Dimitrije E. Panfilov
Editor

Aesthetic Surgery of the Facial Mosaic

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Dimitrije E. Panfilov (Ed.)

Aesthetic Surgery of the Facial Mosaic

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I dedicate this book to
SANJA,
ALEKSEJ, DENIS
NASTASSIA, BORIS, LARA.
They know why.

Preface

Where there is an enthusiast, this is the top of the World. I hope, that our readers will feel the inspired raptures with which all my co-authors have contributed to this book. They have given their best advices in the fields where they are especially successful, with all their tips and tricks. I have made the same as editor: I have not only counted but also have listed a kaleidoscope of 363 ideas, tips and tricks at the end.

The understanding of the face as a dynamic emotional structure has changed more during the last 20 years than during the last 20 thousand years. Our task is not only to rejuvenate the face, but to harmonize, enhance and symmetrize it.

This book should help young plastic surgeons to focus their attention on safe techniques, to recognize the risks, to avoid complications, to enrich their repertoire by many mosaic stones of the face, to benefit of the enormous experience of 36 co-authors. If we presume that each of this World known luminaries has made about 3000 face lifts or more (some of them over 8000!), so this book contents experiences of over 100.000 single facelift surgeries! When I was young, I went into the operating room with open books placed nearby my operating table. I could look at the illustrations and those "sacred books" have helped me enormously. Perhaps, in a similar way, this book could help our young colleagues.

Bonn, May 2006 **Dimitrije E. Panfilov**

Acknowledgements

I have learned from many excellent surgeons, older and younger than me. First place among them takes Gottfried Lemperle not only as my teacher, one of co-authors in this book, but also as a sincere friend. As I cannot pay him back all what he has given to me, I am giving my knowledge further to the coming generation of plastic surgeons with this book.

I am also thankful to all my patients who gave to me their trust. Special thanks has to be paid to those of them, who agreed to publish their faces although they could be recognized. They did it for the scientific reasons, to allow our young reader to understand and learn about faces more and better. I had always open ears for questions and suggestions of my patients. Thank to their ideas, I have created some new methods to harmonize facial mosaic.

I am deeply thankful to all of my co-authors who are all leading experts in the World of plastic surgery – "All Stars" so to say. This "Dream Team" of luminaries in this field of medicine have brought their original ideas of different ways how to solve similar problems. As we are dealing with the face, the reader will have the opportunity to see how our contributors look like. We have added some sort of photo gallery of their portraits.

I am also deeply thankful to the foreword writers, in alphabetic order: Tom Biggs, Bob Goldwyn and José Guerrerosantos who reviewed this book and wrote down their impressions. I adore them as glittering stars on the sky of plastic surgery, but I also feel emotions of friendship toward them. Beside being superb experts, they are nice, polite and moderate contemporaries.

Looking back I have to think of and to thank to all my co-workers past and present. My nurses as operative assistants, first of all Mrs. Ingrid Strasser, my left handed "right hand", also Koby, Sandra, Renate, Britta, Maggy, etc. Short time – less than one year – but deep trace has left my Greek assistant Jorgos Andreanidis (we called him: Adrenalinis), plastic surgeon with great future, now in Athens. For the last 10 years I had the pleasure not to notice any problems with anaesthesia. The merit of this is my superb anaesthesiologist doctor Alfred Heinen. His profound knowledge of the whole medicine, not only of anaesthesia, his calm and pleasant nature and his readiness to serve as superb cameraman for many slides and film sequences in this book are praiseworthy. Also to be mentioned his colleagues Mrs. Susanne Herzogenrath and Mrs. Meike Bergé.

Special thought are accompanying the "good spirit" of my clinic, my wife Sanja Panfilov. Although being educated as professor for literature she became familiar with our patients who were embedded in her arms. Her good soul, understanding of patient's wishes, clever ideas, holding the staff together like a second family and even her twittering voice on the phone made our patients satisfied and our clinic prospering. Without her patience in typewriting many, many pages of this book and countless evenings and weekends spent lonely at home have made this book possible. Perhaps I can make it up to her some day.

Sanja was, together with my younger son Denis the so called "mini-organizing-committee" of our international biannual symposiums. Denis Panfilov has gained degree as architect and he had worked out logos and illustrations for all my

presentations and for this book. As being talented painter he made the majority of graphic images also in this book with quotations from the history of arts, also some contemporary "icons" to make the schematic drawings more familiar to the reader. He was a couple of years a member of our "clinic family".

Doctor Schütze from Bonn called me about two years ago – his son Hans-Jörg Schütze has made diploma for medical graphics in the USA, would I be publishing some new books? Yes, I would. What an important phone call for me! I new Hans-Jörg's graphics from some other medical books. For me, he is at the moment the best medical graphic artist in Germany, perhaps in Europe. And he is a very pleasant, non-complicated person and chap. He did not lost his patience even if some outlines went to and fro several times between us. I find his graphic images superb and very didactic.

I am happy that we can offer wonderful works of Prof. emeritus Walter Thiel of Graz, Austria, from his "Photographical Atlas of Practical Anatomy." Our reader will enjoy nine of his excellent preparations. I thank him for his generosity.

Further more I am thankful to the ethologist from Vienna, Prof. Karl Grammer, for his computer mixed images and for the "pattern of beauty" with "golden cut" developed by maxillo-facial surgeon Stephan Marquardt from California who allowed us to use some of his images.

Some of our patients become our friends, much less of our friends become our patients. One of friends of our clinic, Mrs. Karin Pagmar, singer and actress from Sweden, has showed us the six basic emotional expressions of the face. I am also thankful to the painters La Calas, Jeva Grantina, Rembrandt van Rijn, Ingrid Bickenbach, Andy Warhol, Mirey Orlan, Salvador Dalí, Heiner Meyer (Dalí's student) and Tošo Jukić, and sculptors Tuthmosis (Egypt), and Bustamante (Mexico), and photo collector Peter Engelmeier whose works I was able to reproduce.

Stephan Malarme wrote: "The whole World exists to write one single book". Since I have written "Cosmetic Surgery Today" by Thieme in 1998, I have tried to convince Mrs. Gabriele Schröder from Springer-Verlag in Heidelberg to publish a book of he volumetric rhytidoplasty with new artistic understanding of the face, its psychological and social importance from one side, and to offer to our young plastic surgeons the old and new techniques in a way as simple and practical useful as cook-book on the other side.

I am thankful to Mrs. Schröder that she has resisted till February 20, 2004 when she said "Yes." Meanwhile, I have learned more and more methods and colleagues bringing new ideas, so my knowledge and access to this matter have matured. Selfcritically, I have remembered the sentence one could find in the library of the famous British plastic surgeon Rainsford Mowlam: "O Lord, help me keep my big mouth shut until I know what I am talking about."

Mrs. Ellen Blasig from Springer Heidelberg was the operative person, responsible for the organization of our book. The editor feels great when he gets mails from her like: "Hurra! We have got your materials…" and there is a wonderful personal touch to those two ladies whom I am very thankful for their efforts. The other people like Mrs. Petra Möws and Mrs. Anne Strohbach from Leipzig or Günter Bauer from Wiesloch and Doctor Stuart Evans from UK I know only from mail or phone contact. Them and many more nameless people from Springer I have to thank anonymously.

I thank to my previous publisher Thieme, Stuttgart, Germany, having allowed me to quotate my former book "Cosmetic Surgery Today" (issued also in German, Russian, Serbian languages). I have to mention names and thank for cooperation and generosity: Dr. Dirk Suhr, Angelika Findgott, Susanne Seeger and Heike Schwabethan.

I want to mention some other persons who have helped me to be able to edit this book, Mrs. Kristine Schroeder from Medicon Instruments, Tuttlingen, Germany, who helped me to develop some surgical instruments, Jon Garito from Ellman Radiofrequency, N.Y., NY USA, whose cooperation has been appreciated for years,

my golf-friend Uwe Treskates and his cutter Chris Fitzgibonn from "Spectrafilm", Bonn, who have produced DVD with twelve different operative procedures added to this book.

I have learned a lot during my numerous hospitancies in Paris, Brussels, London, Cambridge, Glasgow, New York, Palo Alto, Mexico City, Rio, Sao Paulo, Curitiba, Singapore… When you start to learn medicine, you can never stop! How to pay back to all those generous colleagues from whose tricks I have learned? This book is one of possible answers.

International and American Societies for Aesthetic Plastic Surgery (ISAPS & ASAPS) organize meetings where every plastic surgeon can learn mostly. I have visited them as often as I could and learned every time a lot. I am therefore thankful for all presenters from whom I could learn. How to pay back? Again – into the future: I have founded Global Expert Service Aesthetic Plastic Surgery (GESAPS) issuing "Aesthetic News" for education of journalists. Furthermore, I am visiting professor of the International Academy for Aesthetic Plastic Surgery (IAAPS). I am doing, learning and teaching aesthetic plastic surgery with passion.

FOREWORD by T.M. Biggs

This is a book written for young plastic surgeons, or so says the editor. He says it in good faith, however, as he has 35 of the world's most luminous surgeons, who have involved themselves in over 100,000 facial rejuvenation procedures, contributing chapters to add to his own 39 segments.

This is a book written for young plastic surgeons in that it gives them a solid foundation for approaching any and all of the challenges awaiting them in their early years of facial aesthetic surgery.

In the training of a plastic surgeon some residents receive an abundance of experience in aesthetic surgery, whereas others receive less. Even those fortunate ones usually encounter only the experience of their program director, who may or may not have availed himself or herself of the most contemporary techniques. This book provides the approach taken by 36 of the world's experts.

This book is written for young plastic surgeons in that it deals with more than the surgery of "face lifting." There are excellent chapters on preoperative and postoperative care, concepts and tricks, what not to do, preoperative and postoperative skin care, and polarized light. There are chapters on Botox, hair, laser with and without surgery, and a special chapter on 363 "tips and tricks." There is a beautiful chapter on "the 4R principle" – relax, restore (volume), resurface, redrape. The nose, lips, eyes, and neck are discussed and that significant twenty-first century phenomenon, lipofilling, is discussed.

This is a book written for young plastic surgeons because, in this writer's view, travel has been the best teacher. This writer's opportunity to travel the world and engage the greatest minds in our field has contributed immeasurably to his growth and understanding of aesthetic surgery. This book, written for young plastic surgeons, gives them virtual travel to most of the major centers and contributors to aesthetic facial surgery, and at a fraction of the cost in money and time, two severely restricting factors in a young plastic surgeon's educational opportunities.

This is a book written for young plastic surgeons and probably should be examined before any facial consultation or operative procedures. It is a book written for young plastic surgeons that probably should be by the side of his or her bed so the last thoughts of the day can be those that will make the morrow more understandable.

All that has been said above is, to this writer, true, but it gives an erroneous impression. This writer, with thousands of facial surgical procedures in his experience chest, found it enlightening and stimulating.

Those familiar with the editor know him to be an unusual man. They know him to be a man with great interest in the history of our specialty and how currently employed concepts evolved. They know him to be a man of intuition and wit. They know him to be a man not afraid to change. They know him to be an unusual man. The editor's personal contributions of 39 chapters appropriately confirm the impressions of those who know him and know his characteristics.

It is not in the purview of this writing to discuss all of the insights presented in the editor's 39 chapters, but a few require mentioning. His early chapter on the evolution of the face was new information for this writer. His comments on the

various expressions seen in the face have a prescient implication in society and have recently been explored in circumstances of "profiling" in airport security. The editor's comments on symmetry, analysis, and psychology, while not new, were significant.

The two chapters that touched this writer the most came early and then later in the book. The chapter of the fourth dimension had lines that tugged at me: "Words are first cascades of feelings, whereas our faces are able to show subtle emotions in smooth flow without rough transitions" and "the mirror of our soul – our character."

From a chapter toward the end of the book the editor described a meeting with Nobel Prize winner Joseph Murray and quoted him when he said, "As humans we are constantly changing." This touched this writer as he has often said, "Youth is the capacity to adapt to change." In keeping with that theme this writer has often told his residents to never come back and tell him, "I did a such and such operation just like you taught me 10 years ago" because for certain he would not be doing it that way at the present time because, being human, he is changing, and hopefully being young he is adapting to that change.

Another line from the conversation with Joseph Murray quotes him as saying that a good plastic surgeon must have "curiosity, fantasy, and endurance." This writer wholeheartedly is in concert with that, but with modesty in even considering amplifying on Joseph Murray's words would say, in addition, that the plastic surgeon must *need* to pursue excellence.

We are living in a time where one golfer has shown himself to be above the pack, and the pack consists of over 100 golfers whose skills are nearly beyond conception. Still, Tiger Woods significantly outdistances them on a regular basis. "Why?" you might ask. Of course no one knows why. He has exceptional physical talent, he practices and prepares intensely, and has excellent coaches and advisers. But so does the pack.

The writer feels that the difference is *need*. Tiger Woods *needs* to win more than the others. And this *need* is exactly what has put the 36 authors of these chapters where they are. They *need* to achieve excellence. Anything less is a severe disappointment. For the young plastic surgeon the opportunity to engage in the collected experiences of these masters whose *need* for excellence has propelled them to the summit of their profession is a delicious opportunity.

So this book, written for the young plastic surgeon to give him or her a foundation in the basics of facial aesthetic surgery as presented by 36 masters is a treat. But for those of us, with significant numbers of cases past, it offers something else as well. It not only acquaints us with the current thoughts of our friends and colleagues of plastic surgery fame, but it gives us a peek into the mind of the editor, a man with great curiosity, a talent for fantasy, and striking endurance – who has a *need* to see, feel, experience, and associate with excellence, and to create it.

He has done so in this book, written for the young plastic surgeon, and for the rest of us as well.

Thomas M. Biggs, MD, F.A.C.S.
Clinical Professor Plastic Surgery Baylor College of Medicine,
Past President of ISAPS,
Editor-in-Chief of "Aesthetic Plastic Surgery", Houston, USA

FOREWORD by R.M. Goldwyn

Throughout recorded history and earlier, the human being has modified the appearance of his face through, for example, tribal markings, growing, trimming, or shaving a beard, distorting parts, inserting foreign bodies, or applying cosmetics.

The face is the most conspicuous part of our body; it is our identity, so much so that if a person wishes to be incognito, he or she will wear a mask or adopt a disguise.

The plastic surgeon today in changing the appearance of the face is continuing a primal preoccupation and an ancient practice, albeit with different skills, methods, and technology.

The hallmark of aesthetic surgery is facialplasty by surgical or nonsurgical means. Almost all who call themselves aesthetic surgeons allot considerable time and energy to changing patients' faces. A bewildering number of objectives and options exist for the patient and the surgeon. This important book has appeared at a critical time to advise, help, and instruct plastic surgeons of any age, not just those beginning their career, how to formulate with the patient a proper plan and hopefully how to achieve the desired result.

Dimitrije Panfilov and his well-known, highly experienced contributors along with the publisher have produced a remarkable book on every aspect of improving facial appearance by the most current procedures. This volume is comprehensive, and though factual, it is highly readable and pedagogically oriented. Each author tells how he or she evaluates a patient, chooses and performs the procedure among the many available in a way that the reader feels as if he or she is in that surgeon's office and operating room.

Through the tapestry of this book run abundant threads of philosophy and psychology as well as the expected details of anatomy. Despite the title, the face is considered in terms of not just its mosaic components but also its relationship to how we conceive and determine its beauty or lack of it.

Just as the face changes its expression, so also has the field of facial rejuvenation changed particularly in the past few years both in its procedures and in its principles.

Our specialty has evolved with regard to the facelift from the very early days of minimal undermining and timid excisions of skin to venturing more deeply into the fascia and the muscles themselves, the periosteum, and the bone. The rationale for decades was that doing more surgically would produce a better, longer-lasting result. More surgery, however, involves more risk for the patient as well as the surgeon. Each in different ways must contend with a more lengthy recovery, greater swelling, and an increased possibility of bleeding and damage to nerves. The other reality for the patient is that the more extensive the operation, the greater the cost to the patient.

Many patients now prefer something less invasive, less hazardous on an ambulatory basis and are willing, even enthusiastic, to repeat the process at short intervals, thereby lessening interruption in their life at work or at home. The surgeon also has

realized that performing a smaller procedure for a lesser fee on more patients can generate greater income. These considerations become apparent in these pages.

Dimitrije Panfilov and other contributors have emphasized that the patient deserves a plastic surgeon properly trained, ethically committed, psychologically attuned, and receptive to new ideas and techniques but not performing them until they have been rigorously evaluated with sufficient follow-up and until the surgeon is competent to do them.

Patients today have more information through friends, the media, and the Internet than they did in the recent past, although that does not necessarily mean that they are better informed. Every plastic surgeon must be aware of what is happening in our specialty, whether it be reconstructive or aesthetic. He or she must continue to learn, to be amenable to assess with objectivity an operation or treatment that can improve his or her care of the patient. To aid the plastic surgeon and thereby the patient desiring to improve his or her facial appearance, this excellent, authoritative book is most timely and much needed.

Robert M. Goldwyn, MD
Clinical Professor of Surgery, Harvard Medical School
Editor emeritus, Plastic and Reconstructive Surgery, Boston, USA

FOREWORD by J. Guerrerosantos

It is an important event when a master plastic surgeon directs his energies to the writing of a book, on a subject that has involved the major portion of his professional life. The material in this book is presented in a clear, practical manner by a plastic surgeon who has successfully practiced facelift; the result is an especially useful and rewarding book. I had the good fortune to see his presentations in German, Mexican and international meetings, and I was so impressed.

I want to congratulate Dimitrije Panfilov for the publication of this interesting book on rhytidoplasty. In the past there have been excellent publications on the same topic but I had never seen a publication that covered all the aspects of this chapter of aesthetic plastic surgery.

It reviews many aspects of this field of plastic surgery, such as considering the face as an anatomical mosaic, historical revision, physical and biological anthropological evolution of the face, factors of aging, anatomy of the face and neck, photographic study, clinical examination, and techniques of modern technology as an ancillary procedures for facelift.

In early twentieth century in Europe the performance of facelift was often shrouded in secrecy. Individual techniques were jealously guarded by many of their originators, causing Passot to complain in the literature about such tactics, especially among the "German surgeons." This book is the opposite and is written by a German plastic surgeon.

This is most complete book of surgical rejuvenation, written by an outstanding plastic surgeon and collaborators from many countries.

I believe that this book will be an excellent guide for the plastic surgeon, especially the young specialist.

Dr. José Guerrerosantos, MD
Founder Dierctor of the Jalisco Plastic Surgery Institute
Professor of Plastic and Reconstructive Surgery, University of Guadalajara
Past President of ISAPS., México

Contents

Part I
General Considerations

The Face as a Dynamic Mosaic Work – Prosopoplasty 1

Dimitrije E. Panfilov

The expectations of an increasingly aging population have changed considerably over the years: 60-year-olds are still very active, not only privately but also in their professional and public lives. And plastic surgeons have developed a new idea of the face. The face is now considered as a three-dimensional dynamic mosaic with five different levels and four layers of depth. Numerous techniques are available to improve the arrangement of the pieces in the mosaic. The combination of various techniques can reduce the aggressiveness of every single method. We can achieve more sustainable harmonic results while also reducing the potential for risks and complications.

There are trends that more and more young patients are coming to us asking for plastic surgery of their faces. We cannot rejuvenate substantially somebody who is in their early 30 s, but we can harmonize and beautify such a person. The media would call these procedures face-styling. We would rather use the term "prosopoplasty" (*prosopon* in Old Greek means face). If we talk in eyelid surgery of blepharoplasty, if we talk of phalloplasty or mastoplasty, then beautifying rearrangements of featural structures should consequently be called prosopoplasty.

For a long time the only aim of facial aesthetic surgical was tightening of the skin, to reduce wrinkles and folds. Today, facelift is not only facelift, but is surgical makeover of the face: harmonizing, symmetrizing, beautifying. Overstretched skin with "surgery looks" and "facelift stigma" with visible scars, dislocated hairline, flattened or scary tragus, elongated, almost amputated earlobes, and retroauricular steps of hairline are *out*. *In* is:

- Facial harmony
- Intravenous sedation
- Shorter scars
- Shorter recovery
- Outpatients procedures

Each face is unique. Every person's face consists of many important details and therefore each face requires an individual "recipe". An analysis of the face

Fig. 1.1. Prosopoplasty: facelift and necklift, microlipofilling, forehead direct excision, rhinoplasty and otoplasty. Instead of adding years to our life, we can add life to the years that have passed

must precede the planning of an operation, at the centre of which should be the patient's wishes. It is of utmost importance that the surgeon listens carefully to his/her patient's wishes and ideas. The result should be a younger-looking patient with more harmonic, more beautiful features and with more dynamic facial plays. Plastic surgery patients will regain their social and erotic appeal by reestablishing their self-esteem.

We are able now to analyse the face, to understand the mimic dynamics, to add beauty and harmony to different mimetic units in different layers of depth, to improve the facial outlook as a three-dimensional dynamic mosaic. Our patients do not want to become or look like somebody else. They just want to look better.

Another trend is noticeable: more and more men are asking for harmonizing, refreshing procedures for their faces to look more dynamic, because a "tired look" hides their inner energy and ability.

Only 20 years ago, facelift patients remained in hospital for a full week. Today, most patients can opt for outpatient surgery by intravenous sedation combined with local or tumescence anaesthesia. Over 60% of patients can return to their social lives after 8 days. Things have improved tremendously. We can also combine nonsurgical procedures, adding the advantages and reducing at the same time the risk of extended procedures.

Yet something remains: the biggest risk in any type of surgery is the surgeon himself/herself. If a surgeon has not received excellent education, if he/she lacks sufficient experience – especially if he/she is not aware of his/her own inadequacies – the patient is exposed to an enormous risk.

There is also a global phenomenon that surgically untrained physicians and even nonphysicians, dentists, and cosmeticians are offering aesthetic surgeries, resurfacing, and skin-filling procedures. Aesthetic or cosmetic surgery is enjoying ever-increasing popularity and social acceptance. Through public education we can focus the proof of the quality of plastic surgery education and improve ourselves. Those plastic surgeons who can offer more options for every patient will have the best success.

Bibliography

Please see the general bibliography at the end of this book.

Historical Overview

2

Dimitrije E. Panfilov

The idea of lifting facial skin did not originally come from a surgeon, but from an elderly female Polish aristocrat who, in 1901, asked the Berlin surgeon Eugen Holländer to lift her cheeks and the corners of the mouth. She asked him to cut out the skin elliptically around the ear. It took quite a while before the patient could convince the surgeon. Erich Lexer published in 1931 a remarkable textbook *Die Gesamte Wiederherstellungschirurgie* (The Complete Reconstructive Surgery). He stated to have operated on an aging actress, who constructed reins of rubber bands and stitching plasters to keep her facial skin tight. After years this produced overlapping excess skin, which Lexer excised with S-shaped excisions in 1906. He stated not having known that such a surgery had been performed before. Jacques Joseph, also from Germany, published his first facelift surgery from 1912 in 1921 and 1928. Charles Miller from the USA wrote in 1906 an article entitled "The excision of bag-like folds of skin from the region about the eyes". He published in 1907 the first textbook of facial cosmetic surgery under the title *The Correction of Featural Imperfections*. Another American, Kolle, wrote in 1911 the book *Plastic and Cosmetic Surgery*. He published illustrations of lower-eyelid incisions to remove the loose skin.

In France, Passot was first surgeon to describe the submental excision to correct a double chin and multiple facial direct excisions in 1919 in his article "La chirurgie esthétique des rides du visage". Suzanne Noel was the first female cosmetic surgeon and she tried to emphasize the sociologic aspects of aesthetic surgery in her book *La Chirurgie Esthétic: Son Role Sociale* published in 1926. Other French pioneers in this field were Bourgouet and Pires.

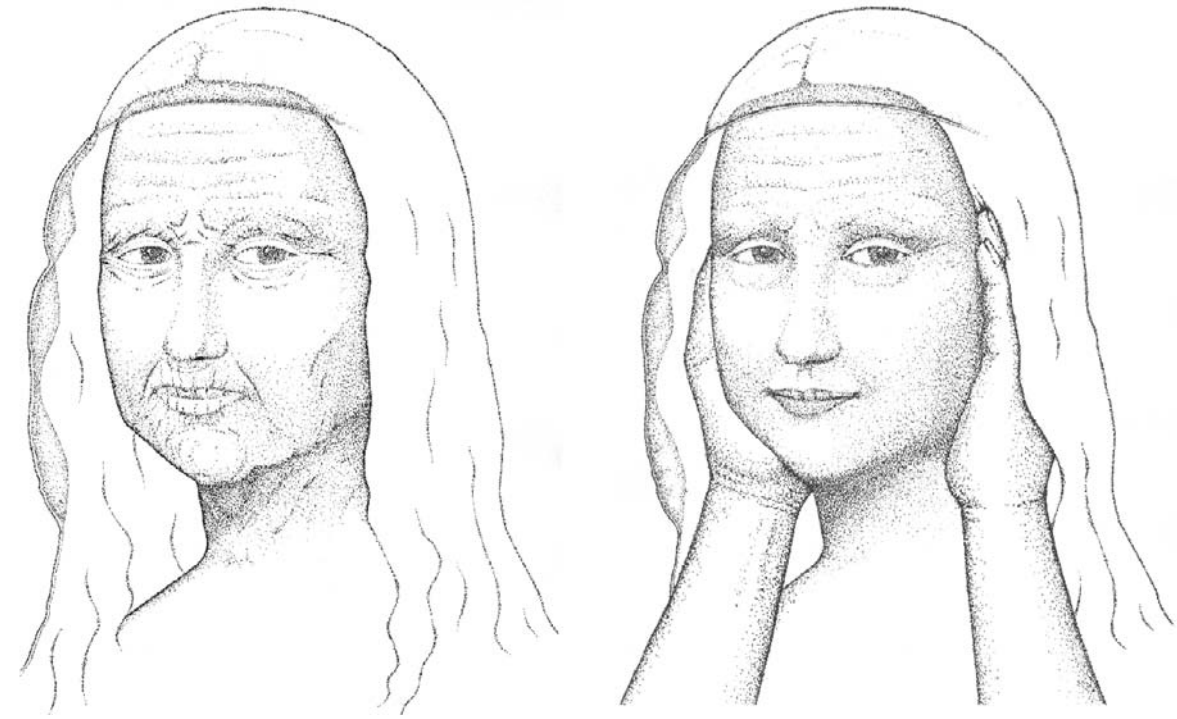


Fig. 2.1. Female manoeuvre in front of a mirror: it was not a surgeon who first had the idea of facelift, but an elderly woman

The Czech plastic surgeon Burian suggested incision lines reaching deep into temporal and retroauricular hair-covered areas which have been used for decades. He also advocated wide undermining to achieve long-lasting results. The periods of World War I and World War II were times when the demand on plastic surgeons was predominantly in reconstructive and not in aesthetic surgery.

Mayer and Swanker were the first to use the term "rhytidoplasty" in the journal *Plastic and Reconstructive Surgery* in 1950. This term would be later exchanged for rhytidectomy, which means excisions of wrinkles and folds, but this definition is not applicable to our contemporary facial styling.

In the following period, innovative contributions to facial rejuvenation were made by González-Ulloa from Mexico, Gillies from the UK, Millard from the USA, and Pitanguy from Brazil.

In the 1970s one went into the deeper planes of the face. Skoog of Sweden wrote in his book *Plastic Surgery: New Methods and Refinements* in 1974 about the subcutaneous layer with its fascia and muscles attached at skin to be repositioned to obtain more sustainable results. Tessier of France was also a pioneer who noticed the importance of the deep structures of the face. Mitz and Peyronie from France made important anatomic studies (1976) and defined the new age in facelift surgery: superficial musculo-aponeurotic system (SMAS) of the face. Connell, Owsley, Lemmon, and Hamra – all from the USA – developed further the usage of SMAS in their clinical practice.

Many other surgeons have merit for the development of different variations of rejuvenative procedures going deeper into the face, like Krastinova-Lolov from France, Psillakis from Brazil, and Hinderer from Spain.

After the 1980s and into the 1990s, the subperiostal plane was reached and was rearranged in order to produce rejuvenation. Ramirez and Little, both from the USA, stepped over into the third dimension of the face by different manoeuvres like skeletal augmentation, soft-tissue transplantation and reassembling and imbrication of facial structures, not only tightening and stretching of tissue, but also adding volume to the facial framework in order to beautify the face.

Parallel lipofilling, suggested first by Miller from the USA and reinvented by Illouz of France, further developed by clinical and histological studies in large series by Guerrerosantos from Mexico and Coleman from the USA, produced a remarkable improvement in facial surgery alone or in combination with other procedures. The separated transplanted cylinders of autologous fat tissue could augment some dimpled, atrophic parts of the face and give more youth to the facial appearance.

The most superficial layer of skin – the epidermis – could be treated by mechanical, chemical, radiosurgical, or laser peel. The first known article is that of Bames (1972) "Truth and fallacies of face peeling and face lifting" and indicated this development of additional possibilities to be added to the surgical procedure to improve the final appearance. But they are overlapping dermatologic activities as the wrinkle fillers are. Baker's peel and Fintsi's Exoderm peel as well as Obagi Blue peel are just a few that can be mentioned. Similar results could be achieved, however, with classic dermabrasion, and the much more expensive tool – resurfacing ultrapulsed lasers – and more recently by high-frequency low-temperature radiowaves.

Since the early 1990s the subperiostal plane with endoscopic microcameras and special endocopic instrument has been reached. This microinvasive surgery is less traumatic. The minimal skin incisions enable us to perform something like keyhole surgery. Forehead surgery and elevation of the eyebrows have experienced special advancements. Vasconez, Ramirez, and Nahai are only a few of the pioneers to be mentioned.

Recently, many other authors made their contributions to the evolution of rhytidectomy, such as Mendelson from Australia, Baker, Stuzin, Gordon, Biggs, Aston, and Massiha from the USA and all co-authors of this book. Every one of these distinguished authors and excellent surgeons has contributed remarkably to the development of achieving better results with lower risks.

There has also been a trend in the last few years for less invasive surgery. To mention only a few names: Hoefflin, Roberts, and Massiha from the USA, Marchac from France, Tonnard and Verpaele from Belgium, Ansari, Saylan, and Panfilov from Germany, and Wu from Singapore.

From the tree of medical sciences many branches give us different fruits. Combining them in a reasonable manner, we can offer our patients a cocktail which is pleasant and will not bowl them over.

Bibliography

Please see the general bibliography at the end of this book.

Evolution of the Face

3

Dimitrije E. Panfilov

God created the world. And part of this world was Charles Darwin. I feel free to respect both: God and evolution.

We are unable to understand that our earth is 4.5 billion years old. How long is that? Brian Bates and John Cleese have compressed the history of the earth into just 1 year. Life appears relatively early on the earth: on 14 February. That is Valentine's Day.

1. The first living beings were **bacteria**, as almost the whole earth was under water. Some 580 million years ago there were shapeless conglomerates of cells like swimming tubes. The next 10 months were pretty boring – no big changes happened.
2. The second step was **pikaia**. Some 520 million years ago would be 15 November in our calendar! It was a small animal on the ground of the sea like a tube with only one opening. It was the **mouth** as the first part of the face!
3. At the end of November there came pikaia's late descendant – **conodont.** It was 5 cm long and had two zones of light-sensitive cells aside the mouth. These were like the rudiments of eyes; later come traces of ears.
4. On 25 November came **sacambapsis**, which was 10 cm long and was like fish a scaly anteater. It had miniature gills through which it could distinguish smells. Some 430 million years ago the next part of the body was the jaw – which first was immovable and later movable.
5. The next animal, **acanthodian**, was a fish with a movable jaw. Thereafter the nose developed as did teeth on the jaws to increase the efficiency of food utilization.
6. It is 2 December – the first animal, **Acanthostega,** 1 m long, is able to go ashore, life is coming out of the water. The first reptile has legs and two small nose openings. The air has much more oxygen than water and is a very good energy supplier.
7. These reptiles grew bigger until they had gigantic bodies – we have now species of **dinosaurs**. All their teeth were of the same magnitude and shape – so they could bite and swallow.
8. The next step was **dimetrodon.** This big animal was similar to dinosaurs but it had two different sorts of teeth: one to bite and the other to chew. From dinosaurs, birds developed in later evolution and from dimetrodon, mammals and humans developed.
9. The first mammal, **megazostrodon,** appears not earlier than 17 December of our evolutionary year. It is the first homoiothermic animal; all the animals before were poikilotherms. It looked like a shrew with big eyes and ears with hair on the head and its jaws were much more flexible than those of any animal before. Because of homoiothermy it did not have a shell but always had thinner skin which isolated the thermic regulation with fur skin. The arrival of mammals on the earth is the birthday of mimetic expressions! Mammals bring live descendants to the world which can get food in the first period of their life only by sucking. To survive, babies had to develop muscles around their mouths – sharpen the lips was the first mimetic expression ever!

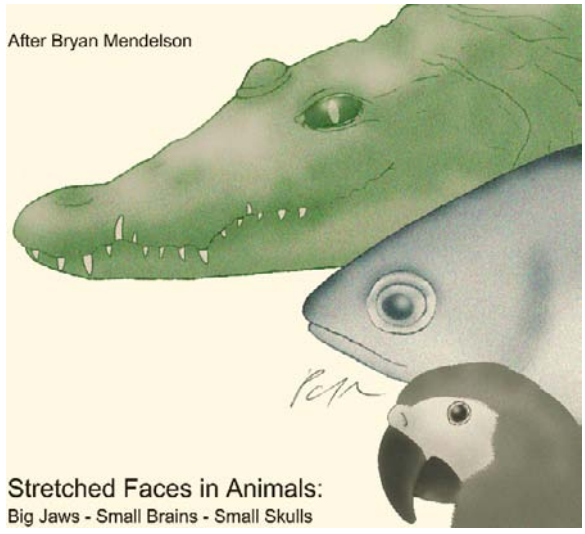


Fig. 3.1. Reptiles, fish, and birds have a stretched face because of elongated jaws. From their faces we cannot read their age

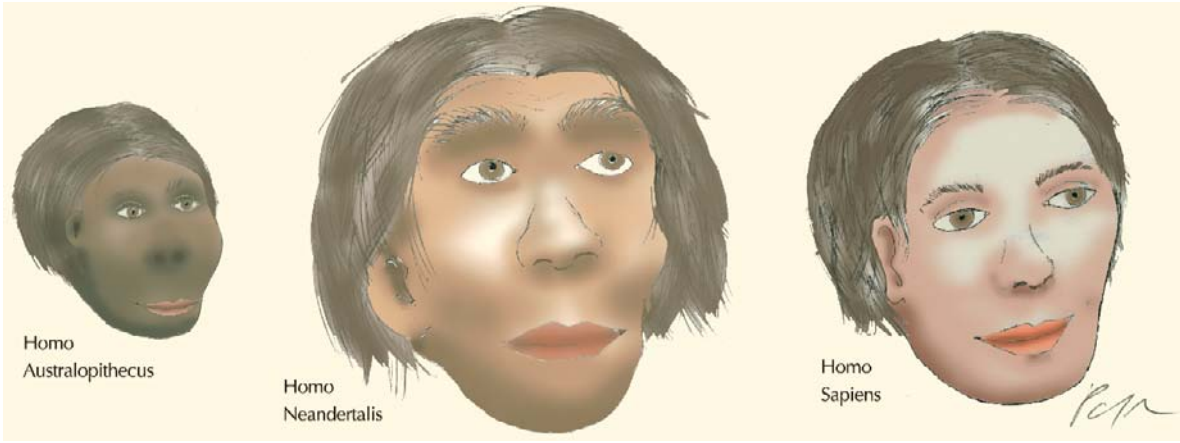


Fig. 3.2. *Homo australopithecus*, *Homo neandertalis*, and *Homo sapiens* as they might have looked

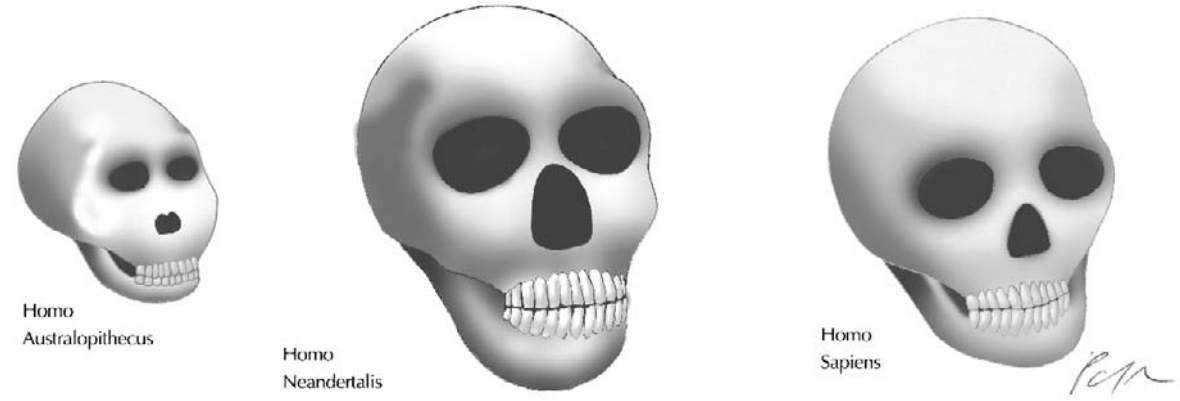


Fig. 3.3. Skulls of the same beings

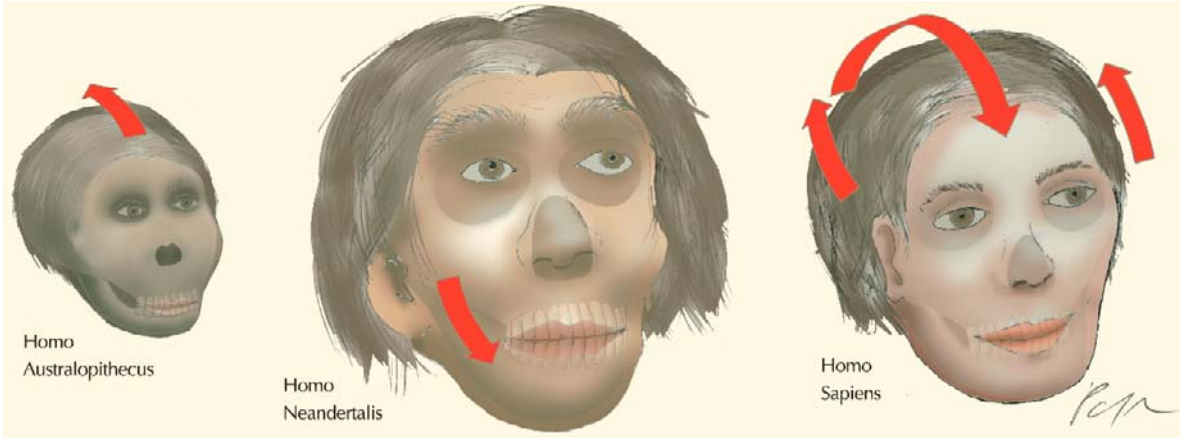


Fig. 3.4. Probable changes that took place during evolution

10. Mammals grew bigger and jumped onto trees where they were safe and found a lot of food. It is Christmas Day–25 December – the first primates appear. The first of them was **aegyptopithecus**, not bigger than a cat. The first mammals mostly ate insects, and primates mostly ate fruits and leaves. To be able to chew effectively, their jaws became shorter.

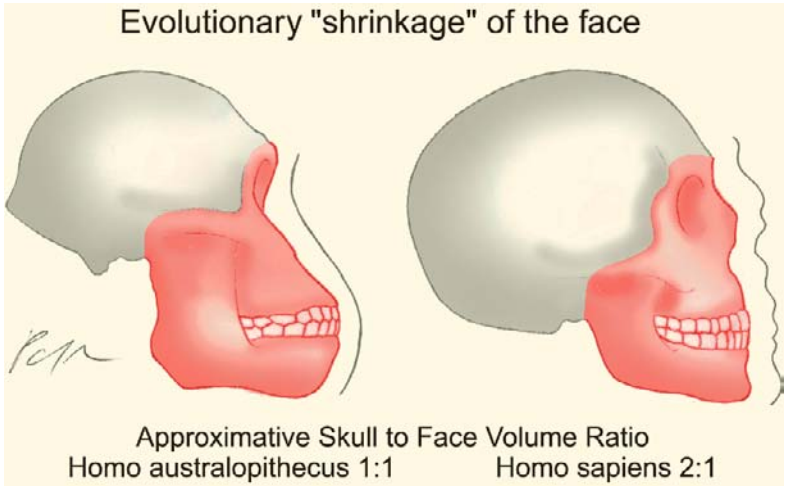


Fig. 3.5. Evolutionary "shrinkage" of the face

11. It is New Year's Eve, 31 December, 6:24 a.m. The first ***homo erectus*** we know was a woman called "Lucy". Palaeontologists excavating her skeleton in Ethiopia listening to the song "Lucy in the sky with diamonds" by the Beatles and they gave her this name. The brain of upright man took more space in the growing skull, which caused shrinkage of the face. Another reason for this process was the fact that the teeth and jaws of *homo erectus* became smaller, probably because the mouth was not needed as a weapon or tool for grasping food anymore. For those purposes our ancestor could use his hands!
    The eyes came to the frontal side of the head to allow binocular vision and determination of distance. Between the eyes and mouth arouse something very human – the prominent nose. The face lost its hair – it is much easier to "read" somebody's feelings from a hairless face than if it is covered by hair. The white sclera of eyes makes it possible to determine where the other person is looking, to what she/he is paying attention! Sclera in primates is dark!
12. This is our last step – we should hurry up and fill our glasses with champagne – it is 23:37 p.m. on 31 December: ***Homo sapiens*** steps onto the stage. Actually this moment is 200,000 years ago. Since that time humans have not stopped making successively love and war. Our DNA is today 98% identical with that of a chimpanzee. And still we cannot expect monkeys to feel guilty because humans originated from them. And humans have not stopped asking themselves for 200,000 years – was there nothing before and is there nothing after life? That is why we have our brains.

Fig. 3.6. The French painter La Calas has compared profiles of two mammals documenting relative facial reduction in humans

Just a few minutes before midnight humans began to speak. It is comforting that probably the first word ever spoken was "mom".

We can see that almost the whole evolution of the face was the history of the mouth. Knowing this, we will pay attention to this mosaic stone of the face when we try to search for more harmony of the outer appearance of human beings.

Bibliography

Please see the general bibliography at the end of this book.

4 Facial Expression

Dimitrije E. Panfilov

The science of the human face is called prosopology. For 3,500 years the Chinese have studied and learned "to read" the human face. They call it *xien mien*. Ivo Andrić, a Nobel Prize winner for literature, said: "You get never tired of looking at a sky full of stars, nor from looking at the human face."

Fig. 4.1. Actress and singer showing basic emotions after her secondary facelift at the age of 54. Mimic expressions are her professional tools and must be preserved

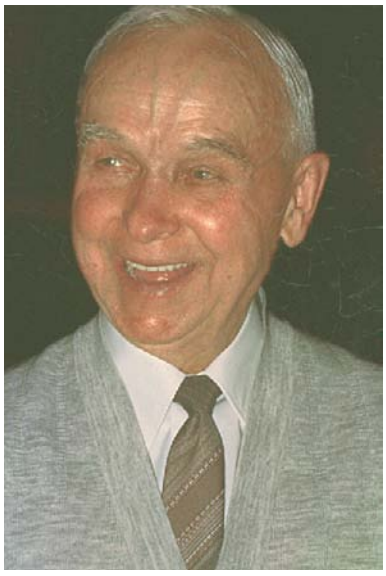


Fig. 4.2. A man of 80 smiling with both lips and eyes showing a natural "Duchenne smile". A smiling face somehow cannot look ugly

Facial expression results from the play of the muscles of the face and as a form of social expression makes a decisive contribution to interpersonal communication. It relates stories and issues orders, betrays aggression, and displays affection. Our facial expression is able to convey six basic emotional states: happiness, sadness, revulsion or disgust, surprise or amazement, anger, and fear. These universal, nonverbal messages are sent subconsciously and are usually also received subconsciously. They are universal across all cultures and are interpreted in a similar way.

The 80 muscles of the face that are innervated by the seventh cranial nerve, the facial nerve, are responsible for facial expression, which itself has connections with the limbic system of the brain. This system is associated with emotions and, in evolutionary terms, belongs to the older structures of the brain. Facial expression is therefore much older than verbal communication. Some scientists speak about paralingual communication.

In the fight for survival, man has, amongst other things, learned to recognize the good and the bad intentions of an opponent from the latter's mimic dynamics. It is one of the most precise forms of expression that we have at our disposal.

The left half of the brain governs intellect; with it we think, speak, and write, for example. The right half of the brain is the "emotional side" and regulates creativity. With it we experience, for example, music, beauty, or grief.

When interpreting actions of facial expression, it is important to know that the two halves of the brain are connected: the left half controls the right side of the body and the right hemisphere is responsible for the left side of our body. Injury to the right side of the brain in the area of the back part of the occiput therefore results, for example, in an inability to recognize faces. It makes a tragic and shocking impression when such patients cannot even recognize, for example, the faces of their next of kin. This is called prosopagnosis.

Research on physiognomy (the study of facial expression) also led to racial prejudice and the criminalization of persons with certain facial features. The Italian psychiatrist Cesare Lombroso (1836–1909) was the founder of the branch of anthropological science that studies criminals. On the basis of systematic studies of criminals, he claimed that these individuals

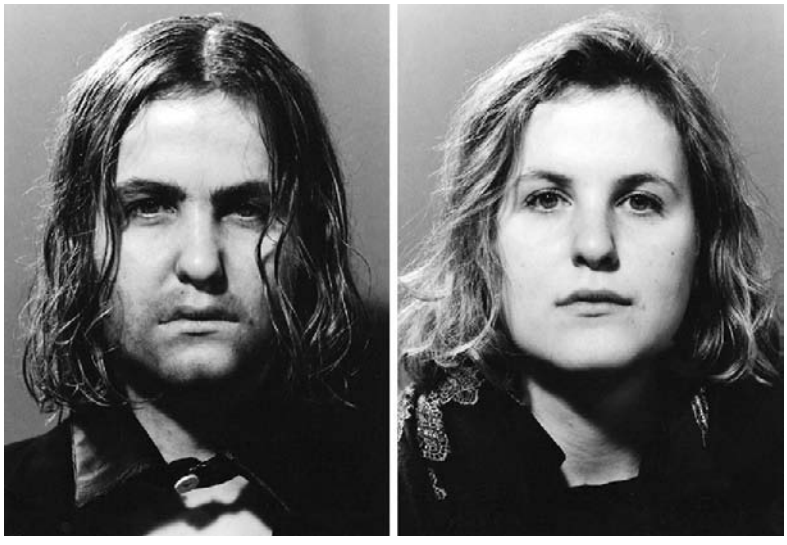


Fig. 4.3. Visagists can easily achieve male-to-female makeover and vice versa. (Courtesy of Christine Marneffe, Berlin)

Fig. 4.4. The face on the *left* looks male; only by reducing the nose and removing glabellar wrinkles does it become clearly a female face

possess more physical and mental abnormalities than the rest of the population. The result of these abnormalities, according to Lombroso, is an immediate moral decline. These studies produced "Lombroso's criminal types". The psychiatrist also maintained that genius and insanity are closely related.

