile gloves and, 162–67
 surgical scrub and, 168–73
- Continent urinary diversion, 743–48
- Continent urostomy, 749–53
- Continuous ambulatory peritoneal dialysis (CAPD), 754–61
- Continuous positive airway pressure (CPAP), 843–47
- Contractures
 assisting from bed to stretcher and, 415–20
 continuous passive motion device and, 1283–88
 passive range of motion and, 475–87
- Contrast medium
 computed tomography and, 1310–14
 magnetic resonance imaging and, 1306–1309
- Controlled substances, 637–43
- Cornrow braids, 382–89
- Coronary angiography, 1382–88
- Corticosteroids, 829–36
- Coughing
 controlled, 809–13
 incentive spirometer and, 814–18
 preoperative teaching of, 467–74
- Cradle carry, 230
- Cranial nerves, assessment of, 22–23
- Cross-contamination
 changing linens in occupied bed and, 316–21
 infection control and, 155–61
- Cross-match, transfusion reactions and, 985–90
- Crutches, 1289–98
- Crutchfield tongs, 1248–54
- Cryoprecipitate, 977, 979
- Cuff pressure, endotracheal tubes and, 903–908
- Cultures
 nose, throat, and sputum, 108–15
 wound drainage specimen and, 1158–62
- Cutaneous ureterostomy, 749
- Cyanosis
 Heimlich maneuver and, 209–18
 respirations and, 47–52
- Cyclic parenteral nutrition, 1026–34
- Cyclosporine, 932
- Cyst, breast, 74–81
- Cystectomy, 743–48
- Cystic fibrosis, 843–47
- Cystoscope, 1367
- Cystourethroscopy, 1367
- Cytology brush, 1361
- D**
- Dakin's solution, 1098
- Dandruff, 382–89
- Dead space, wound packing and, 1136–43
- Death certificate, 488–93
- Debridement
 pressure bandage and, 1116–21
 wet to damp dressing and, 1104–10
 wound packing and, 1136–43
- Debris
 wet to damp dressing and, 1104–10
 wound irrigation and, 1131–35
- Decannulation, 909–14, 922–24
- Decompression
 gastrointestinal suction devices and, 681–86
 nasogastric tube and, 646–53
 nasogastric tube removal and, 666–71
- Decubiti, 1131–35, 1183–92
- Deep breathing
 assisting client with, 809–13

- incentive spirometer and, 814–18
preoperative teaching of, 467–74
- Deep muscle relaxation, 251–57
- Deep venous thrombosis
antiembolic stockings and, 1224–28
pneumatic compression device and, 1229–34
- Defecation, bedpans and, 337–43
- Dehiscence
skin sutures and staples and, 1176–82
wet to damp dressing and, 1104–10
- Dehydration, 68–73
- Deltoid muscle
intramuscular injection and, 558–63
Z-track injection and, 564–69
- Dentifrice, 358–67
- Dentures, 358–67
- Denuded epithelium, 1193–98
- Depilatory, 450
- Dermis
intra-dermal injection and, 547–51
subcutaneous injection and, 552–57
- Desaturation, 819–22
- Dextrose, 1026–34
- Diabetes mellitus, 101–107, 1368
- Dial-a-flo, 955
- Dialysate
concentrated, 754–61
peritoneal dialysis and, 754–61
- Dialysis
central venous catheter and, 991–96
continuous ambulatory peritoneal, 754–61
intermittent, 754–61
peritoneal, 754–61
- Diarrhea, 781–85
- Diastix, 89–95
- Diastolic blood pressure, 53–60
- Diathermy, 275–82
- Diffusion, oxygen therapy and, 800–808
- Digitalization of stoma, 786–91
- Dipsticks, urine testing and, 89–95
- Disinfection, 450–58
- Dislodgement, changing IV gown and, 409–14
- Disseminated intravascular coagulopathy (DIC), 977, 985–90
- Distention, 672–80, 781–85
- Do not resuscitate (DNR) orders, 195
- Doppler, arteriography and, 1382–88
- Dorsalis pedis pulse, 44
- Dorsogluteal muscle
intramuscular injection and, 558–63
Z-track injection and, 564–69
- Dorsolateral muscle, 558–63
- Double cannula tracheostomy tube, 915–21
- Double-lumen nasogastric tube, 646–53
- Douches, 532–38
- Drain
HemoVac, 1144–50, 1151, 1163, 1164
irrigation of, 744
Jackson-Pratt, 1144–50, 1151, 1163, 1169–75
open, closed wound with, 1144–50
Penrose, 1144–50, 1151
rubber catheter, 1144–50, 1151
- Drainage, 1199–1204
chest. *See* Chest drainage system
closed-system catheter and, 724–31
Jackson-Pratt drain site and, 1169–75
postural, administering, 819–22
wound. *See* Wound drainage
- Draining wound
closed, 1163–68
pouching, 1199–1204
- Draw sheet
changing linens in occupied bed and, 316–21
changing linens in unoccupied bed and, 308–15
moving client in bed and, 330–36
proper body mechanics and, 127–36
- Dressing
abdominal binders and, 1235–40
around therapeutic puncture sites, 1122–30
central venous, 997–1002
clear, 1111–15
dry, 1098–1103
IV site, 1111–15
Jackson-Pratt drain site and, 1169–75
pressure, 1116–21
with retention sutures, 1151–57
transparent, 997–1002, 1111–15
TSM, 1124, 1125
wet to damp, 1104–10
wet to moist, 1104–10
- Drip chamber
IV flow rate and, 954–59
peripheral vein total parenteral nutrition and, 1049–55
- D₁₀W, 589–94
- D₅W, 589–94
- Dyspnea, 47–52
double cannula tracheostomy tube and, 915–21
rectal tube and, 781–85
thoracentesis and, 1322–29
- Dysrhythmia, 775–80
- Dysuria, 732–36
- E**
- Ear
assessment of, 10–12
lobe, capillary puncture and, 96
medications, administering, 504–12
- Edema
cast bivalving and windowing and, 1273–77
cast care and comfort and, 1267
emergency airway management and, 189–94
pneumatic compression device and, 1229–34
skin puncture and, 96–100
- Effleurage
back rubs and, 404–408
therapeutic massage and, 258–63
- Elbow
assessment of, 13
passive range of motion and, 477
range of motion of, 481
- Electrocardiogram (ECG), 1300–1305
- Electrodes
electrocardiogram and, 1300–1305
transcutaneous electrical nerve stimulation unit and, 298–305
- Electrolyte imbalance
IV solution and, 589–94
total parenteral nutrition and, 1031
- Electrolytes
fluid and, 754–761
IV solution and, 965–70
- Elimination, nutrition and, 645–797
- Embolism
air, 1030
pulmonary, 467–74
- Emphysema, subcutaneous, 1322–29
- Emulsion
fat, 1026–34
lipid. *See* Lipid emulsions
- End expiratory pressure, 1013–19
- Endoscopic retrograde cholangiopancreatography (ERCP), 1366–75
- Endotracheal cuff, 903–908
- Endotracheal intubation, 903–908
- Endotracheal tube
Ambu bag and, 878–84
emergency airway management and, 189–94
maintaining and cleaning, 903–908
mechanical ventilation and, 890
oxygen via, 804–805
suctioning, 896–902
- End-stage renal disease (ESRD), 1056
- Enema, 762–74
proctosigmoidoscopy and, 1376–81
- Enteral nutrition, 660–65, 672–80
- Enterostomy, 1199–1204
- Epidural analgesia
administering, 631–36
cartridge system and, 620–24
- Epiglottitis, 209–18
- Episiotomy care, 270–74, 368–73
- Epithelium, denuded, irritated peristomal skin and, 1193–98
- Eschar, 1158–62
- Esophageal varices, 1368
- Esophagogastroduodenoscopy (EGD), 1366–75, 1367
- Eupnea, 47–52

- Evacuations, emergency, 224–33
- Examination, physical assessment and, 2–27
- Exercises
- bed, 1255–60
 - Kegel, 732–36
 - postoperative, 441–49, 467–74
 - range of motion. *See* Range of motion exercises
 - safe lifting and, 128
- Exit site
- closed wounds and, 1144–50
 - Jackson-Pratt drain site and, 1169–75
- Expiration
- incentive spirometer and, 814–18
 - respirations and, 47
- Expiratory pressure, 843–47
- Extension, passive range of motion and, 475–87
- External fixation, 1248–54
- External rotation, passive range of motion and, 475–87
- Extraocular mobility, 10
- Exudate
- eye care and, 374–81
 - peritoneal dialysis and, 1131–35
 - wound drainage specimen and, 1158–62
 - wound packing and, 1136–43
- Eye
- assessment of, 10–12
 - care, 374–81
 - goggles, 150
 - medication disk, 508
 - medications, 504–12
 - prostheses, 374–81
- F**
- Face, assessment of, 7–9
- Face shields, 150
- Face tent, oxygen therapy and, 803–804
- Factor IX concentrate, 977
- Factor VIII concentrate, 977
- Falling, 137–43, 421–26
- Fat emulsion, 1026–34
- Fats, allergic reactions to, 1031
- Fatty acid deficiency, 1031
- Febrile nonhemolytic reaction, 985–90
- Fecal impaction, digital removal of, 775–80
- Feces
- enemas and, 762–74
 - testing for occult blood in, 116–19
- Feeding
- assisting with, 344–50
 - oral, 344–50
 - tube. *See* Tube feeding
 - via gastrostomy tube, 672–80
 - via large-bore feeding tube, 654–59
 - via small-bore feeding tube, 660–65
- Feet, assessment of, 21
- Femoral artery, 1075–80
- Fem-stop, 1383
- Fetal diagnosis, amniocentesis and, 1350–55
- Fetal heart rate (FHR), 1351
- Fetal position, lumbar puncture and, 1343–49
- Fever, 28–39
- Fibrocystic disease, 74–81
- Fingers
- assessment of, 13
 - range of motion of, 482
- Finger sweep, Heimlich maneuver and, 209–18
- Fire, emergency client transport and, 224–33
- Fireman's carry, 224–33
- Fistula
- enterocutaneous, 1163–68, 1199–1204
 - hemodialysis site care and, 1056–61
 - high output, 1163–68, 1199–1204
 - low output, 1163–68, 1199–1204
 - pouching a draining wound and, 1199–1204
- Flashback, IV solution and, 934–40
- Flatulence, 781–85
- Flatus, 762–74
- Flexible fiberoptic bronchoscopy, 1356–65
- Flexion, passive range of motion and, 475–87
- Flexor position, cast bivalving and windowing and, 1273–77
- Flow meter, oxygen therapy and, 801
- Fluid and electrolyte balance, 754–61
- Fluid balance
- intake and output measurement and, 68–73
 - postoperative care and, 464
- Fluid overload, 1013–19
- Fluid retention, 68–73
- Fluids, central venous tubing and, 1003–1007
- Fluoride, 358–67
- Flush, saline
- heparin lock and, 971–76
 - IV bolus and, 608–13
- Flushing tubes and drains, 744–46
- Foley catheter
- female indwelling catheter and, 701–708
 - male indwelling catheter and, 693–700
 - urinary catheter irrigation and, 717–23
- Foot, range of motion of, 479, 484
- Foot care, 390–97
- Forced expiratory volume in 1 second (FEV1), 837
- Forced vital capacity (FVC), 837
- Forceps, biopsy, 1356–65
- Foreign body obstruction of breathing passages, 209
- Foreskin, 368–73
- Fowler's position, 330–36
- Fraction of inspired oxygen (FIO₂), 800–808
- Fracture
- cast removal and, 1278–82
 - pin insertion and, 1248–54
 - splints and, 1212–17
- Fracture blisters, traction and, 1255–60
- Fremitus, 809–13
- Fresh frozen plasma (FFP), 977, 979
- Friction
- pressure ulcers and, 1186
 - surgical scrub and, 168–73
 - therapeutic massage and, 258–63
 - turning and positioning client and, 322–29
- Functional residual capacity (FRC), 843–47
- G**
- Gag reflex, 1368
- Gait
- ambulation and, 137–43
 - crutch, 1291–93
- Gait belt, 137–43, 427–33
- Gallbladder, 1315–21
- Gastric contents
- nasogastric tube and, 646–53
 - small-bore feeding tube and, 660–65
- Gastric gavage, 672–80
- Gastrointestinal (GI) endoscopy, 1366–75
- Gastrointestinal (GI) suction devices, 681–86
- Gastrointestinal (GI) system
- closed wounds and, 1144–50
 - postoperative care and, 463
- Gastrostomy tube (GT)
- feeding and medicating via, 672–80
 - large-bore feeding tube and, 654–59
- Gavage, gastric, 672–80
- Gel packs, dry heat and, 275–82
- Genital care, 368–73
- Genitalia, external, 20–21
- Genitourinary system, 463
- Gingivitis, 358–67
- Girdle, pelvic, 1241
- Glans penis, 368–73
- Gliding joint, 484
- Gloves, 144–49
- Glucometer II, 101
- Glucoscan 3000, 101
- Glucose
- levels of, in urine, 89–95
 - positron-emission tomography scanning and, 1389–94
 - serum levels of, 101–107
- Glucostix, 101
- Goniometer, 1283–88
- Gowns, 144–49, 409–14
- Graft, hemodialysis site care and, 1056–61
- Granulocytes, 977