Modern science has now almost completely rejected his ideas, although they are still popular among the lay community which suspects a potential criminal in every ugly person. Most films, especially those from Hollywood, follow this line of black-and-white thinking when casting: the beautiful and handsome are pitted against the ugly, with the ugly usually being the bad guys.

Lombroso's contemporary and colleague, the Parisian neurologist Guillaume Benjamin Duchenne (1806–1875), used electrodes to stimulate the neuromuscular network of the face, which is in fact man's most effective signalling system. By doing so, he produced 80 different forms of facial expression.

Paul Ekman, a modern-day anthropologist from San Francisco, studied a system for coding facial expressions and discovered 44 anatomical action units. Combination of these units produce countless variations. The position of the corners of the mouth is a classic example and is often used by caricaturists. Turned up, they express cheerfulness, whereas they show sorrow or dislike when turned down. The muscle which pulls the eyebrows together consequently produces the facial expression of frowning, and wrinkling one's nose expresses rejection and inner distance. A false, half-hearted smile is produced by the contraction of only the circular muscle of the mouth, while a genuine, hearty smile requires the additional involvement of the muscles around the eyes. Ekman referred to this natural smile as the "Duchenne smile", in honour of his predecessor.

Ethologists (i.e. behavioural scientists) claim that tattooing or masquerading serves to make one appear more handsome or more beautiful, stronger, perhaps even better, and in any case different, than one is. Women "retouch" their faces with make-up, and men with a full beard would like, consciously or subconsciously, to highlight their power, strength, or virility. God, for example, is also often pictured with a full beard. A heavy beard, however, gives the face a threatening appearance and that is the main reason why most men shave nowadays. The clean-shaven man looks younger, more communicative, cleaner; no remains of food or smell get caught up in his beard. Like a beard, tinted glasses also hide the facial expression.

English psychologists from the University of Nottingham photographed freshly shaven male faces and female faces without make-up, covering the hair with neutral bathing caps. Ninety-seven percent of average test persons who were shown the photographs were able to state the correct sex of the person depicted, with a reaction time of only 0.6 s. Only when the photographs were manipulated around the eyebrows, the nose, and the beard did the success rate fall bellow 70%. It is on these parts of the face that the typical sex-related characteristics are to be found.

Ordinary people – not only actors, diplomats, salespeople, and poker players – often hide their feelings behind a facial expression which is not consistent with their feelings. In this context, it is interesting to remember the origin of the word "personality": the Latin word *persona* means mask. Above all, Asians are renowned for being able to hide or "mask" their emotions, especially negative ones.

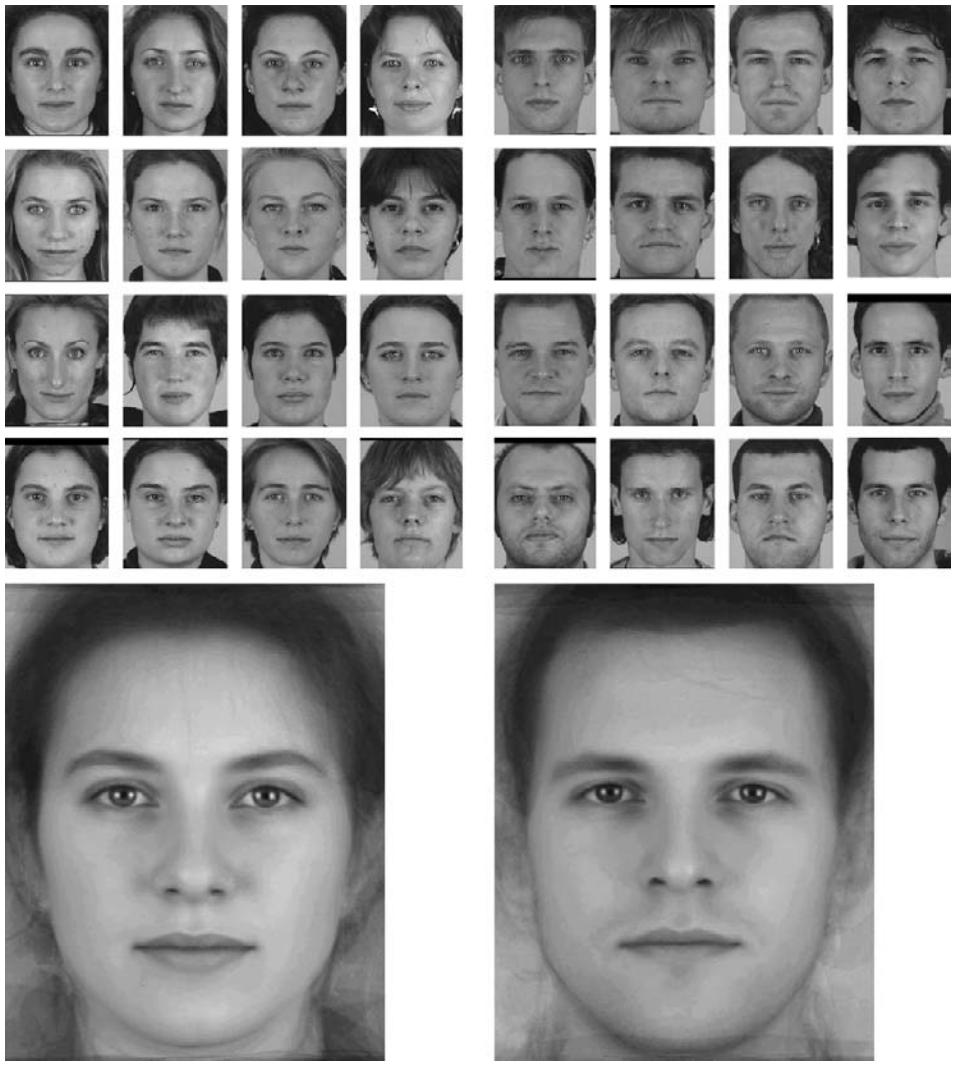


Fig. 4.5. Karl Grammer's per computer mixed faces: the "middle female face" has been found to be the most beautiful and the "middle male face" to be boring. A male face should have signs of social dominance: prominent eyebrows, nose, chin, neck, etc.

Normally we expect a facial expression as a reaction from another person to a comment we have made. As social beings, we seek emotional and expressive resonance. Sociologically speaking, facial reactions virtually have the effect of a psychotonic drug. A smile or a laugh, for example, can cheer someone up enormously, while on the other hand we regard indifferent stony faces, made as a reaction to an emotional and expressive message of ours, as insulting or offending.

The face, as a mysterious medium for conveying attraction and rejection, betrays the identity and the current emotional state of a person. Its messages are intuitively registered by the environment; sympathy or antipathy develop immediately, right at the very first meeting, and only with difficulty are later revised.

The continuous repetition of a certain facial expression "engraves" these stereotypes onto our face, so finally our life becomes mirrored by our face. This will have happened by about the age of 35 years. Both Confucius and Albert Camus wrote that by a certain age everyone is responsible for his own face.

The form of individual sections of the face is used to draw conclusions about the personality traits and the fate of a person. For this purpose the face is divided into three parts:

1. From the hairline to the root of the nose
2. From the root of the nose to the upper lip
3. From the upper lip to the tip of the chin

All three parts of the face are more or less equally long, and harmonious proportions to each other are presumptive of a harmonious character. A high and

Fig. 4.6. If we compare the human being with a plant, the face would be its flower and the smile its fragrance

broad forehead in a man is a sign of sharp intelligence, although it can also be simulated by premature balding. A too-high forehead in a woman is a sign of coldness and aloofness. A low forehead, especially in a man, is said to betray primitiveness and brutality.

Large open eyes are considered to be beautiful, and for centuries women have painted their faces to make their eyes look even larger. Italian courtesans used to use eye drops to widen their pupils and make them attractive. These eye drops contained an extract of the leaves of deadly nightshade, which was also very aptly referred to as belladonna (beautiful lady). Very small eyes are accordingly equated with negative personality traits: envy, jealousy, distrust, etc. The cardiotonic digitalis was later isolated from belladonna.

A large nose in a man is said to be proof of vitality, sexual potency, courage, and ambition, whereas in women a delicate short nose represents the ideal of beauty. If the mouth is full and large, it reflects sensuality, eroticism, and sociableness, while a small mouth is a sign of a strong will, egoism, and sometimes also of arrogance.

The form of the chin is also interpreted in various ways. A chin that is either too round or too square is not associated with a family person with a peaceful disposition. People with a pointed chin are regarded as intelligent and sensitive, while a broad, square chin is said to reflect honesty, energy, and pugnacious vitality.

The Viennese ethologist Karl Grammer used a computer to compile the average female face from several women's faces. This face was subsequently judged to be more beautiful than any of the faces used to produce this mixture. In his book *Signale der Liebe* (Love Signals) he claims that in a woman the average face is desired for its harmony, which promises healthy descendants. While in a man, on the other hand, emphasis is placed on extremes, for example a strong jaw or neck. These details suggest social dominance. Desirable in both sexes, however, are symmetry, shiny hair, and clean skin as signs of healthiness.

Duncan Rowland from the University of St. Andrew's in Scotland has defined the prototype of the "hyperwoman". By this he means the female face according to the small-child model, the appearance of which suggests the need for protection. This facial appearance comprises a small nose, large eyes, and a short distance between eyes and chin. High curved eyebrows, somewhat hollow cheeks, and a relatively large mouth are then added to this "baby face". According to other scientists, the ideal woman is 24.8 years old, an age when the levels of the female hormone oestrogen are at their highest, the form of the breast at its most voluptuous, and the lips are at their fullest – one need only think of the pouted mouth of Brigitte Bardot.

The English naturalist Charles R. Darwin (1809–1882) wrote: "The men of each race prefer what they are accustomed to." In our age of visual communication at cyberspeed, on the other hand, there exists a universal aesthetic preference for how the face should look. For example, Asian women undergo surgery to create an upper-eyelid crease and thus "Europeanize" their faces, while European women sometimes have their eyelids slanted.

Fashion photographers and image creators attempt to manipulate us with their ideals of beauty. For example, Terry Landau writes that faces "are the main source of motivation to lend recognition to social, political, aesthetic, and moral ideas."

I, on the other hand, rather believe that the standardization of facial aesthetics to panethnical look should be considered undesirable. It is by all means a positive thing to strive for a face full of freshness and expressiveness and to correct unsightly deformities, but not at the price of losing the patient's own individuality. In this faceless-becoming world we gain nothing from a beautiful, but cold face. What we need is a pleasing, warm face. If man were a plant, his face would be the flower, and this flower should blossom and be fragrant.

Bibliography

Please see the general bibliography at the end of this book.

Surgical Psychotherapy

5

Dimitrije E. Panfilov

Any patient asking for any aesthetic surgery does not feel well beneath his/her skin. Psychological suffering is the only true indication for every aesthetic plastic surgery operation and so it is valid for facial aesthetic operations. I know from my experience that no person without great distress would seek treatment from a plastic surgeon. Patients have usually been carrying their suffering around with them for years. In our consultation rooms we often hear stories which have been related more than twice. A certain degree of patience is necessary when listening to them.

The most common questions which we put to our patients are:

- "What is disturbing to you about your appearance?"
- "Do you have a precise idea of how the outcome should look?" A clearly defined idea of the aspired correction is desirable. Experience has shown that these patients are the happiest ones at the end of the treatment. The worst imaginable answer to this question would be: "Just give me a beautiful nose."
- "Why do you wish to have this operation?" This question is supposed to provide information about the patient's motives.
- "How long have you entertained the thought of having this correction done?"
- "Do you expect your life to change as a result and in what way?"
- "Have you observed that others have noticed your defect and/or commented on it?"
- "How important to you is the opinion of others?"
- "How important is attractiveness to you?"
- "How many surgeons have you already consulted?"
- "Do you have problems at work or in the family?"
- "Are you often depressed, anxious, nervous?"
- "How do you spend your spare time? What are your hobbies?"

This psychoanalytic probing is very important for us. Sometimes the wishes and ideas of the patients are objectively just not feasible. The best combination is a genuine, correctable deformity and a stable personality. And the most difficult case is the genuine deformity with an unstable personality. Advice is given against having a minimal, and in effect hardly correctable, deformity surgically corrected, no matter whether the personality is stable or unstable.

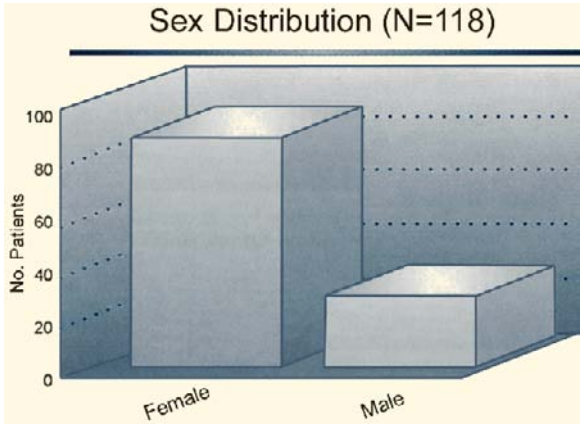


Fig. 5.1. The number of female patients is predominant, but the percentage of male patients is rising

Body image is the psychological, three-dimensional image of the individual's own body and is essentially based on the experience of an integrated feeling of the person himself/herself. The psychoanalyst Sigmund Freud says: "The ego is first and foremost bodily ego; it is not merely a surface entity, it is itself the projection of a surface." For Freud the ego is the mediator between person and reality.

Sensitive people suffer from their physical defects. They usually try out everything possible, and they have often concerned themselves for some time with the idea of undergoing aesthetic surgical correction. However, adapting to a new body image becomes more difficult with advancing age.

Nudism and sauna habits have contributed towards a considerably stricter assessment of imperfections of the body. In advanced age, the traces of time are judged to be signs of weakness, which can in turn lead to devaluation and isolation. This problem is particularly important for people who are in the public eye professionally or in a partnership with greater age differences.

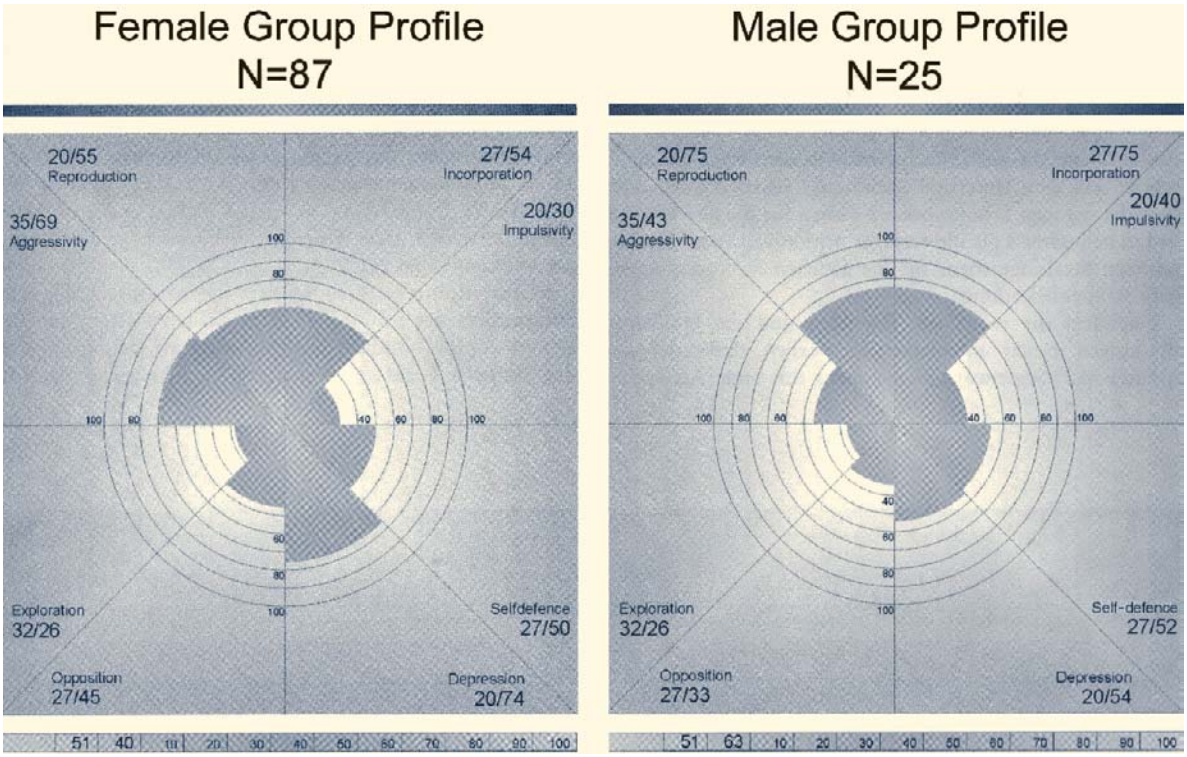


Fig. 5.2. Male and female groups of patients have a different emotional index (Plutchik)

I received the following letter from a female patient:

> Over the last year, my skin has started to sag, especially around my neck and face. I am extremely unhappy about this, it is making my life go downhill. I am no longer coping. I am accustomed to moving in diplomatic circles, going to receptions, participating in dinner occasions, paying visits, and would like to look better, more beautiful – just like anyone else would. I have lost my self-confidence when it comes to going out. I would rather not go. I am 45 years old and married with three daughters. My marriage is not in a crisis, but time and again I catch my husband's eye scrutinizing, as I see it, exactly that part of my face which has started to sag and become wrinkled. I feel terribly depressed.

This patient's story prompted me to measure psychometrically the changes brought about by aesthetic operations, for we plastic surgeons frequently have the feeling that the majority of our patients really "bloom" after the operation. I also wanted to create a psychometric "portrait" of these patients. We know all too well that not everybody who has a physical "defect" also suffers from it and yearns for an aesthetic surgical correction. So what characterizes our patients?

Over 100 patients with the six most common corrections carried out by aesthetic surgery were tested for assessment before the operation and 6–12 months afterwards. Three personality tests were evaluated; the character traits and neurovegetative and emotional characteristics were examined. Pre- and postoperative questionnaires especially designed for these purposes were completed. A total of 44,990 answers were recorded.

Our typical patient is:

- Extroverted, i.e. liberal-minded
- Socially active
- Outgoing
- Emotionally sensitive
- Very critical and self-critical
- Strives for perfection

Less than 5% of the average population fall under this type. They are not understood by the other 95%, and when they wish for surgical correction they are sometimes even confronted with a lack of understanding by their doctors. They are best understood by their own sort, and they are in a minority. That is the reason why these patients seek the direct route to a plastic surgeon and why they afterwards withhold the fact that they have undergone aesthetic surgery. They know quite rightly that they will have to justify them-

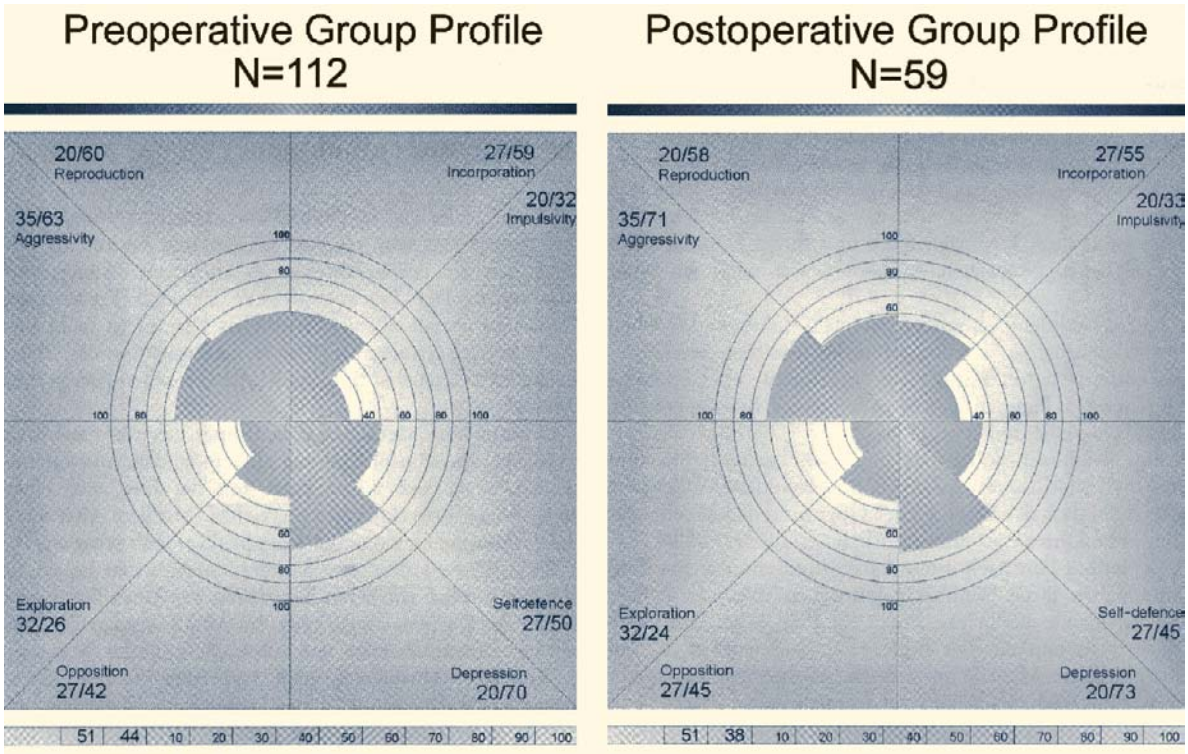


Fig. 5.3. There are remarkable changes of emotional status after aesthetic surgery

selves repeatedly before people who do not understand them anyway.

The outcome of surgery was also interesting in these patients:

- An increased feeling of self-esteem and an increased level of concentration at work are found in 40%.
- Professional success was improved in 22% and social acceptance was improved in 20%.
- 30% entered new emotional, and 19% new sexual, relationships.
- The number of personal encounters was increased in 20% and the frequency of sexual contacts was raised in 9%.
- No negative changes were observed.

Only the persons operated on were taken into account in this study, not those who were advised against surgery.

Julien Reich analysed 750 patients who requested correction of their appearance. He discovered that 36% were normal persons with realistic ideas about the outcome of the operation, 2% had unrealistic ideas, and 62% were emotionally unstable. Reich found not only aesthetic factors amongst the motives, but also emotional and psychosocial factors. The following motives are revealed in this study:

- 59% desire the removal of an inhibiting defect which has given cause for undesired attention and comments.
- 16.5% desire the removal of an obstacle preventing social acceptance for the purpose of a friendship or marriage.
- 5.6% want to start a new phase in their life.
- 4.1% want to incite admiration or wish to be admired once again.

Psychologists distinguish between the two extremes of "having a body" and "being a body". In-between these two poles there are eight types of relations to one's own body, as Blankenburg (1983) writes in his work *Der Leib Als Partner* (The Body As a Partner). The body can be:

1. The prerequisite for a psychopathologic existence
2. The baseline for a psychological subject orientation
3. The source of spontaneity or for the feeling of "I can"
4. A means of observation
5. The source of suffering and nausea
6. An organ of expression
7. The place of articulation between oneself and the world
8. An equal partner

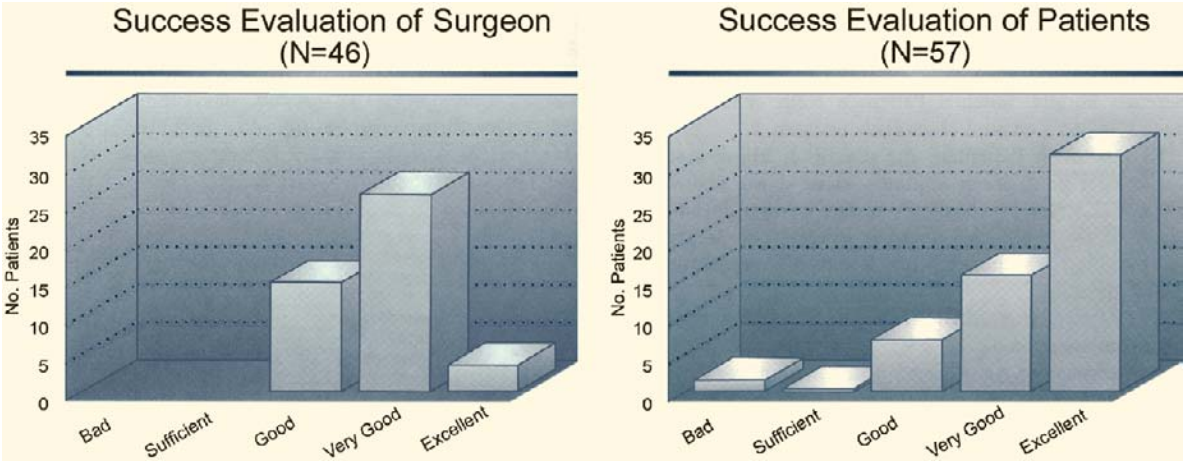


Fig. 5.4. Patients and surgeon judge the success of the surgery in a different way (manner)

Particularly the last variation is, of course, to be evaluated in a positive light. But when the body is regarded as the only aspect of the self, this can degenerate into hypochondria and narcissism. An exaggerated instrumentalization of the body can lead to neurotic manipulation of bodily functions as a means of relating to the environment.

In the final instance, an operation can only be recommended to the patient if, on the basis of his/her experience, the operating surgeon can predict that a more or less significant improvement will at least be reached after the operation. The experienced plastic surgeon will exercise caution when defining the indication for surgery in cases:

- Of minimal deformity with considerable emotional overlay
- Of unrealistically high expectations
- Where the outward appearance is held exclusively responsible for professional failures
- Where a male patient wishes to look more feminine
- Where there is a wish to satisfy the partner or save a dysfunctional marriage

The operating surgeon will be just as careful when the motives are exaggeratedly kept a secret, as when there appears to be an exaggerated hurry to be operated upon. Acute events in patients' lives might give rise to rash reactions which they may later regret. Such patients should be given a few weeks' time to reconsider.

Then there are also those patients who are mentally ill. The various authors do not agree whether neurotics and psychotics should be operated upon, even if they are receiving psychiatric treatment. Those in favour of psychiatric–surgical coordination cite the following reasons:

- The patient is offered a further alternative apart from the operation.
- In cases of severe mental disturbances, the psychiatrists can justify why surgery is out of the question.
- The opportunity to express their emotional situation could lead to a calmer postoperative phase for some of the patients.
- Patients in need of psychotherapy are more prepared to undergo such therapy after an aesthetic operation.

It will become clear after what has been said that plastic surgeons should also equip themselves with psychological and psychiatric knowledge to be able to provide optimal assistance for their patients. These might then be more content, more self-assured, indeed happier, after the treatment. If a young woman no longer suffers from nervous, sweaty hands after successful corrective surgery of her nose, then we have helped, via a mental roundabout route, in bringing her autonomic nervous system under control. This is why Rosner says: "The plastic surgeon is a psychiatrist with a knife." Hinderer writes that aesthetic surgery is "surgical psychotherapy".

Bibliography

Please see the general bibliography at the end of this book.

Ageing/Antiageing

6

Dimitrije E. Panfilov

Simone de Beauvoir wrote in her autobiography: "I hate my reflection in the mirror, a cap over my eyes, bags under them, the face too full, the mouth sadly tugged down, creating wrinkles. People who meet me see, perhaps, only a fifty-year-old, neither well nor badly preserved. She just has the age that she has. But I see my earlier face. Attacked by a plague from which I will never recover."

Lévy Strauss discovered that Nambiquara Indians have just one and the same word for "young" and "beautiful" and another one for "old" meaning at the same time "ugly". They just identify those two opposite terms.

There is the fact that one expects more beauty and youth from women and less from men. It is also much more frequent that younger women pair with older men. Why is that so? Science has proven that more beautiful women have more chances of becoming fertilized than less attractive ones. Fertility of women decreases much faster than that of men. A woman of 30–34 years of age has only 85% of the fertility she had when she was 20–24 years old, between 40 and 44 years of age this reduces to 35% of the initial fertility, and at 50 years of age almost all women have lost their fertility. In contrast to this, men of 45–50 years still have 90% of their initial fertility and at 55 years they still have 80%!

Men have developed the social dominance in their midlife and are still fertile. That means that they can produce children and facilitate their growth, education, etc. This is why such pairs – older man and younger woman – have given their genetic code to the next generations and have become the usual combination. And this is also the reason why women ask more often in our offices for rejuvenative procedures than men. Intuitively, they want to keep their partners or want to be able to attract partners by the subconscious statement – I am still a reproductive, fertile, that means desirable woman!

"The heart has no wrinkles." This aphorism by the Marquis de Sevigne points out that one can have joy in living, even in old age. Salvador Dalí also considered it better "to be 70 years young than 30 years old." The writer Robert Musil concluded from this: "No boundaries tempt one into smuggling more than the boundary imposed by age."

Fig. 6.1. Jeva Grantina shows convincingly the metamorphosis from a young girl to an old woman

Biologically speaking, mammals are calibrated to about one billion heartbeats in a lifetime. Because the various animal species each have a different number of beats per minute, their lifespan is also different. The heart of a mouse, for example, beats 550 times per minute and the mouse lives for 3.5 years. The heart of an elephant beats at a slower rate: 28 times per minute. The elephant therefore lives for 70 years. The American biologist Jay Gould discovered that this magic number – one billion – is roughly the same for all mammals, such as rabbits, kangaroos, or dogs.

Only man has broken through this barrier: at 75 years of age his heart has beaten three billion times and at 100 years four billion times. The oldest recorded age of a human being was 118 years, although even older persons are presumed to exist whose age cannot be proven. On this earth, only the tortoise lives longer than man.

What requirements are necessary for becoming old? All very old people have worked hard all their life, physically or mentally (or both), they avoided extremes in their life, did not move house, took care therefore of their roots, and ate onions more frequently.

The American molecular biologist Leonard Hayflick has discovered that the life expectancy of every creature depends on the maximum ability of its cells to divide. He discovered that the human cell is able to divide 40–60 times. After that our biological clock "runs down." For mice, for example, this number is 28, and for tortoises it is 120. The only cells which do not obey this rule are cancer cells. Will we learn how to prolong life from cancer cells?

On a molecular level, man renews himself every 11 months. Materially speaking, only the genetic memory of the physical framework is what remains of the previous being.

The outward physical signs of ageing are seen on the skin. The eyelids and the face sag, the nose "grows" from the 17th year of life by 1 cm, that is, by 20% of its original length. It does not in fact grow, it droops over the preformed skeleton. The ears also migrate downwards and grow longer. The white of the upper lip becomes longer and the red of the lips become narrower. In the literature, narrow lips are often wrongly regarded as a sign of negative personality traits, which is why upper-lip augmentation is particularly popular amongst women, giving the lips a more sensuous effect. It remains a fact, however, that all these signs of ageing are to be read from a face which cannot be hidden, prompting Elisabeth Taylor to say: "If God decided to give women wrinkles, then why not on the soles of their feet?"

The most beautiful lips, breasts, and hips in each female are at the age of 24.8 years. This is when the level of oestrogen is highest.

Not only the face becomes wrinkled in advanced age, but also the neck, sometimes even more markedly than the face. The scrutinizing look in the mirror evokes the anxious question: "If others also notice these wrinkles, they will think I'm not so capable as I used to be." A vicious circle is set in motion with this look in the mirror which leads to a mental crisis – sometimes called the midlife crisis. Professional, sexual, and partner-related problems arise, not as a result of a few little wrinkles, but from a lowered self-confidence. One expects less and less of oneself, and consequently the accustomed efficiency indeed melts away.

Aesthetic plastic surgery can move mountains here. The lifted skin gives the person a fresh appearance, not just out of reasons of vanity: the inner energy is no longer concealed – Look, here I am!

The French writer, philosopher, and critic André Maurois jokes: "You're in your prime years when you've left your good years behind." The Swiss writer John Knittel describes this phenomenon ironically yet charmingly when he says: "You're old when you find more joy in thinking about the past than about the future." In this patriarchal institutionalized world it is perfectly all right for a man to get older: his interesting life can be read from his face. When women grow old, however, others treat them as if they had no right to. The old woman-hater and philosopher Arthur Schoppenhauer wrote: "Outside these years [from 18 to 28], however, we find no woman attractive…. Youth without beauty still maintains its attraction; beauty without youth has none…". The poet Dusan Radovic also admits in his book *Good Morning, Belgrade*: "The ugly are to be envied – when they grow old, nobody will say of them that they were once beautiful." It should be regarded as an injustice, even as chauvinism, to demand of women that they must look both young and beautiful. This is why they go to a plastic surgeon eight to nine times more often than men do. A female patient once said to me "When women wither, men scatter." Such arguments also play a certain role in our civilization.

The traces of time are also identifiable on other organs apart from the skin. Hair turns white and falls out, the lens of the eye loses its elasticity, the senses of sight and hearing weaken, some of the pulmonary alveoli disappear, there is a build-up of plaque on the inner walls of the vessels, joints lose cartilage, bones lose calcium, muscle fibres are partially replaced by fat. Physical power is reduced, the energy of existence seems to be exhausted.

"Ageing is not very pleasant, but it is the only known way to live longer" is an aphorism by Sent Beuve. Apart from energy and productivity, memory and mental concentration also dwindle in old age. The state of health deteriorates altogether because the human immune system can no longer distinguish self from foreign. This gives rise to autoimmune reactions; disarray prevails in the organism like a kind of "civil war." A cynical gerontologist once said that age "is the only disease from which you cannot expect to recover."

Anti-ageing

The phenomenon of the "fountain of youth" is a symbol of the mythical wish for eternal youth. The attempt by alchemists to create gold powder from sand resembled the illusion of the philosophers' stone. The present-day pharmaceutical industry invests billions of dollars in the attempt to prolong life by molecular means. Will we be able to buy this prolongation at pharmacies some time?

Cambridge geneticist Aubrey de Grey expects that life expectancy will soon extend dramatically. He worked out a very detailed plan to repair all the types of molecular and cellular damage that happen to us over time. Strategies for Engineered Negligible Senescence (SENS) is project to prevent and cure ageing. They should be fully working in mice within just 10 years and it might take only another 10 years to get them all working in humans. The unbelievable legend of Methuselah's age could become true!

Growth of the human body goes into reverse at the age of 36 in women and 28 in men. Lifestyle, nutrition, sleep, fitness, and stress determine two thirds of the process of ageing and are under our control. Only one third is predetermined by genetics. There is a rule in our civilization: vitality means attractiveness.

Scientists have discovered that the process of ageing is accelerated in the body by "oxidative stress" in the form of free radicals. These are produced by UV rays, cigarette smoke, smog, ozone, and excessive competitive sports. Too much sun or use of sunbeds, nicotine, and alcohol (e.g. more than 0.4 l of wine per day) cause the worst damage to the skin.

The American physician Kenneth H. Cooper recommends antioxidants as a remedy against free radicals. Vitamins C and E, β-carotene, and the trace element selenium are examples of antioxidants. a combination of these agents is available over the counter in capsule form. A diet which includes a lot of fruit, vegetables, wholemeal products, and low-fat milk products helps against free radicals.

Hormonal changes of the face grow between the sexes after puberty at adolescence at the fastest speed parallel with levels of oestrogen and androgen hormones. At old age, when the levels of these hormones decrease, the facial appearance of men and women converges. Among children and old people unisexual appearance rules – another reason why older women want to look feminine again.

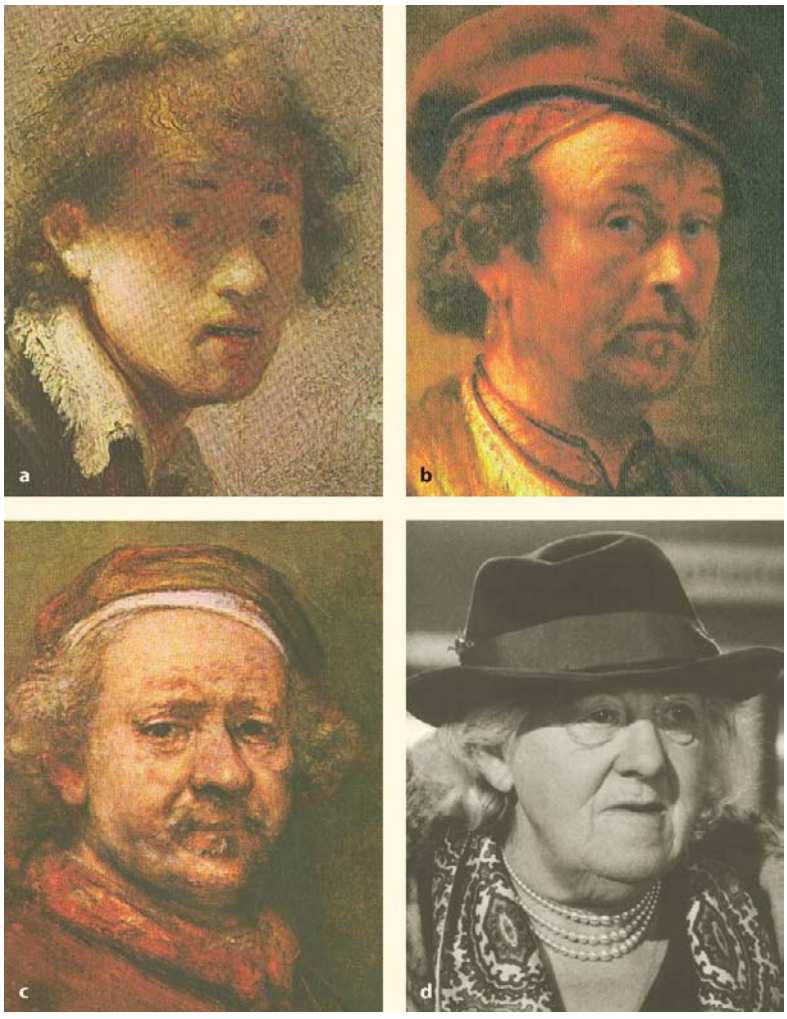


Fig. 6.2. a–c Rembrandt van Rijn made 2,500 oil paintings and 60 self-portraits, among them these at the ages of 23, 44, and 63 years. In his last picture he looks somewhat femininized. **d** Film actress in old age shows more masculine features

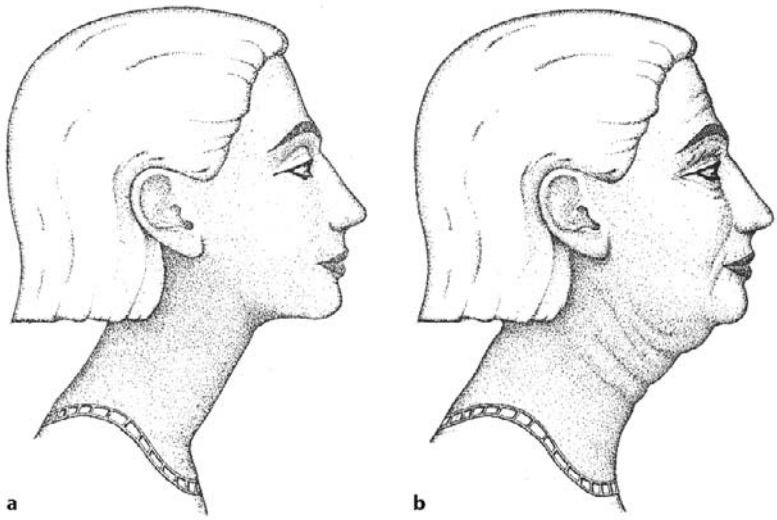


Fig. 6.3 a, b. Alternations of the face with age. **a** Young, well-proportioned, and wrinkle-free face. **b** Fat deposits with gravity lines and lines of facial expression with advancing age

"Hormonal Lifting"

The well-known French physician, biochemist, and physicist Etienne-Emile Baulieu, inventor of the birth-control pill and the abortion pill RU 486, has recently discovered the "pill of youth". Its scientific name is DHEA and corresponds biochemically to dehydroepiandrosterone of the human organism. The longer we live, the less DHEA we have. After taking this "wonder pill" depressions stay away, people feel physically and mentally more capable and overall more content. The memory is supposed to remain unimpaired, sexual appetite and the desire for physical exercise remain intact, and the substance is good for collagen and elastic fibres as well as for skin moisture. But, we should never forget: all medicine is also poison.

The administration of somatotropine can biochemically decelerate the processes of ageing: fat cells are reduced and muscle cells are stimulated. Such cures can cost a fortune, however: € 10,000–15,000 (US $12,000–18,000) per year. Sex hormones are glorified as true "beauty elixirs". Oestrogen promotes hydronic acid, collagen, and elastine fibres and combats free radicals, osteoporosis, and hair loss. Testosterone tightens the epidermis and the connective tissue.

But hormones should be treated with caution. Hormone replacement therapy must not mislead patients into swallowing "lifestyle pills" uncontrollably because they increase the risk of stroke, heart attack, a thromboembolic event, as well as breast and prostate cancer. The Woman's Health Initiative (WHI) study in the USA involving 16,000 female test persons who were on long-term oestrogen–gestagen therapy was recently abandoned owing to the frequency of these complications. For these reasons, a hormone cocktail should only be prescribed with caution, on an individual basis, and should be monitored by an experienced endocrinologist.

In the meantime we should try to manage by using conventional means and by changing our life style. We should change our diet: reduce calories, drink a lot of water, eat a portion of fruit and vegetables five times a day, take vitamins and mineral nutrients, and consume honey, milk, and organic yogurt. The last meal of the day should be taken by 5 p.m.

- *Regular exercise*: 1,500 cal should be "burned" per week. That means, for example, a 3 h walk or a 4.5 h stroll. This not only keeps the body fit, but mental capacity is increased by 15–20%. Pablo Picasso once said: "It takes a long time to become young".
- *Intellectual activity and curiosity.*
- *Laughter.*
- *Positive thinking*: Birgit Frohn said: "Optimists stay young longer and look that way longer."
- *Love*: Human closeness and emotional warmth.
- *Sex*: Endorphins are released during sex, sports, and laughter – they are the body's own pleasure producers which act like opiates.
- *A healthy sleep*: This lasts 7–9 h each day. The daily 6 min nap, as taken by the "old" German chancellor Adenauer or the old Chinese, acts like an oasis of rest in the middle of the day.
- *Autogenic training, meditation, prana-yama*, etc. are other easily learnable methods to recover one's balance and prolong youthfulness.

Antiageing cosmetics are being continuously developed. The transporters used to convey the active in-

gredients through the skin include liposomes, oleosomes, nanocapsules, microspheres, and telomerase. Vitamins such as retinoic acid and D-panthenol are regarded as skin regenerators. Terproline, melatonin, phytohormones, and various moisturizers are used to rejuvenate and regenerate the skin (hyaluronic acid, the amino acids glycin, allantoin, hypotaurin, etc.). Common herbal ingredients include algae, aloe vera, avocado, borage seed oil, ginkgo, soya beans, jojoba oil, and grapes.

Your own life expectancy can be estimated from the age your parents reach. Generally speaking, you are as old as your joints and vessels. But a young spirit at old age is a wonderful rejuvenator. And finally, the wisdom of growing old does not lie in eternal youth, but in growing old sensibly. One should not add the years to life, but life to the years. To speak once again with the words of the poet Dušan Radović: "It is great to be young, but it is no less of an achievement to have grown old."

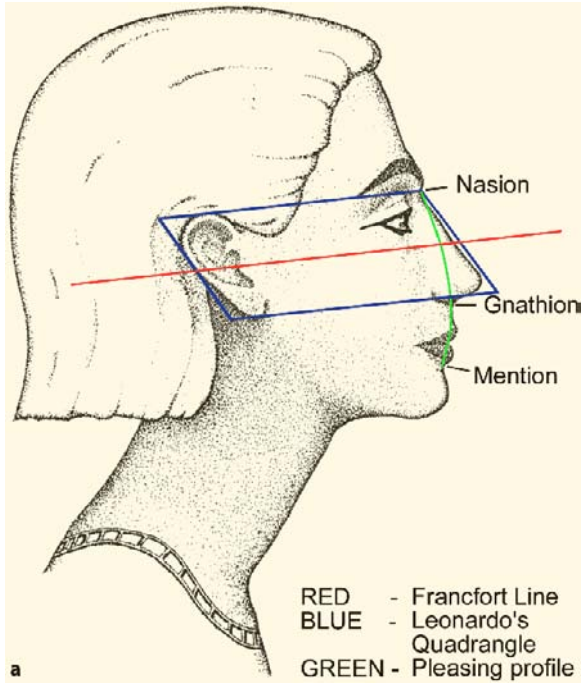
Bibliography

Please see the general bibliography at the end of this book.

7 Facial Analysis

Dimitrije E. Panfilov

Many anthropometric rules have been related to the face since ancient times. There is a relation between the whole body and the head, or the face. The head should have an eighth of the body length and the face a tenth of it. Leonardo da Vinci in his *Trattato della Pittura* gives the relations of the nose, ear, and thumb – they should have the same length. Also Leonardo's quadrangle incorporates the nose and ear in profile and should have edges of the same length. The Frankfurt line goes through the tragus and osteo-cartilaginous junction of the nose and divides the face into the upper and lower half. Stephen Marquardt, a maxillofacial surgeon from the USA, considers the golden cut of 1:1.618 to be essential for geometric perfection of facial harmony. Steven Hoefflin, a plastic surgeon also from the USA, measures the beauty through oval forms and angles (as one can read in his chapter, Chap. 11). These are useful planimetric and stereometric measurements. It is, however, more difficult to measure the grade of glittering eyes or the warmth of a human smile. And there is another rule: a smiling face cannot be ugly.



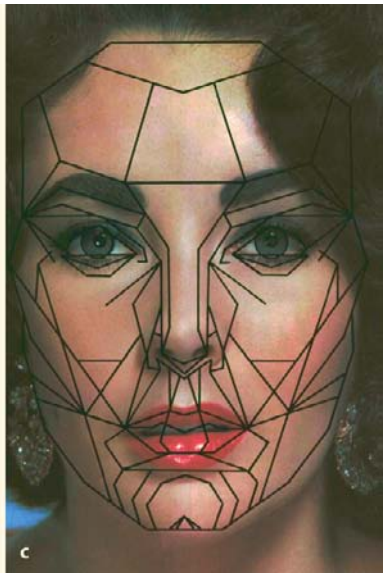


Fig. 7.1. **a** Some anthropometric points, lines, and curves of the face. **b** The icon of beauty of the twentieth century. **c** Pattern of golden cut of Stephen Marquardt fits to this face

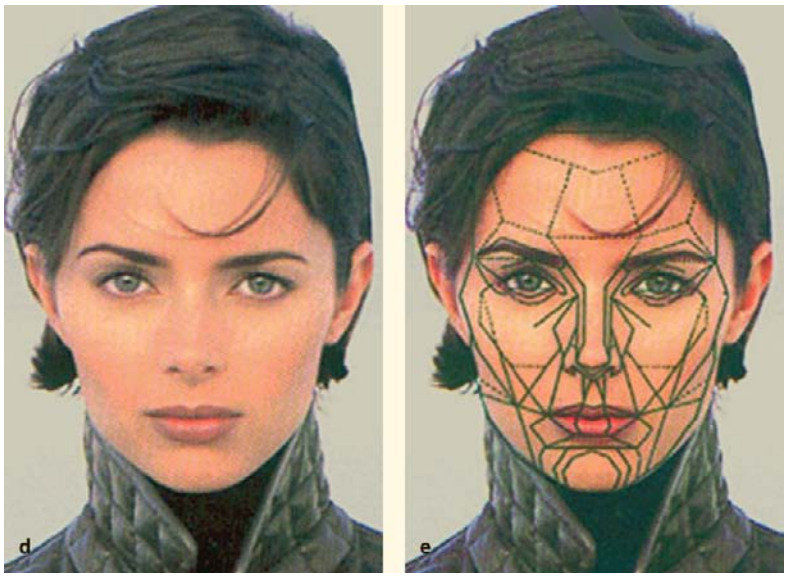


Fig. 7.1. **d** A beautiful young female face. **e** As in **d** with Marquardt's facial pattern of 1:1.618

In profile there are three points relevant for the facial analysis: the root of the nose (nasion), the dimple below the nasal columella (gnathion), and the dimple between the lower lip and the chin (mention). In a beautiful face, the line connecting these three points is convex-curved outwards. In a less pleasing facial profile, its course is straight, and in an ugly face it is concave-curved inwards. This is referred to as a "dish face" or a "witch face". This can be corrected either by protruding the maxilla forwards or by augmentative rhinoplasty and reductive mentoplasty. The opposite extreme of "bird face" can be corrected either by protruding operation of the mandibulla or by reductive rhinoplasty and augmentative mentoplasty.

The young nice face incorporates a triangular apex which is turned down. When we grow old, this apex turns upwards and the cheeks sag down and build the base of this triangle. It is always useful to encourage patients to bring us their photographs of when they were young. By doing so, we will be able to make the right plan for operative procedures to reestablish their youthful appearance. This triangle can be turned upside down to restore juvenile harmony.

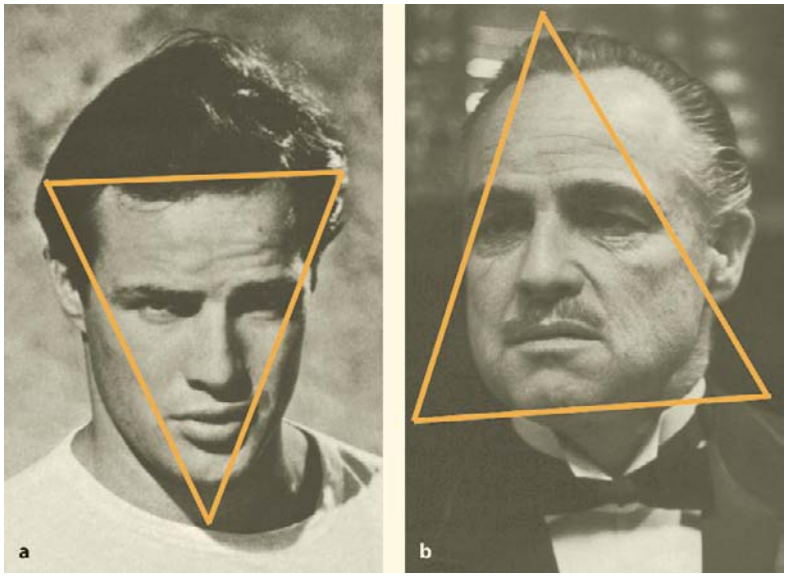


Fig. 7.2. **a** Triangle of youth – the apex is on the chin. **b** This triangle turns upside down as we grow old

Fig. 7.3. **a** Base of the triangle below the jaw line. **b** After rejuvenative surgery the facial triangle could be reversed to restore juvenile harmony

In frontal two-dimensional photographs of people – *persona* is the Latin word for "mask" – we sometimes discover some imperfections like "heavy cheeks", disproportions of a broad jaw compared with a narrow forehead, descendent lip commissures, and nose–eye-irregularities even in young patients. Before starting to analyse the feature composition of the patients, it is advisable to make either digital or Polaroid photographs in professional manner. Sometimes the patients are astonished at how they look in those pictures taken straight ahead. Our aim is not only to rejuvenate, but also to harmonize and beautify faces. And each face is unique, so we have to discuss many details with our patients to find an individualized optimal prescription for each facial surgery. We also have to respect the fact that mimic expressions reflect our emotions. Facial dynamics has to be saved.

Some prominent plastic surgeons have proposed special projections should be analysed, which help our patient to be able to realize what we are able to improve today. Bill Little from the USA has analysed the contour of the semiprofile and has found that this line should not be angular, but from above to the bottom it should be convex–concave. He borrowed an architectural term to describe it: ogee line. He achieves this by his imbrication procedure. Analogously, I have called the angular contour of the semiprofile (not edgy but) edgee line.

Fig. 7.4. **a** Contour of semiprofile shows the "edgee" line. **b** After rejuvenative surgery the semiprofile shows the "ogee" line

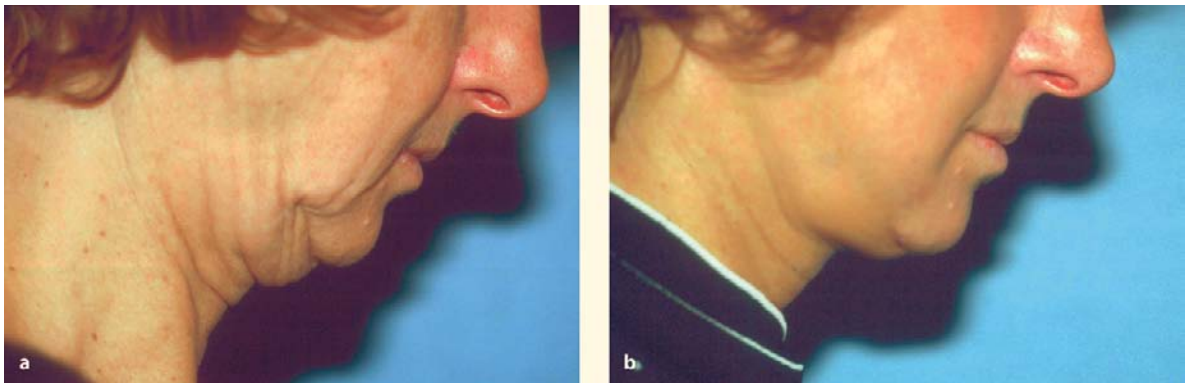


Fig. 7.5. **a** Accordion phenomenon – when the head is in a prone position. **b** Submental region harmonized through facelift, well measured out

Bruce Connell has suggested analysing the neck region when the head is in a prone position. In this position the skin and subcutaneous tissue laxity produce multiple wrinkling or rippling called "accordion phenomenon" which could and should be corrected after facelift surgery.

Sam Hamra has invented "split-faces". This is a photograph divided in the middle (by scissors or by computer) of the preoperative face and the postoperative face. Both photographs have to be taken under the same conditions. Then, for instance, the right preoperative half-face should be added to the left postoperative half (or the opposite combination). In this way we are able to demonstrate on a single picture what has been done or what we are able to change.

Patrick Tonnard also had an excellent idea: he made a physically fit male patient stand on his hands, then a photograph was taken in this upside-down position and was compared with a photograph of the same man in a normal standing position. These photographs were useful to demonstrate that cheek area benefits mostly from a vertical vector of traction. In contrast, the neck skin was wrinkled. Obviously, the vector of traction in the neck should be directed obliquely backwards.

We have added another projection which could be considered when analysing faces: a half profile from the back view. The signs of getting old appear first around the eyes and the lips and they cannot be seen from this projection, but a postoperatively accentuated malar region with concavity below suggests a postoperative pleasing youthful appearance as an ogee line, instead of the preoperative edgee line which would be characteristic for an elderly face.

In order to demonstrate postoperative changes which could be achieved operatively, computer imag-

Fig. 7.6. **a** Split face consisting of left postoperative and right preoperative halves. **b** Preoperative look of the same face. **c** Postoperative appearance

Fig. 7.7. **a** Volumetric face–neck-lift planned: edgee line. **b** Ogee line looks much more youthful: contouroplasty

Fig. 7.8. **a** Back semiprofile with edgee line in a man with hollow cheeks. **b** Ogee line after volumetric mini-facelift

ing is a very useful tool and after initial resistance among plastic surgeons it has been used more and more widely. Certainly, the patients must be warned that an absolutely identical result of computer simulation and surgical outcome is impossible. It is only a virtual way offering the patient the possibility to imagine her/his postoperative appearance. A hand mirror in front of the face could simply simulate the look of the face after 10 years in the forward prone position and the possible appearance after facelift – lying on the back.

The preoperative facial analysis includes also examination of the skin by inspection and palpation. In front of a mirror, we pull the proposed skin vectors to show the patient in which way we intend to refresh and harmonize her/his face. Some of our patients worry about redundant, wrinkled skin above our pulling fingers. We have to assure them that this will disappear after we have resected the skin. For more about skin conditioning, see Chap. 62 by Desmond Fernandes.

Bibliography

Please see the general bibliography at the end of this book.

Symmetry of the Face

8

Dimitrije E. Panfilov

Michelangelo acknowledged the Roman architect from the first century B.C. Vitruvius to be his "teacher". And it was Vitruvius who said: "*Symmetria forma absoluta est*."

The ultimate absolute shape is symmetry. Good healthy colour of skin, exuberant healthy hair, and symmetry are conditions which suggest health of a human being and this anticipates the capability of

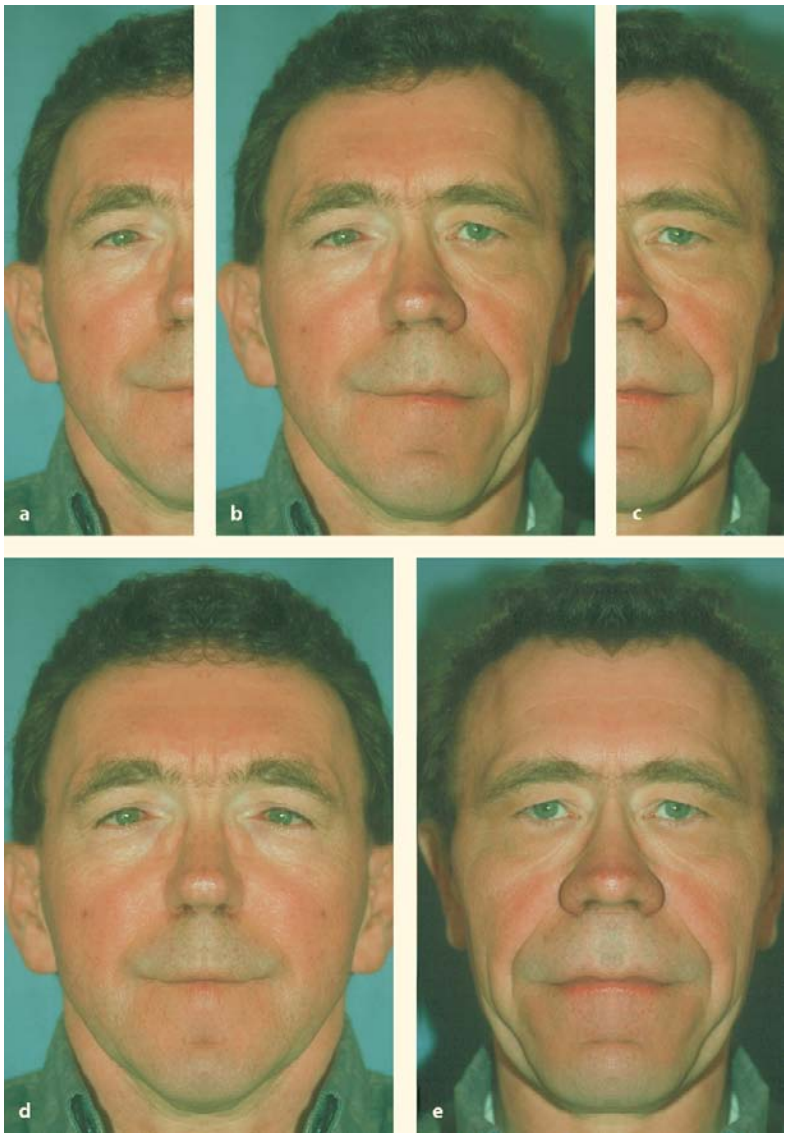


Fig. 8.1 a–e. High-grade asymmetry of a male patient who only wanted to symmetrize the nose. His "left face" seems to be 10 years older than his "right face". **a** Right half. **b** Preoperative face. **c** Left half. **d** Right half doubled. **e** Left half doubled. This "left face" looks 10 years older than the "right face"

Fig. 8.2. Symmetrizing of the nose – reduction of left nostril and elevation of left lip commissure

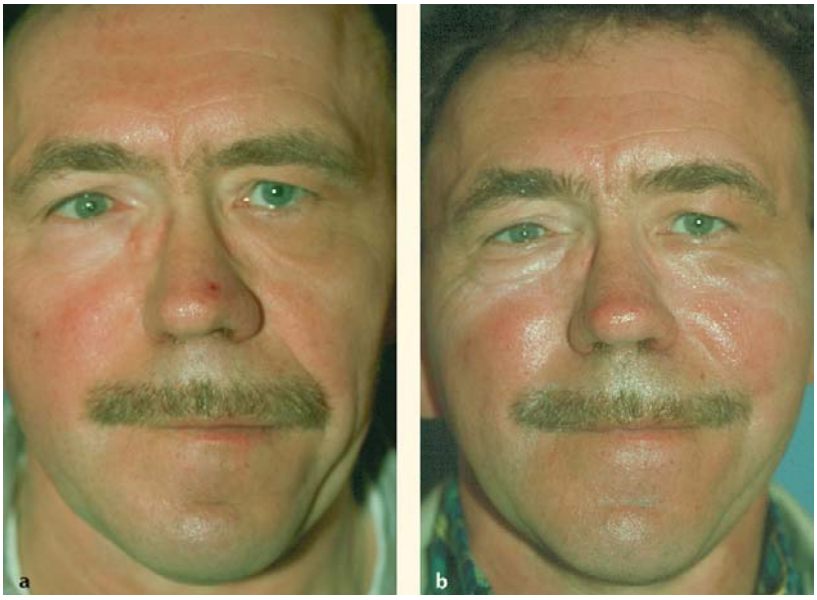


Fig. 8.3. Additionally left side unilateral facelift and microlipofilling of the left temple was performed. **a** preoperative **b** postoperative view

generating healthy descendants. Symmetric-looking persons seem subconsciously more attractive to the opposite sex because of the suggested ability to produce healthy children.

There is another interesting fact. All top sportsmen are somehow good-looking. This is due to the fact that facial symmetry correlates with the corporal symmetry and this is a prerequisite of the optimal physical performance which an individual is able to

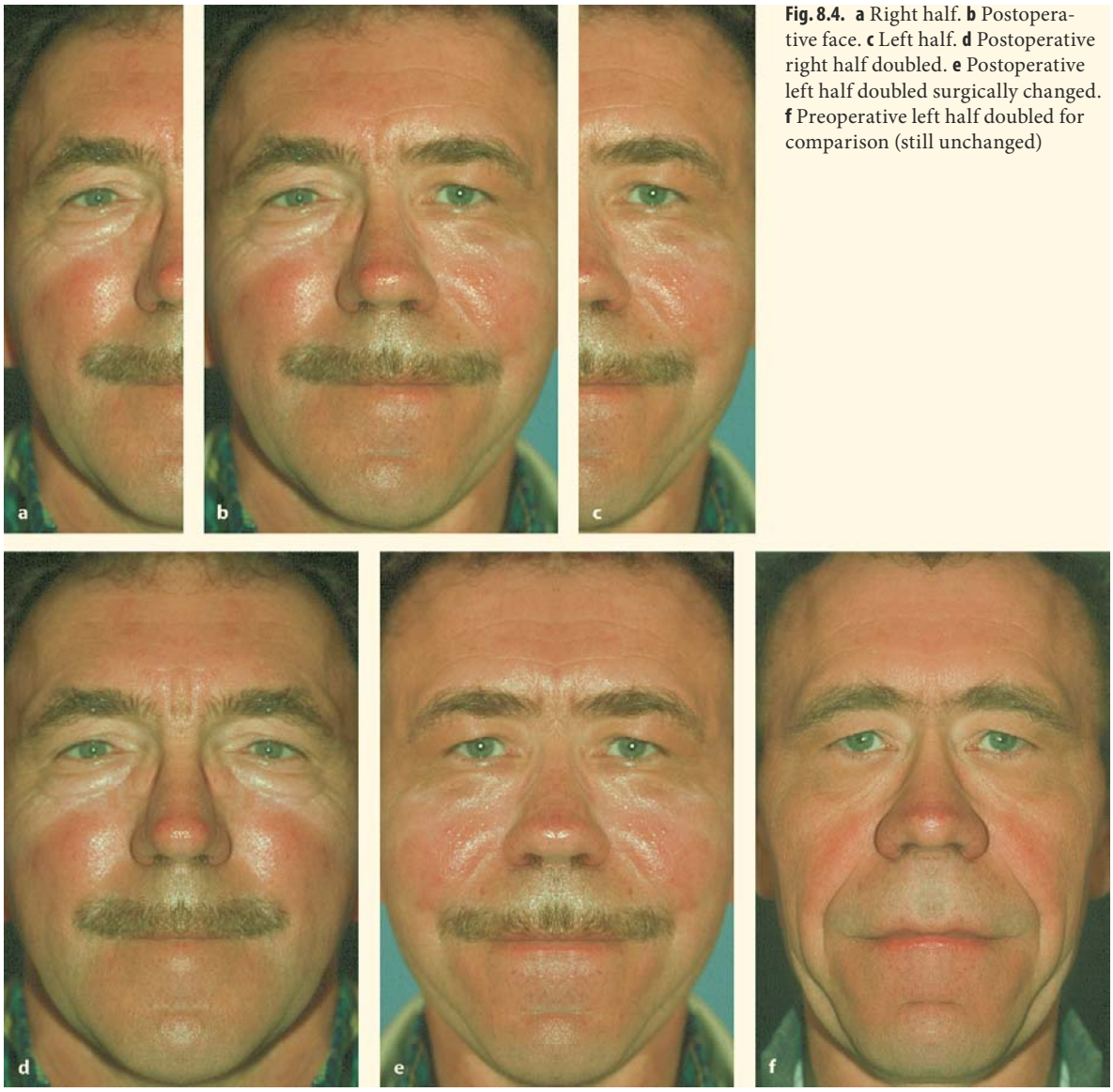


Fig. 8.4. **a** Right half. **b** Postoperative face. **c** Left half. **d** Postoperative right half doubled. **e** Postoperative left half doubled surgically changed. **f** Preoperative left half doubled for comparison (still unchanged)

deliver. Somebody who has one leg shorter than the other or asymmetric muscles in both extremities will not be able to achieve better results than somebody who has symmetric and almost perfect corporal conditions. And featural asymmetry is often accompanied by corporal asymmetry.

On the other hand, there is no face and no body in the world which is absolutely symmetrical. A slight unevenness of eyebrows, of eyelids, or mouth angles and different sizes and positions of cheeks and ears are present in almost every face. Science has discovered that women's earlobes achieve most symmetry during the fertile period of the menstrual cycle. Nature helps women to become symmetric, that means more attractive, just to increase the chances of becoming pregnant! It is interesting that most patients coming to our consulting rooms do not feel conscious of their even obvious asymmetries. Sometimes they are astonished when we analyze their *en face* pictures. They say they did not realize it before.

As the key to facial symmetry, the nose itself often deviates, not only the septum, but sometimes the whole pyramid (ridge) or the tip, or the whole nose might be more or less asymmetric. In planning our surgeries we should pay attention to this point especially if the patients themselves ask for it. If they do not notice these irregularities, we are obliged to ask them if they would like them to be corrected if an operation has to be done. If they agree, we can try to harmonize these mosaic stones in the face, to make it more attractive. For instance, when one side of the face sags more than the other one, the less flaccid side

Fig. 8.5. **a** The nose is the key to facial harmony – middle third of vertical length of the face and the middle structure of the facial symmetry dividing the face into left and right halves; here the deviation is to the left. **b** Same patient 3 months postoperatively. **c** As a piano player she wore glasses for no ophtalmological reason, just to distract attention from the shape of her nose. **d** No need for glasses after correction

can be lifted less than the opposite side, or if one eyebrow is lower than the other one, it should be lifted more to achieve postoperative symmetry, etc. All these elements can be taken into account when the aim is surgical beautification. Some photographic examples of these changes document this.

Bibliography

Please see the general bibliography at the end of this book.

Facial Architecture and Fine Arts

9

Dimitrije E. Panfilov

The human being is an emotional sculpture which cries and smiles. Physical disorders, defects, or imperfections can be surgically improved on condition that our emotional costume is not damaged. Hardly anyone will opt for an operation merely because he/she has too much time or money. It is psychological suffering that brings people to ask a plastic surgeon for help. Michelangelo said: "See the shape within the

Fig. 9.1. **a** A 25-year-old person; it helps us when our patients bring us their pictures of when they were young. **b** Many plastic surgeons and their patients are very fond of the arts. **c** Now, she is 50 years of age. **d** After minimal-invasive (MIDI) facelift and eyelid surgery, she looks some 12 years younger. Smiling lines on her cheeks should have been preserved

Fig. 9.2. **a** Our patient in the studio of contemporary German artist Ingrid Bickenbach with her modern painted portraits: "before" and "after". Her painted look **b** before and **c** after – she does look fresh and youthful

Fig. 9.3. **a** We have made plaster masks of her face to get the three-dimensional proof of what we have achieved; it took more time than the entire surgery. Plaster masks of her face **b** before and **c** after

marble and release it!" Plastic surgery can release the patient from his/her complex. Today we can rectify Sigmund Freud, who stated: "Anatomy is destiny." We are now able to influence destiny positively.

Aesthetic plastic surgery (cosmetic surgery) strives to achieve the highest possible harmony between different parts of the body and the whole body, between face and body, also between anatomy and psychology, between body and soul. *Harmonia suprema lex*. About half of all operations are performed on the face and the other half on the body. Any surgeon performing aesthetic (cosmetic) operations has to possess psychological knowledge, empathy, a high level of ethic integrity, but also the forming talent of an artist.

Aesthetic surgery rests on five pillars: science, psychology, handicraft, art, and business. The plastic surgeon should be able to identify the wishes of the patient, to define his/her problem and to realize the wishes of the patient in the operating theatre and not his/her own ideas of anthropometric perfection.

Plastic surgeons learn their operating technique from their surgery teachers, but we learn the rules of anthropometric harmony from sculptors – from Phidias, Praxiteles, Michelangelo, Leonardo, Rodin, Dalí – and also from countless painters. The artists have established the rule of sevenths applicable to the whole body, but also to the face. Boticelli's Venus is a good example: hair is the upper seventh, the forehead is two sevenths, the nose is two sevenths, the distance between the nose and the mouth is another seventh, and the last seventh is from the mouth to the chin. The ancient Greek painter Zeuxis (fifth to fourth century

Fig. 9.4. The lines by the Irish poet Yeats are spoken from within this sculpture by the Mexican sculptor Bustamante: "I am looking for the face I had, before the World was made."

B.C.) used faces of different women to create his famous portrait of Helen the beautiful. For her beauty's sake, the Trojan war became inflamed.

Umberto Eco wrote the wonderful *Storia della Bellezza* (History of Beauty) which we recommend as supplementary reading. Eco starts with quotation of Hesiods story of the wedding of Kadmos and Harmonia. The muses present sang *hotti kalón, phílon estí* "who is lovely has been beloved, who is not lovely has not been beloved". The ancient Greeks had an expression which unifies the harmony of body and soul *kalokagathía* to be found in the verses of Sappho and the sculptures of Praxiteles. The superb ancient Greek ideals of beauty are harmony, proportions, symmetry, eurhythmy, and analogy.

Eco writes the whole history of beauty on the basis of the works of sculptors, painters, philosophers, and poets because they were the only witnesses of beauty trends and their creators.

The medieval ideal of beauty was inspired by the mathematical beauty of the universe. Thomas Aquinas proclaimed his beauty ideals: proportions, completeness, clarity, and brightness. Chroma – the colours – would be the cause of beauty. In the Middle Ages the priests forbade all means for beautification. In the Renaissance the human being was in the middle of universe and the attributes of beauty were charm and sensuality. During Mannerism there were *ars geometrica* and *homo melancholicus* (geometric art and melancholic humans) – Leonardo da Vinci, Albrecht Dürrer, and Sandro Boticelli tried to show the beauty of the spirit which was shining through the face: it was melancholic beauty. Friedrich von Schelling wrote in his *Philosophy of Art* (about 1803) that a good portrait has to assemble many moments from the life of the person painted in just one single picture.

Then there are the achievements of science, like Copernicus showing that human beings are not the centre of the universe. They are restlessly escaping from the uselessness of life. All social changes, including civil and industrial revolution till the cyberage, find their reflections in the arts.

The contemporary artists Carolle Schneeman and Miray Orlan use their bodies in performing art to be both an image maker and the image itself. Marina Abramović and her partner Ulay force visitors of their "Imponderabilia" to body-touch and to chose the male or female principle at the entrance. Sabine Runde describes the "body as a temple".

Religious values and family importance are diminishing – our body becomes the last refuge. That is why fitness centres, the cosmetics industry, beauty spas, and cosmetic surgery are booming. We live in the age of the body cult, not only of new body consciousness. Plastic surgeons are not the trendsetters, but are very careful observers.

Cosmetic surgery treats those body areas which are visible to everybody. That is the reason why laymen judge not only the result of our treatment but also the indications: should something be operated on or not. We are thus obliged to enter dialogue with public opinion.

Bernd Guggenberger writes that good-looking students receive better grades for equal performances than less attractive ones, and handsome criminals get less severe punishment for the same offences than ugly criminals. Our outward appearance is a social phenomenon and not only a self-image. It is the image that others make of us and we are influenced by their reaction towards us. "Beauty promises happiness", says Stendhal. Our pleasant appearance is not a purpose in itself, but it is an instrument to offer more chances in social and professional competition. According to Charles Darwin's theory of natural selection, beauty is also the principle of sexual choice.

Among animals, the male specimen is more beautiful than the female (lion, deer, rooster, etc.). Beauty in animals indicates strength and determines leadership. The poet would say: " Even among flowers there is no justice." William Hogarth admits, however, that the human female body is more beautiful than the human male body because of its sinuous silhouette (clepsydra figure).

It is a great pleasure and privilege that plastic surgeons are often invited to the studios of the artists who are working there, because many of us are very fond of fine arts, some of us paint, sculpt, or make

Fig. 9.5. Andy Warhol made his "before" and "after" in 1961. Any plastic surgeon could provide many better examples. But, since March 2006 it has been forbidden by German law to show pictures of patients "before" and "after"! This picture was taken in March 2004 when the Museum of Modern Arts in New York was a guest in Berlin

films. We can exchange our ideas. For instance, the mouth of a human being is of the same length as the distance between the pupils of the eyes. This fact creates difficulties for most beginner portrait artists. Portrait paintings used to give the illusion of eternity through the promise of triumph over being forgotten.

Things have changed since Louis Daguerre in France found out in 1837 how to fix the picture to paper. Photography is cheaper and more "democratic" than oil-painted portraits. It is important how to illuminate the photographed face. The Rembrandt effect with a classical look is 45° oblique from above left or right. The "butterfly effect" with illumination from straight above gives a glamorous look. Illumination from below produces a startled look – it is rather undesirable.

More and more often plastic surgeons are invited to museums to give presentations of their interpretation of beauty and arts. After having been invited to Frankfurt's Museum for Applied Art in 2003, I was invited, in spring 2004, together with contemporary French artist Miray Orlan to the New York Museum of Arts and Design. Miray Orlan presented her "Carnal art" and my part was "Anthropo-design: aesthetic surgery is becoming human applied art".

I am deeply thankful for the opportunity to upgrade my profession to the level of other arts, for the privilege of being allowed to enter their "temples" of arts, for being accepted into the extended family together with other artists. There is a fundamental difference between an artist and a plastic surgeon. The artist (painter, sculptor, installer) has only to think of himself/herself and to follow his/her inner voice, without compromising for public taste. The plastic surgeon, on the other hand, has to forget himself/herself, and always aim to satisfy the patient, not necessarily the criticism of his/her colleagues.

High-tech achievements make the success of our treatment more and more probable and reduce the recovery time and the rate of complications. Worth mentioning are endoscopy, radiofrequency surgery, lasers, ultrasound-assisted liposuction, tissue glue, etc. Most operations nowadays are performed under intravenous sedation on an outpatient basis. But there

Fig. 9.6. **a** Miray Orlan performs as "Carnal art" seventh surgery to create her "composite autoportrait" **b** consisting of eyebrows of da Vinci's Mona Lisa, the chin of Boticelli's Venus, some mosaic stones of Europe, Diana, Psyche, etc.

Fig. 9.7. Former Miss World: Beauty is the glittering of the indescribable (D. Panfilov)

is a problem: technical development is faster than our ability to work out ethical consequences. Many things are possible, but the question arises: Can it be morally justified? Is the virtual world running into the cyber-age without pause for thought? Is the creature trying to become its own creator? The *Homo ipsifaber* of Christoph Zellweger? Lec could be right with his statement: "Technology is on the way to acquiring such perfection that man will be able to survive even without himself!"

"Beauty will save the world", Dostoyevsky said. It is not easy to discuss something which is not possible to define, like beauty, love, and happiness. René Descartes wrote: "Common sense (reason) is spread in the most justifying way in the World. Everybody thinks he has enough of it." With beauty it is the opposite. Nobody has enough of it, a plastic surgeon could add.

For me, the human being is still the greatest wonder of this world. Let me end this with a quotation by Anton Pawlowitch Chekhov: "Everything concerning the human being should be beautiful – not only the face and clothes, but also one's thoughts and actions."

Bibliography

Please see the general bibliography at the end of this book.

10 Fourth Dimension of the Face

Dimitrije E. Panfilov

The most important surface full of secrets which we face is the face. It is curved and has its anatomical depth of muscles, nerves, vessels, fat tissues, and ligaments. But it also has a fourth dimension – its spiritual deepness reflecting our mind and soul. It is the tool expressing our emotions, thoughts and messages of surprisingly deep contents in endless floating nuances.

We breathe, eat, drink, speak, and hear with the face. Four senses are concentrated here even the fifth – tactile sense – is represented here. With one look at the face we recognize somebody's age, gender, race, health, even affection and individuality. It possesses unique anatomy, expressiveness, beauty, and singularity. There are six billion faces on earth and not two of them are the same. Even mono-ovular twins have symmetry of their faces, composed like in a mirror.

We have learned more about the face in the last 20 years than in the 20,000 years before! Every human being has a unique and unmistakable iris, pattern of the ears, and thermic emission of the face and, in addition, the voice, fingerprints, and handwriting are unique. If we imagine that facial muscles are musicians in an orchestra, than the game of our facial expressions would be the melody played by this orchestra. The expressive messages of our faces are universally equally produced and understood – we may speak of facial Esperanto.

Words are just cascades of feelings, whereas our faces are able to show subtle emotions in smooth flow without rough transitions. Simply, the face is the mirror of our soul. It also indicates our character.

Neurophysiology has proven that we are able to produce about 7,000 different facial expressions, but we use only several hundred. Like words, there are about 100,000 different words in most languages, but we use only a few thousand.

Nine minutes after birth, a baby looks first of all into faces and almost half of this time it fixed on the eyes of the person communicating with. Babies have universally spread elementary facial expressions. They develop them within the first year of life: smiling and a surprised look shortly after birth; sadness and disgust they learn by the third month; a false "social smile" also by this time; anger between the fifth and ninth months. All babies seem similar but heads, eyebrows, jaws, and noses of male babies are bigger than those of female babies. This proportions do not change in adults.

The muscles of the face are better developed in men than in women, who have a thicker layer of fat

Fig. 10.1. Nefertiti – mystic harmony for over 34 centuries

tissue covering muscles. Still, their facial expressiveness is more intensive as they react to feelings more openly than men. The only group of muscles which is better developed in women is the muscles of the tongue, probably because of exercise – women talk more than men.

A smile is a very powerful social instrument. Different muscles produce a frank and a false "social smile". The first one is produced by zygomatic and the second one by risorius muscle. An acted smile is limited to the mouth: the eyes do not take part in a "social smile". That is why the Japanese have the word *mokushoh*, which means "smile of eyes". A false smile is asymmetric: in-right handed people the left mouth angle is higher than the opposite lip commissure. Similarly, in "acted anger" the left eyebrow is deeper. The face shows the truth, the whole truth, and nothing but the truth. At the same time it might show the lie, the whole lie, and nothing but the lie. That is why Cicero said: "All is situated in the face."

When we are ashamed, for instance when we are caught lying, our faces blush. The Portuguese have a saying: "Better a red face than a black soul". Mark Twain said that a human being is the only animal which blushes – and there is good reason for it. Blushing is a subconscious strong feeling of shame often appearing in adolescence. This fits into the sentence of Oscar Wild: "The real mystery of the world is the visible, not the invisible."

The ethologists Paul Ekman and Wallace Friesen have classified different facial expressions and grimaces into emblems, illustrators, regulators, and adaptors. This paralingual or nonverbal speech is its own microcosmos.

Darwin considered the naked skin as the main sexual ornament of humans; it is lighter in women but becomes darker during pregnancy. And female skin has less hair than male skin. Hormonal influence is responsible for morphological and psychological properties being divergent during the period when we can reproduce and convergent before and after that. Testosterone as an androgen hormone causes the growth of the beard in puberty in boys, which represents the main difference from female faces. If we spend 15 min a day shaving, that means 60 days and nights in a lifetime.

Babies of 18 months begin to recognize themselves in the mirror. Perception of ourselves is only possible with this tool. Narcissus could only see his reflected image in the surface of calm water. Andrea and Domenico d'Anzolo del Gallo found in 1507 in Venice that a certain mixture of mercury and tin fixed on glass produces a mirror. It was a manufacturing secret in Venice till 1664 when Colbert produced mirrors in France with some manufacturers "stolen" from Venice. Because of this Louis XIV could build his "hall of mirrors" in Versailles and soon everybody was able to admire herself/himself in the mirror.

Victor Johnston and Melissa Franklin have published a remarkable article "Is beauty in the eye of the beholder?". They found that beautiful female faces should have high "malar bones", narrow jaws, and big eyes; the distance between the lips and the chin as well as between the lips and the nose should be smaller. The whole lower face should be smaller. That is what we consider by a "baby face". "Cheek bone" is not bone at all but the overlying fat tissue. Fat makes women more beautiful – even breasts consist of 60% fat. Greta Garbo had her malars removed to emphasize the malar prominence. Today, we have much better and less aggressive methods to achieve these effects.

The anthroplogist Douglas Jones scanned pictures of beautiful models into a computer which was programmed to ascertain the age from the features. According to the proportions of lips, cheeks, noses, and cheek bones, the computer calculated the age of these persons to be between 6 and 7 years!

Computers from the University of Amsterdam and the University of Illinois programmed to decode basic emotions have analysed da Vinci's Mona Lisa. It was found that her picture shows 83% happiness, 9% disgust, 6% fear, and 2% anger.

For the purpose of identification of criminals, Jacques Penry constructed a photofit which divides the face into five different segments, each of them having several variations.

Alexander "Sandy" Pantland from the Massachusetts Institute of Technology searched the facial mosaic, which he divided into 100 units, with each unit making 100 different expressions. He found that 10^{200} variations of facial expressions are theoretically possible. It is an unbelievable number of 10 with 200 zeros behind! To compare it with the game of chess , there are 10^{180} (10 with 180 zeros) possible variations of complete chess games – only!

Nowadays faceless intimacy is possible through telephone sex; or an even more virtual possibility is offered by computer per cyberchat or TinyMUD conversation.

In contrast to this, Yvette Hoyle from London has found in her partner agency that it is easier to recommend people with lively expressive faces. If men are choosing female partners for marriage they prefer average-looking ones than the most attractive ones. This corresponds with the Bo Derek scale where the most attractive ones are noted with 10 and the least attractive ones with 1. Somehow those scoring 5 go into relationships with those scoring 4, 5, or 6, and so on. They find themselves, says Bernd Guggenberger, a sociologist from Bern. Situations where somebody who is "2" takes a 10" are impossible. The exceptions

Fig. 10.2. Salvador Dalí's mosaic portrait of Lincoln with his Gala incorporated as the nose; 10 m picture in Teatre-Museu Dalí, Figueras, Spain

are very rare. Evolutionary psychologist Davis Buss published in 1989 a study made among 10,000 people from 37 countries. He found that human warmth and friendliness were the most desirable qualities in choosing partners for life.

Middle-aged managers who consider themselves "too tired looking" and who want to gain a more dynamic appearance are the largest group among our male patients. Sonja Bischoff, a Hamburg scientist, has studied top management representatives in Germany since 1986. She found that appearance is increasingly becoming a factor for success. In 1998, "appearance" ranked as the third-most important factor for success, together with "personal contacts".

In the 2003 investigation, outer appearance had gone up to number three (for woman) and even number two (for men!). In Bischoff's book *Wer führt in (die) Zukunft* [Who is Leading in(to) the Future] specialist knowledge was the focus of the investigation, and minor focus was put on personal relationship, language knowledge, and professional and nonprofessional activities. Outer appearance itself has made a career, even more so among men than among women. Highly paid managers often mention their looks as a contributing factor to their success!

The human weakness for the beautiful was scientifically confirmed by the Hamburg brain researcher Knut Kampe. He measured the effects within the limbic system (which is responsible for human emotions) when looking at an attractive human being. If the limbic system, which is considered one of the oldest in the evolution of human beings, sets off endorphins, we receive a feeling of pleasure. Stereotypes with regard to attractiveness work in favour of the beautiful. In other words, we are doping ourselves.

Meeting the eyes of less attractive human beings can cause negative feelings. The level of pleasure increases as soon as those unbeautiful glances turn away, the medical scientist from Hamburg found. A salesperson with attractive features will find it easier to sell his/her product than someone with less attractive features; an insurance representative with attractive features will find it easier to convince his/her client to sign a contract than a less attractive counterpart. The social psychologist Ronald Henss concludes: "It can be reasonable to take attractiveness into account during the hiring process."

Surprisingly, in New Age circles make-up is nowadays frowned on by women as an expression of vanity and superficial self-loving ego. Masao Yogo from Doshisha University in Kyoto has filmed women sitting for the same time in front of a mirror without make-up, for the same time after they had put make-up on themselves, and after a visagist (face stylist) put the make-up on for them. Without make-up they smiled only 0.9 times into (towards) the mirror, after applying their own make-up five times, and after the professional had applied the make-up eight times! Yogo even found a lower temperature of the forehead after application of make-up as a sign of increased feeling of wellness.

Scientists from the French corporation L'Oreal tested in Lausanne the walking of 16 elderly women (the youngest was 65) for the posture and speed and safety of their steps without and with make-up. The improved facial appearance had the effect of putting joy into their steps which was measurable on the next day and even after 6 months! Patricia Pineau from L'Oreal says that their mobility therapists found the effect on mobility after 20 min of cosmetic facial treatment to be the same as after 10 weeks of walking exercises.

Japanese researcher Tsuneyuki Abe tested elderly women in the geriatric centre of Naruto-Yamagami Clinic suffering from schizophrenia, depressions, and dementia. For weeks cosmeticians applied their make-up for them,; afterwards they applied their make-up themselves. The effects were surprising: one third could again independently eat, wash themselves, and go to the toilet. And 90% of them became more sociable, communicative, and cheerful. This is the power of the smile, when even ill persons start to like their reflection (in the mirror) again!

Scientific researchers from Shiseido and Carita have found that after cosmetic treatment (masks, massages, etc.) women from 24 to 48 years of age have reduced stress hormone cortisol (34%) and increased immunoglobulin A (107%) on average to support the body's defences. The cosmetics industry can financially support such research and prove that somebody who looks better feels better. Plastic surgeons can

only imagine and feel how much our patients benefit after cosmetic operations. Some of them really "blossom" after their surgeries.

To look good is:
- Psychological
- Physiological
- An instinctive need of human beings

Plato defined three supreme principles of our civilisation: the ideas of:
- Goodness
- Truth
- Beauty

Plato also said that Socrates had said: "When we were among Gods, we could see the reality of perfect shapes. Our souls have kept the remembrance of it." Socrates also had to admit knowing what is beautiful but not what beauty itself is.

Beauty is a mixture of biology, youth, health, sexual maturity, voice (as power of the soul), physical charms, ancient Greek harmony, mathematic formulas, Darwin's "taste of beauty for beauty sake", intelligence, cheerfulness, personality, etc. He speaks also of "mental charms" as human "sexual ornament". For me, beauty is the metaphysics of the physics; it is the spiritualized visualization of the substance. The German poet Friedrich Hebbel would say: "Beauty is the depth of the surface." Certainly, it is also a "social power", as Bernd Guggenberger says.

Two personalized incarnations of beauty to be quoted as the author's personal preference are given in the following.

Nefertiti, the ancient Egyptian make-up wonder, evokes universal admiration, even today some 34 centuries after Tuthmosis created her bust. Her plucked and lined eyebrows, her absolutely harmonious nose, her divinely formed and made-up lips, her subtle swan neck all radiate an almost magnetic appeal of exceptional intensity. The mild and mysterious face of the fatally beautiful Nefertiti still leaves many a question unanswered. When I am in Berlin, I entrench myself before the sculpture of Nefertiti and just cannot stop admiring her perfectly formed nose and her full, harmonious lips without any cheap sensuality. The perfect profile of the favourite wife of the pharaoh Amenophis IV – Akhenaten – has lost none of its relevance to the present day, some 34 centuries after its appearance.

Audrey Hepburn had, like Brigitte Bardot, bodily contours of rather modest measurements. But, her face was full of longing, even yearning. Her huge eyes hid craving hope and secrets, showing an erotic smell of naivety with no touch of vulgarity. The suffering of her childhood and the coming suffering of her later days were visible in her middle age. The innocent charms of her resplendent inside resulted in glowing magnetism.

Fig. 10.3. Metaphysical beauty of Audrey Hepburn without cheap sensuality; painted interpretation of Heiner Meyer from Germany, who was student of Salvador Dalí

The great thinker of the twentieth century the Hungarian Bela Hamvas in his cult work *Scientia Sacra* digs even deeper into the phenomenology of inner and outer beauty. For him, beauty is not a characteristic, but has similarities to the Divine, embodied in the celestial virgin Sophie. Her beauty and wisdom are love, and they arouse love. She is compared with the earthly woman, Eve. She left behind beauty in the spiritual world and exchanged it for appeal. She is not beautiful, but seductive. Her main objective is to be fairy-like.

True beauty cannot be lost. What is lost is the means to seduce: the charms. That is why a woman's greatest fear is to become old and ugly. Not only Adam was a victim of the original sin (temptation), but also Eve. When one finally wakes up from the bewitchment, one feels cheated, because "instead of the face, one has chosen the mask", as Hamvas concludes.

As additional reading to this chapter we recommend Daniel McNeill's book *The Face* and Brian Bates and John Cleese's book *The Human Face*.

Bibliography

Please see the general bibliography at the end of this book.

The Definition of Facial Beauty

11

Steven M. Hoefflin

11.1 Introduction

As a scientist, I am quite surprised by the mathematics of facial beauty. As a plastic surgeon, I am delighted. My research has shown that the fundamental difference between an unattractive, average, attractive, and remarkably beautiful face lies within a few millimeters and a few angular degrees. With this in mind, I have developed the formula of "AH," a simple mathematical formula that allows for the first time a mathematical definition of facial beauty based on seven facial angles (A) and seven facial highlights (H).

Research in the study of a normal or average face has opened up a new world in the ability to analyze, classify, and identify faces. Normal or average faces have been studied extensively; a beautiful face has yet to be successfully analyzed mathematically and defined. Agreeably or disagreeably, the attractiveness of the male and female figure is often described in measured numbers. Why not the face? As we live in a measured world of mathematics and computers, a mathematical definition of facial beauty's time has come.

It is important to reemphasize that for well over a century, the attractiveness of a woman's figure (chest, waist, and hips) has been based on numerical measurements (e.g., 36–24–35). The hip–waist ratio has also been studied as a symbol of fertility and fecundity, important in mate selection. Female facial beauty is also numerically related to the volumetric curves and proportioned shapes of several locations on the face. Male handsomeness (to be presented in a future publication) is related to the positional angularity of the face and its volumetric proportions.

The human face can be thought of itself as an "oil painting," a true work of art. Like a beautiful portrait, a face is complimented by the skin (canvas), hair (frame), and teeth (matte). In my opinion, a beautiful face combines facial features that are (1) harmonious, (2) shapely, (3) balanced, (4) elevated, (5) symmetrical, (6) highlighted, and (7) in volumetric proportion and relationship.

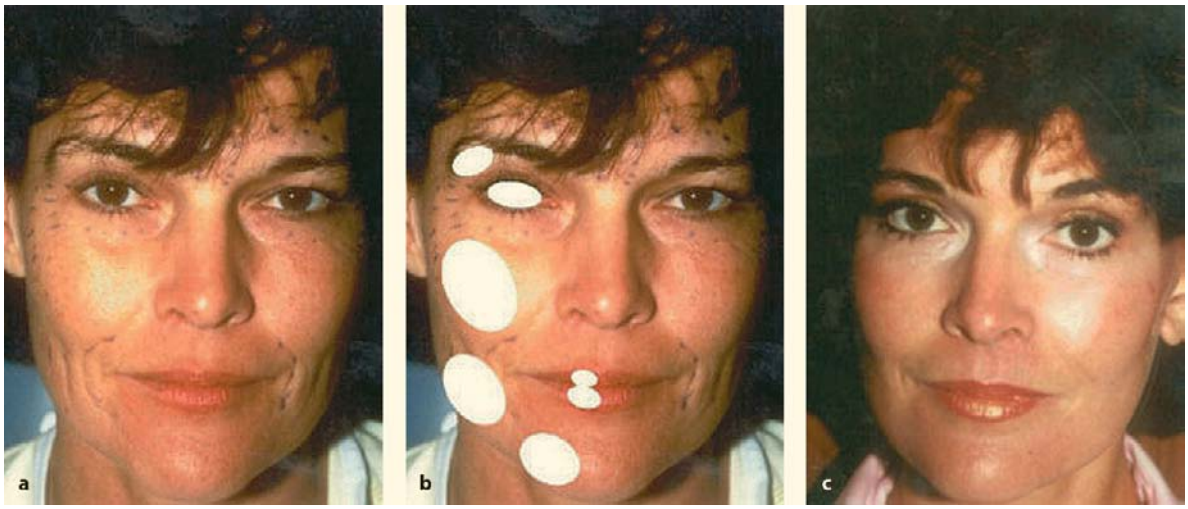


Fig. 11.1. Seven youthful fat pads. **a** A 54-year-old patient, with a tired, aging appearance. **b** Note the proper positioning of the youthful egg-shaped highlights. **c** One-year postoperative extended supraplatysmal plane, endocoronal lift, and fibrofatty grafting to seven the youthful facial fat pads (or "eggs")

Many believe that the true purpose of beauty has escaped those other than philosophers and artists. This is not true considering that beauty has a definite purpose in nature. Insect pollinators are attracted to the most beautiful or fragrant flowers, which ultimately ensures genetic survival for both parties in a symbiotic relationship. In the animal kingdom, beauty can be correlated with health, strength, and youthfulness. These qualities ensure genetic survival through preferential mate selection.