- Gravity
 center of. *See* Center of gravity
 specific, of urine, 89–95
- Grief, 488–93
- Groshong tip, venous access devices and, 1062
- Guaiac test, 116–19
- Guided imagery, 245–50
- Guidewire, 1040–48
- GVHD, 986
- H**
- Hair
 assessment of, 7
 hair and scalp care and, 382–89
 removal, surgical site preparation and, 450
- Halitosis, 358–67
- Hand
 assessment of, 13
 care, 390–97
 passive range of motion and, 478
 range of motion of, 482
 surgery, 453
- Handwashing, 122–26
 infection control and, 144, 150
 surgical, 168–73
- Head
 assessment of, 7–9
 passive range of motion and, 477
- Headache, lumbar puncture and, 1343–49
- Head tilt/chin lift, 195–208
- Hearing acuity, 11
- Heart, assessment of, 16–18
- Heart sounds, 17
- Heat, 264–69, 275–82
- Heimlich maneuver, 209–18
- Hematoma, 926–33
- Hematopoiesis, 1336–42
- Hemocult slide, 116–19
- Hemodialysis site care, 1056–61
- Hemolysis, 977–84
- Hemolytic reaction, febrile, 985–90
- Hemoptysis, 809–13
- Hemorrhage
 esophagogastroduodenoscopy and, 1368
 liver biopsy and, 1315–21
- Hemothorax
 chest drainage system and, 848–57
 chest tube removal and, 873–77
 thoracentesis and, 1322–29
- HemoVac drain, 1144–50, 1151, 1163, 1164
- Heparin flush, 971–76
- Heparin lock
 discontinuing IV and changing to, 971–76
 IV bag and tubing and, 948–53
 IV bolus and, 608–13
- Hepatitis, 986
- Hinge joint, 481, 482, 484
- Hip, 478, 483
- Holter monitor, 1304
- Hoyer lift, 434–40
- Human immunodeficiency virus (HIV), 986
- Humidification, mechanical ventilation and, 890–95
- Humidifiers, 520–25
- Hydralazine hydrochloride, 564
- Hydration
 central venous tubing and, 1003–1007
 hair and scalp care and, 382–89
- Hydraulic lift, 434–40
- Hydrocalculator, 275–82
- Hydrocolloids, 1136–43
- Hydrogen peroxide
 oral care and, 358–67
 wound care and, 1098
 wound irrigation and, 1131
- Hydrophilic polyurethane foams, 1136–43
- Hyperalimentation, 1026–34
- Hypercapnia
 Ambu bag and, 878–84
 controlled coughing and deep breathing and, 809–13
 oxygen therapy and, 800–808
- Hyperglycemia, 1031
- Hyperpnea, 47–52
- Hypertension, 53–60
- Hyperthermia, 283–90
- Hypertonic solutions, 754–74
- Hyperventilation, 47–52
- Hypocapnia, 878–84
- Hypoglycemia, 1031
- Hypotension, 53–60
 orthostatic, 53, 137–43, 427–33
 postural, 53
- Hypothermia, 28–39, 283–90
- Hypotonic solutions, 762–74
- Hypoventilation, 47–52, 800–808
- Hypovolemia, 1090–97
- Hypovolemic shock, 1116–21
- Hypoxemia, 809–13
- Hypoxia
 Ambu bag and, 878–84
 endotracheal and tracheal tube suctioning and, 896–902
 eye care and, 374–81
 Heimlich maneuver and, 209–18
- Hypoxic drive, oxygen therapy and, 800–808
- I**
- Ileal conduit, 737–42, 749–53
- Ileostomy, 792–97
- Ileum, 792–97
- Iliac crest, 1336–42
- Immobile client, weighing, 61–67
- Immobility
 assisting from bed to walking and, 427–33
 moving client in bed and, 330–36
 turning and positioning client and, 322–29
- Immobilization
 bandaging and, 1090–97
 restraints and, 179–88
 splints and, 1212–17
- Immune serum globulin (IgG), 977
- Immunoglobulin A (IgA), 985–90
- Immunosuppressed client, 144–49
- Impaction, fecal, digital removal of, 775–80
- Implementation–action/rationale
 abdominal binders and, 1236–38
 abdominal paracentesis and, 1331–34
 accidental poisoning and, 220–21
 administering medications via secondary administration sets and, 602–605
 Ambu bag and, 880–82
 ambulation and, 139–42
 amniocentesis and, 1352–53
 antiembolic stockings and, 1225–27
 arm sling and, 1219–21
 arterial blood gas specimen and, 1076–78
 arteriography and, 1384–86
 assisting
 from bed to stretcher and, 416–18
 from bed to walking and, 429–31
 from bed to wheelchair, commode, or chair and, 422–24
 with feeding and, 345–47
 back rubs and, 405–406, 407
 bandaging and, 1092–94
 bathing client in bed and, 352–55
 bedpans and urinals and, 338–41
 blood glucose levels and, 103–105
 blood pressure and, 55–58
 blood transfusion and, 979–81
 bone marrow biopsy/aspiration and, 1337–40
 bowel diversion ostomy appliance and, 793–95
 breast self-examination and, 75–78
 bronchoscopy and, 1358–63
 buccal medications and, 496–503
 butterfly needle and, 942–45
 cane and, 1293–94
 cardiopulmonary resuscitation and, 198–205
 cartridge system and, 621–22
 cast bivalving and windowing and, 1274–76
 cast care and comfort and, 1268–70
 casting and, 1262–65
 cast removal and, 1279–81
 catheter care and, 710–11
 central venous catheter and, 992–94, 1009–10, 1021–23

- Implementation–action/rationale
(continued)
- central venous catheter removal and, 1036–37
 - central venous dressing and, 998–1000
 - central venous pressure and, 1014–17
 - central venous tubing and, 1004–1005
 - changing IV gown and, 410–13
 - changing linens in occupied bed and, 317–19
 - changing linens in unoccupied bed and, 309–13
 - chest drainage system and, 849–55, 866–67
 - chest drainage system specimen and, 870–71
 - chest tube and chest drainage system and, 859–62
 - chest tube removal and, 875–76
 - clean-catch, midstream urine specimen and, 83–86
 - closed-system catheter and, 725–29
 - closed wound drainage system and, 1164–66
 - closed wounds and, 1145–48
 - cold treatment and, 292–94
 - computed tomography and, 1311–12
 - condom catheter and, 688–90
 - contaminated items and, 156–59
 - continent urinary diversion and, 744–46
 - continuous passive motion device and, 1284–86
 - continuous positive airway pressure and, 844–45
 - controlled coughing and deep breathing and, 810–12
 - controlled substances and, 639–41
 - crutches and, 1290–93
 - digital removal of fecal impaction and, 776–78
 - double cannula tracheostomy tube and, 916–19
 - dressing a wound with retention sutures and, 1153–55
 - dressings and, 1124–28
 - dry dressing and, 1099–1101
 - dry heat and, 277–80
 - effective communication process and, 238–41
 - elastic bandage and, 1207–1209
 - electrocardiogram and, 1301–1303
 - emergency airway management and, 190–92
 - emergency client transport and, 226–30
 - endotracheal and tracheal tube suctioning and, 897–900
 - endotracheal tubes and, 904–906
 - enemas and, 765–71
 - epidural analgesia and, 632–34
 - epidural catheter and, 1082–84
 - eye and ear medications and, 506–10
 - eye care and, 375–79
 - female indwelling catheter and, 702–706
 - gastrointestinal endoscopy and, 1370–73
 - gastrointestinal suction devices and, 683–84
 - gastrostomy tube and, 675–77
 - guided imagery and, 246–48
 - hair and scalp care and, 383–87
 - hand and foot care and, 392–95
 - handwashing and, 123–24
 - Heimlich maneuver and, 210–15
 - hemodialysis site care and, 1057–59
 - heparin lock and, 972–74
 - hydraulic lift and, 435–37
 - implanted venous access device and, 1070–72
 - incentive spirometer and, 815–16
 - indwelling catheter and, 714–15
 - indwelling catheter removal and, 733–35
 - infant radiant heat warmer and, 289
 - intake and output measurement and, 70–71
 - intermittent positive-pressure breathing and, 839–40
 - intradermal injection and, 548–49
 - intramuscular injection and, 560–61
 - irritated peristomal skin and, 1194–96
 - IV bag and tubing and, 949–51
 - IV bolus and, 609–11
 - IV flow rate and, 956–57
 - IV insertion site and, 961–62
 - IV solution and, 590–92, 596–98, 936–38, 966–68
 - Jackson-Pratt drain site and, 1170–73
 - large-bore feeding tube and, 655–57
 - liver biopsy and, 1317–20
 - lumbar puncture and, 1344–47
 - magnetic resonance imaging and, 1307–1308
 - male indwelling catheter and, 694–98
 - mechanical ventilation and, 892–93
 - mixing medications and, 583–85
 - moist heat and, 265–67
 - moving client in bed and, 330–34
 - nasal medications and, 521–23
 - nasogastric tube and, 647–51
 - nasogastric tube removal and, 667–69
 - nebulized medications and, 541–43
 - noncontinent urinary diversion and, 738–40, 750–51
 - nose, throat, and sputum specimens and, 109–13
 - occult blood in stool and, 117–18
 - oral care and, 360–65
 - oral medications and, 498–501
 - oxygen therapy and, 802–805
 - passive range of motion and, 476–79
 - patient-controlled analgesia and, 626–28
 - peak expiratory flow rates and, 831–33
 - perineal and genital care and, 370–71
 - peripherally inserted central catheter and, 1041–46
 - peripheral vein total parenteral nutrition and, 1051–53
 - peritoneal dialysis and, 756–58
 - pharyngeal airway and, 886–87
 - physical assessment and, 5–24
 - pin insertion and, 1250–51
 - pneumatic compression device and, 1230–32
 - positron-emission tomography scanning and, 1390–92
 - postmortem care and, 489–91
 - postoperative care and, 461–64
 - postoperative exercises and, 469–72
 - pouching a draining wound and, 1201–1203
 - preoperative care and, 443–45
 - pressure bandage and, 1117–19
 - pressure ulcers and, 1185–89
 - proctosigmoidoscopy and, 1377–79
 - progressive muscle relaxation and, 252–54
 - proper body mechanics and, 130–32, 133
 - pulmonary therapy and postural drainage and, 820–21
 - pulse and, 41–43
 - pulse oximetry and, 824–26
 - rectal tube and, 782–84
 - respirations and, 49–50
 - restraints and, 181–83
 - safe lifting and, 130–32, 133
 - shaving a client and, 399–401
 - sitz baths and, 271–73
 - skin puncture and, 97–99
 - skin sutures and staples and, 1177–80
 - skin/topical medications and, 514–17
 - skin traction and, 1243–45
 - small-bore feeding tube and, 661–63
 - splints and, 1214–15
 - sterile gloves and, 163–65
 - stoma and, 787–89
 - subcutaneous injection and, 553–55
 - sublingual medications and, 496–503
 - surgical scrub and, 169–72
 - surgical site preparation and, 452–55, 456
 - temperature, 29–36
 - therapeutic massage and, 260–62
 - thermal blanket and, 285–88
 - thoracentesis and, 1324–26
 - total parenteral nutrition and, 1028–30
 - tracheostomy tube and, 910–12, 923
 - traction and, 1256–58
 - transcutaneous electrical nerve stimulation unit and, 300–302