Unlike poets and artists of the past and present, my goal is to provide a mathematical definition of a beautiful face, a very important step in understanding facial beauty. Until now, a numerical classification has not been successful in assessing facial beauty. Defining a face as beautiful in an artistic context is quite simple; the difficulty lies in being able to provide a precise, objective, and mathematical definition without being surpassed by a subjective interpretation.

Whatever its reason, the quest for beauty is here to stay. A beautiful face will never be denied or ignored. Facial beauty offers its own rewards to be shared, enjoyed, studied, and remembered.

11.2 The Language of Beauty

For centuries, poets and artists have been unsuccessful in creating a uniform definition of "beauty." Early attempts to do so have left behind a montage of words and images for the rest of us to ponder and appreciate. Today, more than any other era in history, there is an intense interest in beauty. The pursuit of beauty has only been outweighed by the attempts to acquire it.

Defining beauty, like defining love, has left poets with centuries of work and authors with pages and volumes of phrases. Defining words pour forth, such as aesthetic, aphradite, art's architecture, attractive, balanced, belle, blended, breathtaking, charming, contoured, detailed, defined, delicate, enhanced, elegant, elevated, exquisite, fabulous, featured, flawless, glamorous, goddess, great, gorgeous, grand, harmonious, healthy, ideal, intense, intoxicating, luxurious, majestic, natural, sensual, pleasing, pretty, pristine, queen of form, radiant, smooth, sparkling, stunning, sweet, and vibrant.

The artistic or poetic description of beauty is universal with terms such as *beautè* (French), *Schönheit* (German), *bellezza* (Italian), *beleza* (Portugese), and *skjönnhet* (Norwegian). It is clear that if something is beautiful, the subject will be evaluated and admired by many. There must be a common denominator, a consistency of qualities or features that our aesthetic sensitivities automatically perceive as beautiful.

In my opinion and studies, a beautiful face, like a beautiful oil painting, combines impressive and unified expressions of ideal features, rhythm, balance, and symmetry of proportion, harmony, style, and artistic value. There are pleasant, graceful lines, angles, and arches. There are uplifted and balanced forms and contours. There may be complementary coloring and shading with stunning harmony, and a symphony of anatomical rhythm. The result is a beautiful portrait.

In short, I would define beauty itself as "a highlighted and extraordinarily high-quality elevated image which catches and hold's one's emotional attention, pleases and enhances one's perception, prolongs the eager evaluation, and creates lasting and positive appreciation. It certainly can be a somewhat rare, but splendid experience, to be shared by all."

Alas, no wonder the positives of beauty and its worldwide appreciation have been the subject of many poems, songs, novels, movies, and other attempts to capture its permanent artistic image. The mystery and enjoyment of true beauty and its capture remains remarkably elusive. Before attempting to rejuvenate any patient's face, a definitive "architectural topographical plan" is an absolute necessity. In order to produce the best possible work, the top architects and artists must painstakingly plan each step of their work in a calculated, methodical manner. A plastic surgeon dealing with a patient's face should do no less.

I have found it very useful to view a patient's face as if it were a portrait complemented by "the canvas" (the skin and teeth), "the oil painting" (the contours and features of the face), and "the frame" (the hair).

11.3 Looking at a Face Using a Scientific Approach

Technological advances in the military have given pilots the ability to look at an imaginary computerized "windshield" and to know the exact location and position of their targets. Special helmets and eyeglasses can measure exactly where a pilot looks. Similar technology can be used in determining where we look when looking at a beautiful face.

Visually, we perceive light highlights and dark shadows as shapes. This perception allows us to assess the position, volume, and shape of objects. We are able to visualize distance and depth perception through binocular vision. Owing to the number and the physical structure of the optic muscles that move the eyeball, the cerebral cortex evaluates an image more easily when the eyes move from side to side on a horizontal plane rather than up and down on a vertical plane. Graceful flowing curves are more satisfying to the eye

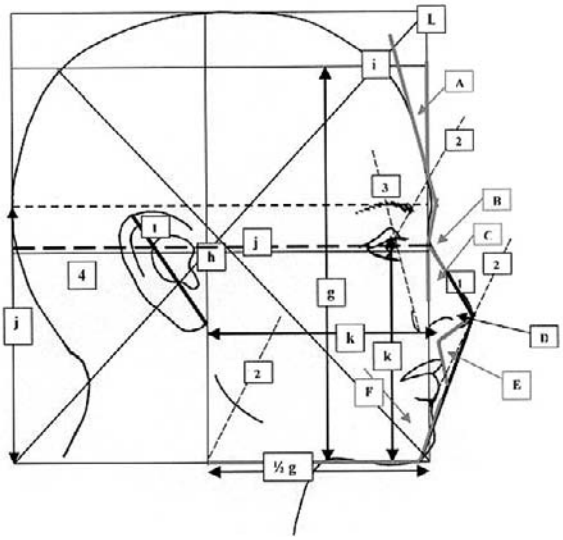


Fig. 11.2. A normal f ace. *A* Forehead angle: the slope of forehead off the vertical is approximately 10°. *B* Nasofrontal angle: ranges from 115 to 130°. *C* Nasofacial angle: ranges from 30 to 40°. *D* Nasomental angle: ranges from 120 to 132°. *E* Nasolabial angle: ranges from 95 to 100°. *F* Mentocervical angle: ranges from 80 to 95°. *g* The distance from the mandibular angle to the chin is half the distance from the chin to the hairline. *h* The half point, where the upper-ear helix connects to the sideburn. *i* Anterior hairline. *j* The distance from the occipital to the chin is twice the distance from the glabella to the chin horizontal. *k* The distance from central nasal base to the ear is equal to the distance from the pupil to the chin horizontal. *L* An anterior vertical line, from the glabella to the chin, defines a normal. *1* Ear and nasal bridge are positioned at parallel angles. *2* The angle of the line from the pupil to the glabella is parallel to the line from lower lip to the nasal tip, which is parallel to the angle of the neck. *3* A line from the base of the ala to the pupil will pass through the brow arch peak

and cause less muscle movement than straight or irregular lines. Following an irregular, jumpy line or viewing vast changes in contrast may result in excessive eye muscle movement and unnecessary cerebral activity and fatigue.

Anatomically and physiologically, the eye, like a camera, is stimulated by the quantity and quality of light that is reflected off the face. In viewing an image, the eye focuses on areas that are highlighted with pleasing shapes. As light stimulates the eye, these highlights are perceived as gentle, rhythmic, and flowing curves. This pleasing visual stimulus may be genetically wired into our brain. In viewing a beautiful face, the eye will be drawn to the smooth "egg"-shaped volumetric soft tissue areas (fat pads) with uniformly bright highlights and pleasing, rhythmic flowing curves.

11.4 Defining the Beautiful Face

Historically, noted contributions have been made to describe a beautiful sunset, bird, flower, opera, ballet, or masterpiece. These contributions have somewhat answered a bold challenge that pales in one's attempts to define a beautiful face. Although Hungerford stated that "Beauty is in the eye of the beholder," I must correct this and say that "attraction" is in the eye of the beholder, while beauty is shared by all.

How do we define beauty in human faces? The areas of the face that add the most to facial beauty (the eyes, cheeks, nose, and lips) also command the most scrutiny. One must attempt to combine art with science in answering this question.

In evaluating a beautiful face, the features which command the most attention, in order of appearance are the eyes, brow, cheeks, lips, nose, chin and jaw line, and neck. Features which rarely attract scrutiny (unless an abnormality is noted) are the forehead and ears.

As stated, in my artistic opinion, a beautiful face combines facial features that are harmonious, shapely, balanced, elevated, symmetrical, highlighted, in volumetric proportion and relationship.

Ideally, the width of the "Fabergé egg" highlights should be 50–60% of their length. The sum total of the seven egg volumes and their respective height and angles off the horizontal can be compared with the total egg volume of the face. The proportions are determined and analyzed. Although a very difficult and sophisticated mathematical analysis can be performed with digital imaging and computerized calculations, a more simplified approach has been developed to help the average person. Although the three-dimensional shape of the facial soft tissue features should be accurately calculated as such, two-dimensional calculations are easier.

It appears that measuring the actual volume of the "Fabergé egg" highlight may be difficult. A good correlation exists when comparing the width of the egg to its length. Although these features are truly three-dimensional values, using length and width measurements and proportion alone should suffice. The higher the value of the width compared with the length (up until 50–60%) reached, the more beautiful and youthful the features. These proportions can certainly be too great, leading to an abnormal or possibly deformed facial feature.

In its simplest form, the beauty of a face can be visualized merely by placing and judging the position, volume, and angle of the seven eggs on one side of the face:

1. Subbrow egg and its position, volume, and angle
2. Eye egg and its position, volume, and angle

3. Cheekbone egg and its position, volume, and angle
4. Upper-lip egg and its position, volume, and angle
5. Lower-lip egg and its position, volume, and angle
6. Mandibular angle egg and its position, volume, and angle
7. Chin eggs and their position, volume, and angle

Although the words describing a beautiful face may be quite descriptive and artistically satisfying, one has not been able to analytically create a reliable, mathematical definition. In an era where beautiful architecture can be defined numerically, it is easiest to define an architect's creative and artistic work as a marriage between art and science.

In a computer age where communicating is becoming increasingly numeric and digitized, a more scientific description is all the more important. Art without science, and science without art, is not optimal. Combining both science and art is the best communicative approach. A significant limitation to both the artist and the plastic surgeon is the ability to intelligently communicate one's desired goal. The desire to exchange information is strong, but the language is in its early developmental stages. Descriptive words alone do not suffice in a detailed, measured, and calculated discipline.

Appreciating the artistic description of beauty, combined with descriptive scientific numerology, will advance the disciplinary linguistics and the more successful capturing and creation of a stunningly beautiful face. This is certainly an artistic and scientific dream well worth all of the work to obtain the final product.

In analyzing a beautiful face, one must appreciate the existence of a normal skeletal and structural foundation. There has been an extensive amount of work performed by many medical disciplines in establishing facial norms. The muscular–skeletal dimensions must be within the normal position and range. Basic skeletal landmarks and overlying muscle positioning may vary in the volume of bony prominence in the normal or average face. As an example, an attractive or beautiful face may have a larger or more voluminous malar (cheek bone) prominence. Correcting the overprominence or deficiencies of bony structures can be modified where necessary. Normal mathematical ranges have been well established and publicized. The establishment of normal, facial bony values has been of substantial assistance to the craniofacial surgeon, orthodontist/oral surgeon, and the reconstructive plastic surgeon. However, it is not the average or normal face where we direct our interests, but the stunningly beautiful face. How does this entity differ? It is not only the extraordinary bony landmark prominence or volume, but also the soft tissue features (skin, fat, and their landmarks such as position, volume, angles, and shape) that truly creates the beautiful face. It is this soft tissue layer, above the muscular–skeletal framework, when given the proper analytical values, that sets the strikingly beautiful face apart from the normal–average face. This realization will then allow the assessment, planning, and subsequent soft tissue modifications to incorporate beauty into a face. Using mathematical standards of beauty in cosmetic surgery would result in a more predictable and successful outcome.

As noted earlier, there is a triad of features that contribute to one's facial beauty:

1. The facial framing: This involves the hair's characteristics and styling.
2. The canvas: This involves the skin, its treatment, makeup, and other adornments.
3. The portrait/oil painting: This involves bony and soft tissue features and their volume, positioning, proportions, and harmonious relations.

Both the facial framing and the canvas can be modified and beatified through hair styling, skin care, and makeup. A few extra brush-lightened highlights and elevations can create artistic beauty. The "portrait" itself can be improved using soft tissue repositioning, a discipline in the hands of plastic surgeons, who now posses a method of assessment, planning, and the creating of facial beauty.

To artistically determine if one is beautiful takes no more than the ability to form an opinion. It is far more difficult to give a precise, objective, and mathematical definition without a nonscientific or subjective interpretation.

The true difference between individual faces is the position, volume, shape, and angles of skeletal landmarks, facial fat, skin, and external features such as eyebrows, eyes, cheeks, nose, lips, and chin. To answer the question of what defines facial beauty, we analyzed and classified over 100 examples each of beautiful, attractive, average, and unattractive faces, both artistically and mathematically. Each classification was based on the reviews of several interpreters. From the beautiful to the unattractive face, the most common characteristics were determined, and computer-assisted measurements were assigned. Using a simple formula, a uniform and replicable range for each category of beauty was then noted and classified.

After analyzing a series of beautiful faces, we found that we could simplify a complicated analysis into two categories: the angles (A) of the features and the volumetric highlights (H) of the facial soft tissue. These can be used to differentiate the beautiful face from the average face.

A beautiful face has the following features based on scientific–artistic interpretation: a Beautiful face is basically a normal face with augmented and elevated angles and highlights.

11.4.1 The Beautiful Brow

Artistically, the beautiful brow should be of medium width, height, and arched at the junction of the medial two thirds and the lateral third. It should lie just above the bony rim. The lateral tip should be higher than the medial. The brows should be uniformly shaped, medium to thin, with medial thickness tapering to lateral thinness. The eyebrows should follow a smooth curving line, extending from the lateral to the medial brow around the nasion, and down the lateral nasal wall. In men, this curve is more angulated at the medial brow. The beauty of the brow lies not only in the angle from the inner to the outer brow, but also in the "Fabergé egg" located as a definite soft tissue fullness below the brow. This is the attractive highlight located on the lateral soft tissue between the brow and upper eyelid. Highlights are very well expressed in photographs where bright light illuminates the egg-shaped highlight, which is evident beneath the eyebrows.

Scientifically, the beautiful brow should have a smooth, harmonious 10–20° climb from the medial to the lateral apex without creating a surprised appearance. The lateral brow complex in more attractive faces has a gentle, upward tilt above the medial brow. The height of the brow, from the glabella to the trichion, is one third of the facial height. The medial brow should begin on a vertical line with the medial canthus. The distance from the eyebrow to the eyelid crease is 1.6 cm, from the eyebrow to the midpupil is 2.5 cm, from the eyebrow to the supraorbital rim is 1 cm, and from the eyebrow to the hairline is 5–6 cm. The brow peak is optimal when a line is drawn from the most lateral point of the ala through the lateral limbus to the brow. The end of the brow should fall at a point on a line drawn from the most lateral point of the ala to the lateral canthus.

11.4.2 The Beautiful Eye

Beautiful eyes are thought to be large and somewhat almond-shaped. The lower eyelid should be shaped like a tapered scroll, much like the subtle edge of an English rosebud. Its positioning should be at the level of the iris or slightly below. It should have a slight concavity, but blend smoothly with the cheekbone. The lid margin curves are slightly asymmetric with slight medial elevation on the upper lid and light depression on the lower lid. The eyelashes should be arched and somewhat full. They should be longer and thicker on the upper lid, and begin more medially than on the lower lid. A white sclera with a distinctive color to the iris is most attractive; hence, the popularity of colored contact lenses. The vertical height of the lower to the upper lid at the medial limbus creates this entity. On the horizontal, this width should be at least one third of the medial-lateral canthal width. The beautiful eyes have a subtle, but distinctive upper-lid crease. There should be a distinctive "Fabergé egg," dividing the lateral half of the upper eyelid from the lateral half of the eyebrow. The subbrow "egg" should be full and create a distinctive highlight.

Scientifically, beautiful eyes have definite mathematical values. The average eye width is 30.7 mm. The distance from the medial to the lateral canthus should be equal to one fifth of the facial width. One eye width lies within the medial to medial canthus. There should be zero to minimal sclera showing below the iris. The intercanthal distance should equal to the width of the eye, ranging from 25.5 to 37.5 mm. The sclera should be white and highlighted. The distance between the upper-lid margin and the lowest part of the eyebrow is a minimum of 12–15 mm. The primary lid fold is 7–12 mm above the lid margin. The upper lid should cover approximately 1 mm of the iris. On the horizontal, the upper-lid margin should cross the iris just at or above the pupil at 9–12 mm above the lower-lid margin. On the profile, the upper, lateral lid soft tissue is situated 30° more anteriorly than the lower lid. This represents the full superior orbital rim area. The distance from the lower-lid lashes to the cheek apex should be 27 mm or less. There should be a relatively smooth transition between the lid and cheek. The entire eyebrow, eye, and eyelid should have at least a 5–7° lateral tilt upward. The lateral canthus should be at least 5–10° higher than the medial canthus. The lateral half of the lower lid should have an additional upward projection of 5–10 toward the lateral canthus. The medial canthus is one of the few landmarks that does not change position with age.

11.4.3 The Beautiful Cheek

Artistically, the beautiful cheek is one of the most important and attractive facial features. For centuries, this beautiful eminence has been highlighted with makeup and festive painting. The beautiful cheek should be well defined, full, and ovoid like a definite highlighted "egg." The peak of the highlighted cheekbone or malar eminence should be high and full. The full egg volume should be sitting at an angled position, marked from the upper lip to the upper ear with

its pointed end toward the ear. The egg apex should lie on the vertical line splitting the lateral canthus and brow, and the horizontal line, from the division of the middle and lower thirds of the nose to the superior auricular tragus or cartilage bump in front of the ear. The fullest portion of the cheek should be centered high over the cheekbone and not down toward the nasolabial fold, as occurs with aging. The appearance of the nasolabial fold should be minimal, and the jowl area should be flat or slightly concave. A prominent nasolabial fold occurs owing to genetics or aging, loss of fat and bone volume, and the slipping of the fat pad and skin down against the contracted nasolabial fold and mandibular or "jowl" ligaments. This creates the aged and unattractive cheek folds and jowls.

Scientifically, the measured peak height of the cheek eminence should be 25–27 mm from the lateral canthus. The optimum angle is 40°. This area comprises bone, muscle, soft tissue, and cheek fat pad. If the Frankfurt horizontal is drawn, the high point of the cheek is approximately 1 cm above that line and 1 cm posterior to the lateral orbital rim. The width of the cheek egg should be at least as wide as the distance from the lower lid to the brow peak horizontal. The width of the cheeks or malar bone should be equal to the width of the mandibular. This width is at least 15% less than the width between the zygomatic arches. The hollow of the beautiful cheek or "thumbprint of beauty" is located on the occlusal plane or above a line drawn between the ear lobule and the ala.

11.4.4 The Beautiful Nose

An attractive nasal contour is represented by a slightly sloped dorsum, which blends into a moderate nasal frontal angle located at the suprapupillary line or radix. Straight lines are not as pleasing to the eye as are gracefully curved and flowing lines. The dorsum should flow, but not dip. The bridge is moderately narrow, as in the tip with subtle definition, and should be on a parallel axis with the ear. A prominent nasal spine may give an overly obtuse presentation, and this should be carefully assessed. The tip should be the most prominent point on the nasal dorsum. It should have a definite highlighted nasal projection or two tip defining points. The degree of tilt should be such that one can only slightly see the open nostrils on frontal view, and the profile has a slightly pleasant uplifted angle. The nostrils should be within a vertical line drawn down from the medial canthi, lie in a vertical–oblique position, and be moderate in size and ratio.

Scientifically, the following measurements are for a beautiful nose. The beautiful nose represents the central third of the distance from the trichion at the midsagital point to the gnathion. The most attractive nasal height from the nasion to the columella is about 48–50 mm. The female dorsum should lie 2 mm under a line drawn from the radix to the tip. The nasal profile will fall between the top and the bottom of the ear. The ideal length of the nasal bridge is 45 mm, the nasal width is 18 mm, and the alar width is 30 mm (or equal to the intercanthal distance) or 70% of the nasal length. The distance from the columellar base to the tip is 19 mm. The nasofrontal angle measures between 115 and130°, and the angle of the nasal bridge from the vertical line to the Frankfurt horizontal ranges from 30 to 40°. The distance from the base of the nose to the upper lip should be the same distance as the width of the combined central upper and lower lip, or the distance from the lower-lid lashes to the upper-lid supratarsal crease. This "labial ledge" is unattractive or aged if longer. The nasofacial angle ideally should be 36° with a range of 30–40°. The nose should be tilted up slightly with an open nasolabial angle of 95–110°. The nasal projection should be 50–60% beyond the vertical drawn from the nasal base to the upper-lip vertical projection. As describe by Goode, the distance of the horizontal line from the alar groove to the nasal tip should be 0.55–0.60 times the nasal length.

11.4.5 The Beautiful Lips

Artistically, in the beautiful lips, the upper lip should protrude out further than the lower lip, but the lower lip should be fuller in volume than the upper lip. There should be a slight, but distinctive upper lip "white roll." The lateral commissure should be at a vertical line drawn down from the medial iris-pupil. If a line is drawn from one commissure of the lip to the other, this horizontal line would sit on the lower-third point at the center of the upper lip. The upper and lower lips should have a central fullness shaped like two pairs of twin eggs lying against one another. The lower-lip twin "Fabergé eggs" should be larger and slightly more protuberant than those of the upper lip. Within limits, society has readily correlated fullness or labial plumpness with beauty. A slight pouting of the upper lip has been identified with youthfulness or sensuality.

Scientifically, the beautiful lips are approximately 57–62 mm in width. The upper lip should have a distinctive Cupid's bow with a slight pout or upward tilt from the commissure to the Cupid's peak of 10–20°. The upper lip precedes or protrudes more than the lower lip. The upper-lip vertical height is 8.5–9 mm, and the lower-lip height is 9.5–10 mm. The width of the philtrum, at the junction with the vermillion, is 10–11 mm and distinctive. From a central open point,

located between the upper and lower lips, the horizontal angle to the commissures should be at least 5–10°. The upper-lip and lower-lip angles of the Cupid's bow, off the horizontal, should be 10–20° positive and negative, respectively. The distance from the base of the columella to the Cupid's bow horizontal or "labial ledge" should be equal to or shorter than the distance from the lower-lid lash line to the supratarsal crease. The gingiva exposed in a smile should be 0–2 mm maximum. The horizontal lip position should fall behind the nasomental angle line at a distance of 4 mm for the upper lip and 2 mm for the lower lip.

11.4.6 The Beautiful Chin and Mandible

Artistically, the beautiful chin and mandible should be soft, slightly curved, and well defined. A delicate menton is associated with more feminine beauty. The chin should have adequate projection. The tip of the chin should just touch a vertical line, dropped from the nasion through the nasal spine and perpendicular to the Frankfurt plane. On frontal view, two attractive mental "Fabergé eggs," lying against one another should be seen centrally. The "Fabergé eggs" at the angle of the jaw are subtle, but distinct highlighted sites. These represent fat and muscle soft tissue over the masseter muscle. This Fabergé area, by calculation, is usually more attractive in the masculine face. This pair of eggs should have an angle parallel to the mandible.

Scientifically, the jaw line should be clean, smooth, and relatively free of ptotic fat. The soft tissue of the chin ranges in thickness from 10 to 14 mm. The chin should be positioned on the vertical line drawn from the nasion to the subnasale to the labrale inferius. The mentolabial sulcus should lie approximately 4 mm behind this line, or slightly anterior to a line drawn down from the upper to the lower lips. The mandibular angle should be tilted from the chin up along the jaw or mandibular border at least 10–25° from the horizontal. The jaw angle should have a definite soft tissue egg, lying over the masseter muscle. A distinctive hollow should fall below the entire mandibular border.

11.4.7 The Beautiful Neck

Artistically, the beautiful neck should be smooth and long. The platysmal muscle bands should not be apparent or be minimally visible. The submaxillary glands should be supported and hidden. The Adam's apple or laryngeal cartilage should be minimally defined.

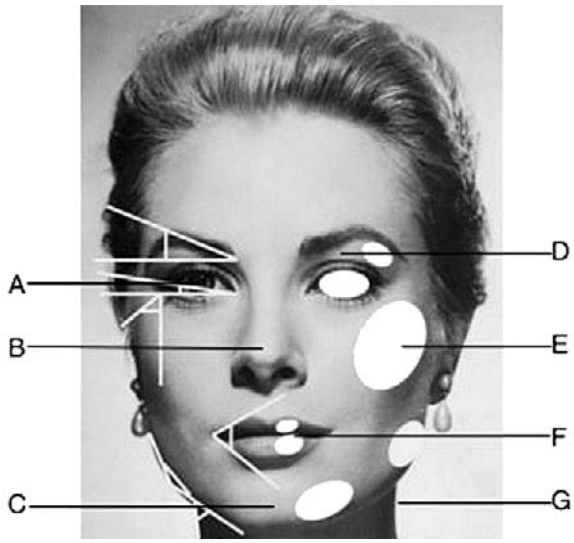


Fig. 11.3. A beautiful face. A summary of the measured parameters of a beautiful face. A beautiful face differs from a normal face in that it possesses uplifted angles and full, volumetric highlights. *A* The average width of the eye is 30.7 mm. The intercanthal distance should equal the width of the eye, ranging from 25.5 to 37.5 mm. The entire eyebrow, eye, and eyelid should have at least a 5–7° lateral tilt upward. *B* The most attractive nasal height, from the nasion to the columella, is 48–50 mm. The ideal length of the nasal bridge is 45 mm, the nasal width is 18 mm, and the alar width is 30 mm, or 70% of the nasal length. The nasofrontal angle measures between 115 and 130°, and the angle of the nasal bridge from the vertical line to the Frankfurt horizontal ranges from 30 to 40°. *C* The chin should be positioned on the vertical line drawn from the nasion to the subnasale to the labrale inferius. The mentolabial sulcus should lie approximately 4 mm behind this line, or slightly anterior to a line drawn down from the upper to the lower lips. The mandibular angle should be tilted from the chin up along the jaw or mandibular border at least 10–25° from the horizontal. *D* Ideally, there should be a smooth 10–20° climb from the medial to the lateral apex. The distance from the eyebrow to the eyelid crease is 1.6 cm, from the eyebrow to the midpupil is 2.5 cm, from the eyebrow to the supraorbital rim is 1 cm, and from the eyebrow to the hairline is 5–6 cm. *E* The measured peak height of the cheek eminence should be 25–27 mm from the lateral canthus. The optimum angle is 40°. The width of the cheeks or malar bone should be equal to the width of the mandibular. This width is at least 15% less than the width between the zygomatic arches. *F* The beautiful lips are approximately 57–62 mm in width. The upper lip should have a Cupid's bow with an upward tilt from the commissure to the Cupid's peak of 10–20°. *G* The beautiful neck has a 60–75° angulation with the horizontal line. The mento-cervical angle should be 80–95°. The neck should have a width approximately equal to the spacing of the vertical lines dropped from the lateral canthi

Scientifically, the beautiful neck has a width approximately equal to separation of the vertical lines dropped from the lateral canthi. The neck has a definite 60–75° angulation with the horizontal line. The mentocervical angle should be 80–95°. The submental fat pads and digastric muscles should not be prominent.

11.4.8 Ears

The ears should not be excessively prominent or protruding. with average-sized lobes.

The rim should be smooth. The height of the ear should be equivalent to the distance from the glabella to the nasal base. The antihelix should create a linear highlight. The tragus should be curved, smooth, defined, but not prominent. The long axis of the ear should be parallel to the long axis of the nasal dorsum. The ears protrude from the skull at an angle of 20–30°. The lateral edge of the helix to the mastoid skin is 15–25 mm.

11.4.9 The Beautiful Face

In my opinion, a beautiful face is oval or egg-shaped. The fuller base is superior in position (like an egg turned upside down).

11.5 The Standard of Beauty

Grace Kelly is a standard of beauty. Her facial features all have positive, beautiful angles (A) and highlights (H). The exquisite angles of her brow, eye, cheek, lips, and neck all fall into the range of "beautiful." Her full, shapely, and well-positioned "Fabergé egg" fat pad highlights are correctly positioned and score high on the beauty index.

Both her angles and highlights (AH) are one of the highest recorded on the beauty index scale (9.6/10), confirming objectively her very subjective beauty.

11.6 The Facial Aging Mnemonic: SAG

Geographically, the face ages owing to displaced "hills and valleys" and the formation of "ungroovy grooves"! As an example, the fully hilly cheeks become valleys of fat on the elderly. The normal fat or slightly concave areas around the jowl areas become hilly jowls.

To simplify the basis of facial aging, I have come up with the mnemonic SAG.

"S" for skin changes: Sun exposure, heredity, and environmental toxins (smoking, drugs, alcohol, poor diet, etc.) prematurely age the skin. This results in a change in the health of the collagen and the loss of the elastic properties of the skin. The skin loosens, wrinkles, and turns into a brownish-gray tone.

"A" for avoluptosis: This is the progressive loss of facial fat and facial *deflation*. The deflated facial skin falls against contracted facial ligaments, much like snow falling in an avalanche against a fence. Owing to this loss of facial fat, our face is like a deflating balloon. As our face "deflates," our grooves tighten and the residual fat and skin falls against the "ungroovy" grooves. This deflation results in the arc of aging as fat is lost in the forehead, temples, brows, eyelids. and cheeks. Fat gathers and fatty pads accumulate on the lower cheeks, jowls, and under the chin.

"G" for groove formation: As one ages, the face loses fat and *ligaments* contract, forming grooves. Much like in an elderly person who has stiffness and contracture of the shoulder, hip, and knee joints, our facial ligaments also contract.

11.7 A Few Parallels in Life to Understand Facial Aging

The face truly ages like a collapsing balloon. There is true bone and fat pad volume loss. This is like the deflation of the balloon. The loose skin and residual fat then falls down against age-tightening ligaments (avoluptosis). The two balloons are the same initially and have the same surface area, elasticity, and potential volume. The "fuller" one represents a youthful face and the deflated balloon represents the aged face, having lost 40% of its volume. While both balloons have the same physical properties, other than the volume of water inside them, they appear very different. The "younger" balloon seems to have more "skin", but it does not.

Our goal in beautifying a face is to work from a very natural structural foundation. We turn back the clock 10–15 years and add natural beauty and youthfulness to the most important features. This triad of naturalness, youthfulness, and beautification should not be violated.

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12 Facelift-Related Anatomy

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"*Anatomia clavis et clavis medicinae*", said Gabriele Fallopio, Italian pioneer of anatomy. It is the key and helm of the whole medicine. Profound knowledge of anatomic variations is the prerequisite for any physician who is thinking of becoming a surgeon. We will pay attention especially to the topographic anatomy of the face.

Epidermis – the upper layer of the skin – renews itself. In babies this process is completed within 7 days; in our 70s, it takes 4–6 weeks. Below is the corium, which is connected to the epidermis with collagen and elastic fibres like a rubber layer. It allows the flexibility of the skin. Losing collagen and elastic fibres, our skin becomes wrinkled.

Between skin and bone there are fat layers, muscles, fascias, nerves, vessels, ligaments, glands, and lymph nodes. Muscles of the face have not only attachments to the bone, but also to the skin. Musculus orbicularis oris and mm. orbiculares oculi are circular muscles which have no attachments to the bone and are most important for the countenance. M. orbicularis oculi is, after the myocardium, the most active muscle of the human body – it contracts every 4 s when we are awake. In 16 h our eyes are closed for 23 min.

There are sensory and motor nerves of the face. For local anaesthesia of sensory nerves the most important are nervus infraorbitalis (from n. maxillaris), n. mentalis (from n. mandibularis), nn. supratrochleares and supraorbitales (from n. ophtalmicus), the greater auricular nerve, and the transverse cutaneous nerve of neck. The motor nerve of the face is the facial nerve, the seventh cephalic nerve, and n. oculomotorius, the third cephalic nerve, is responsible for movements of the eyes.

The facial skin is in certain points fixed with strips of firm connecting tissue to the periosteum. We call these formations retaining ligaments. They are not elastic and do not follow the sagging of the skin. That is why they cause dimples in the soft tissue of the face with advanced ageing. We have to detach some of them to obtain a smooth surface of the skin when we perform rejuvenating surgeries. If we can do it blindly it will not bleed. Otherwise, we have to do some electrocoagulation. If those connecting ligaments do not reach the periosteal layer, we speak of false retaining ligaments.

Bryan Mendelson from Australia had a splendid idea to compare the retaining ligaments with trees. In this way their inflexibility becomes understandable for everybody.

We detach the first three ligaments regularly when performing facelift surgery, and last three we resect seldom (Fig. 12.5).

Fig. 12.1. High-grade magnification of the surface of the skin (Science Photo Library)

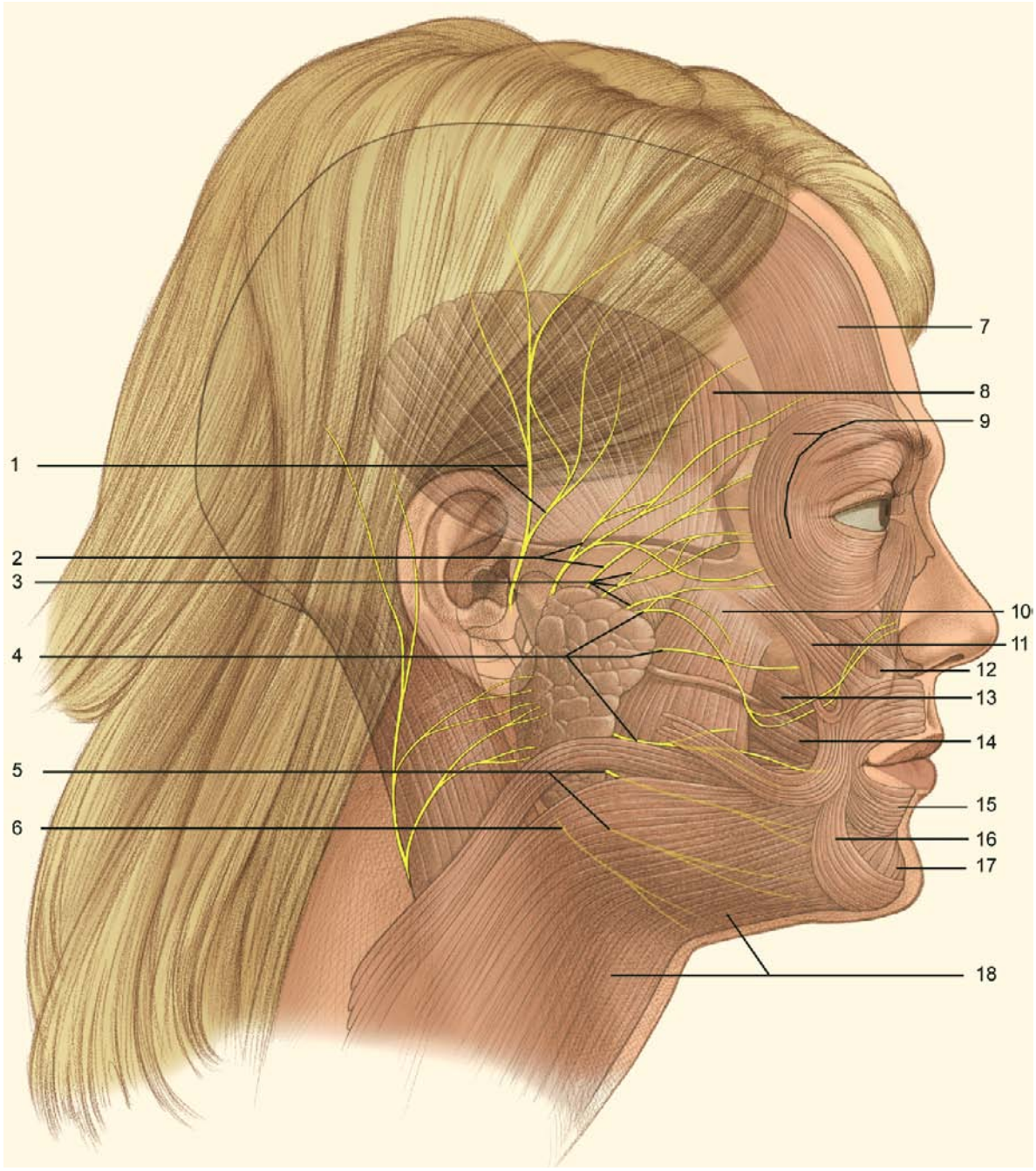


Fig. 12.2. Topography of muscles of the face and branches of the facial nerve. *1* Temporal branches of the facial nerve, *2* frontal branches of the facial nerve, *3* zygomatic branches of the facial nerve, *4* buccal branches of the facial nerve, *5* marginal mandibular branch of the facial nerve, *6* transverse nerve of the neck, *7* frontal part of the epicranial frontooccipital muscle, *8* temporal muscle, *9* orbicularis occuli muscle, *10* masseter muscle, *11* greater zygomatic muscle, *12* lesser zygomatic muscle, *13* buccinator muscle, *14* risorius muscle, *15* orbicularis oris muscle, *16* depressor anguli oris muscle, *17* mentalis muscle, *18* platysma

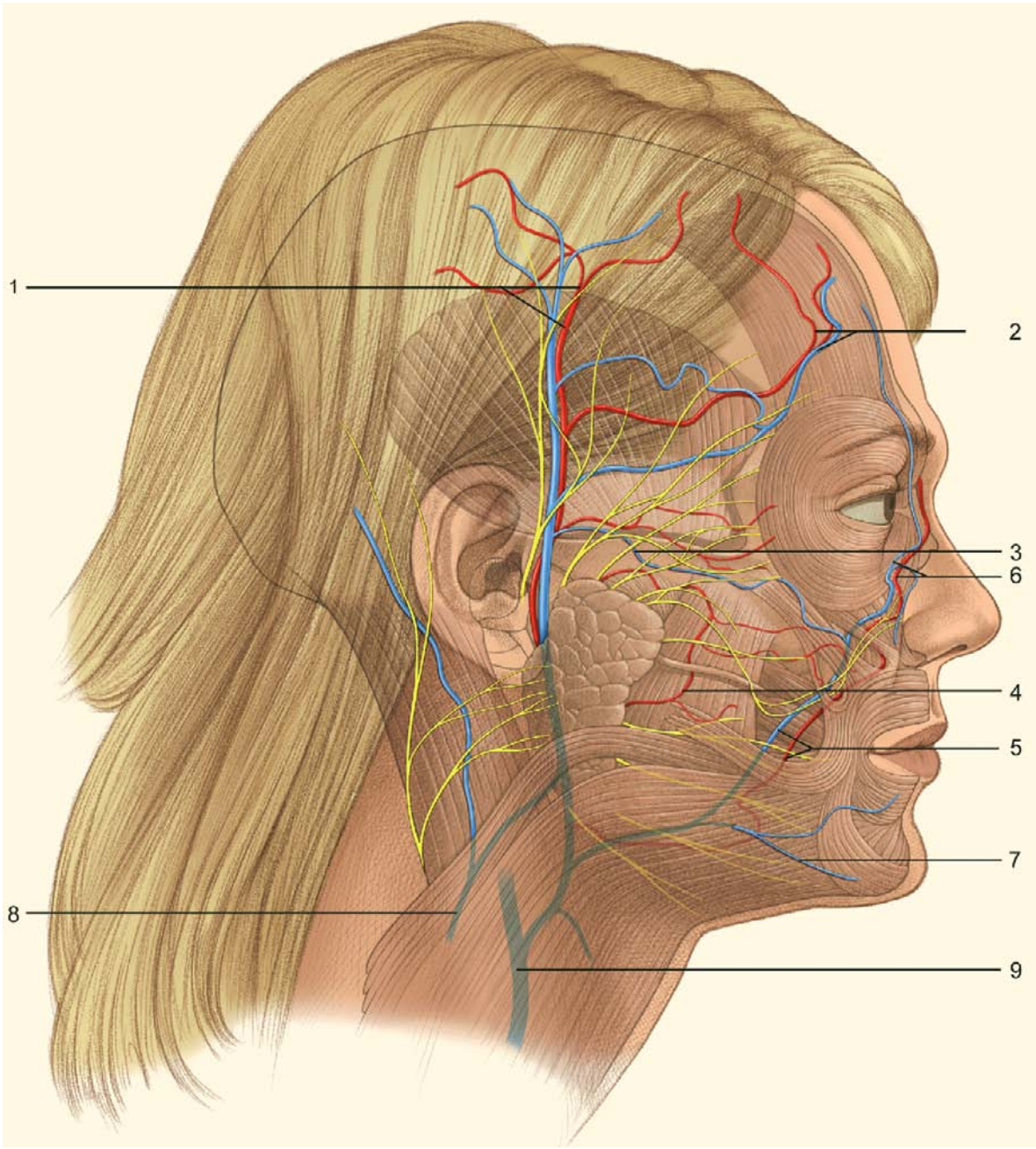


Fig. 12.3. Topography of facial vessels. *1* Parietal branches of superficial temporal artery and vein, *2* frontal branches of superficial temporal artery and vein, *3* transverse facial artery and vein, *4* maxillary artery (and vein), *5* facial artery and vein, *6* angular branch of facial artery and vein, *7* submental vein (and artery), 8 posterior external iugular vein, *9* external iugular vein

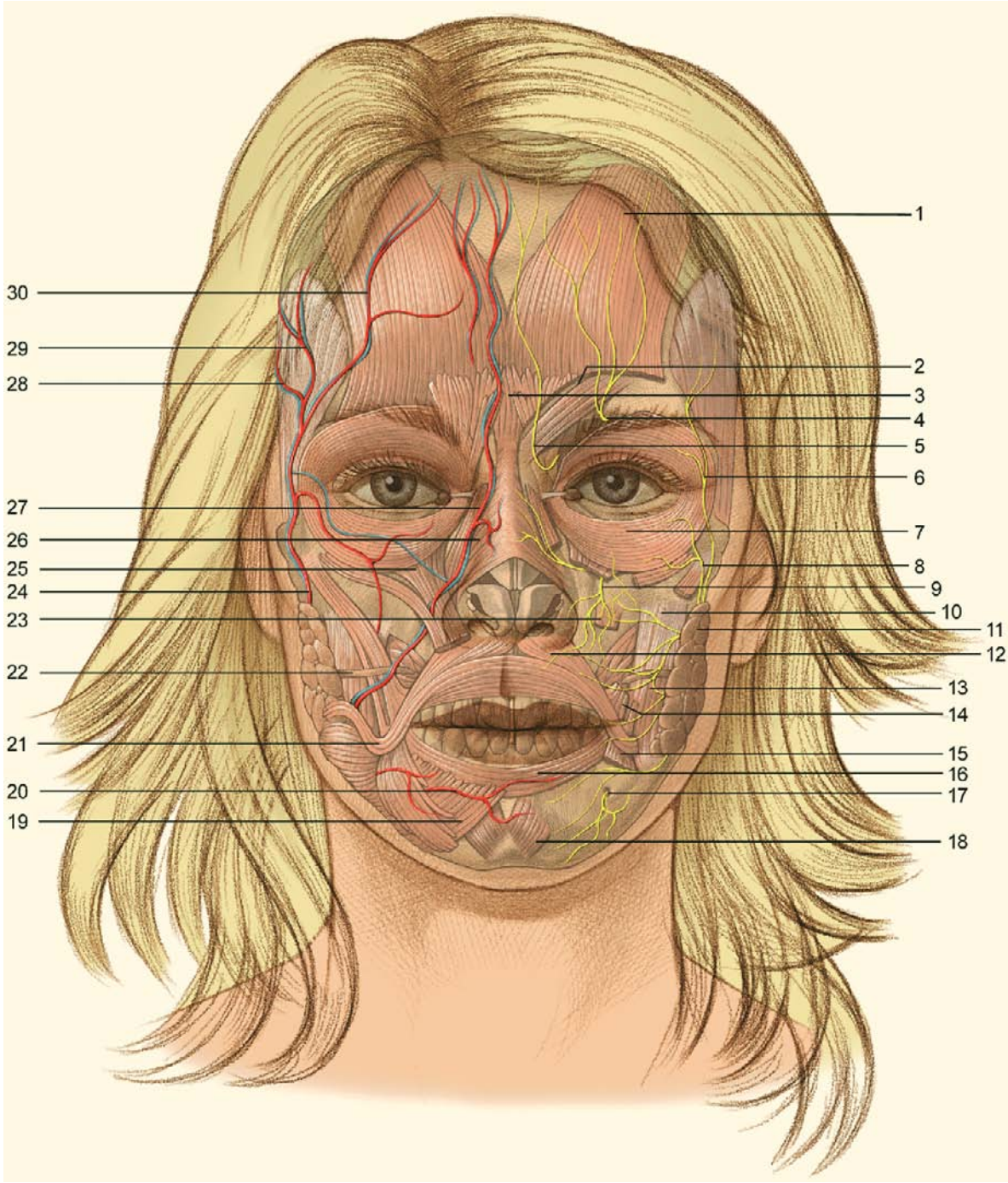


Fig. 12.4. Frontal view of facial anatomy: muscles, nerves and vessels. *1* Frontalis muscle, *2* superciliary corrugator muscle, *3* procerus muscle, *4* supraorbital nerve, *5* supratrochlear nerve, *6* frontal branch of facial nerve, *7* orbicularis oculi muscle, *8* zygomatic branch of facial nerve, *9* infraorbital nerve, *10* buccal branches of facial nerve, *11* parotid gland, *12* depressor muscle of septum, *13* masseter muscle, *14* buccinator muscle, *15* depressor anguli oris muscle (resected), *16* orbicularis oris muscle, *17* mentalis nerve, *18* mentalis muscle, *19* depressor labii inferioris muscle (of lower lip), *20* mental branch of inferior alveolar artery, *21* risorius muscle, *22* parotid duct, *23* levator anguli oris muscle, *24* retromandibular artery and vein, *25* levator labii superior muscle, *26* nasal muscle, *27* angular artery and vein, *28* parietal branch of superficial temporal artery and vein, *29* temporal branch of superficial temporal artery and vein, *30* frontal branch of superficial temporal artery and vein

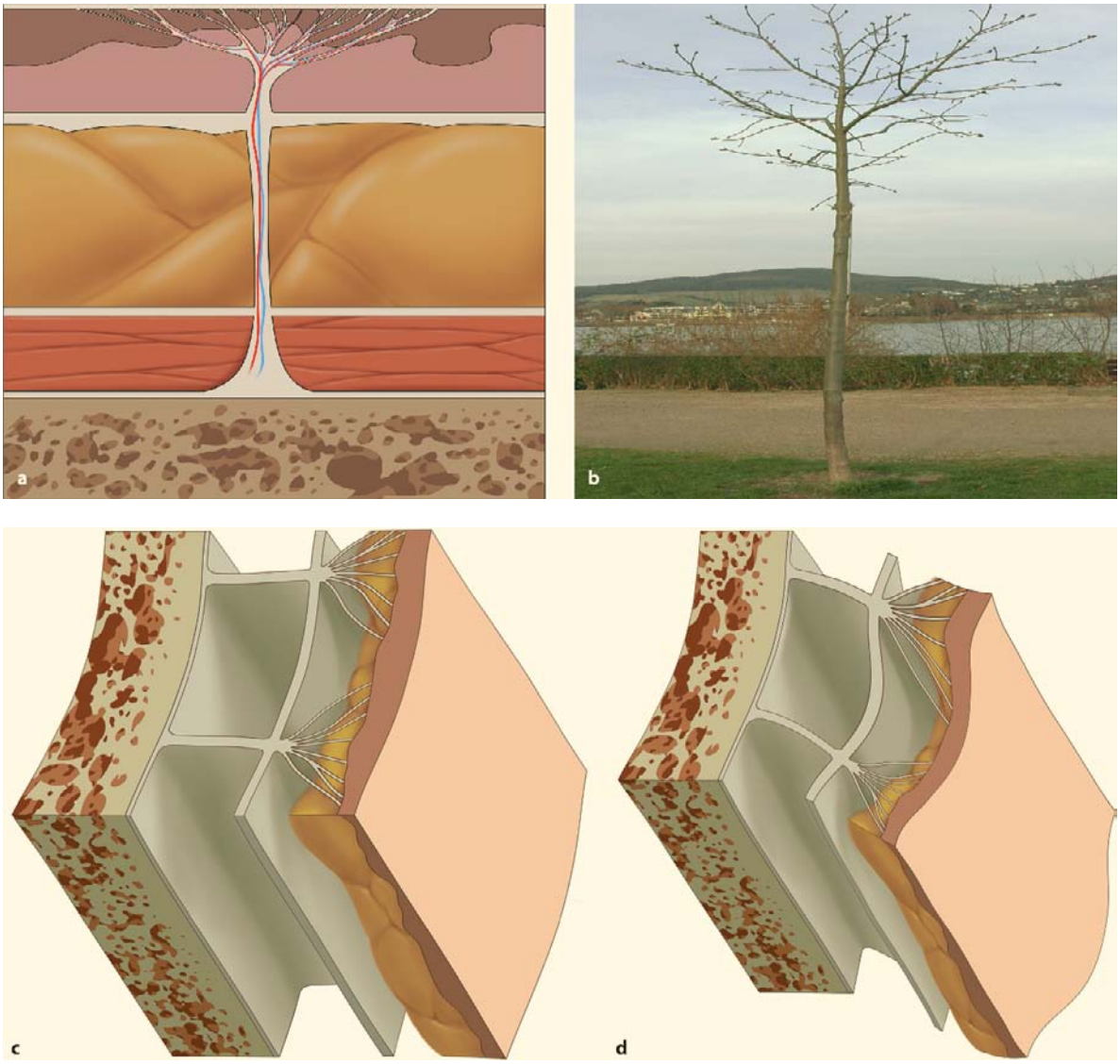


Fig. 12.5. **a** Retaining ligaments. **b** Botanic comparison with a tree rooted in the earth. **c** Retaining ligaments as fibrous supporting tissue connecting skin to the bone. **d** With advanced ageing, they show increased laxity and sagging of the skin

When we perform surgery we have to handle the human tissue with awe. We have to respect the fact that one squeeze of the forceps can destroy millions of cells. Our operating technique has to be gentle and respectful. If we act in this way we will have best possible healing and scar formations.