- transfusion reactions and, 987–88
 - transparent dressing and, 1112–13
 - turning and positioning client and, 324–27
 - urinary catheter irrigation and, 718–21
 - urine specimen and, 83–86
 - urine testing and, 91–93
 - vaginal medications and, 533–35
 - venipuncture and, 928–31
 - venous access devices and, 1064–65
 - volume-control sets and, 615–17
 - walker and, 1294–96
 - warm soaks and, 271–73
 - weight and, 62–65
 - wet to damp dressing and, 1105–1108
 - wound drainage specimen and, 1159–60
 - wound irrigation and, 1132–33
 - wound packing and, 1138–40
 - Z-track injection and, 565–67
 - Incentive spirometer (IS)
 - assisting client with, 814–18
 - intermittent positive-pressure breathing and, 837–42
 - postoperative exercises and, 467–74
 - Incision
 - dry dressing and, 1098–1103
 - postoperative exercises and, 468
 - skin sutures and staples and, 1176–82
 - Incontinence
 - condom catheter and, 687–92
 - indwelling catheter removal and, 732–36
 - perineal and genital care and, 368–73
 - Incubators, isolette, 283
 - Indiana pouch, 743–48
 - Indwelling catheter
 - female, 701–708
 - male, 693–700
 - obtaining residual urine specimen from, 713–16
 - removing, 732–36
 - Infants. *See also* Children
 - airway obstruction and, 213–15
 - cardiopulmonary resuscitation for, 203–205
 - Infection
 - cap and mask and, 150–54
 - central venous catheter removal and, 1035–39
 - contaminated items and, 155–61
 - donning cap and mask and, 150–54
 - gowns and gloves and, 144–49
 - hair and scalp care and, 382–89
 - intraoperative, 1158–62
 - IV bag and tubing and, 948–53
 - nosocomial. *See* Nosocomial infection
 - postoperative, 1158–62
 - preoperative, 1158–62
 - safety and, 121–233
 - surgical site preparation and, 450–58
 - total parenteral nutrition and, 1031
 - turning and positioning client and, 322–29
 - Infiltration
 - butterfly needle and, 941–47
 - IV insertion site and, 960–64
 - IV solution and, 934–40
 - peripheral vein total parenteral nutrition and, 1049–55
 - Inflammation
 - vein, 960–64
 - wound drainage specimen and, 1158–62
 - Informed consent, 195, 441–49
 - Infusion, central venous tubing and, 1003–1007
 - Infusion device, intermittent, 971–76
 - Infusion port, implanted, 1069–74
 - Infusion pump, 954–59
 - Infusion rate, basal, 625–30
 - Infusion set, 614–19
 - Inhalers, 520–25, 539–46
 - Injection
 - intradermal, 547–51
 - intramuscular, 558–63
 - subcutaneous, 552–57
 - Z-track, 564–69
 - Injection port
 - administering medications via secondary administration sets and, 601–607
 - IV bag and tubing and, 948–53
 - IV bolus and, 608–613
 - IV solution and, 595–600
 - Inner cannula
 - double cannula tracheostomy tube and, 915–21
 - plugged, 922–24
 - Inspiration
 - incentive spirometer and, 814–18
 - respirations and, 47
 - Inspiratory capacity, maximal, 837–42
 - Inspiratory pressure, 843–47
 - Insulin-dependent diabetes mellitus (IDDM), 1368
 - Insulin management, 101–107
 - Intensive care, surgical, 459–66
 - Intercostal space, 1315–21
 - Internal rotation, 475–87
 - Intracranial pressure (ICP)
 - Ambu bag and, 878–84
 - increased, 1343–49
 - Intraoperative care, 450–58
 - Intraoperative period, 441–49
 - Intravenous (IV) bag
 - changing IV gown and, 409–14
 - IV solution and, 595–600
 - and tubing, 948–53
 - Intravenous (IV) bolus, 608–13
 - Intravenous (IV) bottle
 - changing IV gown and, 409–14
 - IV solution and, 595–600
 - Intravenous (IV) controller, 954–59
 - Intravenous (IV) flow rate, 954–59
 - Intravenous (IV) gown, 409–14
 - Intravenous (IV) insertion site, 960–64
 - Intravenous (IV) line, primary, 601–607
 - Intravenous (IV) piggyback, 601–607
 - Intravenous (IV) push
 - administering medications via, 608–13
 - heparin lock and, 971–76
 - Intravenous (IV) site dressing, 1111–15
 - Intravenous (IV) solution
 - adding medications to, 595–600
 - butterfly needle and, 941–47
 - central venous tubing and, 1003–1007
 - changing, 965–70
 - discontinuing, and changing to heparin lock, 971–76
 - heparin lock and, 971–76
 - IV bag and tubing and, 948–53
 - preparing, 589–94
 - starting, 934–40
 - Intravenous (IV) tubing
 - changing IV gown and, 409–14
 - IV flow rate and, 954–59
 - Intubation
 - emergency airway management and, 189–94
 - pharyngeal airway and, 885–89
 - Iodine, 1310
 - Ipecac syrup, 219–23
 - Iron dextran, 564
 - Irrigation
 - of bladder using closed-system catheter, 724–31
 - of drains, 744
 - gastrointestinal suction devices and, 681–86
 - of stoma, 786–91
 - tube, 666–71, 744
 - urinary catheter irrigation and, 717–23
 - wound, 1131–35
 - Isolation
 - contaminated items and, 155–61
 - donning cap and mask and, 150–54
 - infection control and, 144–49
 - Isolette incubators, 283
 - Isotonic solution
 - enemas and, 762–74
 - subcutaneous injection and, 552–57
 - Isotopes, 1389–94
- J**
- Jackson-Pratt (JP) drain, 1144–50, 1151, 1163, 1169–75
 - Jaw lift, 195–208
 - Jejunostomy, percutaneous endoscopic, 654–59
 - Jejunum, 672–80