As a generous gesture, Walter Thiel, the superb Austrian anatomist from Graz, has allowed us to reproduce nine of his excellent cadaveric studies from his remarkable work *Photographic Atlas of Practical Anatomy* published by Springer. I am sure that many young plastic surgeons to whom this book is addressed will benefit from these extremely precise works and I am deeply thankful to Walter Thiel for his generosity.

Bibliography

Please see the general bibliography at the end of this book.

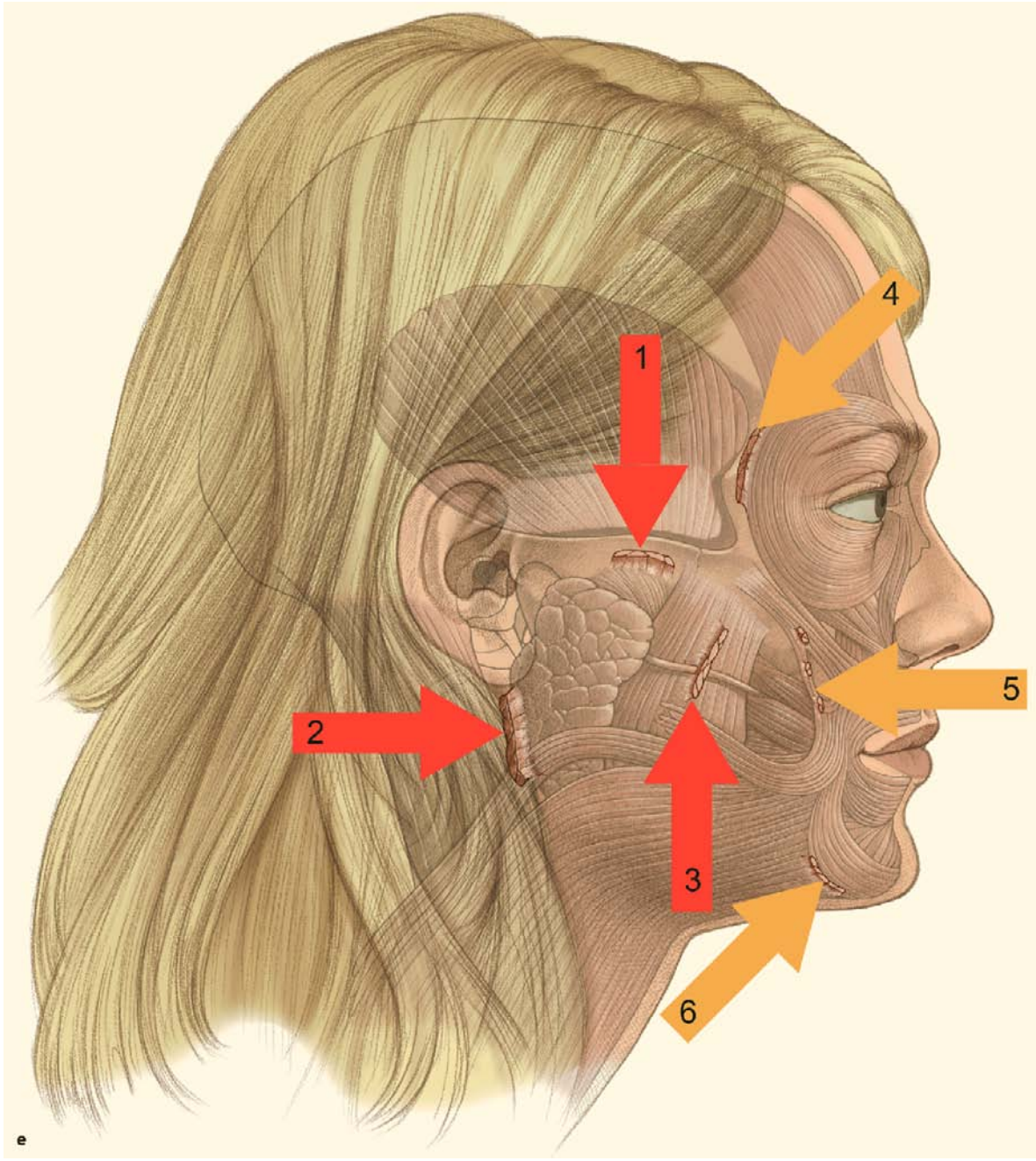


Fig. 12.5. **e** Facial retaining ligaments: the first three ligaments we detouch regularly performing facelift surgery, and last three we resect seldom. *1* Zygomatic ligament, *2* Platysma-auricula ligament (false), *3* Masseteric cutaneous ligament (false), *4* Orbital retaining ligament, *5* Buccal-maxillary retaining ligament (false), *6* Mandibular retaining ligament

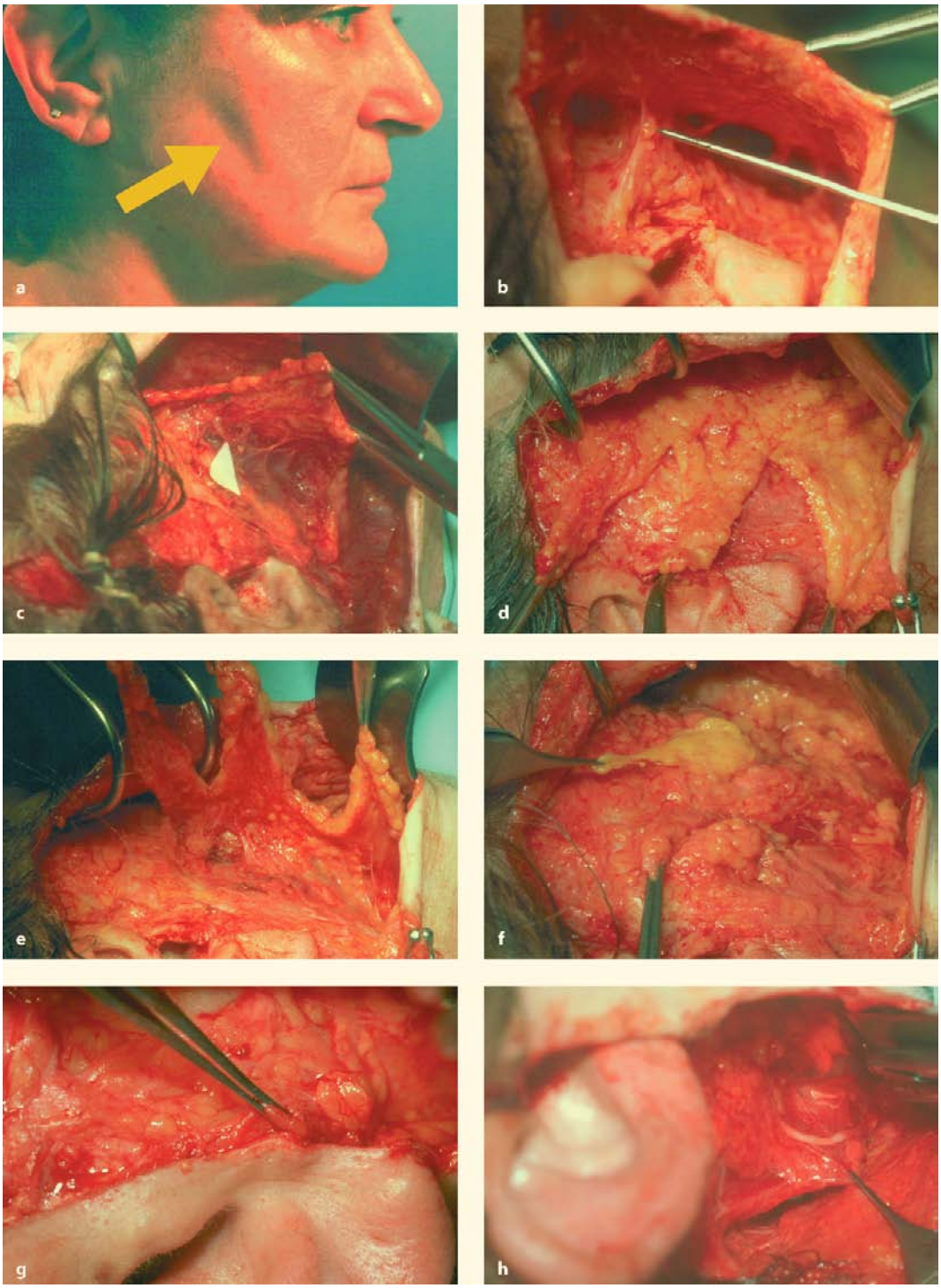


Fig. 12.6. **a** McGregor's malar patch produces a dimple in ageing cheeks. **b** McGregor's malar patch – zygomatic retaining ligament is a very firm formation. **c** Buccal branches of facial nerve visible below elevated superficial musculo-aponeurotic system (*SMAS*) flap – indicated with a *white triangle*. **d** Huge SMAS flap divided into three leaves. **e** Elevated tricuspidal SMAS flap. **f** Bichat's buccal fat pad expulsed through the SMAS layer. **g** Fascia Loré below the preauricular incision is very firm and suitable for fixation of the SMAS flap, not provoking ear distortion. **h** A branch of the greater auricular nerve appears some 5 cm below the earlobe

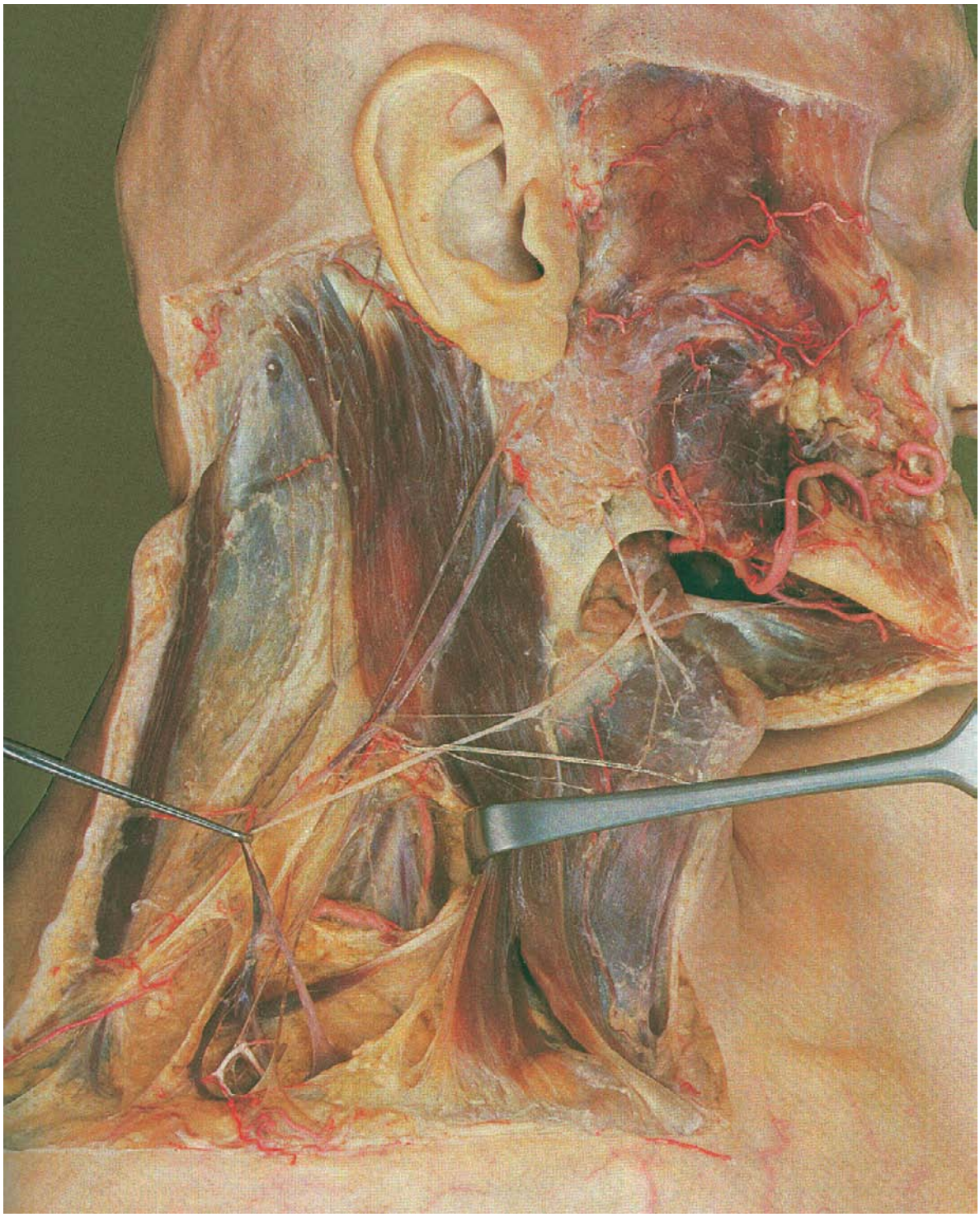


Fig. 12.7. Retro- and subauricular region with m. sternocleidomastoideus and plexus cervicalis

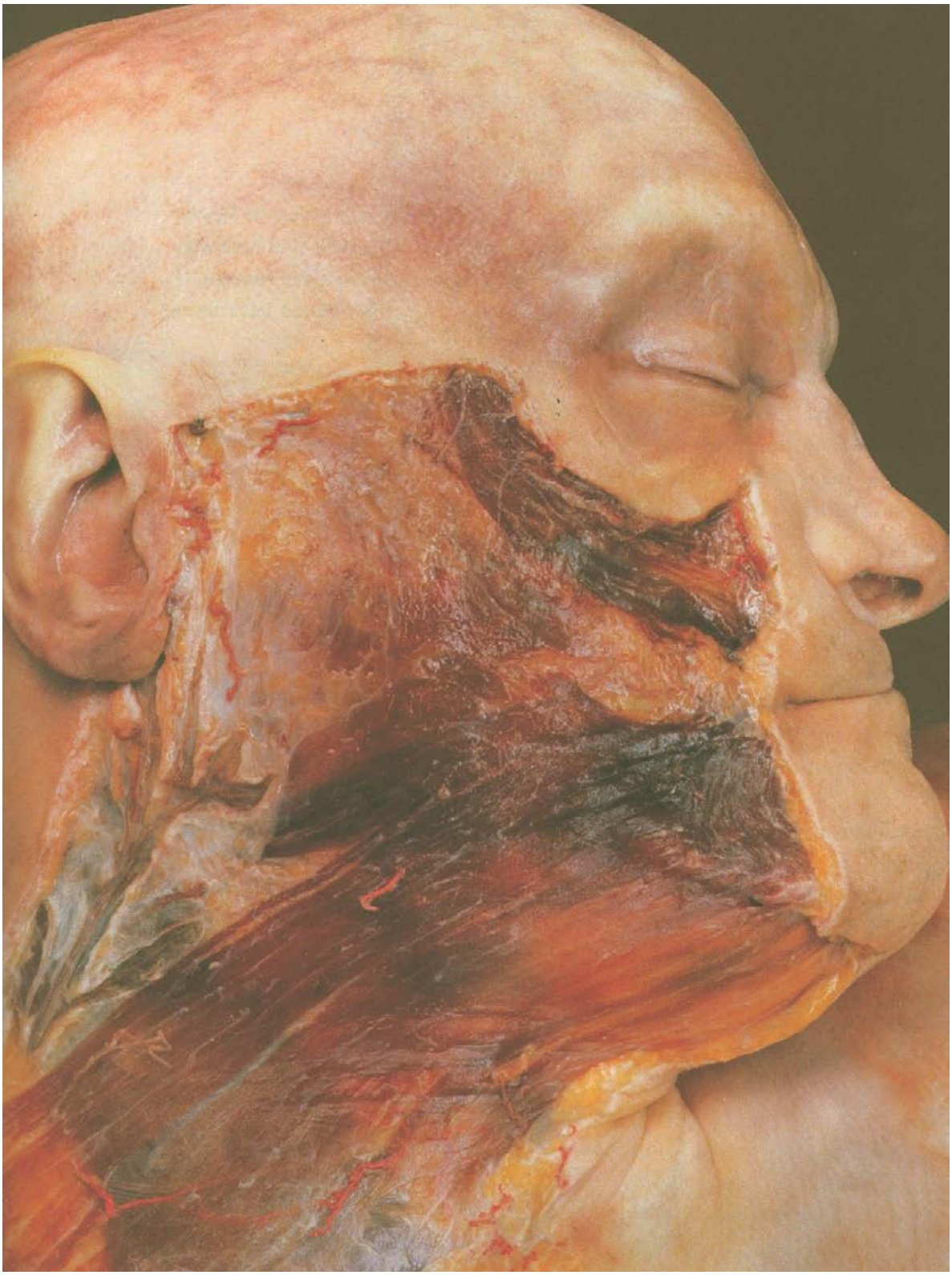


Fig. 12.8. Supra-SMAS and supraplatysmal layer

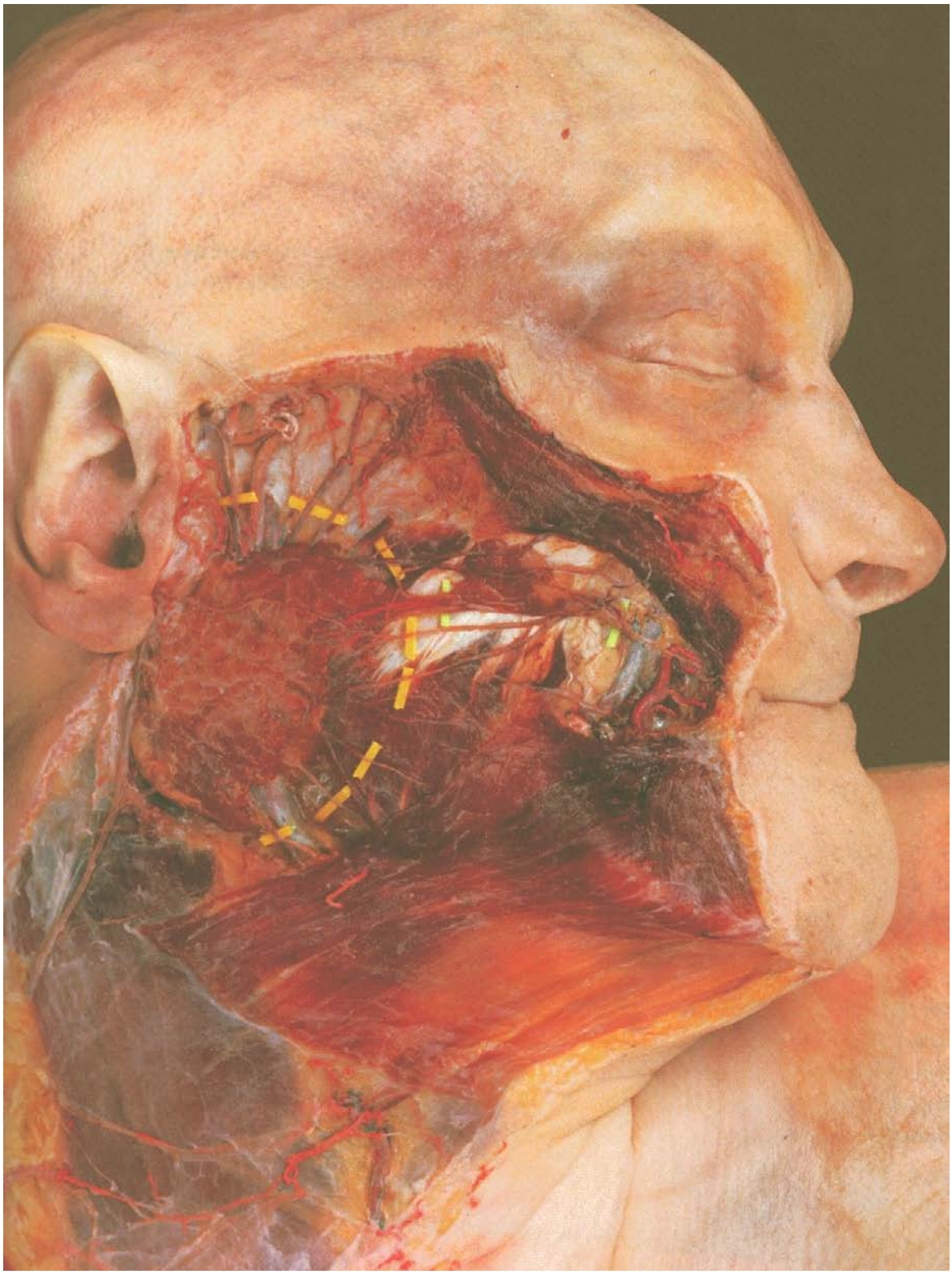


Fig. 12.9. Parotid gland, branches of facial nerve with following vessels and supraplatysmal layer

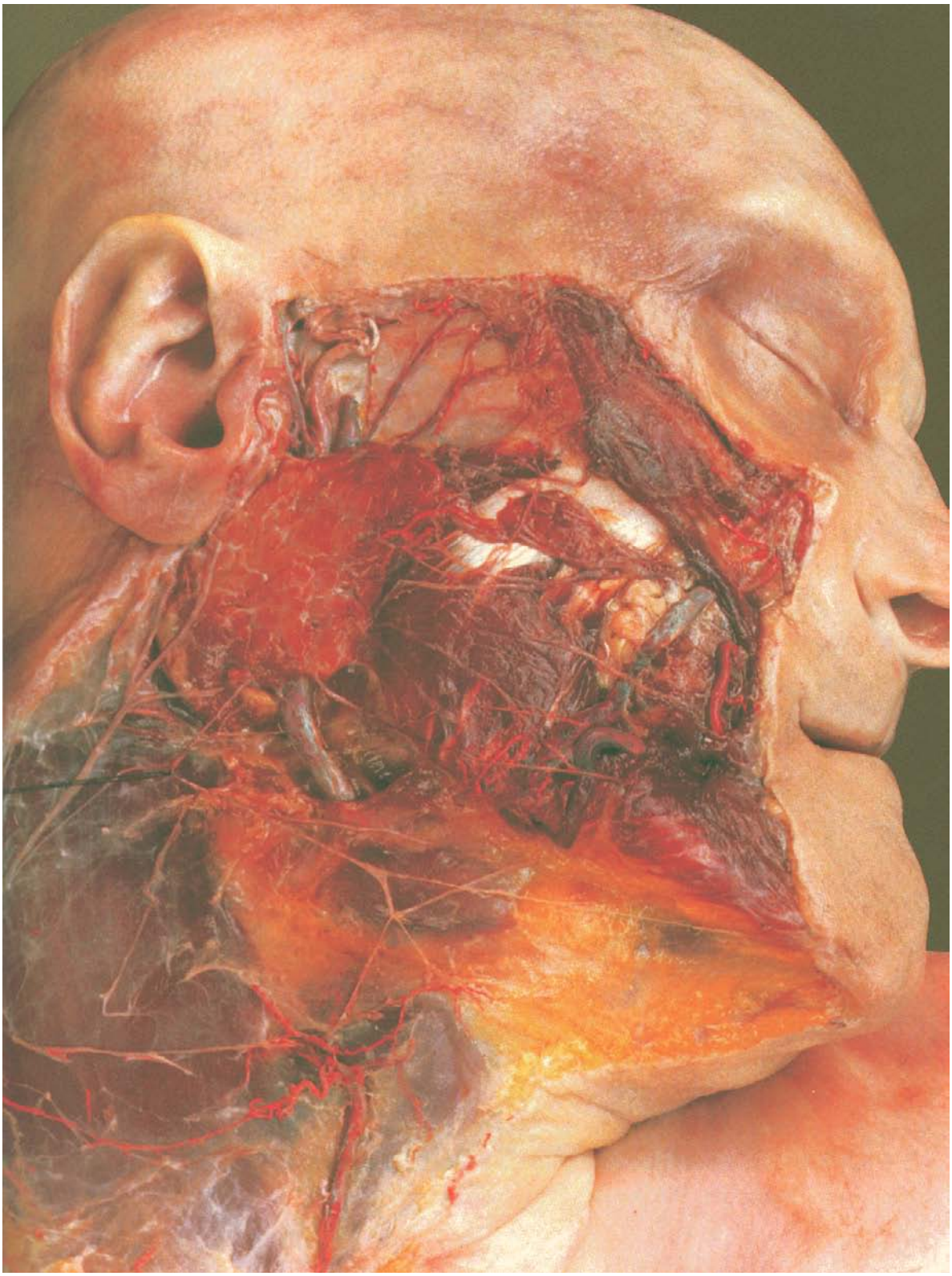


Fig. 12.10. Parotid gland with rami zygomatici et buccales nervi facialis and subplatysmal ramus marginalis mandibularis

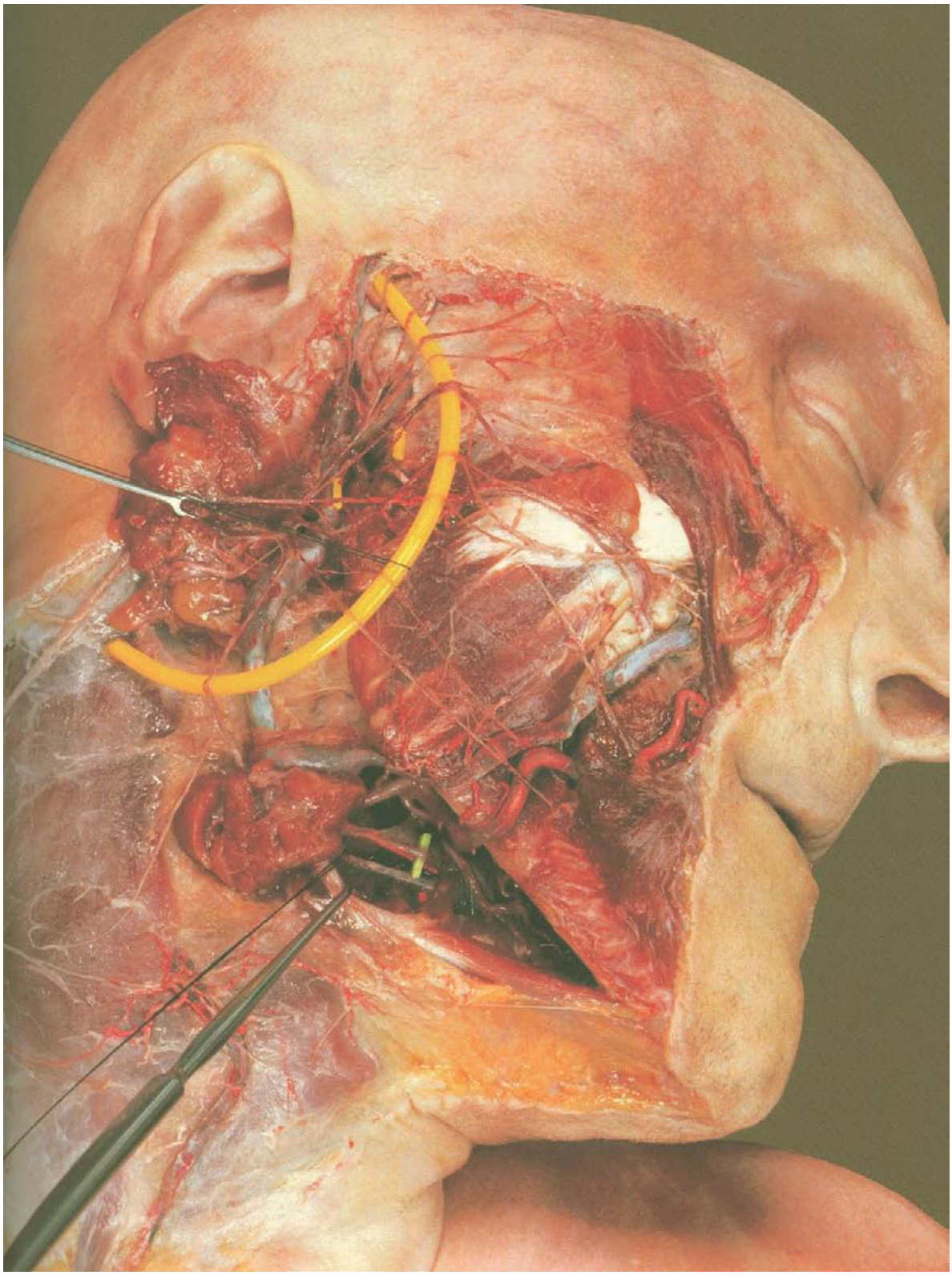


Fig. 12.11. All six branches of n. facialis branching below the parotid gland: ramus temporalis, ramus frontalis, ramus zygomaticus, ramus buccalis, ramus marginalis mandibularis, ramus colli

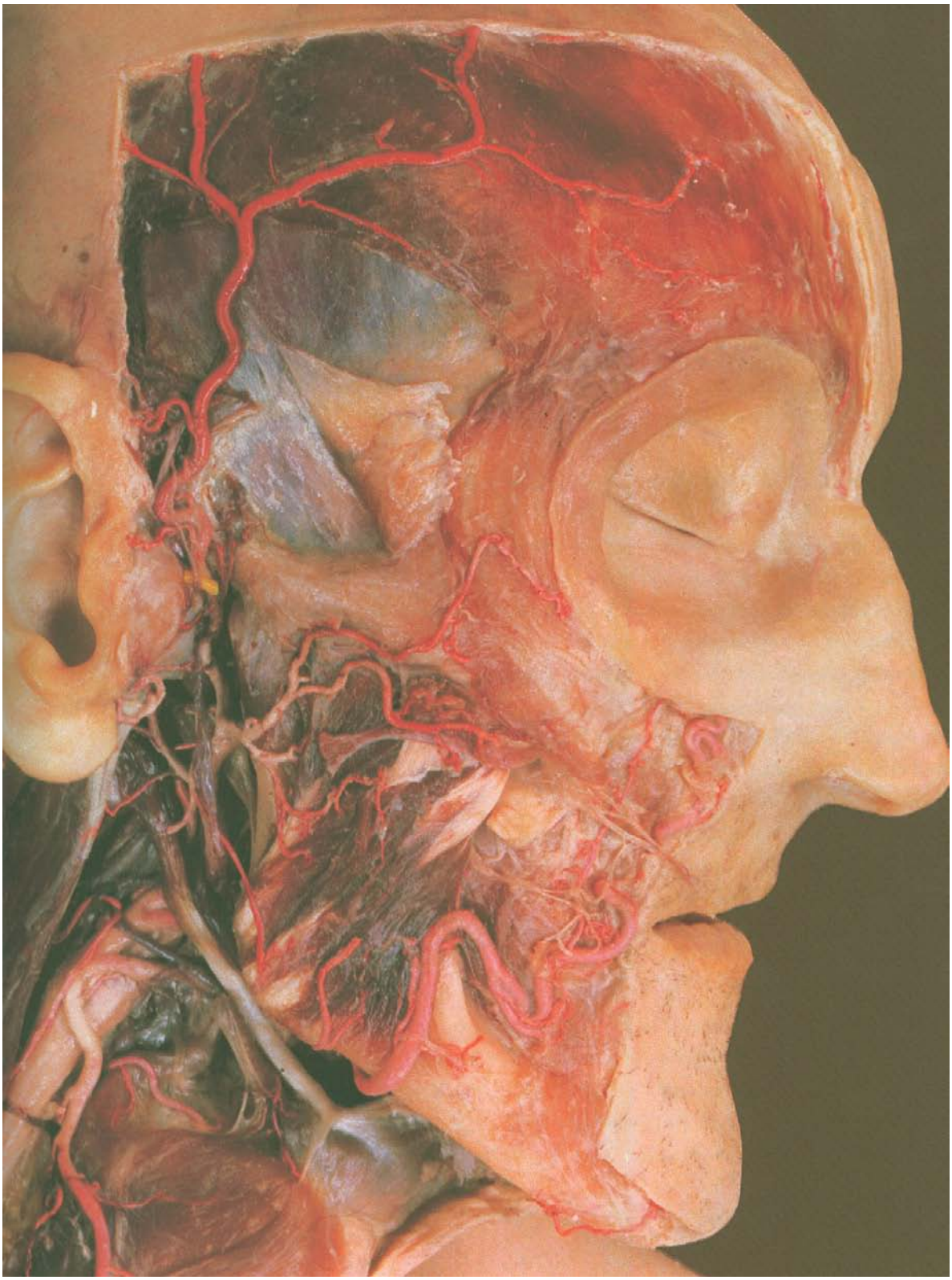


Fig. 12.12. Periosteal plane of the face

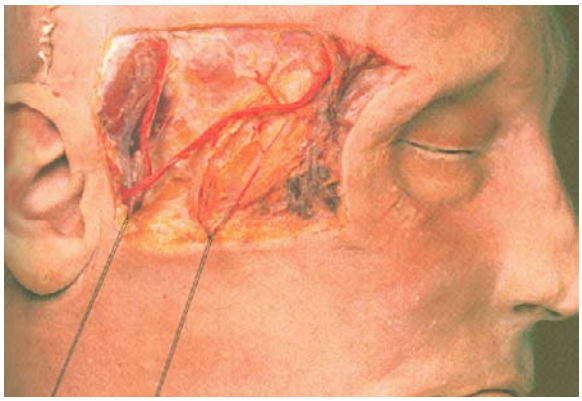


Fig. 12.13. Rami temporales et frontales n. facialis are following the vessels with the same names

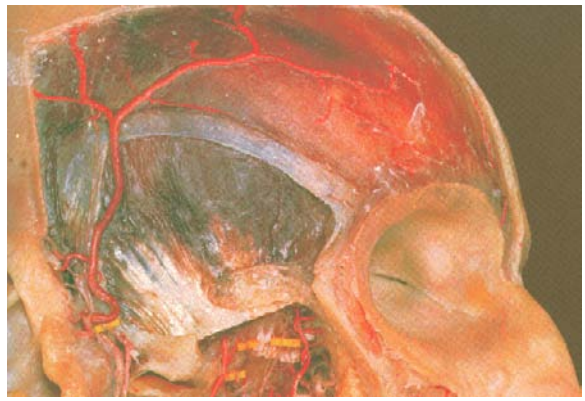


Fig. 12.14. Musculus temporalis and musculus frontalis. Arcus marginalis in-between

Fig. 12.15. Septum orbitale

13 Five Topographic Levels of the Face and Four Layers of Surgical Acting

Dimitrije E. Panfilov

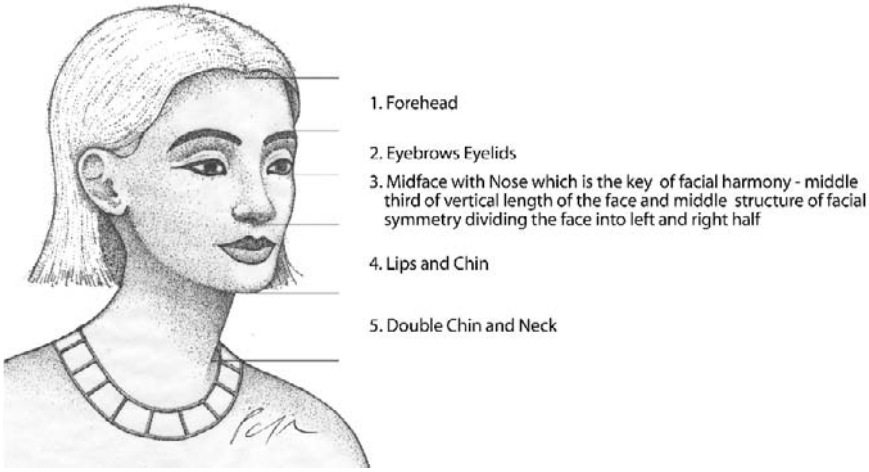


Fig. 13.1. Five topographic levels of the face

The perception of the countenance happens below the conscious level, but it is determinative for the intercourse of two human beings. Harmonious order of facial proportions can be divided in five facial "levels":

1. Forehead
2. Eyebrows and eyelids
3. Midface with nose
4. Lips and chin
5. Double chin and neck

There are four layers of surgical acting:

1. Epidermis
2. Skin with subcutaneous fat layer
3. Muscle–superficial musculo-aponeurotic system–muscle layer
4. Periosteum and bone

There are numerous operative techniques available today for each of those levels and layers. Nowadays we are not forced to do extended operations, which according to the study of Edward Ivy and Paul Lorenc from the USA result in more serious complications and prolong the recovery time. We can combine less aggressive procedures of different facial "mosaic stones" to improve the final outcome, to reduce the possible risks, and to shorten the recovery time.

Fig. 13.2. Mona Lisa with mimic units

We have, however, to respect the mimic units not exceeding our incisions or vectors of traction across this limits or not to change too much soft-tissue elements across the bone structure like in some cases of periosteal facelifts: it could produce an unnatural, strange look. *Suprema lex*: our patients do not want to look altered (different – to be somebody else), but

Fig. 13.3. David with tension lines

Fig. 13.4. Plinius said: "Eyes are the windows of the soul." and Shakespeare wrote: "Love is born, lives and dies in the eyes." Panfilov: "Beauty is the metaphysics of the physics"

want to look *better*! Under no circumstances we should change somebody's personal facial appearance; there should be no alteration of recognitive personal look. Scars have to be hidden in natural folds of the skin and should not cross the skin tension lines – then they can become almost invisible or at least hardly noticeable.

The supreme aim of our surgery should be the harmony of proportions among facial units to look pleasant and not to provoke repulsion. The human weakness for the beautiful has been scientifically confirmed by the brain researcher Knut Kampe from Hamburg.

We receive 80% of all information visually. Humans more than animals live totally in an optical world. The whiteness of the sclera allows the viewer to recognize where the other human being is looking , what attracts his/her attention. Such a phenomenon does not exist in primates. When two human beings communicate they look into the eyes of each other. We look through the pupils of the other person into the fundus occuli, which is built of optical nerve as the prolongation of the brain. Looking into the eyes, we can see into the thoughts of each other, because at the end of the look there is the brain at both ends. That is why Plinius said: "Eyes are the windows of the soul."

When we hate somebody, our pupils contract – sympathicus reaction. Subconsciously we see less of the hated person. When we love somebody our pupils dilate: the loved person becomes blurred – we do not see her/his imperfection. The saying is true: "Love is blind." The beauty of eyes determinates significantly the whole person, and Shakespeare wrote: "Love is born, lives and dies in the eyes." The eyes are indeed a very powerful instrument of our emotional expression.

Meeting the eyes of less attractive human beings can cause negative feelings. The level of pleasure increases as soon as those unbeautiful glances are turned away, the medical scientist Knut Kampe found.

Bibliography

Please see the general bibliography at the end of this book.

14 The Ideal Candidate

Dimitrije E. Panfilov

After initial consultation and examination, we try to identify preferably the most convenient candidate, who should, in the ideal case, be emotionally stabile without psychic disturbances, and the intended surgery should promise a great deal of success, that means facial constellation is obviously correctable. If the findings are minimal and psychic instability is present, we are advised to think twice or to refuse to perform surgery under such circumstances. The most dangerous case would be obvious deformity connected with psychic instability. Also in such cases we should do psychological sounding out. To operate on somebody with untreated psychosis could have catastrophic or tragic consequences.

The ideal candidate for aesthetic surgery:

- Suffers because of real existent body disorder
- Has inner motivation
- Has no unrealistic expectations
- Has thought of surgery for a long period of time beforehand
- Has a precise idea of the desired outcome

The ideal patient is not really that rare. He or she has thought over the desired correction for a considerable time (at least for a few months). The deformity is clearly recognizable, to the patient and the surgeon as well as to an unbiased observer. The patient can formulate precisely what he or she expects to have altered. The patient is motivated and would like this correction to be done for himself/herself, that is, with the purpose of achieving a better relationship with himself/herself and not for the sake of other ambitions.

The expectations regarding the changes that could occur after the operation should not be set too high, otherwise disappointment is preprogrammed. Fear of the operation is normal and by all means understandable. Sometimes, however, it is so pronounced that it prevents the patient from having the desired correction performed. It is for this reason that the fear threshold should not be too low.

The ideal patient must have the ability to build up trust in the surgeon of his/her choice. Not only good

Fig. 14.1. Prosopoplasty: face- and neck-lift, microlipofilling, eyelid surgery, and removing of crow's-feet

healing qualities but also a healthy portion of optimism are very desirable and helpful. Finally, the ideal patient must be organically healthy, that is, healthy with regard to bodily functions. Emotional stability is also important. This listing of characteristics does not of course mean that we only accept ideal patients to operate on. Under certain circumstances and after thorough counselling, deliberation, and scrutiny, even less ideal patients can be considered for surgery if the patient's expectations have been clarified and there is mutual trust.

The patient beaming with happiness after completion of the treatment is a meaningful experience for us. I would even say that many of us have become really addicted to this feeling and always want it anew. To know that you have liberated someone from the dungeon of their inhibitions and insecurity and inferiority complexes is a feeling that is second to none – at least for me.

Bibliography

Please see the general bibliography at the end of this book.

15 Prerequisites of the Surgeon

Dimitrije E. Panfilov

Which qualities does the ideal surgeon require? The ideal surgeon should:

- Posses a strong capacity for understanding and patience, both while operating and when listening to patients
- Have undergone the right training, but also have kept abreast of the current literature after completing the specialist training
- Attend congresses and courses at which the latest methods of treatment are demonstrated, and have work-shadowing experience with prominent surgeons who produce particularly good results using certain operative procedures
- Have technical aptitude and dexterity, a high degree of precision, but also a leaning towards artistic design
- Work systematically and with endurance

Furthermore, humour is of great advantage. Finally, sincerity and a love of his/her work are indispensable for the ideal surgeon.

Albert Einstein once said that "fantasy is more important than knowledge". Apart from his/her experience, a plastic surgeon too must have fantasy in order to be able to already envisage the final result at the start of the treatment, that is, how the patient will look in 3 weeks', 3 months', or 3 years' time. This is particularly important with operations which can only be performed over several sessions. As early as 1972 the cofounder of the Association of German Plastic Surgeons, Ursula Schmidt-Tintemann, drew up the following rules which are still valid today:

- *The plastic surgeon must be able to judge whether a certain procedure is really going to help the patient above and beyond any organic reconstruction or improvement.*
- *He/she must be in a position to weigh up whether the operative risk is in reasonable proportion to the effective result.*
- *He/she must be capable of explaining these aspects to the patient so that the, in the first instance, 'healthy' patient is informed and can make an independent decision.*

It is not always easy for patients to find a reliable surgeon who appears to be suitable for their particular problem. It would seem logical to consult their family doctor about it. Some patients are ashamed, however, to shed their sorrow in several places and instead opt for the direct way. Some also fear that their secret might be somewhat at risk, if not from the family doctor himself/herself then perhaps from the staff. And besides, the family doctor's basic attitude might be hostile towards the entire aesthetic plastic surgery. Our experience has shown that family doctors and other doctors in private practice only refer patients to us if they themselves are convinced about our work. That is by all means a good thing.

The best and surest way to find a good doctor is by word of mouth. Unfortunately with aesthetic plastic surgery, patients are often disinclined to admit that they have had surgery. Not frequently, beauticians and hairdressers send us their clients for counselling. Some patients just "stumble" across the sign on the door, even though they are otherwise accustomed to going about such things more systematically. The addresses of specialist societies willing to send their list of members are available from the medical association. Many patients search for the addresses of clinics and surgeons in newspaper adverts. This is also certainly a way of finding good reliable surgeons, but one can also run into some "black sheep" who have followed quite obscure training pathways and only posses a very limited degree of experience and knowledge. One cannot warn too often about such "denigrators" because they discredit the entire medical profession by the damage they do.

No surgeon in the world, not even celebrities of our profession, can talk them free of any complication. With well-trained and experienced plastic surgeons, these complications are rare. When something happens, these are mostly minor complications and we are educated to master them. The ideal plastic surgeon also has honesty and the ability to recognize his/her own mistakes, and is able to correct them and move on.

Fig. 15.1. The operating theatre is the "temple of our surgical religion"

The well-mastered operative technique is "conditio sine qua non". There is the proper training to be completed. Learning surgical technique is some sort of "monkey discipline": as good as our surgery teacher is and as good as we can imitate him/her, so much we will be better ourselves. In my first year of general surgery training a female patient of 40 years, mother of ten children, died 10 days after strumectomy of recurrent struma because the surgeon from whom I learned cut the a. carotis communis in the belief it was a superficial neck vein. He palpated it – but too briefly. He was always hurrying when performing surgery: he did his appendectomies within 4 min.