- Joints
 assessment of, 21
 range of motion of, 480–84
- K**
- Ketones in urine, 89–95
 Kirschner wires, 1248–54
 Knee
 assessment of, 21
 passive range of motion and, 479
 range of motion of, 484
 Koch's pouch, 749–53
 Korotkoff's sounds, 53–60
 K-pads, 275–82
 Kussmaul's respirations, 47–52
- L**
- Labia, 701–708
 Labor pain, 1081–87
 Lacrimal system, 374–81
 Lactated Ringer's solution, 589–94
 Lactation, 1235–40
 Lactic dehydrogenase (LDH), 1322
 Lancet, 96–100, 926–33
 Laparoscopy, 1367
 Laryngeal pharynx, 885
 Laryngoscopy, 903–908
 Lateral decubitus position, 1343–49
 Leads, electrocardiogram and, 1300–1305
 Leak, air, chest tube and chest drainage system and, 858–64
 Leg, passive range of motion and, 478, 479
 Leukemia, 1336–42
 Leukocytes, 89–95
 Level of consciousness, 1343–49
 Levin's tube, 646–53
 Lidocaine, 1360
 Lift, hydraulic, 434–40
 Lifting, safe, proper body mechanics and, 127–36
 Lift sheet, 415–20
 Linens
 changing, in occupied bed, 316–21
 changing, in unoccupied bed, 308–15
 soiled, removal of, 156–57
 Lines
 skin traction and, 1241–47
 traction and, 1255–60
 Lipid emulsions
 peripheral vein total parenteral nutrition and, 1049–55
 total parenteral nutrition and, 1026–34
 Liver biopsy, 1315–21
 Liver capsule, 1315–21
 Liver toxicity, 1031
 Lochia, 368–73
 Lock
 air, 1049–55
 heparin. *See* Heparin lock
 Luer, 971–76
 Lock-out interval, patient-controlled analgesia and, 625–30
 Log roll, changing linens in occupied bed and, 316–21
 Lower extremities
 assessment of, 21
 physical assessment and, 3
 surgery of, 454
 Lubrication, rectal medications and, 526–31
 Luer lock, 971–76
 Lumbar puncture, 1343–49
 Lumen, gastrostomy tube and, 672–80
 Lungs, assessment of, 13–16
 Lymph nodes, assessment of, 7–9, 13
 Lymphoma, 995
- M**
- Maceration
 hand and foot care and, 390–97
 irritated peristomal skin and, 1193–98
 wound irrigation and, 1131–35
 Macro drip, 954–59
 Magnetic resonance imaging (MRI), 1306–1309
 Malabsorption, 1026–34
 Malaria, 986
 Malnourishment, 1026–34
 Mammogram, 74–81
 Manometer, 1013–19
 Manual carry, 224–33
 Mask
 donning, 150–54
 nonbreather, 803–804
 oxygen, 800–808
 partial rebreather, 803–804
 Venturi, 800–808
 Massage
 back, 258, 404–408
 therapeutic, 258–63
 Mattress pad, 308–15
 Maximal inspiratory capacity, 837–42
 Meatus, 709–12
 Mechanical lift, 434–40
 Medication administration record (MAR), 496–503
 Medications, 495–643
 accidental poisoning and, 219–23
 adding, to IV solution, 595–600
 administration of, 495–643
 piggyback, 601–607
 via cartridge system, 620–24
 via gastrostomy tube, 672–80
 via IV bolus, 608–13
 via IV push, 608–13
 via IV solution, 589–94, 595–600
 via secondary administration sets, 601–607
 via volume-control sets, 614–19
 via Z-track injection, 564–69
 buccal, 496–503
 central venous tubing and, 1003–1007
 controlled substances, 637–43
 ear, 504–12
 emergency, 971–76
 epidural analgesia, 631–36
 eye, 504–12
 intradermal injection, 547–51
 intramuscular injection, 558–63
 liquid, 496–503
 mixing, from two vials into one syringe, 582–88
 nasal, 520–25
 nebulized, 539–46
 oral, 496–503
 pain, 1255–60
 patient-controlled analgesia, 625–30
 piggyback, 601–607
 preparing an IV solution, 589–94
 rectal, 526–31
 skin/topical, 513–19
 subcutaneous injection, 552–57
 sublingual, 496–503
 topical, 513–19
 vaginal, 532–38
 withdrawing, 570–81
 Z-track injection, 564–69
- Medium
 communication and, 236–44
 contrast. *See* Contrast medium
 wound drainage specimen and, 1158–62
- Melena, 116
 Membrane, peritoneal, 754–61
 MGW solution, 763
 Micro drip, 954–59
 Microdroplets, 576–81
 Microhematocrit, 96–100
 Midstream urine specimen, 82–88
 Mobile client, weighing, 61–67
 Mobility
 assisting from bed to walking and, 427–33
 pressure ulcers and, 1186
 turning and positioning client and, 322–29
 Mouth, assessment of, 10–12
 Movement
 cast bivalving and windowing and, 1273–77
 cast care and comfort and, 1267–72
 of client in bed, 330–36
 traction and, 1255–60
- Mucosa, rectal, 775–80
 Multistix, 89–95
 Muscle relaxation, progressive, 251–57
 Muscles, bones, joints, and back (MBJB)
 assessment, 3
 Muscle spasms, skin traction and, 1241–47
 Musculoskeletal system, assessment of, 3, 21

- N**
- Narcan, 1368
 - Narcotics, 496–503, 637–43
 - Nasal cannula, 802–803
 - Nasal pharynx, 885
 - Nasal specimens, 108–15
 - Nasoduodenal tube, 654–59
 - Nasogastric (NG) tube
 - Ambu bag and, 878–84
 - dressing a wound with retention sutures and, 1151–57
 - gastrointestinal suction devices and, 681–86
 - inserting and maintaining, 646–53
 - large-bore feeding tube and, 654–59
 - removing, 666–71
 - small-bore feeding tube and, 660–65
 - Nasopharyngeal specimens, 108–15
 - Nasopharynx, 885–89
 - Nebulizers, 539–46
 - nasal, 520–25
 - Neck
 - assessment of, 12
 - passive range of motion and, 477
 - surgery, 452–53
 - Necrosis
 - administering medications via secondary administration sets and, 601–607
 - wound packing and, 1136–43
 - Needle
 - butterfly, 941–47
 - filter, 576–81
 - Huber, 1063, 1067, 1069–1074
 - Needle biopsy, 1315–21
 - Needlestick, 926–33, 934
 - Negative pressure
 - endotracheal and tracheal tube suctioning and, 896–902
 - mixing medications from two vials into one syringe and, 582–88
 - withdrawing medication from vial and, 570–75
 - Neobladder, 743–48
 - Neonates, cardiopulmonary resuscitation for, 205. *See also* Children
 - Nephrostomy, 1122–30
 - Neurogenic bowel, 775–80
 - Neurological system
 - assessment of, 3, 21–24
 - postoperative care and, 463
 - Neuromuscular examination, 12–13
 - Neurovascular assessment
 - cast care and comfort and, 1267–72
 - continuous passive motion device and, 1283–88
 - skin traction and, 1241–47
 - Neurovascular system
 - arm sling and, 1218–23
 - bandaging and, 1090–97
 - splints and, 1212–17
 - Nitrates in urine, 89–95
 - Nitrites in urine, 89–95
 - Nitrogenous waste products, 754–61
 - Noncontinent urinary diversion
 - catheterizing, 737–42
 - pouching, 749–53
 - Nonhemolytic reactions, 985–90, 986
 - Non-insulin-dependent diabetes mellitus (NIDDM), 1368
 - Nonviscous solution, 552–57
 - Normal saline (NS)
 - blood transfusion and, 977–84
 - dry dressing and, 1098–1103
 - enemas and, 763
 - IV insertion site and, 963
 - IV solution and, 589–94
 - nebulized medications and, 539–46
 - wound irrigation and, 1131
 - Nose, assessment of, 10–12
 - Nose drops, 520–25
 - Nose specimens, 108–15
 - Nosocomial infection
 - infection control and, 144–49, 150–54
 - wound drainage specimen and, 1158–62
 - Nutrition
 - assisting with feeding and, 344–50
 - central parenteral, 1026–34
 - cyclic parenteral, 1026–34
 - and elimination, 645–797
 - enteral. *See* Enteral nutrition
 - peripheral parenteral, 1026–34
 - pressure ulcers and, 1186
 - small-bore feeding tube, 660–65
 - total parenteral. *See* Total parenteral nutrition
- O**
- Obstetrics, perineal and genital care and, 368–73
 - Occult blood
 - in stool, testing for, with Hemoccult slide, 116–19
 - in urine, 89–95
 - Opiates, 631–36
 - Opioids, 625–30
 - Oral care, 358–67
 - Oral pharynx, 885
 - Organ donation, 488–93
 - Oropharyngeal airway, 885–89
 - Ambu bag and, 878–84
 - emergency airway management and, 189–94
 - Oropharyngeal tube, 885
 - Oropharynx, 885–89
 - Orthopedics, 1205–98
 - Orthopnea, 47–52
 - Orthostatic hypotension, 53
 - ambulation and, 137–43
 - assisting from bed to walking and, 427–33
 - Orthotopic bladder, 743–48
 - Osmosis, 754–61
 - Osteomyelitis, 1248
 - Ostomies, irritated peristomal skin and, 1193–98
 - Ostomy appliance
 - bowel diversion, 792–97
 - noncontinent urinary diversion and, 749–53
 - pouching a draining wound and, 1200
 - Otosopic assessment, 11
 - Output
 - from chest drainage system, 865–68
 - intake and, 73
 - urinary, 687–92
 - Overhydration, 89–95
 - Oximeter
 - postoperative care and, 459–66
 - pulse oximetry and, 823–28
 - Oxygen
 - inspired, fraction of, 800–808
 - partial pressure of, 1075
 - postoperative care and, 462
 - via artificial airway, 804–805
 - Oxygenation, 799–924
 - Oxygen saturation
 - endotracheal tubes and, 903–908
 - oxygen therapy and, 800–808
 - Oxygen therapy, 800–808
 - Oxyglucose, 1389
 - Oxygen arterial saturation, 823–28
- P**
- Packed red blood cells, 977–84
 - Packing a wound, 1136–43
 - Packsaddle carry, 230
 - PaCO₂, 878–84
 - Pain
 - acute, 298–305
 - body language in assessment of, 1368
 - chest, chest tube removal and, 873–77
 - chronic, 298–305
 - control of, 819–22, 1255–66
 - epidural analgesia and, 631–36
 - labor, 1081–87
 - nonpharmacological relief of, 270–74
 - patient-controlled analgesia and, 625–30
 - postoperative care and, 463–64
 - Palpation
 - blood pressure and, 53–60
 - physical assessment and, 2–27
 - venipuncture and, 926–33
 - Paracentesis
 - abdominal, 1330–35
 - peritoneal dialysis and, 754–61
 - Parenteral IV solution, 965–70
 - Parenteral nutrition, total. *See* Total parenteral nutrition
 - Passive range of motion (PROM), 475–87
 - Patches, 513–19

- Patency, gastrointestinal suction devices and, 681–86
- Pathogens
donning cap and mask and, 150–54
wound drainage specimen and, 1158–62
- Patient-controlled analgesia (PCA), 625–30, 1081–87
- Patient safety, restraints and, 179–88
- Peak expiratory flow rates, 829–36
- Peak flow, 829–36
- Peptides, allergic reactions, 1031
- Percussion, 2–27
- Percutaneous absorption, 513–19
- Percutaneous endoscopic gastrostomy (PEG)
gastrostomy tube and, 672–80
large-bore feeding tube and, 654–59
- Peri-care, 368–73
- Perineal care, 368–73
bathing client in bed and, 351–57
warm soaks and, 270–74
- Perineum
female indwelling catheter and, 701–708
perineal and genital care and, 368–73
- Perioperative care, 450–58
- Perioperative positioning injury, 459–66
- Peripheral parenteral nutrition (PPN), 1026–34, 1049–55
- Peripheral vascular disease, 390–97
- Peripheral vein total parenteral nutrition, 1049–55
- Peristalsis
assisting from bed to wheelchair, commode, or chair and, 421–26
digital removal of fecal impaction and, 775–80
gastrostomy tube and, 672–80
postoperative exercises and, 467–74
- Peristomal hyperplasia, 792–97, 1193–98
- Peristomal skin, 1193–98
- Peritoneal cavity, 1330–35
- Peritoneal dialysis, 754–61
- Peritoneal membrane, 754–61
- Peritoneum, 754–61
- Peritonitis, 1315–21
- Pestle, medications and, 496–503
- pH
arterial blood, 1075
large-bore feeding tube and, 654–59
small-bore feeding tube and, 660–65
of urine, 89–95
- Pharyngeal airway, 885–89
- Phenylketones, 89–95
- Philadelphia collar, 1241
- Phlebitis
butterfly needle and, 941–47
IV insertion site and, 960–64
peripheral vein total parenteral nutrition and, 1049–55
- Phlebostatic axis, 1013
- Phoresis, 991–96
- Physical assessment, 1–119
- Physiotherapy, chest, 819–22
- Piggyback
emergency evacuations and, 228
medications and, 601–607
- Pin care, traction and, 1248–54, 1255–60
- Pinna, 504–12
- Pirbuterol, 829–36
- Pivot joint, 480
- Plaque, 358–67
- Plasma
blood transfusion and, 977–84
fresh frozen, 977
transfusion reactions and, 985–90
- Platelets, 977–90
- Pleura, 47–52
- Pleural cavity
chest drainage system and, 848–57
thoracentesis and, 1322–29
- Pleural effusion, 1322–29
- Pleur-evac, 865–68
- Pneumatic compression device (PCD), 1229–34
- Pneumonia
aspiration, 654
incentive spirometer and, 814–18
- Pneumothorax
bronchoscopy and, 1356–65
central parenteral nutrition and, 1030
chest drainage system and, 848–57
chest tube and chest drainage system and, 858–64
chest tube removal and, 873–77
intermittent positive-pressure breathing and, 837–42
liver biopsy and, 1315–21
spontaneous, 873
tension. *See* Tension pneumothorax
thoracentesis and, 1322–29
- Poisoning, accidental, 219–23
- Port
access, 869–72
balloon, 732–36
implanted, 1062–68
implanted infusion, 1069–74
injection. *See* Injection port
specimen collection, 713–16
- Positioning
perioperative, 459–66
pulmonary therapy and postural drainage and, 819–22
surgical site preparation and, 450–58
and turning a client, 322–29
- Positive end expiratory pressure (PEEP), 890
- Positive-pressure ventilators, 890–95
- Positron-emission tomography (PET), 1389–94
- Postanesthesia care unit (PACU), 459–66
- Postmortem care, 488–93
- Postoperative breathing, 809–13
- Postoperative care, 450–58, 459–66
- Postoperative unit, 459–66
- Postpartum care, 368–73
- Post-tusic, 809–13
- Postural drainage, 819–22
- Postural hypotension, 53
- Posture, assisting from bed to walking and, 427–33
- Potassium chloride, 595–600
- Pouch
draining wound and, 1199–1204
Indiana, 743–48
Koch's, 749–53
noncontinent urinary diversion and, 749–53
stoma and, 792–97
- Povidone-iodine
central venous catheter and, 1020–25
central venous dressing and, 997–1002
implanted venous access device and, 1069–74
wet to damp dressing and, 1104–10
wound care and, 1098
- Precipitates, 601–607, 1049–55
- Pregnancy variations
breast self-examination and, 79
epidural catheter and, 1086
- Premature infants, cardiopulmonary resuscitation for, 205. *See also* Children
- Premedication, chest tube removal and, 873–77
- Prenatal testing, amniocentesis and, 1350–55
- Pre-op checklist, 441–49
- Preoperative care, 450–58
administering, 441–49
teaching of postoperative exercises and, 467–74
- Pressure sores, 1183–92
moving client in bed and, 330–36
turning and positioning client and, 322–29
- Pressure ulcer
continuous passive motion device and, 1283–88
preventing and managing, 1183–92
turning and positioning client and, 322–29
- Proctoscopy, 1376–81
- Proctosigmoidoscopy, 1367, 1376–81
- Proetz position, nasal medications and, 520
- Program, cartridge system and, 620–24
- Prone position, 322–29
- Prosthesis, ocular, 374–81
- Protein intolerance, 1031
- Protein in urine, 89–95
- Proximal position, bathing client in bed and, 351–57