After this tragic experience I stopped considering operative speed as one of qualities which I should aimed for. I have seen many luminaries operating; I have also watched many of the co-authors of this book at work. No one was hurrying. All of them operated slowly and carefully, but the operating times were always very short. Why? The real masters in our profession have no unnecessary movements. Every act, every movement is well planned and carefully carried out. That is the whole secret.

Notnagel said that "only a good human being could be a good physician." In a similar way we can add "only a good physician could be a good plastic surgeon", besides being a good human being. We can summarize the characteristics of an ideal plastic surgeon:

- Passion
- Fantasy
- Precision
- Patience
- Love
- Artistic talent
- Luck

Fig. 15.2. Ronadro's "Surgeon's Prayer": Many plastic surgeons pray to God for help in doing surgery well and in making their patients happy

Surgeons Prerequisites. My former teacher, a great didact, wrote at the end of his judging certification: "I wish him … and luck, so badly needed of any surgeon."

The *New England Journal of Medicine* made a questionnaire among thousands of physicians to see if they are praying for the welfare of their patients. Those who had prayed had significantly more success in healing!

Bibliography

Please see the general bibliography at the end of this book.

Part II
Preoperative Preparations

Initial Consultation

16

Dimitrije E. Panfilov

The first contact our patients have with our office is mostly through our staff by phone. This first communication should avoid difficulties which could arise. Our staff should note the patient's name and should call him/her by name when answering questions. The information should be general, even average costs could be given, if asked, but this communication should be friendly and interesting. At the end of telephone conversation, an appointment could be politely suggested. One should assure one's staff of the importance of telephone communication. Some patients call five to ten plastic surgeons and make the decision of where to go just upon the kind, obliging voice of your secretary. Recognize it as a success of your staff if they make an appointment with this patient at the end of the phone call.

The patient is sitting for the first time in our waiting room. The most frequent way for a patient to finds us nowadays is the Internet or his/her GP has sent him/her here after reading or hearing about our work in the medical press or from lectures and forming his/her own well-founded opinion of us. Perhaps the patient has also received recommendations from friends who have been successfully treated in our clinic or even a hairdresser told their clients where they produce fine scars after facelift! Less likely, he/she has received the address after phoning the Medical Council or even less likely he/she got it from a journal which perhaps contained an article about our work, or he/she has found the address in the Yellow Pages or in advertisements. He/she could also have "stumbled" into the surgery having noticed the sign bearing our name and speciality.

The waiting room itself should be pleasant and bright, if possible transparent communication with our reception desk should be possible, there could be some pleasant background music, and some neutral pictures could decorate the walls; not only our diplomas and awards should hang there. There should be a folder with articles by our office/clinic from journals for laymen , or if we have written a book on this topic for laymen this, or at least a booklet about our clinic, should be available for patients.

The waiting time should not be too long. Our staff could offer some drinks (tea, coffee, etc.) and a questionnaire. On the front page there are personal data: how the patient found our address, physical health, severe illnesses, operations – especially the cosmetic ones. The back page of our questionnaire is given as in Fig. 16.1.

A harmonic understanding should develop between patient and doctor during their first meeting. A prerequisite for this is that the patient's hopes and expectations correspond with what is surgically feasible. The outcome of an aesthetic operation can very well please both parties; the patient is happy and the surgeon proud.

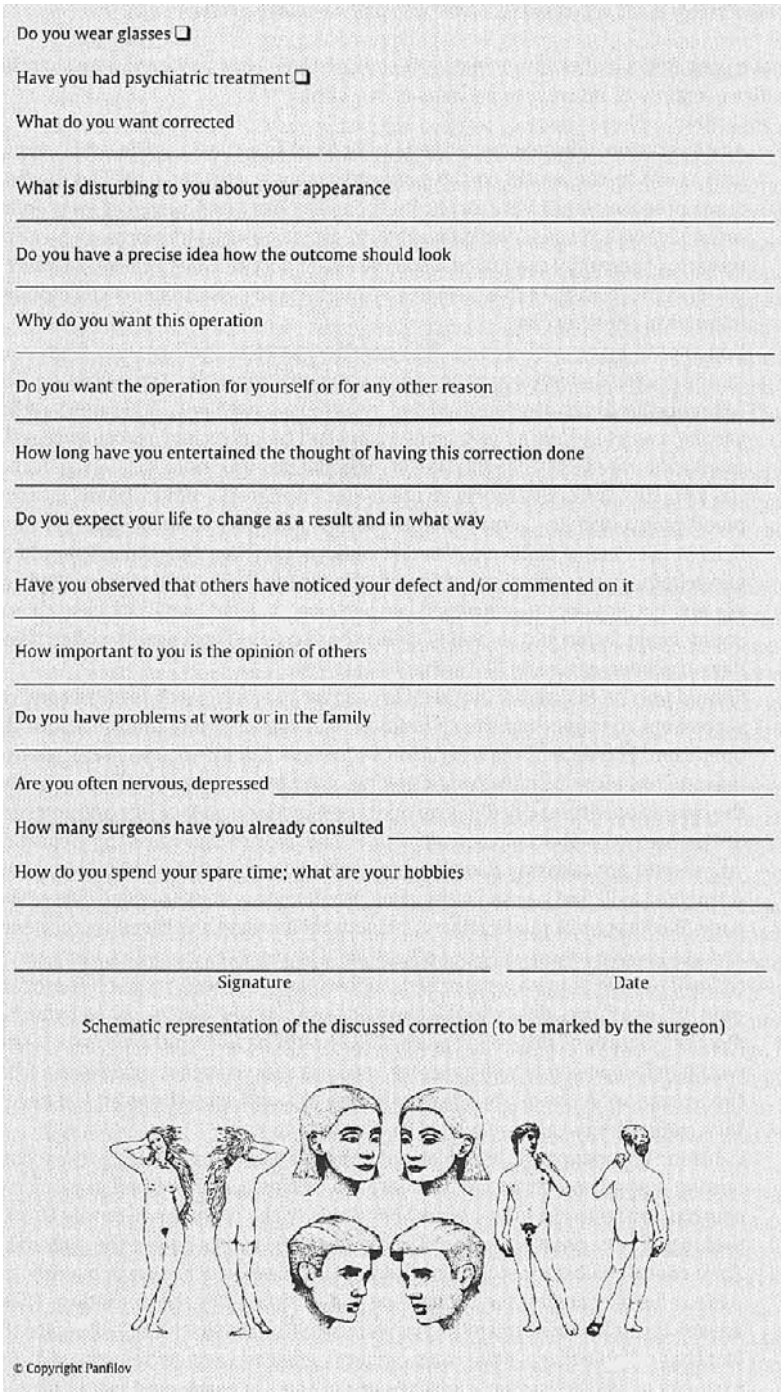
We should learn about our patients':

- Indication
- Motivation
- Expectation
- Incubation

We should clarify these questions in order to determine favourable candidates for surgery and to be able to diagnose and exclude the less good ones. If somebody decided to undergo surgery just couple of weeks ago – perhaps just because of an emotional stress situation – we should advise such a person to wait 2 or 3 months until his/her situation settles down. To rush into a decision to be operated on could afterwards be regretted.

If some woman expects from her husband who has left her that he will return home after her facelift or if somebody expects to get a dream job after becoming more attractive through cosmetic surgery, these are mostly unrealistic expectations and such patients should be advised not to undergo cosmetic surgery. I have never regretted saying "No" to a patient, but I have sometimes regretted saying "Yes".

It is useful to remember what Jack Sheen wrote in his milestone of *Aesthetic Rhinoplasty*: "A psychiatrist once told me, 'If you can't elicit a smile from a patient, don't operate!'". When a smile goes and comes back, the bridge has been built.


Do you wear glasses ❑

Have you had psychiatric treatment ❑

What do you want corrected

What is disturbing to you about your appearance

Do you have a precise idea how the outcome should look

Why do you want this operation

Do you want the operation for yourself or for any other reason

How long have you entertained the thought of having this correction done

Do you expect your life to change as a result and in what way

Have you observed that others have noticed your defect and/or commented on it

How important to you is the opinion of others

Do you have problems at work or in the family

Are you often nervous, depressed

How many surgeons have you already consulted

How do you spend your spare time; what are your hobbies

Signature Date

Schematic representation of the discussed correction (to be marked by the surgeon)

Fig. 16.1. Questionnaire

Motivations for surgery should be reasonable and the expectations not unrealistically high. We only can recommend or agree with a patient's wish for cosmetic surgery if we can expect a somewhat reasonable improvement of her/his featural appearance. In the ideal case we achieve from our patient more self-satisfaction, more self-confidence. We do not only want to earn money, we also want to have happy patients.

If our schedule is too busy, somebody from our staff should show the patients in the waiting room our album with pictures of our patients' "before" and "after" surgeries, or should display those images with a DVD player. I prefer to show these to my patients in my consulting room on my laptop.

It is now our patient's turn. He/she knocks, opens the door, and enters the consultation room. His/her

Fig. 16.2. Intimacy of the consulting room: the secret of gaining the trust of the patient is as unexplainable as the conception of a child or of an artistic work

mind only marginally registers the furniture and medical equipment. The doctor is the centre of his/her interest: What does he/she look like? How is he/she looking at me? Can he/she arouse my trust? Is he/she in a hurry?

Even if we are short of time, we should not show this to our patients. They need our whole concentration and reliable explanation. It is, however, a fact that our patients remember only 30% of facts spoken during an average consultation. I show them all the possibilities in modern facial aesthetic surgery on my laptop, and afterwards we discuss the special problem the patient has pointed out, to be solved in front of a mirror.

Every question the patient asks should be answered without necessarily entering into any mutual obligations. On the other hand, the doctors should be given all the details which could influence the operation. Matters of interest include:

1. Previous disorders
2. Any previous operations
3. Habits such as smoking and alcohol consumption
4. Any current medications, above all
   - Anticoagulants prescribed after heart attacks, heart-valve surgery, and thromboembolic events
   - All medications containing acetylsalicylic acid since they considerably increase the tendency to bleed
   - Hormone preparations, including hormone contraceptives

The medications mentioned should be discontinued before the planned operation.

The first consultation allows the surgeon to assess the patient's deformity and form a rough opinion about the patient's skin, subcutaneous fatty tissue, and the time and effort required for the operation. The surgeon will also take the opportunity of thoroughly counselling the patient about risks and possible complications.

No final decision needs be made at the first consultation as to whether the operation will be undertaken. After the patient has received a wealth of information, he/she should be given enough time to think things over. Sometimes questions arise afterwards which can be clarified on the phone or during a further consultation. If both sides decide to refrain from an operation, then much has been gained: worry, annoyance, and disappointment have been avoided. If, however, the operation is unanimously agreed upon by both sides, then a sacred trust must be generated between patient and doctor. Surgeons must be able to assure patients that they will personally carry out the operation and that they will be available during the whole period of aftercare.

Some patients bring their spouse or companion to the first consultation. This can be a beneficial support, and at the end the partner is often heard remarking: "It doesn't bother me, but if you think that it will help you, then go ahead."

Less often the opposite situation occurs. For example, a woman may have an operation done secretly to surprise her husband and the surprise has quite a different effect than intended: the partner is disappointed and feels aggrieved that he was deprived of any involvement in deciding about such an important issue. It is therefore our recommendation to inform the partner about the intended operation, even though the decision itself ultimately lies with the patient.

Bibliography

Please see the general bibliography at the end of this book.

17 The Interface Between Aesthetic Surgery, Psychiatry and the Law: Some Practical Advice

Mark Gorney

17.1 Introduction

It is unfortunate that in the lengthy process of surgical education, most plastic surgeons fail to acquire any real sense of the basic criteria for patient selection, nor the interface between aesthetic surgery and psychiatry. It takes some experience to develop a real sense of who is and who is not appropriately motivated for, what is after all, a voluntary anatomical revision [1]. Virtually all such surgeons emerge into the real world filled with the latest techniques on the cutting edge of their specialty. However, most have only a vague concept of how to recognize the candidate for a facelift who will benefit from the procedure anatomically and psychologically from the one who will be unhappy no matter the quality of improvement.

This problem is compounded by the endless love affair between the media and the universe of beauty surgery. The avalanche of publicity creates in the public's mind an image that is unreal and deceptive. The impression that this kind of surgery is simple and foolproof creates false expectations that later translate into severe aggravations for the surgeon. Any attempt to recruit a patient into this kind of surgery motivated by a substantial professional fee can cost the surgeon far more in the end.

There is little disagreement between mental health professionals and aesthetic surgeons that patients who exhibit signs suggestive of a variety of psychiatric diagnoses constitute very poor candidates for any elective surgery. However, some of the diagnoses, such as body dysmorphic disorder, come in many shades of gray. This compounds the difficulty for the surgeon not familiar with the "red flags" which, to the psychologist, may seem obvious,

To make matters even more confusing, those in plastic surgery scarred by experience of sufficient years can universally point to patients in their collection who do, in fact, present with minimal to moderate deformity causing disproportionate patient concern. However, some of these, after a well-executed correction, undergo explosive positive personality changes in their life.

So what should the surgeon's appropriate response be? Learning to say "No" may seem easy, but it is far more complicated that it seems. Referral to a psychiatrist or psychologist almost universally results in an angry patient who walks out and will, sooner or later, have the procedure done anyway (and harvest the consequences). The only reasonable course left to the surgeon is to learn as early in his/her career as possible to select among all those shades of gray. Where uncertainty exists, it is prudent to fall back on the counsel of more experienced colleagues or a psychiatrist regardless of the consequences. Failure to do so universally produces headaches for the surgeon far beyond the value of any monetary reward. In its ultimate (but thankfully rare) form, ignoring these red flags has cost at least five surgeons their lives in the past two decades. All were shot to death by a disturbed patient dissatisfied with her results.

Of all medical specialists, the plastic and reconstructive surgeon's exposure to professional liability is unique in at least two respects:

1. The plastic surgeon who performs elective aesthetic surgery is not assuming the care of a sick or injured patient to make him/her *well*. Rather it is a matter of taking a well patient to make him/her *better*.
2. The results of treatment are judged by the patient according to standards that are entirely subjective, and often colored by their self-image. The actual result may be good, but if it does not meet the patient's expectations, the procedure may be judged a failure.

After years of practicing, teaching and evaluating claims against plastic surgeons, this author has concluded the four most critical ingredients for successful plastic surgery outcomes are:

1. Competence
2. Communication
3. Appropriate patient selection criteria
4. Meaningful informed consent

The remainder of this chapter discusses in detail the plastic surgeon's obligation to the patient [2].

17.2 Facelift sans Stigma

This chapter will not concern itself with the technical aspects of the facelift operation. We leave that to the many other excellent colleagues who have contributed to this text. Rather, we will concentrate on those very important facets of the procedure, which, no matter the brilliance of the surgeon, can make a dramatic difference between a happy patient and a dissatisfied one despite the adequacy of the surgical improvement.

Most patients who request rhytidectomy have an endless variety of motivations. Within the natural limitation of the quality of tissues they bring with them, the surgeon may or may not be able to achieve what the patient desires. One cannot make a designer gown out of sackcloth. Assuming adequate quality of the raw material, satisfaction with the end result of the operation now becomes dependent on many factors that *are* within the control of the surgeon's hands. Given that most applicants for facelift are women, one can safely assume that the majority desire a result that is compatible with their age bracket. No rational 60-year-old woman expects to look 30 when you finish. What they *do* expect is that, given appropriate cosmetic assistance, they will look the best they can within their age group—freshened, more vibrant and less "tired." Most do not want their friends to be immediately aware that they underwent surgery. This implies that they want to look natural.

The surgeon should try to avoid the overly "tight" look that announces from a distance that a facelift has been done. The look of "eternal surprise" should be avoided by exaggerated traction on the brows. The surgeon must make every effort to avoid pulling the temporal/preauricular hairline up and out of position. This is most disturbing, because it is then virtually impossible to avoid advertising the operation. If the preauricular incision is to be curved behind the tragus of the ear, every effort should be made to restore the tragus and avoid leaving a widened, round ear opening that looks like a "porthole" on a ship. One of the most obvious advertisements that surgery has been done is the distorted pulled-forward or elongated earlobe. There are many ways to avoid this. When a woman looks down, she should not exhibit a series of diagonal creases that appear along the cheek. This trumpets the failure of the surgeon to take into account the positioning and the vectors of tension applied to the cheek flap before closure of the incisions.

All of these telltale signs can and should be avoided. With proper attention to detail at the operation, even in the secondary or tertiary facelift, there are ways to prevent these signs, or at least minimize them. It is this kind of careful attention to detail and savoir-faire that distinguishes the superior operator from the ordinary one.

17.3 Disclosure: Informing Your Patients *Before* They Consent

Most countries' legal requirements hold that patients must be told the most probable of known dangers and the percentage likelihood. More remote risks may be disclosed in general terms. Once the information has been fully disclosed, that aspect of the physician's obligation has been fulfilled. The weighing of risks is usually not a medical judgment, but instead must be reserved for the patient.

Any or all of the information is wasted unless it is documented in the patient's record. For legal purposes, if it is not in the record, it never happened!

17.4 Elements of Adequate Disclosure

In all countries where consent is a real issue, the following elements of a valid informed consent fulfill what the law usually requires [3]:

- The nature and purpose of the proposed treatment or procedure and its anticipated benefits
- The risks, complications or side effects
- The probability of success, based on the patient's condition
- Reasonable available alternatives

In situations dealing with elective treatment, as with cosmetic surgery, the open disclosure of risks and consequences may need to be expanded. This is particularly necessary if the procedure is *purely* for cosmetic purposes.

17.5 Documentation

An increasing number of laws and regulations in most western countries now require the completion of specifically designed consent forms. Studies indicate that physicians sometimes underestimate the patient's ability to understand. If your records disclose no discussion or consent, you must explain legally sufficient reasons for such absence. It is a test of your communication skills if what you say to patients is less important than *how* you say it in order to obtain meaningful consent without frightening the patient. No permit or form will absolve you from responsibility if there is negligence; nor can a form guarantee that you will not

be sued. Permits may vary from simple to incomprehensibly detailed. Most medical-legal authorities agree that a middle ground exists. A well-drafted informed-consent document is proof that you tried to give the patient sufficient information on which to base an intelligent decision. Such a document is often the key to a successful malpractice defense when the issue of consent to treatment arises.

17.6 Patient Selection Criteria

Well over half of the complaints after facelift can be easily avoided. Most are based on failures of communication and/or patient selection criteria, not on technical faults. Patient selection, however, is the ultimate inexact science. It is a mixture of surgical judgment, gut feelings, personality interactions, the surgeon's ego strength and, regrettably, economic considerations. Regardless of technical ability, a surgeon who appears cold, arrogant or insensitive is more likely to be sued than one who relates at a "personal" level. Obviously, a doctor who is warm, sensitive, naturally caring, with a well-developed sense of humor and cordial attitude, is less likely to be the target of a malpractice claim. The ability to communicate clearly is probably the most outstanding characteristic of the claims-free surgeon. Communication is the sine qua non of building a doctor–patient relationship. Unfortunately, the ability to communicate well is a personality characteristic that cannot be readily learned in adulthood. It is an integral part of the surgeon's personality.

There are, however, a number of helpful guidelines in the selection of patients.

- Great expectations. There are certain patients who have an unrealistic and idealized, but vague conception of what elective aesthetic surgery is going to do for them. They anticipate a major change in life style with immediate recognition of their newly acquired attractiveness. These patients obviously have an unrealistic concept of where their surgical journey is taking them and have great difficulty in accepting the fact that any major surgical procedure carries inherent risk.
- Excessively demanding patients. In general, the patient who brings with him/her photographs, drawings and exact architectural specifications should be managed with great caution. Such a patient has little comprehension that the surgeon is dealing with human flesh and blood; not wood or clay. This patient must be made to understand the realities of surgery, the vagaries of the healing process and the margin of error that is a natural part of any elective procedure. Such patients show very little flexibility in accepting any failure on the part of the surgeon to deliver what the patient anticipated.
- Familial disapproval. It is far more comfortable, although not essential, if the immediate family approves of the surgery being sought. If there is disapproval, errors in communication or less than optimal results, this may produce an automatic "See, I told you so!" reaction, which deepens the guilt and dissatisfaction of the patient.
- Patients you do not like (or who do not like you). Regardless of the surgeon's personality, in life there are people whom you simply "do not like" or who do not like you. Most experienced surgeons know within minutes of entering the examining room whether or not they will or will not be operating on that patient. Accepting a patient whom you basically dislike is a serious mistake. A clash of personalities for whatever reason is bound to affect the outcome of the case, regardless of the actual quality of the postoperative result. No matter how "interesting" such a case may appear, it is far better to decline the patient.
- The "surgiholic" [4]. A patient who has had a variety of plastic surgery procedures performed is often attempting to compensate for a poor self-image with repeated surgeries. In addition to the implications of such a personality pattern, the surgeon is also confronted with a more difficult anatomical situation owing to the previous surgeries. He or she also risks unfavorable comparison with previous surgeons. Often the percentage of achievable improvement is not worth the risk of the procedure.

Generally speaking, there is a clear risk–benefit ratio to every surgical procedure. If the risk–benefit ratio is favorable, the surgery can be encouraged and has a high probability of success. If the risk–benefit ratio is unfavorable, the reverse not only applies, but the unintended consequences of the unfavorable outcome may turn out to be disproportionate to the surgical result. The only way to avoid this debacle is to learn how to identify those patients whose body image and personality characteristics make them unsuitable for the surgery that they seek.

17.7 Scarring in General

Most surgeons assume the patient understands that healing entails formation of scar. Unfortunately, it is seldom discussed in the preoperative consultation. In plastic and reconstructive surgery, the appearance of the resulting scar can be the major genesis of dissatisfaction. It is imperative that the plastic sur-

geon obtains from the patient clear evidence of their comprehension that without scar there is no healing. The patient must be made to understand that their healing qualities are as individual to them as the texture of their hair or the color of their eyes; it is built into their genetic program. Documentation of such conversation in the preoperative chart should go a long way towards making any resulting claim more defensible.

17.8 Psychological and Psychiatric Aspects of Modifying Anatomy

The growing popularity of elective aesthetic surgery makes it imperative to establish clear criteria of patient selection. Who, then, is the "ideal" candidate for aesthetic surgery? The surgeon must differentiate between healthy and unhealthy reasons for seeking aesthetic improvement.

Most litigation in plastic surgery has the common denominator of poor communication. This doctor–patient relationship can be shattered by the surgeon's arrogance, hostility, coldness (real or imagined) or simply by the fact that the patient feels that "he or she did not care". There are only two ways to avoid such a debacle: (1) make sure that the patient has no reason to feel that way and (2) avoid a patient who is going to feel that way no matter what is done.

Although the doctor's skill, reputation and other intangible factors contribute to a patient's sense of confidence, rapport between patient and doctor is based on open and accurate communication. This will normally prevent the vicious cycle of disappointment, anger and frustration by the patient, and reactive hostility, defensiveness, followed by arrogance from the doctor, which deepens the patient's anger and ultimately may provoke a lawsuit.

17.8.1 Anger: a Root Cause of Malpractice Claims

Patients feel both anxious and bewildered when elective surgery does not go smoothly. The borderline between anxiety and anger is tenuous, and the conversion factor is uncertainty – fear of the unknown. A patient frightened by a postoperative complication or uncertain about the future may surmise: "If it is the doctor's fault, then the responsibility for correction falls on the doctor."

The patient's perceptions may clash with the physician's anxieties, insecurities and wounded pride. The patient blames the physician, who in turn becomes defensive. At this delicate juncture, the physician's reaction can set in motion or prevent a chain reaction. The physician must put aside feelings of disappointment, anxiety, defensiveness and hostility to understand that he or she is probably dealing with a frightened patient who is using anger to gain control.

The patient's perception that the physician understands that uncertainty, and will join with him/her to help to overcome it, may be the deciding factor in preserving the therapeutic relationship.

One of the worst errors in dealing with angry or dissatisfied patients is to try to avoid them. It is necessary to actively participate in the process rather than attempting to avoid the issue. Nothing will diffuse anger more effectively than a clear manifestation of concern and willingness to do everything possible to correct the situation.

17.8.2 Body Dysmorphic Disorder

Beware of the patient showing a pathological preoccupation about a physical trait that may be within normal limits or so insignificant as to be hardly noticeable, but which to the patient has become a consuming obsession [5].

As the popularity of aesthetic surgery increases, one is reminded of the fairytale that asks the question: "Mirror, mirror on the wall, who's the fairest of them all?" The number of patients finding comfort and solace in repetitive elective surgical procedures is growing. Beyond the unrealistic expectations of aesthetic correction, many patients are seeking surgery when the need for it is dubious at best. The physical change sought through surgery is usually more a manifestation of flawed body image in a disturbed mind than a measurable deviation from physical normality.

As the trend to advertising and "marketing" cosmetic surgery grows worldwide, there is greater probability that those living in the shadow of borderline psychological abnormality will eventually decide on the surgeon's scalpel, rather than the psychiatrist's consultation as an answer to their problem.

Since patients with body dysmorphic disorder never carry that badge openly into the consultation with the plastic surgeon, medical disputes about the surgical outcome depend entirely on what was *said* versus what was *understood*. This is where accurate detailed documentation of what was said becomes absolutely critical.

In the best of all possible worlds, the prospective patient would project from his or her mind onto a screen exactly the changes he or she conceives, for the surgeon to decide whether or not he/she can translate that image into reality. Lamentably, we are still many decades short of achieving such imaginary technolo-

gy. It is easy for the well-meaning surgeon to be deceived about the patient's pathological motivation.

There are many examples of beneficial change wrought through successful aesthetic corrective surgery. Nonetheless, statistically the odds for an unfavorable result and a claim are much greater when the comparison between the objective deformity and the distress it creates in the patient is out of proportion The surgeon is cautioned to search for appropriate psychological balance and lean strongly against surgery in those where there is doubt.

It is possible to reduce the likelihood of all these unpleasant experiences by the application of simple principles: maintaining good communication and rapport with the patient through good times and bad, restricting your practice to those procedures with which you feel thoroughly comfortable, close and careful attention to documentation of your activities, and above all, the realization that a normal temperature and a valid credit card by themselves are very poor criteria for elective aesthetic surgery.

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Identifying the Body Dysmorphic Patient in Aesthetic Surgery

18

Darryl James Hodgkinson

18.1 Introduction

Body dysmorphic disorder (BDD), formally called body dysmorphophobia, is a psychiatric illness of perceived ugliness. The disorder has been referred to in the medical literature for nearly 100 years but only recently entered the psychiatric classification of diseases.

Increasingly, patients with BDD seek out a cosmetic surgeon to find a solution to their perceived, often-delusional body fixation and too often are profoundly dissatisfied with the outcomes of cosmetic surgery. Plastic surgeons have been aware of the difficulty operating on patients with psychiatric disorders and gave advice [5] to refuse surgery to those individuals with imagined disfigurement [14]. The plastic surgeon should be aware of BDD, know how to identify the possibility of its presence and refer to a mental health care professional, rather than unwittingly operate on a patient.

18.2 BDD – the Scope of the Problem

In 1997, the *Diagnostics and Statistical Manual of Mental Diseases* (fourth edition; DMS 4) published by the American Psychiatric Association classified BDD as a somatoform disorder. BDD is on the increase within the general population and perhaps 2% of the population are affected and the incidence is rising. The manifestations of the disorder include a fixation on appearance and social avoidance mechanisms because of a perceived deformity and becomes evident in 70% of cases in late teenage years. The disease is progressive and body part dysfunction can change over time. The incidence appears to be about equal for both sexes. The public is also much like the medical fraternity becoming more aware of BDD. Popular books [12] as well as self-help manuals [3] and Website support and chat rooms are available for the growing number of the population who have or believe they suffer from BDD [17, 18].

18.3 The Characteristics of Individuals Suffering from BDD

BDD sufferers are extremely disparaging concerning their body appearance far in excess of what an objective assessment would be. Their fixation upon their appearance leads to social avoidance, hours per day of preoccupation eventually interfering with professional and personal lives. The causation is not known; however, psychological factors may play a part, including early teasing at school, and an accentuation by print media on body perfection and the perceived psychosocial benefits of an ideal form of beauty are thought to play a part. A neurobiological explanation has been sought and suggested as a precursor, making individuals vulnerable to developing BDD. The treatment response of BDD to serotonin reuptake inhibitors (SRI) also suggests that a disturbed brain chemistry may play an important role. The sufferer may resort to extreme rituals of camouflage, including excessive make-up, wearing wigs and large hats, and may often turn to dermatologists or plastic surgeons to seek out a surgical solution. Depression and suicidal behavior is not infrequent.

The body sites reported most frequently of concern include hair, nose, skin, eyes, thighs, abdomen, breast size and shape, lips, chin, scars, height and teeth. It is difficult to delineate between obsessive–compulsive disorder and the treatment of both is similar. Besides depression, the occurrence of sexual dysfunction makes diagnosis difficult [19].

People with eating disorders and obesity have similar features to those of BDD patients, such as frequently weighing themselves, checking in the mirror and excessive weightlifting or exercising. Other symptoms might include avoidance of mirrors or reflective surfaces, constant scrutinizing the appearance of others, excessive grooming (Fig. 18.1), seeking reassurance from parents or dependence on others for constant reassurance, touching, picking or fiddling with the defect, repeated measuring or photographing of the defect, avoidance of social contact, withdrawn, housebound truancy, avoiding athletics, boating or drama classes and failure to hold employment.

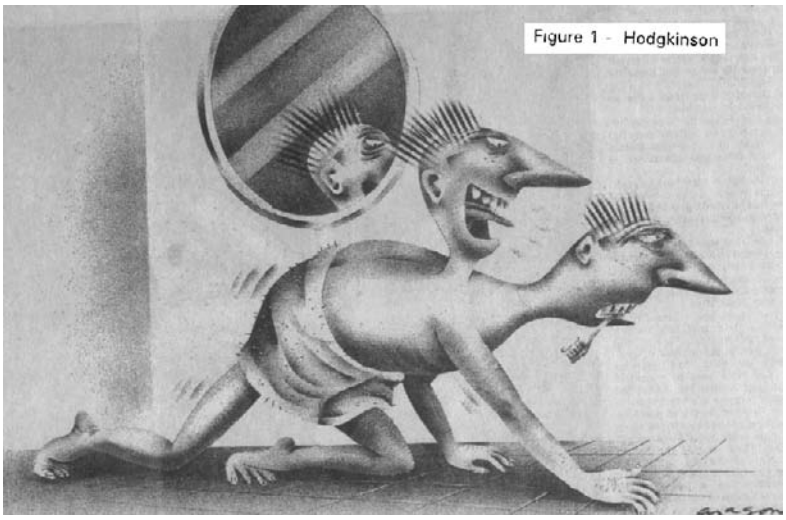

Fig. 18.1. Body dysmorphic disorder patients may either check themselves in mirrors constantly or avoid them

18.4 Signs of BDD

To the surgeon, catastrophized dislike or disgust of a minimum defect or variation in size, shape or minimal scar is an alert or red flag to suggest BDD. The over-made-up or doll-like patient, or those with a clinging friend, parent or relative also can be an alert. The difficulty arises in the degree of disability exhibited by those with a minor disorder and the more subtle presentation which can become florid symptomatology after cosmetic surgery.

18.5 The Cosmetic Surgery Junkie

Up to 6–15% of patients presenting to the plastic surgeon for cosmetic surgery may suffer from BDD [13]. Patients previously operated upon, especially if multiple times and the patients are still dissatisfied, could likely be afflicted by BDD.

The cosmetic surgery junkie is a red flag candidate. In rhinoplastic surgery, it is estimated that men are three times more likely to be dissatisfied with their surgery than women [7]. The outcome of cosmetic surgery for each patient must be judged in psychological terms as well as in objective changes and for the patient the expectations are mostly psychological or psychosocial [11]. We need to appreciate the expectations of external factors improving (enhancement of social networks, relationships and employment) is paramount for the patient (Fig. 18.2); hence, a dissatisfied patient may have failed with the external factors and attributes failure to the perceived unsuccessful cosmetic surgery operation.

Fig. 18.2. The expectations for a patient are mainly psychological or psychosocial

The solution becomes more surgery, which compounds a pre-existing unresolved, psychosocial problem. If patients regard cosmetic surgery as a life panacea or epic-changing event, they are likely to be disappointed when the physical changes do not lead to the anticipated social outcome. After surgery, pain, numbness, minor healing problems or complications will accentuate anxieties in all patients and especially in the BDD patient, resulting in the exacerbation of symptoms or a BDD attack with feelings of anger, hopelessness and despair.

18.6 Diagnostic Tests for BDD

Cosmetic surgery aims to improve a patient's body image and self-esteem (Fig. 18.3). Disturbances of body image are present in a wide variety of psychiatric illnesses, including hypochondria, eating disorders, social phobia and schizophrenia [1]. Psychological evaluation of patients is not standard in clinical plastic surgery practice. Questioning of motivation and interview techniques to ascertain how realistic a patient is, however, standard. Considering that 50% of patients presenting for cosmetic surgery are on psychotropic medications and 27% of those are taking antidepressants suggests that perhaps some standard psychological tests should be introduced into the initial cosmetic surgery consultation [9]. Only a few authors have suggested this as a routine [15].

A suspicion of BDD might indicate that a simple standard questionnaire be called the BDD questionnaire (Table 18.1) [12]. A more specific diagnostic questionnaire is the BDD examination self-report [3]. To determine the severity of BDD, Phillips [12] has developed the BDD-YBOCS to be used by interviewing mental health care professionals to assess the severity of the disorder. This tool is more likely to be used as a clinical research tool by a psychiatrist. The diagnosis is confirmed by a psychiatrist who confirms the criteria as outlined in the DSM 4 which meet that for BDD. The plastic surgeon's suspicion or red flags perhaps with the aid of a screening BDD questionnaire should alert him/her to refer the patient to a psychologist or psychiatrist who can confirm the diagnosis and initiate treatment if the diagnosis is confirmed.

18.7 Treatment of BDD

Once BDD is suspected or identified, avoidance of surgery is paramount and referral to the mental health care professional obligatory. Cognitive behavior therapy is a mainstay treatment for dealing with the behavioral components of BDD, focusing on response, prevention and behavioral change.

Medications complement the behavior therapy and, in particular, SRIs are clinically helpful as they are in the treatment of anxiety disorders. The prescribing and management of these patients is out of the realm of the plastic surgeon and is left to the treating psychiatrist.

18.8 The Consequences of Operating on Patients with BDD

All surgeons have had or will have the unfortunate experience of operating on patients who become profoundly dissatisfied with the surgical outcome even when objectively the result is satisfactory. It is likely that many of these patients were not diagnosed with BDD prior to them becoming unwittingly operated on. A minor problem such as wound healing, scar, numbness or persistent bruising can trigger profound dissatisfaction or the BDD "attack," No amount of encouragement or support will mitigate their disappointment and these people become the total focus of you and your staff's working and out-of-office time often at the expense of other patients in the practice. The stress levels of the treating surgeon and his/her

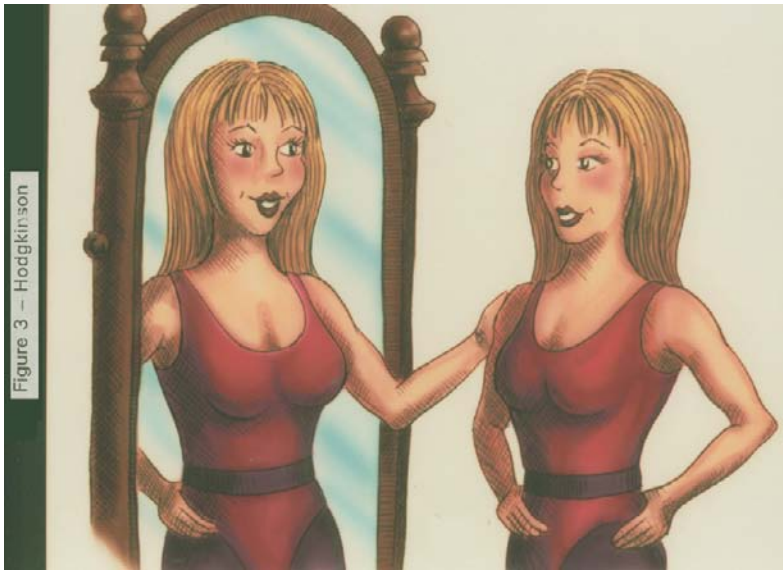

Fig. 18.3. A satisfied cosmetic surgery patient has an improved body image and self-esteem

Table 18.1. Body dysmorphic disorder questionnaire

Body Dysmorphic Disorder Questionnaire (BDDQ)

Name _____

This questionnaire assesses concerns about physical appearance. Please read each question carefully and circle the answer that best describes your experience. Also write in answers where indicated.

1. Are you very concerned about the appearance of some part(s) of your body that you consider especially unattractive?
   ☐ Yes ☐ No

   If yes: Do these concerns preoccupy you? That is, you think about them a lot and wish you could think about them less?
   ☐ Yes ☐ No

   If yes: What are they?

   _____

   _____

   Examples of areas of concern include: your skin (e.g., acne, scars, wrinkles, paleness, redness); hair (e.g., hair loss or thinning); the shape or size of your nose, mouth, jaw, lips, stomach, hips, etc.; or defects of your hands, genitals, breasts, or any other body part.

   If yes: What specifically bothers you about the appearance of these body part(s)? (Explain in detail):

   (Note: If you answered "No" to either of the above questions, you are finished with this questionnaire. Otherwise please continue).

2. Is you main concern with your appearance that you aren't thin enough or that you might become too fat?
   ☐ Yes ☐ No

2/Body Dysmorphic Disorder Questionnaire (BDDQ)

3. What effect has your preoccupation with your appearance had on your life?
   - Has your defect(s) caused you a lot of distress, torment or pain?
     ☐ Yes ☐ No
   - Has it significantly interfered with your social life?
     ☐ Yes ☐ No

   If yes: How?

   _____

   - Has your defect(s) significantly interfered with your school work, your job, or your ability to function in your role (e.g., as a homemaker)? ☐ Yes ☐ No

   If yes: How?

   - Are there things you avoid because of your defect(s)? ☐ Yes ☐ No

   If yes: What are they?

   _____

   _____

   _____

   - Have the lives or normal routines of your family or friends been affected by your defect(s)?
     ☐ Yes ☐ No

   If yes: How?

   _____

   _____

   _____

4. How much time do you spend thinking about your defect(s) per day on average? (circle one)
   a) Less than 1 h a day
   b) 1–3 h a day
   c) More than 3 h a day

staff are increased dramatically. This worsens if the dissatisfied patient begins to threaten the physician with violence. Unchecked, the BDD patient often proceeds to litigation. Bodily harm and even murder of a surgeon are possible but an unlikely sequence. The following three cases , two patients I operated unwittingly on and another I reviewed for a colleague, demonstrate the diverse but disturbing sequelae of operating on patients with BDD.

18.8.1 Kate

Kate, a 20-year-old attractive white woman, presented for breast enlargement. Her request was for 600 ml as she claimed she wanted to become a Penthouse centerfold model. I acquiesced and provided a larger than normal DD result. Within 12 months, the patient requested even larger implants to 800 ml. The request was denied. She then wished to have facial enhancement, larger lips, cheek implants, rhinoplasty and laser resurfacing. What followed was a conservative rhinoplasty as well as a Terino shell silicone implant bilaterally and laser resurfacing. Initially, the patient was satisfied with the result but she began wearing huge sombrero-like hats and became extremely made up, using extreme amounts of make-up and lipstick. She soon requested another rhinoplasty saying she wanted her nose to be small and to look "operated upon." After I refused to reoperate, she ignored my counseling not to destroy a perfectly good surgical result and found a willing surgeon to operation on her nose. Her operated-on nose gave her a bizarre simian appearance with which she was ambivalent. Her interpersonal relations with older, married men and the suicide of a peer male boyfriend accompanied the unhappy consequences of her cosmetic surgery. I asked Kate if she thought she should never have started with cosmetic surgery and she concurred. Kate demonstrates the trap of repeated surgeries which eventually led to a deformity justifying her delusions of unattractiveness.

18.8.2 Brad

Brad, a 25-year-old male actor, presented for assessment of his nose, having previously had three rhinoplasties, two of which were performed by recognized rhinoplastic surgeons. Both surgeons and the original operator had refunded the patient the surgical fee after the patient became profoundly dissatisfied with their effort. There was a slight deformity of the dorsum of the nose and irregularity of the glabella owing to lack of infracture of the nasal bones confirmed by CAT scan. Multiple consultations followed along with communication with two of the previous surgeons.

The patient claimed that his acting career had been adversely affected by his nasal appearance. A conservative rhinoplasty was agreed upon and a slight modification of the dorsum and osteotomy to narrow the bony vault was carried out. Immediately, the patient was dissatisfied and would not hear that swelling was still present 6 weeks postoperatively. The patient returned repeatedly and brought with him a female partner from whom he regularly sought reassurance and confirmation of his distress and inability to work. He demanded a refund of his surgical fee. After refusing this initially, I referred the problem to my medical indemnity company, who after reviewing all documents and photographs recommended I not acquiesce to the patient's demands. On informing the patient of my indemnity company's decision, Brad reigned down a litany of abuse saying that he would get the surgeon (me) and was on his way to get his money. These threats were reported to local police, who contacted Brad advising him not to proceed with his threats and not to contact the office. I have not heard from the patient since, however, to my angst, I have been notified that Brad is a member of my local private tennis club and I am now not comfortable playing at that club. Brad illustrates how dissatisfaction occurs quickly after surgery and can become violent. It also points to the fact that male secondary rhinoplastic cases are of particular concern for BDD.

18.8.3 Janene

Janene's file was sent to me to review by the indemnity company of a colleague in another state of Australia. Preoperatively, the patient, a 41-year-old woman had a doll-like facial appearance. She was fastidiously attired, complained of wrinkles around her eyes, some crow's-feet and some excessive skin in her upper eyelids. The surgeon skilled at laser blepharoplasty suggested a modest removal of upper-lid skin and lower-lid laserbrasion of her wrinkles. The procedures were carried out without complications. At 3 months, there was no lag ophthalmia, minimal pigmentary changes and good elimination of the crow's-feet and lower-lid wrinkles. Janene was, however, profoundly dissatisfied, saying that her life had been ruined. She wrote a 25 page letter of complaint to the operating surgeon. She reported the surgeon to the State Medical Board and arrived at the surgeon's office on Christmas Eve demanding her clinical notes. The local police had to be summoned to remove her from the premises. Janene pursued her complaint through the Health Care Complaints Commission

and subsequently her case was heard and brought before the State Medical Board. A disciplinary hearing of the operating surgeon then ensued. This patient represents the "doll-like" perfectionist, obsessed with her appearance with no minimal deformity who is unwittingly operated on by a colleague.

18.9 Discussion

There is a paucity of plastic surgery literature regarding the psychosocial changes in patients who undergo cosmetic surgery [15]. We are aware that surgery will not affect a positive psychosocial change in patients with BDD. BDD is now recognized as a specific entity similar to how the public and medical profession viewed anorexia nervosa in the 1960s and 1970s and we recognize the treatment of the disorder as psychiatric and not surgical. Efforts to screen for BDDs are coming into our plastic surgery literature [2] but this is usually in a university-based setting rather than in an individual private practice [10, 16]. Awareness of the pitfalls of operating on patients with BDD alerts us to the possible adverse psychosocial pitfalls and operating on other patients with related somatoform disorders and, in particular, obese patients. Obese patients might maintain their victim status and be dissatisfied with the ever-increasing services offered to them, including large-volume liposuction and skin resection procedures after bariatric surgical stomach stapling. Whether interview technique or specific BDD testing is used to identify the potential BDD sufferer, the responsibility of the operating surgeon is to deny surgery. Dissatisfaction with a cosmetic surgery operation which falls short of a patient's expectations can lead to a legal judgment against the surgeon even if the objective result is satisfactory [8]. The legal profession has a penchant for compensation of "victims" and the BDD patient dissatisfied with surgery falls into the category of "victim." BDD unrecognized is no longer likely to be a satisfactory excuse for the incurred suffering of the postoperative patient. The social isolation, depression and loss of time from occupation by their fixation compounds the damages against the surgeon. BDD is firmly established as a psychiatric illness and it behooves us to recognize these patients before rather than after they have undergone surgery [4, 6].

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Examination

19

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The next step is diagnosis. We take at least an *en face* picture of the patient and, if possible, both profiles, to be able to analyse it together with the patient afterwards. Then the patient is turned towards a large mirror and we turn towards the patient's face. She/he explains which details are disturbing her/him. We now can explain what we can do and how. Incisions and especially the scar position should be explained in detail. Also, operative technique and changing the facial structures by pulling the skin should be demonstrated. Nowadays PC simulation of the possible result of the surgery in many clinics and offices in developed countries is a "conditio sine qua non", that means obligatory.

At the same time we examine the quality of the skin, its thickness, and mobility. If we have an idea of what else could improve the facial appearance of this particular patient, we ask her/him to propose it. Some patients are thankful for this, but some already have their prefabricated opinion of what they want to achieve and cannot follow our ideas. This is what we have to respect. The aim of anthropometric perfection of the plastic surgeon is not the deciding factor, but the wishes of the patient.

Anyhow, each and every face is unique, so we have to make an individualized plan of surgical and non-surgical measurements which we believe will promise the most effective improvement of our patient's face. It is advisable to list these points according to the effectiveness for this particular face from the most effective to the least effective ones, because it is financially different if we do just one or more operative steps. The patient who is not willing (or able) to pay for a composite treatment can choose the treatments which will bring her/him the most effectiveness.

When we then analyse the picture of the patient together with her/him, they are mostly astonished how they look on digital or Polaroid photographs which are fully illuminated, without shadows. This makes it easier to propose operative steps and plan the composite surgery together with the patient. Also it is very useful after weeks or months, when the patient has forgotten how he/she looked , to compare the preoperative and postoperative pictures. Then all doubts disappear.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 19.1. A photographic studio can be improvised with a demonstrating mirror in the corner of the consulting room, hidden behind a partition wall

20 Digital Photography and Computer Imaging

Luiz S. Toledo, Richard W. Dabb

20.1 Introduction

Plastic surgeons have an intimate relationship with photography. It has always been part of our practices for documenting our work, for educational and legal purposes. The digital revolution has completely changed our offices, our office budgets, our lectures and our profession. The first change came when we introduced computers into our practice.

The use of the new computer programs as a means of filing preoperative and postoperative photographs and postsurgical projection images is now widely used amongst plastic surgeons.

Digital photography was next. Use of celluloid might be ending and soon all image capturing will be digital. The digital storage of images is no longer a problem, the color is constant, the image does not deteriorate as traditional film does, and can be stored, reproduced and accessed easily and quickly. Presentations for congresses and patients have improved. We have witnessed the change from slide carrousels to digital presentations in our congresses.

People are usually resistant to change and many plastic surgeons are still afraid to enter the digital photography era. It takes time to learn and to adapt to a new technology. The same is true with surgical techniques. Surgeons who rarely change surgical techniques will probably be the last ones to buy a digital camera. Maybe they can buy one, but not use it in their practices.

Some questions arise: Should we replace our film cameras completely? Are we going to print out every photograph taken or just store them on the hard disk, printing just a few? Will the photographs be taken in a studio, an examining room, an operating room or by the bedside?