- Psychological complications of total parenteral nutrition, 1031
- Psychosocial intervention
 guided imagery and, 245–50
 progressive muscle relaxation and, 251–57
- Pulmonary embolism, 467–74
- Pulmonary therapy, 819–22
- Pulse, 40–46
- Pulse oximeter, 823–28
- Pump
 blood, 977–84
 cartridge system and, 620–24
 infusion, 954–59
- Puncture sites, therapeutic, changing dressings around, 1122–30
- Purulence
 closed wounds and, 1144–50
 Jackson-Pratt drain site and, 1169–75
 wet to damp dressing and, 1104–10
- Pyorrhea, 358–67
- Pyrexia, 28–39
- Q**
- Quadriceps muscle, 564–69
- R**
- Radial artery
 arterial blood gas specimen and, 1075–80
 palpation method of blood pressure using, 57–58
- Radiation, ionizing, 1310
- Radioisotopes, 1389–94
- Rales
 nebulized medications and, 539–46
 tracheostomy tube and, 909–14
- Range of motion (ROM) exercises
 arm sling and, 1218–23
 cast care and comfort and, 1267–72
 continuous passive motion device and, 1283–88
 passive, 475–87
- Reagent strips, 89–95, 101
- Rectal exam, 1376–81
- Rectal mucosa, 775–80
- Rectal tube, 781–85
- Rectum, 526–31
- Red blood cells (RBCs)
 infusion rates for, 979
 packed, 977–84
 transfusion reactions and, 985–90
- Refractometer, urine testing and, 89–95
- Relaxation
 deep muscle, 251–57
 guided imagery and, 245–50
 muscle, progressive, 251–57
 progressive muscle relaxation and, 251–57
- Relaxation breath
 guided imagery and, 247
- progressive muscle relaxation and, 251–57
- Repositioning client, moving client in bed and, 330–36
- Rescue breathing/emergency resuscitation, 209–18
- Residual urine specimen, 713–16
- Respiration
 artificial, 195–208
 assessment of, 14–16
 counting, 47–52
 normal and abnormal patterns of, 48
 pharyngeal airway and, 885–89
- Respiratory acidosis, 1075–80
- Respiratory alkalosis, 1075–80
- Respiratory arrest, 48
 cardiopulmonary resuscitation and, 195–208
 endotracheal tubes and, 903–908
- Respiratory depression, 625–30
- Respiratory distress/failure, 890–95
- Restraints, 179–88
- Resuscitation
 cardiopulmonary, 195–208
 emergency, 195–208
 Heimlich maneuver and, 209–18
- Retention catheter
 closed-system catheter and, 724–31
 female indwelling catheter and, 701–708
 indwelling catheter removal and, 732–36
- Rh factor, transfusion reactions and, 985–90
- Rhonchi, 909–14
- Rotation, passive range of motion and, 475–87
- S**
- Saddle joint, 482–83
- Safety and infection control, 121–233
- Salem sump tube
 gastrointestinal suction devices and, 681–86
 nasogastric tube and, 646–53
- Saline, normal. *See* Normal saline
- Saline flush
 heparin lock and, 971–76
 IV bolus and, 608–13
- Sanguineous drainage, 1144–50
- Scales, 61–67
- Scalp care, 382–89
- Scrub, surgical, 168–173, 450–458
- Seal
 air, chest drainage system specimen and, 869–72
 water, 848–857, 858–864, 865–868
- Secondary administration sets, 601–607
- Secondary intention, healing by, 1136–43
- Sediment, urinary catheter irrigation and, 717–23
- Semi-Fowler's position
 gastrointestinal suction devices and, 681–86
 moving client in bed and, 330–36
- Sensation
 cast bivalving and windowing and, 1273–77
 cast care and comfort and, 1267–72
 traction and, 1255–60
- Sensory perception, pressure ulcers and, 1186
- Sepsis
 peripheral vein total parenteral nutrition and, 1049–55
 total parenteral nutrition and, 1031
- Septic shock
 liver biopsy and, 1315–21
 transfusion reactions and, 985–90
- Serosanguineous drainage, 1144–50
- Sexual maturity rating, 81
- Shampooing, 382–89
- Shaving, 398–403
 surgical site preparation and, 450–58
 wet, hair removal and, 450
- Shearing force
 assisting from bed to stretcher and, 415–20
 moving client in bed and, 330–36
- Sheet
 draw. *See* Draw sheet
 fitted, 308–15
 lift, 415–20
 top, 308–15
 turn, 330–36
- Shock
 anaphylactic, 539–46
 hypovolemic, 1116–21
 septic. *See* Septic shock
- Short bowel syndrome, 1026–34
- Shortness of breath, chest tube removal and, 873–77
- Shoulder
 assessment of, 12
 passive range of motion and, 477
 range of motion of, 480
- Shunt, hemodialysis site care and, 1056–61
- Side-lying position, 322–29
- Sigmoidoscopy, 1368, 1376–81
- Sims' position, 526–31
- Single cannula tube, 922–24
- Single-lumen nasogastric tube, 646–53
- Skin
 assessment of, 7
 breakdown, 1241–47
 irritated peristomal, 1193–98
 peristomal, 792–97
 traction, 1255–60
- Skin integrity
 central venous dressing and, 997–1002
 and wound care, 1089–1204

- Skin puncture, 96–100
 blood glucose levels and, 101
 venipuncture and, 926–33
- Sleep apnea, 843–47
- Sling
 arm, 1218–23
 hydraulic lift and, 434–40
 triangular, 1218–23
- Small-bore feeding tube, 660–65
- Snellen chart, 10
- Soaks
 hot, 264–69
 warm, 270–74
- Solution
 IV. *See* Intravenous solution
 urinary catheter irrigation and, 717–23
- Spasms, muscle, skin traction and, 1241–47
- Specimen
 arterial blood gas, 1075–80
 bronchoscopy and, 1356–65
 collection, 713–16
 from chest drainage system, 869–72
 nose, 108–15
 throat, 108–15
 urine. *See* Urine specimen
 venipuncture and, 926–33
 wound drainage, 1158–62
- Spectrometry, 823–28
- Sphygmomanometer
 blood pressure and, 53–60
 pressure bandage and, 1116–21
- Spinal tap, 1343–49
- Spirometer, incentive. *See* Incentive spirometer
- Splinting, 1212–17
 controlled coughing and deep breathing and, 809–13
 postoperative exercises and, 467–74
- Splints, 1213
- Sputum specimens, 108–15
- Stab wounds, 1144–50
- Standard precautions
 donning cap and mask and, 150–54
 infection control and, 144–49, 155–61
- Staples, skin, removing, 1176–82
- Steinmann pins, 1248–54
- Stem cell collections, peripheral, 991–96
- Sterile field, 174–78
- Sterile technique. *See* Asepsis
- Sternum, 1336–42
- Stethoscope, 442
 blood pressure and, 53–60
 oxygen therapy and, 801
- Stitches, 1176–82
- Stockinette, 1261–66
- Stockings, antiembolic, 1224–28
- Stoma
 care, 741
 catheterization, 737–42
 digitalization of, 786–91
 irrigating and cleaning, 786–91
 pouching a, 792–97
- Stomatitis, 358–67
- Stool, occult blood in, 116–19
- Stopcock, three-way, 608–13
- Styler, 1040–48
- Stylus, 1336–42
- Subclavian vein, 1040–48
- Substance abuse, 1368
- Suction
 chest drainage system and, 848–57
 chest drainage system output and, 865–68
 chest tube and chest drainage system and, 858–64
 endotracheal tubes and, 896–902
 gastrointestinal, 681–86
 nasogastric tube and, 666–71
 tracheal tubes and, 896–902
- Superior vena cava, 1040–48
- Superior vena cava (SVC) syndrome, 960
- Supine position, 322–29
- Suppository
 rectal medications and, 526–31
 vaginal, 532–38
- Suprapubic position, 351–57
- Surface tension, 576–81
- Surgery
 abdominal, 781–85
 epidural catheter and, 1081–87
 site preparation and, 450–58
- Surgical incisions
 dry dressing and, 1098–1103
 postoperative exercises and, 468
- Surgical intensive care, 459–66
- Surgical prep, 441–49
- Surgical scrub, 168–73, 450–58
- Sustained maximum inspiration (SMI), 467–74
- Sutures
 continuous, 1176
 dry dressing and, 1098–1103
 interrupted, 1176
 removing, 1176–82
 retention, 1151–57
- Synchronized intermittent mandatory ventilation (SIMV), 890
- Synovial joint, 480
- Syringe
 one, mixing medications from two vials into, 582–88
 Toomey, 717–23
 venipuncture and, 926
- Systolic blood pressure, 53–60
- T**
- Tachycardia
 pulse and, 40–46
 thoracentesis and, 1322–29
- Tachypnea, 47–52, 1322–29
- Tamponade, cardiac, 873
- Tanner stage, breast development and, 13, 74–81
- Tapotement, 258–63
- TED hose, 1224–28
- Teeth, assessment of, 12
- Temperature, 28–39, 463
- Temporomandibular joint (TMJ)
 assessment of, 9
 range of motion of, 480
- Tension pneumothorax
 chest drainage system specimen and, 869–72
 chest tube and chest drainage system and, 858–64
- Test strips, urine testing and, 89–95
- Thermometer, 28–39
- Thoracentesis, 1322–29
- Thoracic breathing, 48
- Thorax
 assessment of, 14–16
 chest drainage system and, 848–57
- Throat, assessment of, 10–12
- Throat specimens, 108–15
- Thrombophlebitis
 continuous passive motion device and, 1283–88
 postoperative exercises and, 467–74
- Thrombosis
 central venous catheter removal and, 1035–39
 deep venous. *See* Deep venous thrombosis
 venous, 1030
- Thumb, range of motion of, 482–83
- Thyroid, assessment of, 12
- Tidal volume
 endotracheal tubes and, 903–08
 intermittent positive-pressure breathing and, 837–42
- Toes, range of motion of, 484
- Tomography
 computed, 1310–1314
 positron-emission, 1389–1394
- Toomey syringe, 717–23
- Toothbrushing, 358–67
- Total nutrient admixture system, 1026–34
- Total parenteral nutrition (TPN)
 central venous catheter and, 991–96
 infusing, through central venous catheter, 1026–34
 peripheral vein, 1049–55
- Tourniquet, 926–33
- T-pump, 275–82
- Trace element deficiencies, 1031
- Trachea
 assessment of, 12
 tracheostomy tube and, 909–14

- Tracheal intubation, 903–908
- Tracheal tube, suctioning, 896–902
- Tracheostomy
- double cannula tracheostomy tube and, 915–21
 - endotracheal and tracheal tube suctioning and, 896–902
 - mechanical ventilation and, 890
 - tracheostomy tube and, 909–14, 922–24
- Tracheostomy ties, 909–14
- Tracheostomy tube
- Ambu bag and, 878–84
 - double cannula, 915–21
 - maintaining and cleaning, 909–14
 - oxygen via, 804–05
 - plugging, 922–24
- Tracheotomy
- double cannula tracheostomy tube and, 915–21
 - tracheostomy tube and, 909–14
- Traction
- elastic bandage and, 1206–11
 - maintaining, 1255–60
 - pin insertion and, 1248–54
 - skeletal, 1241–1247, 1248–1254, 1255–1260
 - skin, 1255–60
 - Z-track injection and, 564–69
- Transducer, central venous pressure and, 1013–19
- Transfers, 421–26
- Transfusion, blood, 977–984
- Transfusion reactions, 977–90
- Transport, emergency client transport and, 224–33
- Trendelenburg position, 1116–21
- Trendstrips, 101
- Trunk, passive range of motion and, 477
- Tube feeding
- gastrostomy tube and, 672–80
 - nasogastric tube and, 646–53
 - nasogastric tube removal and, 666–71
- Tubing
- central venous, 1003–1007
 - IV. *See* Intravenous (IV) tubing
- Tunneled wound, 1136–43
- Turbo-inhalers, 520–25
- Turbulence, withdrawing medication from vial and, 570–75
- Turgor, stoma and, 786–91
- Turning and positioning a client, 322–29
- Turn sheet, 330–36
- U**
- Ulcer
- decubitus, 1183–92
 - dermal, 1183–92
 - peptic, 646–53
 - pressure. *See* Pressure ulcer
- Ultrasound, 1350–55
- Umbilicus, 351–57
- Unassisted walking, 137–43
- Unconscious adults
- chest thrust and, 213
 - Heimlich maneuver and, 211–12, 213
- Unconscious children, airway obstruction in, 215
- Universal precautions, 144–49, 150–54, 155–61
- Unoccupied bed
- changing linens in, 308–15
 - changing linens in unoccupied bed and, 308–15
- Ureterostomy, cutaneous, 749–53
- Urethroscope, 1367
- Urinalysis, 713–16
- Urinary diversion
- continent, 743–48
 - noncontinent. *See* Noncontinent urinary diversion
- Urinary meatus, 701–708
- Urinary output devices, 687–92
- Urination, 337–43
- Urine, 69
- clean catch, 737–42
 - glucose in, 89–95
 - irritated peristomal skin and, 1193–98
 - ketones in, 89–95
 - occult blood in, 89–95
 - specific gravity of, 89–95
- Urine specimen
- clean-catch, midstream, collecting, 82–88
 - noncontinent urinary diversion and, 737–42
 - residual, 713–16
- Urinometer, 89–95
- Urobilinogen, 89–95
- Urokinase, 1020–25
- Urostomy
- continent, 749–53
 - noncontinent urinary diversion and, 737–42, 749–53
- Urticaria, 539–46
- V**
- Vacutainer, 926–33
- Vacuum
- chest drainage system and, 848–57
 - mixing medications from two vials into one syringe and, 582–88
- Vagina, 532–38
- Vaginal birth postpartum care, 368–73
- Vagus nerve, 775–80
- Valium, 1368
- Valsalva maneuver, 873
- Varicose veins, 1206–11
- Vascular compromise, 1261–66
- Vascular disease, peripheral, 390–97
- Vascular study, arteriography and, 1382–88
- Vasoconstriction, 291–97, 270–74
- Vasodilation, 270–74
- Vasovagal reaction, 775–80
- Vastus lateralis muscle, 558–63
- Vena cava syndrome, 1350–55
- Venipuncture, 101, 926–33
- Venous access, 934–40, 965–70
- Venous access device (VAD)
- central venous catheter and, 1020–25
 - central venous dressing and, 997–1002
 - external long-term, 1122
 - implanted, 1062–68, 1069–74
 - long-term, 1122–30
- Venous return, 421–26
- Venous stasis, 1229–34
- Venous thrombosis, 1030
- Ventilation
- client with Ambu bag and, 878–84
 - mechanical, 890–895
 - oxygenation and, 799–924
- Ventrogluteal muscle, 558–63, 564–69
- Vertebrae, lumbar puncture and, 1343–49
- Viscosity, postoperative exercises and, 467–74
- Visual acuity, 11
- Vital capacity (VC), 837
- Vital signs, 464
- VoluTrol, 614–19
- Vulva, 368–73
- W**
- Walker
- assisting with, 1289–98
 - emergency transfer from bed to, 227–28
- Walking. *See* Ambulation
- Warmers, radiant, infant, 275–282, 283–290
- Waste products, nitrogenous, 754–61
- Webril, 1261–66
- Weight, 61–67
- pin insertion and, 1248–54
 - skin traction and, 1241–47
- Wheezes, 539–42
- Witch hazel, 368–73
- Wound
- closed. *See* Closed wound
 - draining, 1199–1204
 - dry dressing and, 1098–1103
 - irrigating, 1131–35
 - packing, 1136–43
 - protection, 1111–15
 - with retention sutures, 1151–57
 - skin integrity and, 1151–57
 - stab, 1144–50

Wound (continued)

- tunneled, 1136–43

Wound drainage

- closed system of, 1163–68

- culturing and, 1158–62

- wound irrigation and, 1131–35

- Wound healing, 270–74

Wrist

- assessment of, 13

- passive range of motion and, 478

- range of motion of, 482

X

- X-ray, chest. *See* Chest x-ray

- Xylocaine gel, 780

Y

- Y adapter, 724–31

- Y-port, 601–07

- Y-tubing, 977–84

Z

- Z-track injection, 564–69