You will have to determine the quality of the camera you actually need, and what price range you can afford. Buy only what you really need! Of course it is good to have the best camera available, but how often will you use all of its features? If your main concern is image quality, your initial investment will be bigger than if you prefer ease of use. If you only need photographs for smaller prints, a lower-resolution camera will do.

You will want to pay only for the features that are most important to you. Some surgeons are more specialized in faces, others perform more body procedures. Will you need the camera for closeups or for body photographs? Probably both. We can photograph for documentation, to monitor a treatment or to alter the image during a patient consultation. Not every surgeon teaches or lectures. Some features might be unnecessary if you do not. Some surgeons photograph several cases per day, others only a couple of cases per week. You will have to think also about the recurring costs, such as the type and quality of prints. You can make your own prints, using self-developing instant film or you can email the digital images to a laboratory and have them delivered to your office. That will depend on the time available, if you have to take the prints to the operating room or only attach them to the patient's chart.

There is a wide variety of printers available:

- *Black and white laser printer*: They produce inexpensive grayscale prints suitable for many purposes.
- *Color laser printer*: A color laser printer offers a good speed and low per print costs. It is not the best choice for photography, but the results on plain paper can be impressive.
- *Inkjet Printer*: These inexpensive printers provide very good color prints. The print speed is very slow, but with special paper they can provide the best results.
- *Photo Printer*: Instant color film or photographic paper is used to produce true photographic output from digital files. Expensive.

Digital photography can save you money because you can capture and review images and print only the good ones. And the storage card can be erased and reused as soon as you transfer the images to the computer.

20.2 Computers

If you have computers in every room, patient data can be entered by front-office staff and images captured in photographic room or studio are available immediately in examining rooms. If you want to save money on your computer, the processor – CPU – is probably a good place to trim. You do not have to get the latest, fastest, because the difference between 1 and 2.3 GHz probably will not be noticeable. But you will need at least 512 MB of memory – RAM – or more for imaging. You will also need a high-capacity hard drive (120 GB or more) and probably another external hard drive to store images and for backup. Remember you can probably store about 1,000 images per gigabyte. You can also backup on CD-R or DVD and for this you will need a recorder. If you need to transfer photographs or lecture presentations to another computer you can do it with a CD-R or a Flashcard.

20.3 E-Labs

If you do not want to print the photographs yourself, most cities today have e-labs. You can email your files to an e-lab and receive the printed photos the next day by courier. Large files (up to 1 GB) can be sent to the laboratory via http://www.yousendit.com. Many laboratories already have their own Internet system on their Web site where you can upload your photographs.

20.4 Cameras

There are several cameras on the market. You will have to choose the one that best suits your interests. And it is probably better to have more than one. You might want to leave your office camera all set for the professional work and take another camera, usually a smaller one, with you to different places. Some examples of cameras are:

1. Sony Cyber-shot DSC-H1 (Fig. 20.1)
   - 5.1 megapixel CCD imager
   - Pop-up flash
   - Multipattern metering
   - Auto focus and manual exposure modes. Macro 2 cm
   - Wide-angle, telephoto, closeup
   - Sony lens 36–432 mm (35 mm equivalent) ×12 optical zoom, F2.8–F3.7
   - 2.5 in. LCD monitor
   - USB connection

Fig. 20.1. Sony Cyber-shot DSC-H1 with pop-up flash

Fig. 20.2. Fuji S2 digital SLR

   - Storage: Memory Stick/Memory Stick Pro
   - Sensitivity: ISO 100–400
   - Price range: US $500
2. Fuji S2 digital SLR (Fig. 20.2)
   - Six megapixel CCD
   - Popup flash. Flash Synch socket (X-type), accepts dual flash heads and studio lights.
   - Through-the-lens metering
   - 2 in. LCD display
   - Connection: Dual IEEE 1394 FireWire and USB interface for image transfer and computer-controlled shooting

- Macro Nikkor 60 mm. Auto focus and manual (macro 22 cm)
- Storage: Dual media slots for SmartMedia and Compact Flash type II
- Sensitivity: ISO 100–1,600
- Price range: US $3,000

20.4.1 The Importance of Lighting

Photography means the recording of light. Just by changing the position of the lights we can improve a patient's appearance. Images captured just minutes apart may seem like before and after pictures.

We can use different types of flash:

- Camera-mounted flash
- Built-in/pop-up flash
- External flash

For any camera-mounted flash, cast shadows are an issue. Red-eye can also be a problem although red-eye reduction is a standard feature on most cameras. Remember it is just a reduction, not removal. Keeping the flash away from the lens reduces instances of red-eye and often produces more attractive portraits. If you want maximum flash control, look for a camera that allows you to manually adjust its output too.

To eliminate red-eye use an external camera-mounted flash You will need a camera with either a hot shoe or a sync connection. It is important that the flash and camera be compatible so that the camera can not only trigger the flash, but also control the power as well. This allows for the use of automatic metering.

20.4.2 Types of Light Sources

20.4.2.1 Pop-Up Flash

Figure 20.3 shows a photograph taken with the flash located directly above the camera lens, so when the camera was held sideways for a vertical image the light was coming from the side and threw a very strong shadow behind the opposite side of the patient.

Figures 20.4 and 20.5 are two examples using an external camera-mounted flash system with dual flash heads. To give you an idea of the kind of control and flexibility you can get with an external flash, both of these images were captured using the same flash system.

In the first image, the two flash heads were positioned on either side of the camera lenses (Fig. 20.4). As we can see, the two light sources throw two shad-

Fig. 20.3. With the flash located directly above the camera lens when the camera was held sideways for a vertical image, the light coming from the side creates a very strong shadow behind the opposite side of the patient

Fig. 20.4. An example using an external camera-mounted flash system with dual flash heads. The two flash heads were positioned on either side of the camera lenses. As we can see, the two light sources throw two shadows behind the patient

Fig. 20.5. Another example using an external camera-mounted flash system with dual flash heads. Here the flash unit was rotated by 90°. We obtain two shadows, above the head and under the chin

ows behind the patient, but each shadow is softened somewhat by the opposing flash head.

In the second image, the flash unit was rotated by 90° (Fig. 20.5). When one of the heads was disabled, the result was a single light source positioned at the top of the frame, which throws a shadow that is mostly hidden behind the patient (Fig. 20.6).

20.4.2.2 Studio Strobes

Studio strobes may be equipped with large diffusers known as "soft boxes." The diffuse light produces diffuse shadows that are not especially distracting.

Studio strobe considerations:

- Flash sync connection
- Manual controls
- Sensitivity (ISO/ASA) and aperture range
- Low ISO numbers and large f numbers

For the image in Fig. 20.7, the patient was positioned about 1 ft in front of the backdrop. If you have enough space to move the patient farther away from the backdrop, you may be able to pretty much eliminate the cast shadows altogether. What has actually happened here is that the shadows have gotten so large and diffuse that they bleed out of the frame.

Fig. 20.6. By disabling one of the heads, one achieves a single light source positioned at the top of the frame, which throws a shadow that is mostly hidden behind the patient

Fig. 20.7. Studio strobes may be equipped with large diffusers known as "soft boxes." With the patient positioned about 1 ft in front of the backdrop, we can still see some shadows, but, by moving the patient 3 ft away from the backdrop, you may be able to pretty much eliminate the cast shadows altogether

20.4.2.3
Hot Lights (Video Lights)

A better option when using a point-and-shoot digital camera may be to use "hot" lights, so called because they are always on. Using a steady light source instead of strobes allows you to use the camera in program mode, which can greatly simplify things. Kinoflo is a special light for video and filming that combines two different light temperatures.

20.4.3
Lenses

You have probably learned that for facial photography you want to use a lens that is s somewhere around 100 mm. This provides the most natural appearance. If you use a lens that is too short, facial photographs will exhibit a "fisheye" effect.

What to look for in a lens:

- Quality
- Interchangeable?
- Zoom (none or manual, i.e., controlled focal length)
- Focus (manual and/or good auto)
- Focal length (35 mm equivalent)

20.4.4
Resolution

Resolution is somewhat analogous to film grain. If you capture one image using 100 speed film and another using 1,000 speed film (Figs. 20.8a, 20.9a), you might not notice much difference until you go to enlarge the two images. Then you would see that the 1,000 speed film is much grainier (Figs. 20.8b, 20.9b).

If we take a small area of each image and enlarge it, we see that the higher-resolution image contains much greater detail. Since we have enlarged a portion of the images, we are now looking at only 238,210 and 6,324 pixels, respectively. As you can see, this difference is noticeable.

How many pixels is enough? That depends on how your images will be used. Usually two million pixels is enough for our office work. This means you can select your camera on the basis of features other than resolution. Even if you do not base your decision on resolution, you may find that the camera you end up buying just happens to have a resolution of three or four megapixels or higher. After all, the average resolution is continuing to climb. But should you always capture images at the camera's maximum resolution? Most cameras let you select from several resolution settings.

Fig. 20.8. **a** Image resolution of 1,494 megapixels (4.1 MB). See also Fig.20.9a. **b** If we take a small area of the image and enlarge it we see that the higher-resolution image contains much greater detail (cf. Fig. 20.9b). Since we have enlarged a portion of the image, we are now looking at only 238,210 pixels (56 KB).

Today most cameras vary from 1.3 to ten megapixels. The key is knowing what you need from your photos. For photographs of size 8 in.×10 in. or larger, a camera with at least three megapixels is a necessity. For photograph sizes such as 3 in.×5 in. or 4 in.×6 in. you find great results and lower prices in the one to two megapixel class. It does not hurt to have more megapixels than you need, as it leaves room to grow. Just remember to shoot at a higher resolution.

Fig. 20.9. **a** The resolution of the image in Fig. 20.8a has been reduced from 1,494 megapixels (4.1 MB) to 381 megapixels (172 KB). Viewed in this manner, the two images are indistinguishable. **b** If we take a small area of the image and enlarge it we see that the higher-resolution image contains much greater detail (cf. Fig. 20.8b). Since we have enlarged a portion of the image, we are now looking at only 6,324 pixels (4 KB). As you can see, this difference is noticeable

The following is a list of resolution/size examples:

- Web: 300×400=120,000 pixels
- Projector: 1024×768=786,432 pixels
- High-resolution monitor: 1,600×1,200=1.92 megapixels
- Inkjet (8 in.×10 in. at 150 lines per inch): 1,200×1,500=1.8 megapixels
- Journal (4 in.×5 in. at 300 lines per inch): 1,200×1,500=1.8 megapixels

Digital cameras come in all shapes and sizes. While there are some very small digital cameras on the market that produce beautiful photos, their petite size cannot physically house all the features consumers want. Keep in mind that while your neighbor has a digital camera that will fit in his pocket, your need for a ×10 optical zoom or an external flash calls for an average to larger-size camera. If a small camera tops your list of important features, be aware that you may be sacrificing other features.

Now even if you do not need six million pixels you might want to have a camera that offer this. But there are higher costs of high resolution. Higher resolution leads to larger files that take up more storage space, require more RAM and may slow down many systems. Unless you have a specific reason for capturing extremely high resolution images, we recommend capturing images at a resolution of two million to three million pixels.

It does not matter how many images the camera can store because of removable storage media that allow you to transfer the images to a computer and reuse the memory card. Images are a part of the patient record. They need to be transferred to a hard drive or network server that is backed up on a regular basis.

20.4.5 Memory Cards

The type of memory card used by the camera is another factor to consider. If you want your camera for traveling, a higher-capacity memory card is very handy for storing photos until you can download them to a computer. If you use a camera at work or frequently carry it with you, you may want a more durable card. Compact Flash memory cards are currently the most popular type of memory card on the market because of their durability and the wide range of storage they offer (from 16 MB to 1 GB). There are more cameras on the market today that accept Compact Flash memory cards than any other type of memory, which means that you have more choices in cameras, memory cards and card readers.

20.4.6 Card Readers

You have just finished taking pictures. Now you need to get them into your computer. There are two ways to make that happen: attaching your camera directly to the computer (also known as tethering) or using a memory card reader.

Card readers are available for all popular memory card types, including Compact Flash, SmartMedia, Sony Memory Stick, and more. USB is the most common type of card reader interface, and for good rea-

son: most computers include at least one USB connection port, and USB card readers provide good transfer speeds.

Some computers – laptops, in particular – come with slots that accept cards directly into the computer or via a PC card adapter. These features essentially function in the same way a card reader does.

Some cameras accept IEEE 1394 FireWire and USB interfaces for image transfer and computer-controlled shooting. With this feature, the image can be captured directly by the imaging software. The software will also regulate the camera settings and standardize them for every area of the body to be photographed.

20.4.7 Battery

Make sure the camera you select accepts rechargeable batteries. A good camera takes roughly 100 photographs with a single charge. Always have two or three recharged batteries for when you have to photograph in different places.

20.4.8 Image Sensor

The image sensor captures the intensity of light. To capture color images, the individual sensor elements are filtered to respond to the red, blue or green components of the incoming light. This means there three images are actually captured and combined to create one color image. So a two million pixel image is actually made up of two million red pixels, two million green pixels and two million blue pixels. Each of these pixels takes up 1 B of memory when the image is open.

To calculate image size, we simply multiply the image resolution by 3.

20.4.9 Storage Capacity

The image size is the amount of data contained in an image and the file size is the amount of storage space consumed by an image file. File size is related to image size, but the two are not necessarily equal.

File size is also expressed in bytes, but it is a measure of how much space an image file takes up when it is saved to a storage card or disk.

If we want to figure out how many two million pixel images we can store on an 8 MB Compact Flash card, we start by calculating image size – in the case of the two million pixel example, 6 MB. Without compression we could store only one image, but a 6 MB file with 1:8 JPEG compression is reduced to 0.75 MB. So we can fit about ten images on the 8 MB card.

Fig. 20.10. **a** JPEG compression: this 2 MB image may be saved as a 1.2 MB (Fig 20.11a), or a 172 KB (Fig 20.12a) JPEG image. Looking at these images like this, we find it pretty difficult to see any difference. **b** When we enlarge the aggressively compressed image, we can see a difference (cf. Figs. 20.11b, 20.12b)

We can safely compress images to about one tenth of their original size with no noticeable difference in quality. Maybe even to as much as 1/20, but beyond that we can notice the degradation.

Fig. 20.11. **a** JPEG compression: 1.2 MB JPEG image compressed from a 2 MB image (Fig. 20.10a). **b** When we enlarge the aggressively compressed image, we can see a difference (cf. Figs. 20.10b, 20.12b)

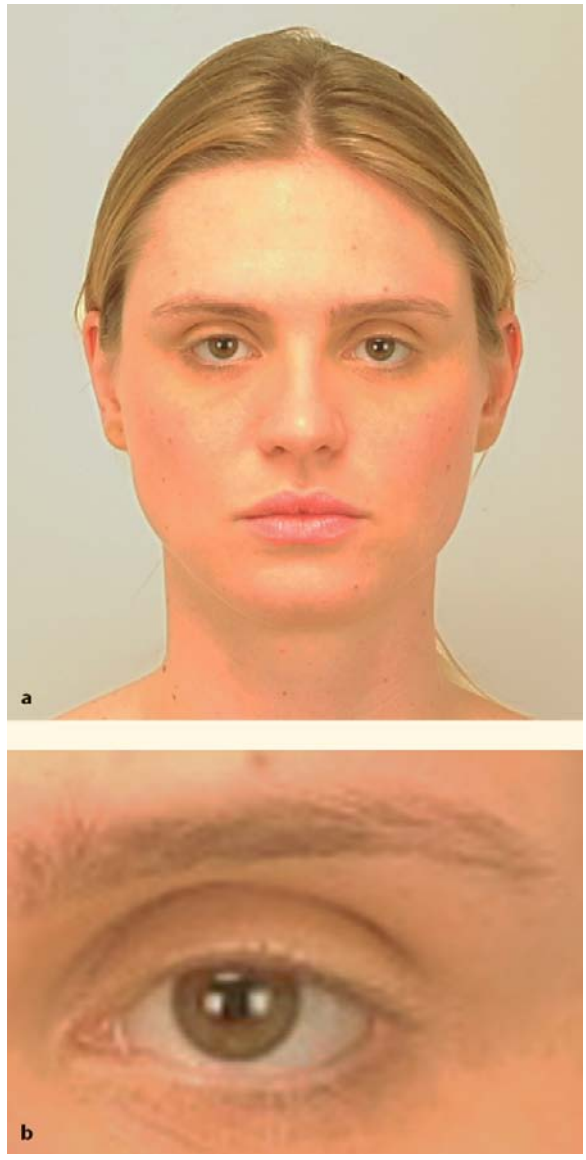

Fig. 20.12. **a** JPEG compression: 172 KB JPEG image compressed from a 2 MB image (Fig. 20.10a). **b** When we enlarge the aggressively compressed image, we can see a difference (cf. Figs. 20.10b, 20.11b)

For example, the 2 MB image in Fig. 20.10a) may be saved as a 1.2 MB JPEG image (Fig. 20.11a) or a 172 KB JPEG image (Fig. 20.12a). Looking at these images like this, we find it pretty difficult to see any difference, but when we look at the aggressively compressed image, however, we can see a difference (Figs. 20.10b, 20.11b, 20.12b.

20.5 Computer Imaging

When deciding on an imaging software for your practice, make sure you get software that allows you to perform as efficiently as possible. It should be quick and easy to get images from a digital camera, assign

Fig. 20.13. Simulation with the mirror-image software. *Left* preoperative state, *center* simulated result and *right* 1 year after rhinoplasty and chin augmentation

them to a patient, tag them with data and find the images when you need them. To compare images you may find that software designed specifically for the medical field offers a big advantage over a generic image management program. Medical-specific software makes it easier to perform these basic functions: image adjustment, annotation, presentations, simulation (Fig. 20.13) and printing.

The accuracy of computer imaging is 80% [1]. This means that surgeons and patients agreed that the value of prediction was about 80%.

When we use computer imaging for the preparation of surgical procedures and their predictability, the final results prove to be comparable with those programmed, particularly in the case of rhinoplasty and liposuction.

The following is a list of computer imaging software considerations:

- Will you use the software in front of patients?
- Will you use the software on a network?
- Who will support the software?
- Is training available?

Most patients think computer imaging should be a routine part of preoperative evaluation [2]. Before-and-after photographs have long been used to demonstrate to patients the effects of aesthetic surgery. Computer imaging can keep patient expectations realistic and lead to a truly informed consent [3].

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Dermography

21

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It is possible to make drawings on the skin with special water-resistant felt pens. We have learned to use drawings in liposuction in different body areas because fat tissue has a different arrangement and form when we stand or lie. Also the face has a different shape when we are standing, lying on the back, or if we are in a forward prone position. As we grow older the changes will be more and more obvious.

In breast surgery, we make drawings and markings when we plan surgery with the patient in the standing position. We know that the position of the breast is in front of a woman when she stands or sits. Both breasts flow to the lateral chest wall when the woman lies on her back. These changes also increase with advanced age.

Fig. 21.1. **a** Forward prone position – simulated face appearance in 10 years. **b** Lying on the back – simulated facial appearance after facelift

Fig. 21.2. **a** Immediately before surgery, in front of a mirror – planning of surgery and dermographic markings. **b** Marking of supratrochlear and supraorbital nerves (17 and 27 mm lateral of the midline) before endoscopic forehead lift

Fig. 21.3. **a** Dermographic blue markings of incisions, vectors of superficial musculo-aponeurotic system (*SMAS*) and skin traction, SMAS-plication line (*black line*), and superficial nerve branches, lateral cheek dimple to be augmented (*green*). **b** Vector arrows, incisions, and superficial nerve branches

Analogous to this methodology, it would be an advantage if we use felt pens for markings in the standing position when planning facial surgeries. Everybody judges herself/himself when standing or sitting, not in a lying or in a prone position. This is the best way to draw the vectors of traction which we intend to apply onto facial structures. Topographic points could be marked as well as incision lines and dangerous areas where the nerve branches are exposed.

We can surround the areas where we will apply liposuction in the head and neck or mark the structures where we want to add some volume by autologous fat micrografting. We are advised to mark asymmetric structures to correct them in a proper way during the surgery. In the middle of the neck, we can mark the midline to check our symmetric work in the neck areas. For instance, if we start with face–neck-lift on the right side, when we have finished it our midline will deviate to the right. When we have completed the left side, our marking should be in the midposition again.

When doing prosopoplasty, we often correct more facial "mosaic stones " and not only the facelift. After a couple of hours of surgery, we are not in danger of forgetting some of operative steps we agreed upon with the patient before surgery. Or the mistake will not befall us that happened to a poor Danish surgeon in Berlin. The patient was astonished after surgery that his upper eyelids had been operated on, and not as he wanted, the lower eyelids. All happened in front of running cameras. The TV audience was not enthu-

Fig. 21.4. **a** Asymmetry of nasal skeleton and chin marking where the hump of the nose is to be implanted. **b** Forehead nerve branches (*green*) and areas for microlipografting (*blue*)

Fig. 21.5. **a** Vectors of traction (*black arrows*), incision lines, crow's-feet, areas for microlipofilling (*blue*), frontal and marginal branch of facial nerve, and supraorbital and supratrochlear nerves (*red lines*). **b** Nose corrections and areas for microlipofilling (*blue*), microliposuction (*black*), larynx projection (*red*)

Fig. 21.6. **a** Skin incisions and vectors and microlipofilling areas (*blue*), SMAS vectors (*black*). **b** The same patient 2 weeks postoperatively. **c** Her left side with *dotted blue lines* for frontal and marginal branches of the facial nerve

siastic about this forgetfulness! With pre-existing drawings, such mishaps cannot happen.

Psychologically it is also good that the patient realizes the precision with which the surgeon prepares the surgery. This is the moment when the patient, standing in front of a mirror, can articulate his/her wishes and additional suggestions, or ask the last questions. Some patients call these drawings "Indian war colours" or some sort of "Aboriginal art". Anyhow, they also help the surgeon to recapitulate his/her surgical concept for this particular patient and to focus his/her mind on the upcoming surgery.

We use an Edding 3000 permanent marker, which is available in Germany. We recommend blue, black, and green. A red colour is not as visible on the skin as the other ones.

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Please see the general bibliography at the end of this book.

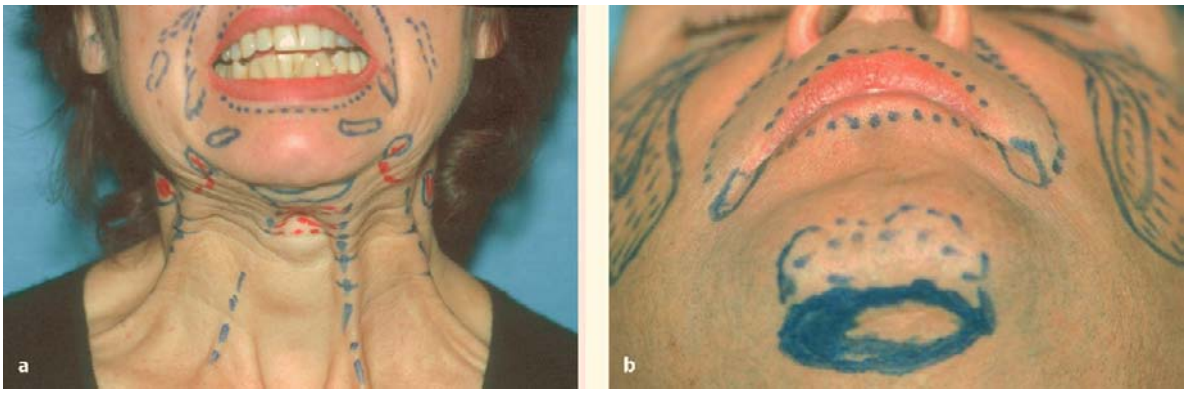

Fig. 21.7. **a** Microlipofilling in lower face and platysma bands of the neck: the upper part to be corrected by corseting, the lower part by notching. **b** Bottom view of a male face with submental witch's chin correction, autologous microlipofilling, nose correction, and mini-facelift

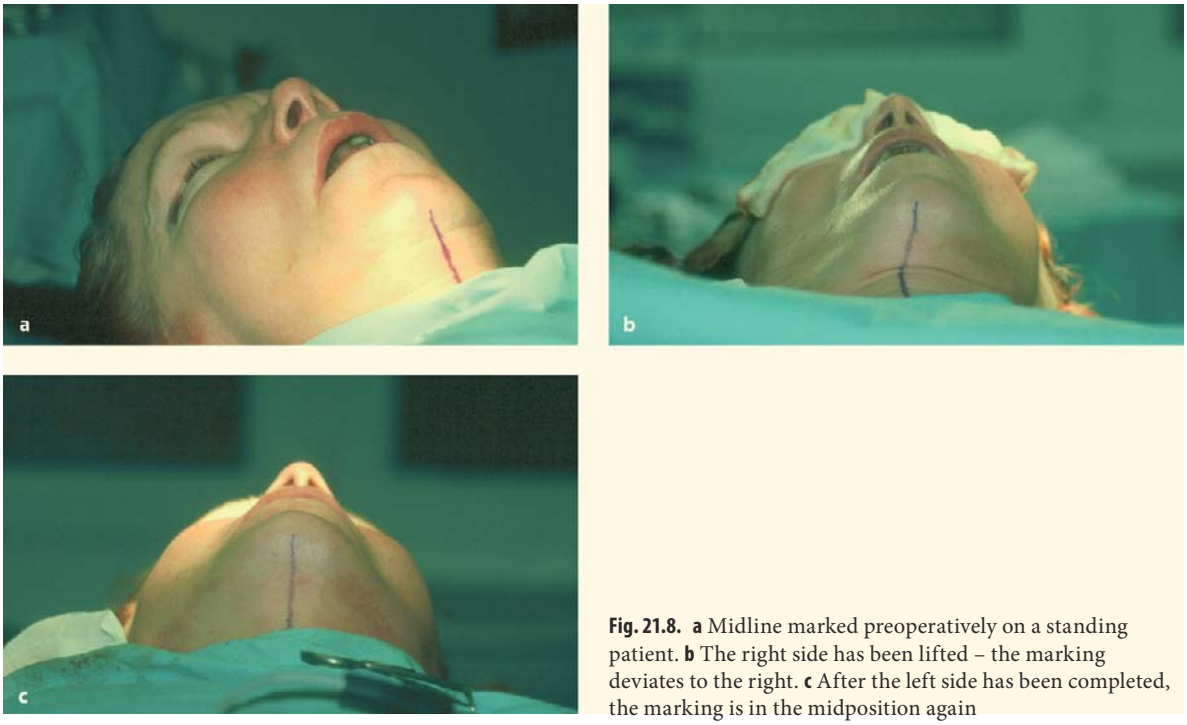

Fig. 21.8. **a** Midline marked preoperatively on a standing patient. **b** The right side has been lifted – the marking deviates to the right. **c** After the left side has been completed, the marking is in the midposition again

Operating Room

22

Dimitrije E. Panfilov

The operating room is the "heart" of any surgical clinic. As we deal with physically healthy patients, the possible risks should be reduced to a minimum. Nosocomial infections should be avoided and such clinics should in the optimal situation only be used for plastic surgery and aesthetic–cosmetic operations. Surgical specialities which deal with inflammatory and septical indications, like abdominal surgery and proctology, do not match the extreme need for aseptic work we require.

The operating room should be spacious, at least 25 m^2, bright, allowing direct optical impression of outward climate and natural light sources. This is important for the members of the operating team and their positive motivation, which is not so high if they work in artificially illuminated spaces. Air conditioning is necessary, especially if implantations and transplantations are to be performed. Reducing microbiological contamination is also the aim of air conditioning, with especially high standards required in some countries. Special glass should hinder any observer from outside from looking into the operating theatre. The average temperature inside should range between 18 and 22 °C.

There should be separated and isolated space for disinfection of hands for surgeons and assistants, liquid soap, and a disinfector container should be activated with the elbow and water flow should be started automatically through hand movement or with a lever arm or foot pedal. The entrance door into the theatre should have a bull's-eye window and should be hermetically closed and activated with an electric switch. There should be three separated areas adjoining the operating area: changing and dressing room for staff, entrance separated from the exit for patients, and the third area for instruments ending in the sterilization room (if possible with two sterilizers: a quicker, smaller one and a bigger one with digitalized data). Each of those three areas should not cross each other.

The walls and floor should be tiled. In some countries it is allowed for there to be a silicon sheet covering to enable easy and complete cleaning and disinfection. Plugs have to be at least 120 cm above the floor. If possible, one wall might have an image of a smooth water surface or some scenery of water life with fish and plants but without too much colourful accentuation. It has been found that electroencepha-

Fig. 22.1. How should we do a facelift operation – standing or sitting? We prefer the sitting position, which allows comfortable operative action

Fig. 22.2. The operating room should have facilities for teaching workshops with video and audio transmission to the audience, or just to record surgeries for video archives

lographs show the lowest waves if human beings look at water, because all life, ontogenetically and philogenetically, comes out of the water. Such images will additionally calm down our patients, which is psychologically very important.

Does music have its place in the operating theatre? Many surgeons of the older generation will answer negatively. This is certainly a justifiable point of view in the case of unusual operations or emergency surgery, or when undesired complications might be expected. When the patient is struggling between life and death or when the anaesthetist needs to assess the function of lung and heart with a stethoscope, music is out of place.

When scheduled operations are being performed for which the entire surgical staff is well adjusted to working together and all the phases of the operation are well mastered by all the members of the operating team, then carefully chosen and correctly dosed music can most certainly help in the quest for perfection.

Music is nowadays used for the treatment of various disorders. Books are available on the market containing CDs such as *The Musical Medicine Cupboard*, *Musical Psychotherapy*, and *Health Through Music*.

Music by Bach, Vivaldi, Tchaikovsky, and Mozart has a particularly inspiring effect during aesthetic operations. Some pieces by Sarasate, Grieg, or de Falla are an excellent supplement to the atmosphere in the operating theatre. I also operate to the sounds of compositions by Chopin, to the Spanish guitar, or to the only and unique violin concerto in D major by Beethoven. It does not appear impossible that Chopin's nocturnes, Boccherini's minuet, Toselli's serenade, or Strauss's waltzes can penetrate into the fingertips of a plastic surgeon and help create a more beautiful and harmonious result.

Apart from classical music, the musical background is also excellently supplemented by instrumental music featuring the saxophone, clarinet, and piano – even the violinists Zacharias, Mantovani, or Grapelli. Heavy metal or hard rock would do more harm than it would be of use. It would be interesting to conduct research into which type of music patients would choose for their operations. In our private clinic Nefertiti in Bonn, Germany, we have asked in our questionnaire given to the patients preoperatively which of six kinds of music the patients would prefer to have played during their surgery. The top answers by far were classical and instrumental music.

Bibliography

Please see the general bibliography at the end of this book.

Local Anesthesia for Facial Surgery

23

A. Aldo Mottura

23.1 Introduction

Local anesthesia has been used in facial cosmetic surgery for decades [1–4]. The anesthetic drugs allow operating without general anesthesia; the addition of bupivacaine gives some hours of postoperative pain relief; adrenaline produces vasoconstriction for some hours and a profuse infiltration separates the planes of dissection, thus facilitating the surgery. For local anesthesia, light or deep sedation is always necessary. For this kind of anesthesia, four steps should be considered [5].

23.2 Selection of the Patient

There are both calm and relaxed patients and very nervous ones. This last kind of patient is conflictive and needs a different preparation and possibly a deeper sedation. Smokers, alcoholics, hypertensive patients and tranquilizer users have their hepatic metabolism accelerated and will probably need a different plan for sedation [6].

23.3 Sedation

To bring a patient to the operating room in the optimal condition, an appropriate preparation should be followed. There are calm and relaxed individuals who need less care, while others need sedation for some days before surgery. But it is extremely important that the patient has a relaxing sleep the night before. When patients have had a bad night, adrenaline is secreted and they enter the surgery not totally relaxed [7].

There are two methods of sedation. The patient can be superficially sedated and the surgeon or the anesthesiologist can have verbal contact with the patient or, in contrast, the patient is operated on under deep sedation. In the former case, when the patient wakes up adrenaline is secreted; therefore, the blood pressure and the hepatic metabolism of the drugs administrated increase. Then more or repetitive sedation should be administered and vasoconstriction does not last long.

When the patient is under deep sedation, breathing spontaneously, the blood pressure remains low and so does the hepatic metabolism of drugs. Under deep sedation, the patient can have problems with the airways, because the neck tilts, and the tongue relaxes and obstructs the pharynges. In some cases, an oral or pharyngeal tube is needed. As oxygen is administrated through a nasal tube, it has to be moved from the frontal area to the neck when each area is approached.

The association of midazolan–fentanyl is the best combination to keep the patient asleep. Midazolan should be administered in a small bolus so that no respiratory depression arises. Fentanyl should be administered before the infiltration. When the surgery lasts for some hours, complementary ketorolac injections help to keep the patient free of positional pains.

One hour before surgery, complementary sedation with propofol helps a prompt postoperative recovery [8]. Nausea and vomiting should be prevented during surgery by administering metoclopramide or ondasestron, because after surgery these are undesirable effects.

Sedation can be conducted by an anesthesiologist, by a well-trained nurse or by a technician. The last two can keep the patient under control during surgery but the anesthesiologist manages a wider range of drugs and options. In the case of an anesthetic problem, the anesthesiologist has more possibilities to reverse it and the surgeon is legally better protected.

23.4 Anesthetic Drugs

Lidocaine is a very old and safe anesthetic drug that allows 90 min of numbness. Its standard dose is 7 g/kg, or 25 ml of 2% lidocaine (500 mg) for a 70 kg person, but it is known that this dose can be augmented many times; some papers mention about

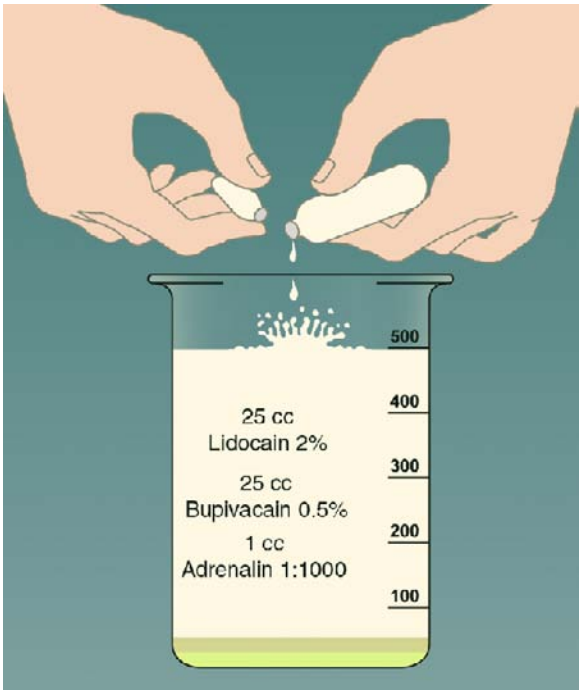

Fig. 23.1. Five hundred anesthetic solutions are prepared

seven times the maximum recommended dose [9] (Fig. 23.1).

Bupivacaine is a long-lasting anesthetic that is largely used in block anesthesia. Its dose is 1.25 mg/kg, 25 ml of 0.50% bupivacaine for a 70 kg person and its action lasts 6 h.

The standard concentration of adrenaline is 1:1,000 and it can be diluted in 100 or 500 ml, obtaining a dilution of 1:100,000 to 1:500,000 [10]. This drug's vasoconstrictive action lasts 5–7 h and causes brief side effects like tachycardia and hypertension.

If the patient is awake and the surgeon needs to neutralize the acid anesthetic solution, then the addition of bicarbonate is indicated. If the patient is under deep sedation, bicarbonate is unnecessary.

For a coronal lift, I use approximately 200 ml, for a facelift 150 ml and for the neck 150 ml depending on the size of the head and neck of each patient.

23.5 Technique of Infiltration

The infiltration should begin with a very fine needle, injecting slowly, because rapid distension of tissues is painful. Once the skin has been anesthetized, the fine needle is changed for a longer one or for a cannula. The inner side of an Abbocatt no. 16 or a spinal needle are also very useful.

In general, I infiltrate the whole forehead, face and neck at the beginning of the surgery. This way, when the second or third region is approached, it already has an appropriate vasoconstriction. The infiltration is begun at the facial region where the surgeon will first start. If the surgeon begins at the forehead, this area is infiltrated first.

I start with the face and, in general, I infiltrate 1–2 cm outside the whole marked area of the face and neck, because the dissection can cross the premarked limits. In the central part of the neck, I infiltrate the skin and the posterior aspect of the central fat so as to facilitate its dissection [11, 12].

With use of 200 ml of the same solution, the scalp is infiltrated first with a long needle in the hypodermis underneath the incision line and 2 cm behind the marked line, and deep into the frontal muscle or into the galea. Then I infiltrate the forehead, in the subgaleal plane up to the orbital rim and the nasal dorsum

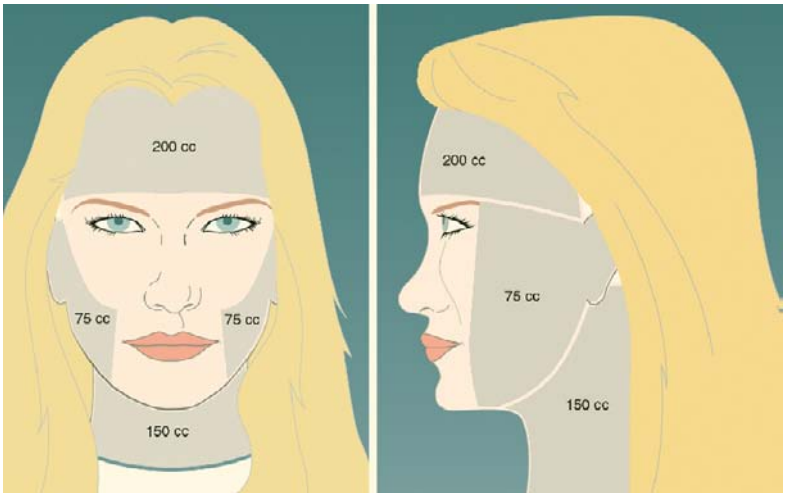

Fig. 23.2. Distribution of the infiltration for a forehead–face–neck-lift

to assure a better vasoconstrictive effect of the plane to be undermined (Fig. 23.2).

When I finish the infiltration, 15 min has already elapsed and I can start surgery on the region that was firstly infiltrated. I usually begin with the face and then go on with the neck. Before the superficial musculo-aponeurotic system dissection, I infiltrate this plane for vasoconstriction and for hydraulic dissection and separation of the planes. The whole surgery takes me 3–4 h. I never have to reinject while I am finishing with the sutures.

A pale color of the skin shows a well-infiltrated area, while an island of reddish skin means an area that has not been infiltrated, such as often happens in postacne scarred skin.

When I have already dissected one side of the face and neck, I introduce two compresses under the skin and I go to the contralateral side, where I repeat the procedure. Then I come back to the first side and I remove the compress slowly while doing the coagulation of the vessels.

23.6 Discussion

I have more than 25 years' experience using local anesthesia for facelift. At the beginning of my practice, I personally did the sedation using a premedication with morphine–prometazine–atropine, but postoperative recovery was not fast. Then I used valium–ketamine, but later changed to midazolan–fentanyl. For 10 years ago I have had an anesthesiologist in each surgery and he combines midazolan–propofol–fentanyl according to the case. He also uses flumazenyl to wake up the patient at the end of the surgery. Using metoclopramide and ondasestron, I have a rate of less than 10% postoperative vomiting.

The argument that after using adrenaline there is a vasodilatation is against the experience of most of facial surgeons. Bleeding does not occur because after some hours of vasoconstriction, the sealing of the sectioned arteries and veins and the clot of the intravascular coagulation are firm.

It is often heard that surgeons say they use a tumescent infiltration in the face and neck. As the tumescence is massive, tense, or hard like a ball infiltration and this does not happen on the face and neck, the use of the term tumescence is totally inappropriate for this surgery.

The doses of anesthetic drugs are well tolerated when used much diluted. Big faces and heads need a greater amount of infiltration, while small ones need less. Hydraulic distension of local anesthetics reduces the bleeding and facilitates the undermining.

I routinely use bupivacaine, which gives 3–4 h pain relief after surgery. I have not had a single problem with this drug in my experience of more than 3,000 aesthetic surgeries.

23.7 Conclusions

Local anesthesia and deep sedation is a good combination for ambulatory surgery. With local anesthesia, there is no intubation and a low rate of vomiting. With bupivacaine, there are some hours of postoperative pain relief. The cost of anesthesia is also lower.

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24 Operative Instruments

Dimitrije E. Panfilov

Every surgeon is used to using certain instruments which he/she learned to work with during his/her training. Worldwide there are very competent manufacturers of surgical instruments, and facial plastic surgery is constantly developing. New ideas are growing and arising with every new generation of plastic surgeons.

For each surgery a fundamental set of instruments should be packed into special containers and very common instruments are separately packed as single packages to be available if needed for replacement as well as such instruments which we do not use routinely.

Tuttlingen in southern Germany has several firms specializing in the manufacture of special instruments and equipment for medical purposes. In the past, the ironsmiths used to go to Paris to learn the high art of ironwork and then returned to Tuttlingen. When visiting these factories one just cannot help admiring the precision and care put into the honing of these instruments to the highest degree of perfection. My preferred company is Medicon, which has a specialized department for plastic surgery and a catalogue with set suggestions for different cosmetic surgeries.

The instruments in Figs. 24.2–24.10 are just a personal suggestion of mine, without claim to general acceptance. This is a sample of what could be recommended. During main meetings many booths are rented by instrument manufacturers and plastic surgeons frequently visit them and try the handling of new tools.

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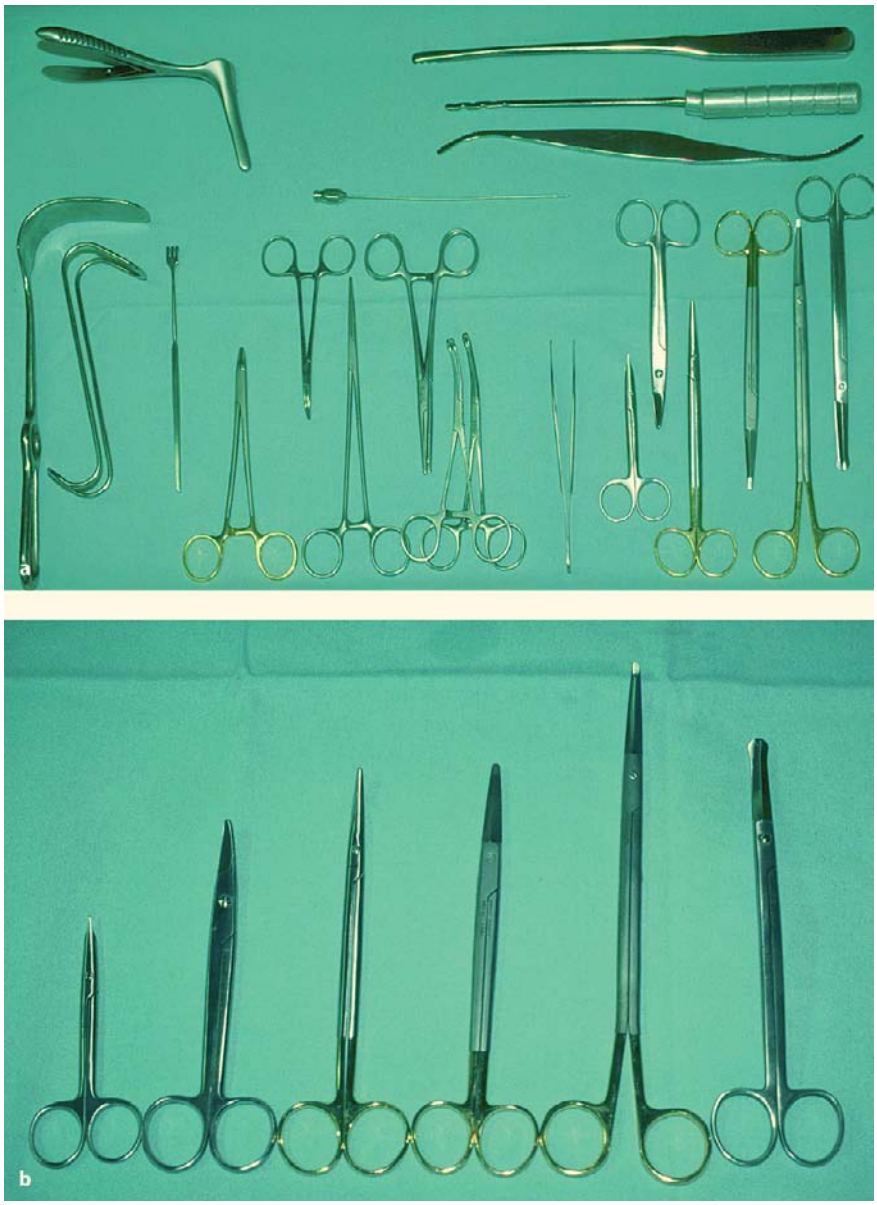

Fig. 24.1. **a** Set of instruments for routine facelift used by the author. **b** Preferred scissors: Stevens, Castañares, Metzenbaum, Gorney, Gorney–Long, Rees

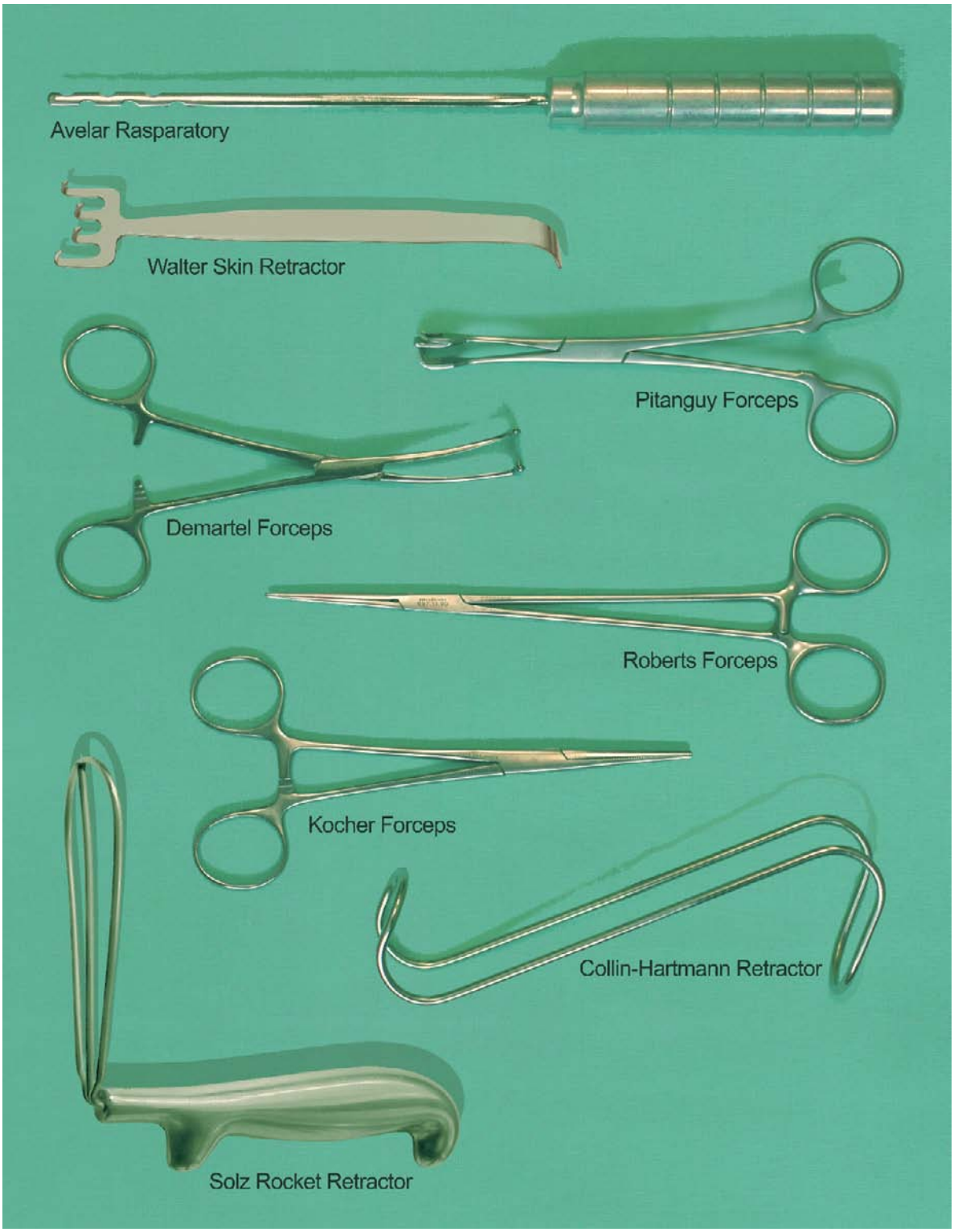

Fig. 24.2. Instruments for facelift

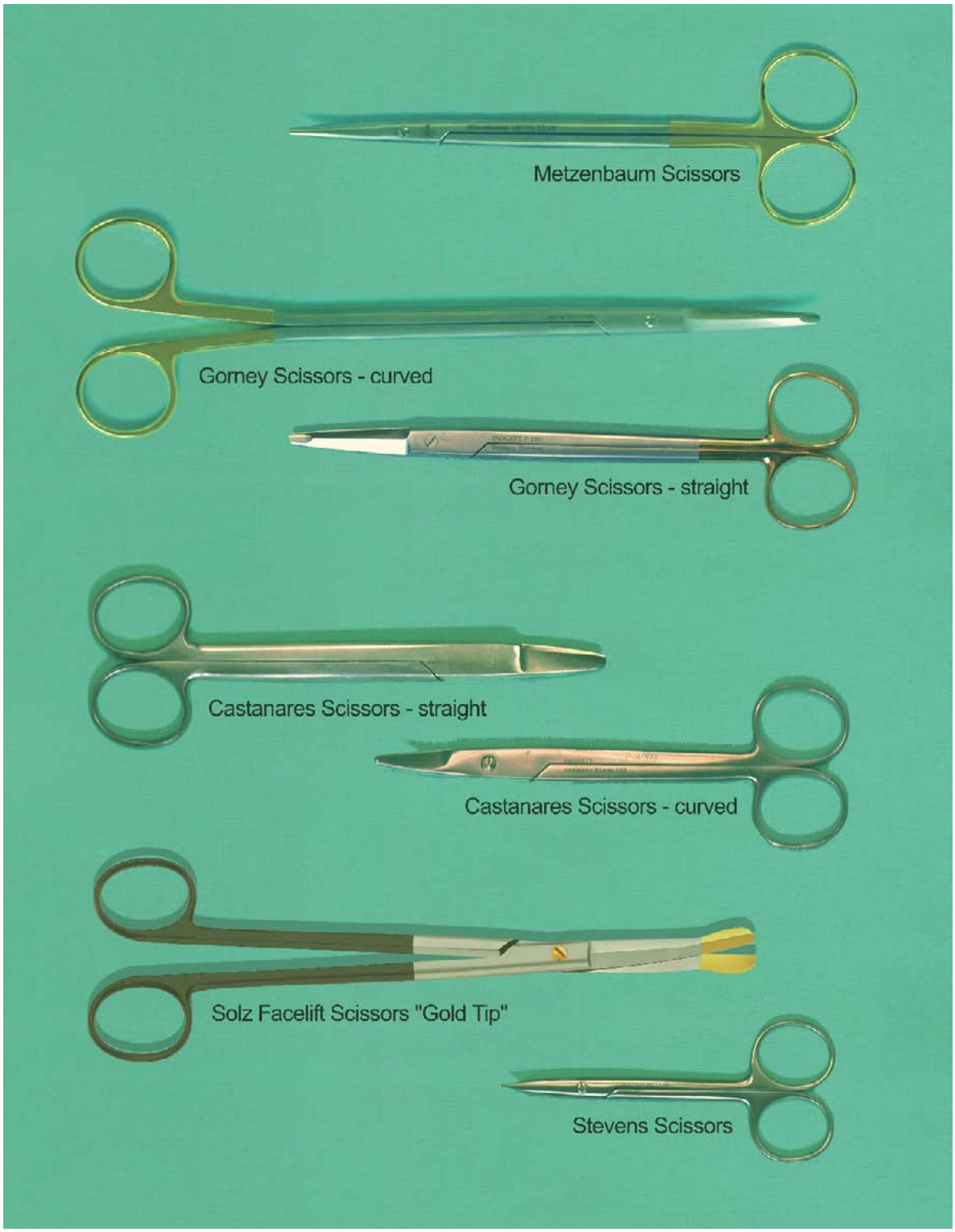

Fig. 24.3. Instruments for facelift

Fig. 24.4. Instruments for facelift

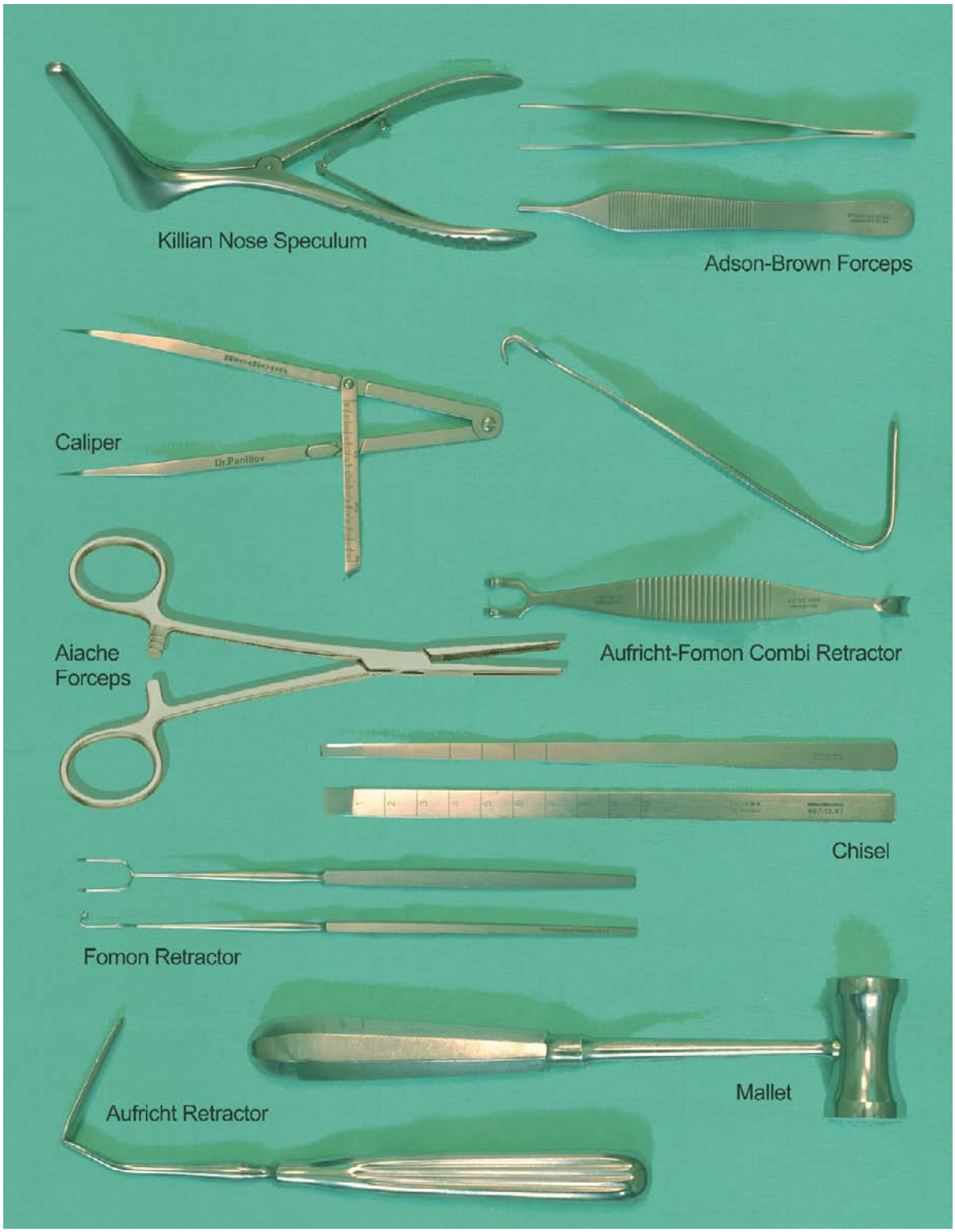

Fig. 24.5. Instruments for rhinoplasty

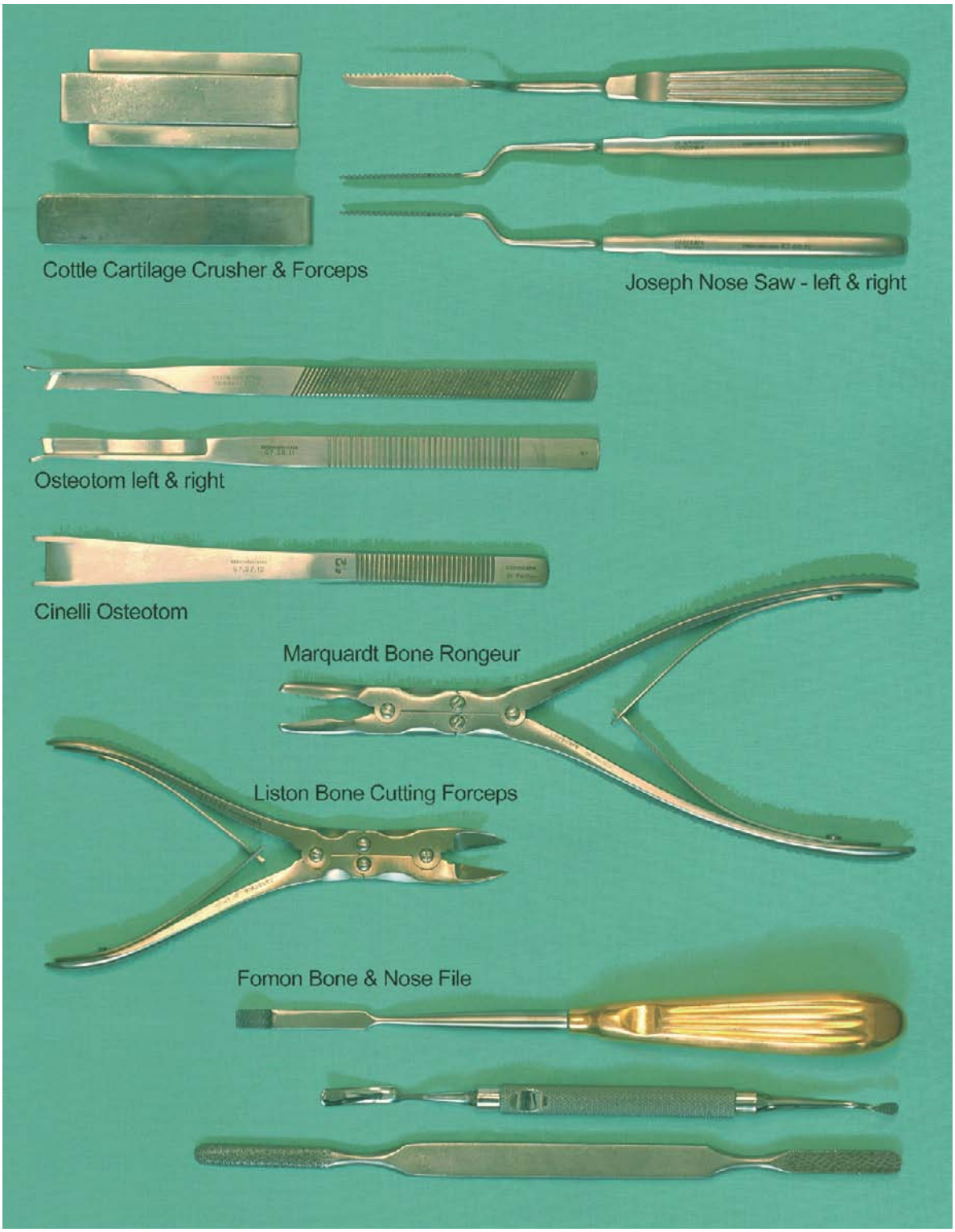

Fig. 24.6. Instruments for rhinoplasty

Fig. 24.7. Instruments for blepharoplasty

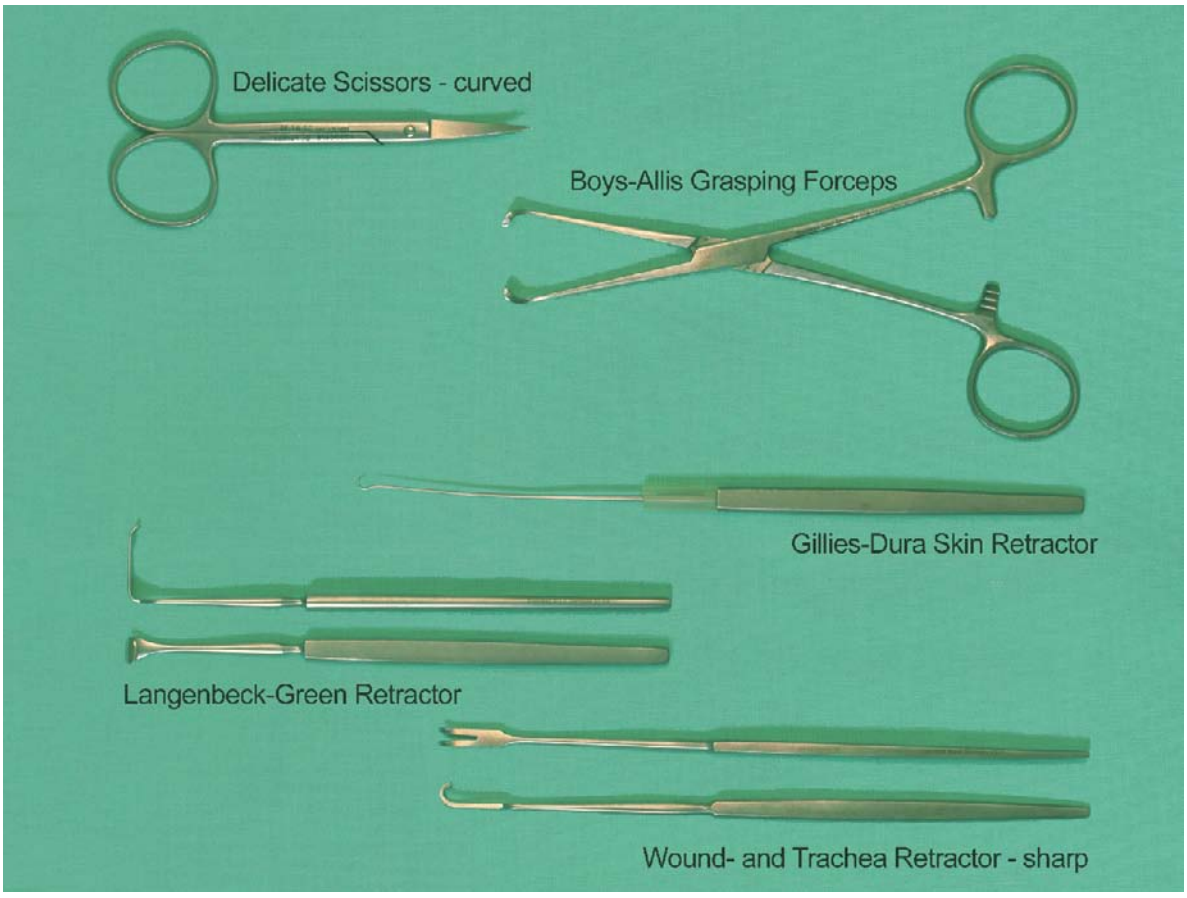

Fig. 24.8. Instruments for otoplasty

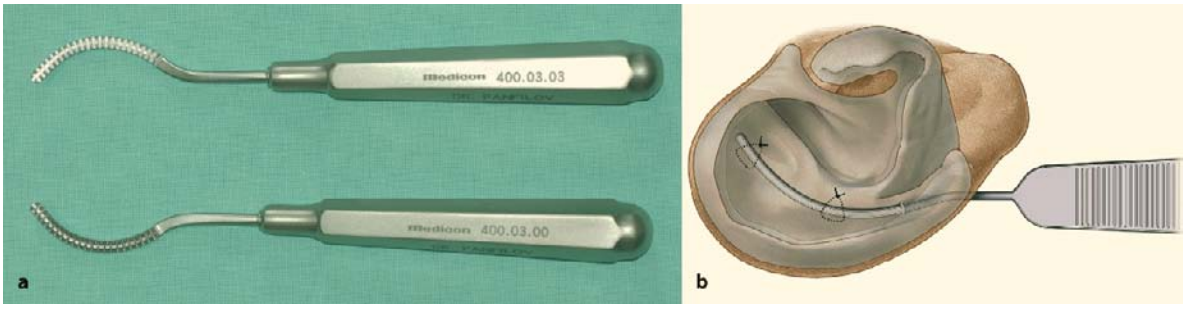

Fig. 24.9. **a** Author's antihelix file. **b** Author's file in action

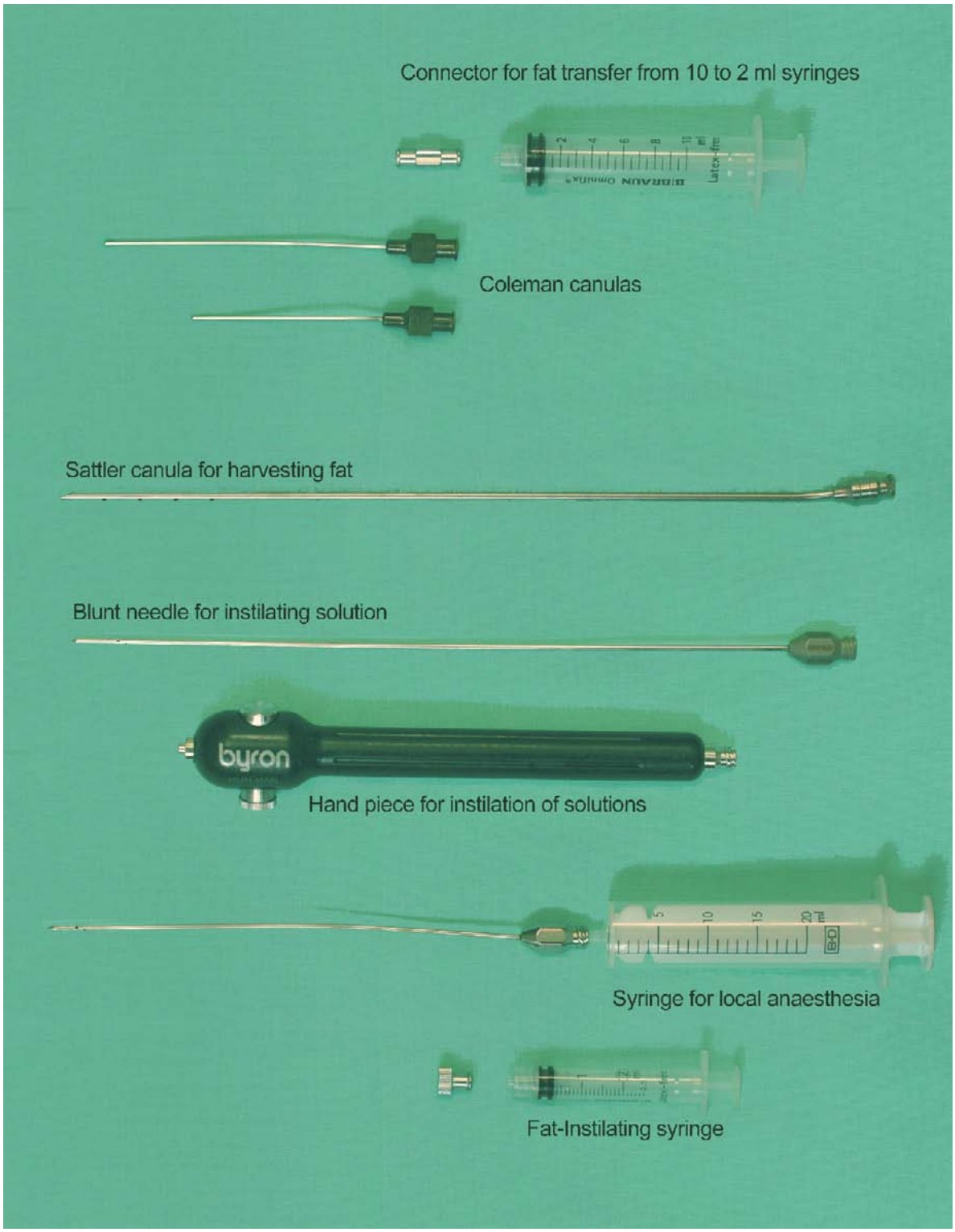

Fig. 24.10. Instruments for autologous fat transfer

25 High-Tech Equipment

Dimitrije E. Panfilov

Developments in the fields of technology and chemistry and other scientific achievements have brought some magnificent advances. Quite a number of operative procedures which were unthinkable only a short time ago have now become routine work.

Today we have sources of heat at our disposal to "spot-weld" even the smallest vessels. Manufacturers supply us with different electrocoagulators. They provide various options ranging from bloodless cutting to coagulating and are a great help when operating inasmuch as they allow precise and speedy haemostasis. Because they produce extra heat, they are not the first choice when cutting the skin – they may produce burns of wound edges with prolonged wound healing.

Light sources are very important for properly distinguishing tissue elements from each other during the operation. Operating lights are becoming increasingly better. Head lamps are also available which follow the movements of the surgeon's head and line of vision, as well as cold-light sources with flexible cables which can be introduced into the body's interior.

Nowadays we have microcameras with their own light source with a diameter of 4 or even 2.7 mm. For endoscopic surgery, a few, barely 1-cm-long, incisions are made through which probes are inserted, which in turn direct light sources, miniature video cameras, and instruments to the actual site of the operation. This requires some degree of rethinking. Usually the surgeon's attention is concentrated on the operating field of the patient while operating. During endoscopic surgery, however, the surgeon has to look at a monitor on to which an enlarged image of the operative procedure is displayed. Much has become possible in aesthetic facial surgery today using endoscopic surgery. The forehead lifting should be a routine endoscopic procedure in modern offices. Once a surgeon is used to it, the surgeon will find ways to access the deeper layers of the midface to achieve astonishing results through minimal skin incisions. Several invited co-authors explain this technique in their guest chapters.

Laser technology is one of the great achievements of our time and enjoys a wide variety of uses in medicine. It uses a bundled ray of light with the following characteristics: single-coloured (monochromaticity), synchronous oscillation (coherence), and high emittance. So much energy, intensity, and precision was hitherto unknown. The mechanism of the effect has three components:

1. Coagulation (clotting)
2. Carbonization (charring)
3. Vaporization

Fig. 25.1. High-tech on the operating table: suction cannula, cold light, radiosurgery "pen", electrocoagulatory forceps

Particularly the first and third components are desired and utilized in medicine.

The core of a laser is the resonator. Here the light ray is generated and transmitted via a system of mirrors to the site where the photochemical effect is needed. Different wavelengths result in different colours. A distinction is made between several types of laser: argon laser, CO_2 laser, helium–neon laser, neodymium–YAG laser, excimer laser, etc. The spectrum ranges from simple "soft-laser" systems, which produce hardly more than an irritation and general toning of the skin, to the ultrapulse laser, with a computer-controlled scatter effect. Admittedly, an overdose cannot always be ruled out, even with the latest and most expensive system, also referred to as a resurfacing laser.

Unlike when using the cold or electric knife, eye–hand–foot coordination is required when lasering. All those present must wear protective glasses and the assistant holds an air aspirator ready to draw off the evaporations. Surgeons have their "sights" on the operating field, the laser handle with the infrared light maker in their hand, and their foot over the release pedal. They have to focus their concentration on the target site. Any cloths in the vicinity should be kept as moist as possible, otherwise swabs and strips of tulle gras would easily ignite.

It is also possible to learn this technically most demanding form of therapy with "practice runs". Countless apples, oranges, and grapefruits serve as "guinea pigs".

Very good results can be achieved with the laser, provided that these three components are optimal:

1. A well-defined indication
2. A well-chosen device
3. A well-trained surgeon

With a laser one can cut, coagulate, and remove small tumours, Tattoos and port-wine stains react well to laser therapy. Care should be taken with pigmented moles, however: a very experienced diagnostician must first dispel any final suspicion of a malignant pigmented tumour – malignant melanoma.

Not only the latest ultrapulse resurfacing CO_2 laser is capable of removing the most superficial layer of skin. The principle is the same as with the already known methods of dermabrasion or peeling. Industry sometimes invests vast sums in advertising campaigns, however, so that the impression is forced upon people that the laser is a universal remedy. Blind trust in technology takes on its strongest form when it comes to laser technology. Of course, excellent results can be also achieved with lasers for the removal of superficial wrinkles, but the patients must be very well selected and the doses optimally adjusted. See the special chapters on this by Ashok Gupta (Chap. 70) and Carlos Oscar Nebel (Chap. 71).

Bibliography

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26 Radiofrequency Surgery as a Refinement in Aesthetic Surgery

Dimitrije E. Panfilov

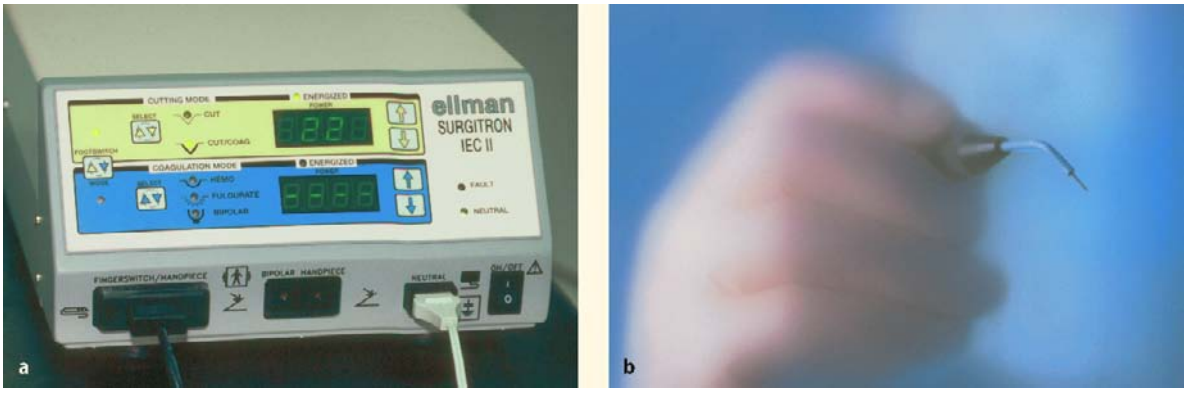

Fig. 26.1. **a** Radiofrequency generator. **b** Radiofrequency "pen" allows maximal precision

There is a need for absolutely precise incisions in many areas of aesthetic surgery. It is also most important to have the option of dry, bloodless incision lines and to avoid pressure of the blade on the skin, allowing it to be divided "by touch". Both of these prerequisites are fulfilled with radiofrequency surgery using a frequency of 4 MHz. It is also useful if the same device is able to coagulate blood vessels.

Ellman International of New York markets patented radiowave instruments and has effectively redefined the significance of radiosurgery, particularly its use in cosmetic surgery. For the experienced operating surgeon, its advantage over all the alternative techniques, such as scalpel, laser, or electrosurgery, is indisputable.

Reduced heat production produces faster healing and lower postoperative discomfort. The aesthetic surgeon is able to make an accurate incision, without applying pressure and without the tissue being pulled; much the same way as an artist wields an ink pen while drawing. The radiowave incisions both improve haemostasis and are antibacterial. Histologic tissue samples are not distorted by artefacts, as is the case with electrosurgery and laser surgery. Scar formation is optimal and superior to all other procedures (scalpel, laser, etc.).

We use this high-tech tool for blepharoplasties, facelifts, direct excisions in facial surgery, nostrils and lip commissures, neck incisions, and in all locations where a high degree of precision is required.

Fig. 26.2. "Bull's-horn" incision with radiofrequency treatment

Radiosurgery is used predominantly in aesthetic facial surgery where surgical techniques cannot be applied with the same degree of precision or they are not as straightforward as radiowave surgery. When making an incision, the skin is simply touched by the electrode; it is 100% precise, and there is no tissue warping. The instrument's hand piece is similar to a penholder. Surgery with lasers, on the other hand, is complicated, imprecise, and associated with pro-

longed wound healing owing to denaturation of the wound edges from the effects of extreme heat, which is an unsatisfactory compromise for the advantage of minimizing intraoperative bleeding. In contrast to radiowaves, the conventional scalpel cuts under application of pressure and pulling, which is an imprecise incision technique for soft tissues such as eyelid skin; the scalpel does also not provide simultaneous haemostasis.

Other operations such as rhinophyma treatment, endoscopic browlift, hair transplant, and tumour removal will benefit from 4.0 MHz radiosurgery, as would many major surgical interventions such as breast surgery, dermolipectomy, abdominal plastic surgery, and vein surgery. A particular issue is the minimal scar tissue formation. At times we are even able to make some scars invisible.

The benefit of radiosurgery for cosmetic surgery lies in its superior results and the ease of the method, establishing it as a valuable aid. Although work with radiowaves requires operative skill and most importantly a steady hand, any surgeon new to this technique need not fear lengthy training or an extended learning curve. Like other high-tech tools, radiosurgery enables us to achieve detail improvement of our operations and softer scarring.

Bibliography

Please see the general bibliography at the end of this book.

27 Successful Office–Clinic Management: Organization of a Beauty Clinic

Ana Zulmira Diniz Badin

27.1 Introduction

The idea of organizing a clinic is certainly fascinating and captivating. However, not only the organizational aspect must be analyzed but the whole context, which includes motivation and favorable and unfavorable conditions.

The size of the physical structure and the team, what to offer, the organizational structure, maintenance and continuity at long term must also be taken into consideration.

The doctor himself/herself is not an entrepreneur and at the moment the clinic has been set up the focus changes completely, with more of the doctor's time being absorbed by administrative matters.

27.2 Motivation

The very first topic to be analyzed is the motivation which leads to this investment (Table 27.1). There are several reasons, such as the need to concentrate work with all its surgical volume in only one place, thus providing time-saving since it will not be necessary to move from hospital to hospital in different parts of the city. Beyond that, the ideal environment for the plastic surgery and its associated services provides a differential in attending, with refinement and details.

Furthermore, the environment where only plastic surgeries are performed avoids both contamination and the possibility of hospital infection. The reduction of hospital costs owing to its smaller structure will also provide a greater viability of surgeries, increasing the work potential.

The idea of a clinic as a highly profitable business involves a concept of association among professionals with larger structures and this is not what we want to take into consideration.

Table 27.1. Motivation

Concentrating all the work in just one place
Associated services, differentiated attending
Minor risk concerning contamination and hospital infection
Reduction in cost
Profit

27.3 Favorable Conditions

When taking over the organization of your own clinic, you can idealize it according to your concept and professional experience, making it functional, practical, fitting it to your specific needs taking into consideration the way the patient would like to be treated. In other words, personalizing the service of the clinic to our way of being.

Surgeries become more viable with the reduction of costs. There are more vacancies for admitting patients as well as free schedules in the operating rooms and that not only tranquilizes but also makes the doctor's job much easier. Concerning cases of infection, they will present much less danger than those arising in hospital.

27.4 Unfavorable Conditions

The responsibility one takes over on setting up a clinic is not evident at first. It is extremely important that this aspect be analyzed as not only the medical responsibility but also the surgeon's responsibility is at stake. The responsibility is an entity which is connected to the medical responsibility.

The preoccupation with the patient goes beyond the surgical act, involving each organizational detail of the entity, such as employees, equipment, materials, and security. In the case of juridical actions both the doctor and the entity have to take responsibility for them.

The financial aspect has to be taken into consideration concerning the building of a clinic since there is the planning of the physical construction, the purchase of equipment and decoration. Not less important is the maintenance of all this structure, employees, and replacement of equipment and materials on an uninterrupted basis.

27.5 Name of the Institution

If the institution is a private clinic it can be named after the professional; however, a fantasy name disentails the entity from the professional mainly if there are more doctors or other professionals. The designation of the name of the clinic must create a connection between the beauty and the professionalism it intends to offer. Strong names with an aesthetic connotation highlight and give an impact to the brand, such as Nefertiti and Athena, among others.

27.6 Physical Structure

The physical structure must involve all the sectors of the clinic: the arranging of the appointments, the surgical act itself, the immediate recovery, rooms, and supporting services and associated services.

27.6.1 Offices

A space for appointments can be used by one or more professionals of the same specialty or other correlated specialties. It must offer a reception as well as waiting room(s), taking into consideration a proper place for the surgical returns, especially the ones which involve the face so that the patients operated on will not feel embarrassed, neither will the new patients.

According to the volume of work, several attending rooms are advisable for they facilitate the flux of the postsurgical returns, diminishing the waiting time and the patient will receive basic attention from the nurse.

The room for the first appointment can be larger and better decorated, while the return rooms can be more functional. The circulation among the rooms must be restricted to the doctors and their team (Fig. 27.1).

27.6.2 Hospitable Environment

27.6.2.1 Reception

The reception must be exclusive to the hospitable area, not involving the offices. It must have a healthy and clean aspect and it can be formed by several ambient facilities, such as gardens, a television area and some kind of service, such as coffee and water, in order to ease the waiting time (Fig. 27.2).

Fig. 27.1. Doctor's office

Fig. 27.2. **a** Reception. **b** Special and agreeable waiting rooms

A special room (a VIP room) is important for special people or for face surgeries, so the patient can have a more private experience

27.6.2.2 Operating Room

The number of rooms must be in proportion to the intended surgical flux and the number of professionals involved. The physical structure of the number of the rooms must be super-dimensioned so that it will not become precociously insufficient. Plastic surgery has the particularity of presenting the time of finishing as a moment of refinement. That is why it takes so long.

Since the hygiene and cleaning of the room between surgeries as well as the anesthesia procedure take time, more rooms enable us to proceed faster to the following surgeries.

As the surgeon spends a great deal of his/her time on surgical procedures both his/her mental and emotional quality of life must be taken into consideration. The rooms must be large, with windows which permit interaction with nature, preserving his/her emotional balance and keeping him/her in contact with the environment: sun, rain, sky, greenery, etc. Subtle details which preserve sensibility and balance are so very important and necessary in our specialty (Fig. 27.3).

Fig. 27.3. Operating room keeping the surgeon in contact with the environment

Fig. 27.4. Doctor's room

26.6.2.3
The Doctor's Room

Just like the operating room, the doctor's room must be cozy. It does not have to be large, but should be pleasant. This room provides the surgeon with a place to rest and recompose himself/herself (Fig. 27.4).

27.6.2.4
Recovering

The number of beds must also be in proportion to the number of rooms and the surgical flux. They also have to be super-dimensioned. They must have equipment to control the recovery of the patient after anesthesia (Fig. 27.5).

Structures correlated to the operating rooms, such as the sterilization area, pharmacy, storehouse and the area for the cleaning material, must be structured on the basis of a practical and functional flux.

27.6.2.5
Hospitalization
(Individual Apartments and Day Apartments)

Apartments or suites must be designed with refinement as they are the places where the patient and his/her family will be most of the time. The day apartments are designed for surgeries that do not demand hospitalization, such as blepharoplasty, minor liposuctions, rhinoplasties, mammaplasty and retouch-

Fig. 27.5. Recovery room

Fig. 27.6. **a** Day apartment. **b** –Suite

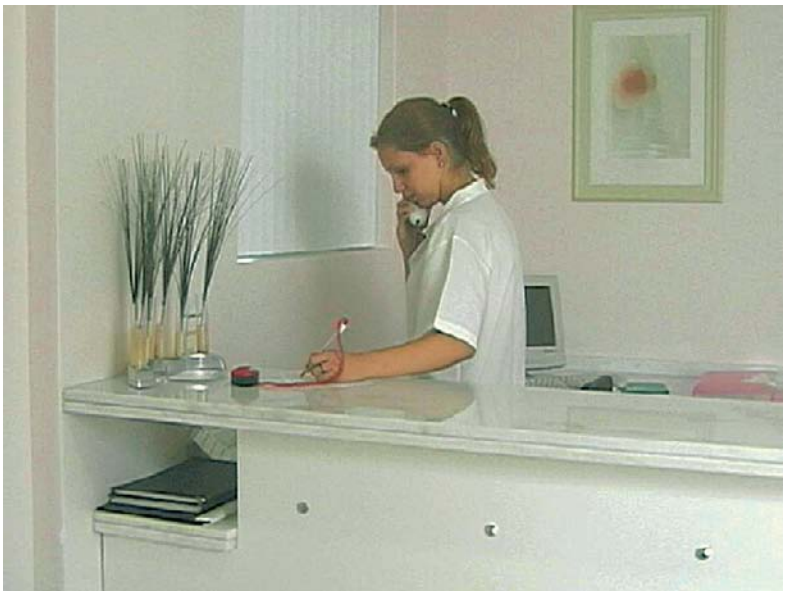

Fig. 27.7. Nurse's place

ing. They are furnished with more beds for observing the patient after he/she leaves the recovering area of the operating room. In this area a snack can be served so that the anesthesiological criterion can be analyzed in order to release the patient at the end of the day.

This kind of accommodation where the patient stays for a very short period reduces the costs of the procedure and provides us with security on releasing the patient who is recovering perfectly. Not to mention the fast turnover for the clinic (Fig 27.6).

The nurse's place can be only one, that is, they can attend both the day apartments as well as the other apartments (Fig. 27.7).

27.6.2.6 Support Services

Support services can be used depending on the cost–benefit to the clinic. They are kitchen, laundry, blood bank and clinical laboratory. Rooms must be allocated for storage, distribution and general maintenance.

27.7 Organizational Structure

In the organizational structure all the functional and administrative hierarchy can be found and differs according to the country (Fig. 27.8).

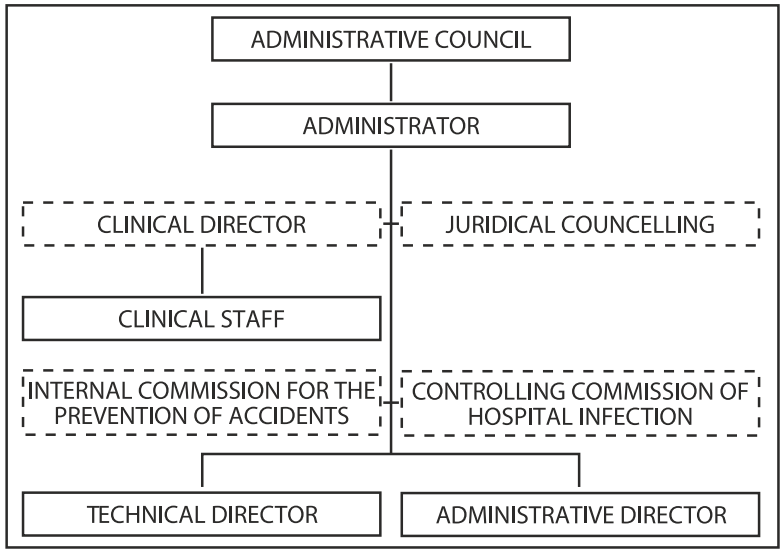

Fig. 27.8. Minimum organogram of a day clinic in Brazil

27.8 Associated Services

27.8.1 Aesthetic Physiotherapy

Other services complement the structure of a plastic surgery clinic. One of the most frequently used is the service of aesthetic physiotherapy, which involves the postsurgical lymphatic drainage, of maintenance and facial aesthetics.

Specialized professionals and in agreement with medical indications execute a specific complementary job clarifying doubts and anxieties of patients. During the preoperative period, services such as relaxing, massage and Reiki can be used (Fig. 27.9).

27.8.2 Laser Therapy

Ambulatory lasers complement aesthetics treatments such as removal of spots, hair, tattoos, vascular lesions and facial rejuvenation.

Our clinic, The Institute of Laser Treatment – Intralaser – uses lasers for all these treatments, assembling professional dermatologists, plastic surgeons, vascular surgeons and pediatricians. In the case of high-tech equipment, the group of professionals collaborate on the costs of purchasing and maintaining and optimizing the usage of gadgets, avoiding underuse (Fig. 27.10).

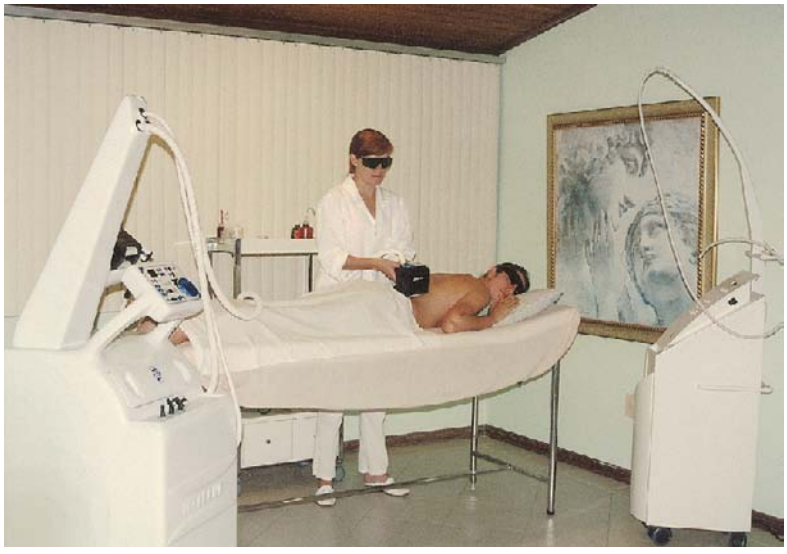

Fig. 27.9. Aesthetic physiotherapy

Fig. 27.10. Laser service

27.8.3 Spa

The spa permits both pre- and postoperative use, with the uses being most different : day spa, with internment or even health insurance with mediator spas.

27.8.4 Marketing

When the structure is functioning properly, marketing has an extremely important role for the dream to come true. Several different methods can be applied; however, the most important one is client satisfaction, which nowadays makes all the difference. Businesses multiply, technology develops, health professionals specialize more and more and the client chooses the one who makes the best offer and has the best conditions.

Advertising can be used; however, it must be ethical, subtle and not abusive. A Web site on the Internet as an important tool and it must be used in order to market the clinic, its services and professionals.

Particularly in our clinic we use folders which show the different procedures and a 3 monthly magazine which divulges new techniques and technologies, surgical procedures, dermatological and other correlated specialties. It always presents these in an informative, educational manner, without any sensationalism, taking into consideration its own name *Ethics and Aesthetics*.

The magazine presents information that is easy and agreeable reading, and it is of great help since the patient arrives at our offices aware of the basic notions and their correct procedures, without the distortions of the media in general (Fig. 27.11).

Fig. 27.11. Marketing – magazine and folders

27.9 The Charm of the Athena Clinic

The Athena Clinic offers different facilities, such as office services, clinic, aesthetic physiotherapy and a laser center (Intralaser), in a structure today called Centro Médico Athena (Medical Center Athena). (Fig. 27.12).

It offers all kinds of plastic surgeries, including microsurgery, but facial rejuvenation minimally invasive surgery is the "most important one" performed by the clinic.

With the description of the videoendoscopic technique in 2001 in *Aesthetic Plastic Surgery* with temporal access to the medial and inferior face, associated with frontal endoscopy and/or a laser, facial rejuvenation has been the most requested surgery in our clinic (Figs 27.13, 27.14).

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Fig. 27.12. The Athena Clinic

Fig. 27.13. **a** Preoperative facial rejuvenation. **b** Postoperative forehead and midface lift plus laser CO_2 resurfacing.

Fig. 27.14. **a** Pre- and postoperative conventional face lift. **b** Pre- and postoperative forehead and midface lift

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Part III
Harmonizing Facial Mosaic Stones

Forehead

28

Dimitrije E. Panfilov

The upper third of the face is limited by the hairline above and the eyebrows below. The most powerful muscles, innervated by fronto-temporal branches of n. facialis, are m. frontalis and mm. corrugatores supercilii. The hyperaction of frontalis ingraves the horizontal "wrinkles of concentration" and corrugators produce vertical glabellar "wrinkles of anger" or "worry wrinkles".

The superficial wrinkles can be treated by peeling (mechanical dermabrasion, chemical abrasion, laser abrasion, or by radiofrequency treatment) through permanent or nonpermanent skin-fillers or by Botox, the huge popularity of which some 3–4 years ago has diminished for two reasons. First, its measurable effect lasts only 8 weeks; second, faces with a china surface have no mimetic expressions. Autologous fat transfer into the lower two thirds of the face is very successful but is less effective in the forehead, probably because of strong tension of the skin in this region.

In the last 10 years I only twice did a classic forehead lift with preferably ciliar incisions. The majority of foreheads were treated by endoscopic forehead lift.

If two or more forehead wrinkles are very deep, they can be excised, well adapted, and sutured in two layers very carefully. After a while, the scar will look like a single wrinkle.

Thanks to endoscopic technology, we are now able to lift the forehead through three to five incisions of 1–2 cm length. The light source and the microcamera have a diameter of 4 or even 2.7 mm and on monitor we see anatomical structures magnified 10 times.

Endofrontal lift is almost always associated with temporal lift, which can also be performed isolated. Temporal excision should be made in a prolonged line from the nostril to the lateral canthus.

The medial part of the forehead can be reached through a T-incision. Caudal preparation with a less or more curved rasparatorium follows in the subperiostal layer, backwards on the scalp in the subgaleal layer. After weakening of frontal muscle, the occipital muscle produces more tension through the galea. Proceeding forward and caudal with the rasparatorium, we reach the level of the eyebrows. Here we need a horizontal complete uninterrupted section of the periosteum from the left end of left eyebrow to the right end of the right eyebrow. This is easy to perform with the rasparatorium turned opposite to the bone curvature.

Care should be taken of the nn. supratrochleares, which arise 17 mm lateral of the midline, and the nn. supraorbitales, which are 27 mm away from the midline, as Lopez from New York found after cadaveric studies. This distances are constant. Knowing this,

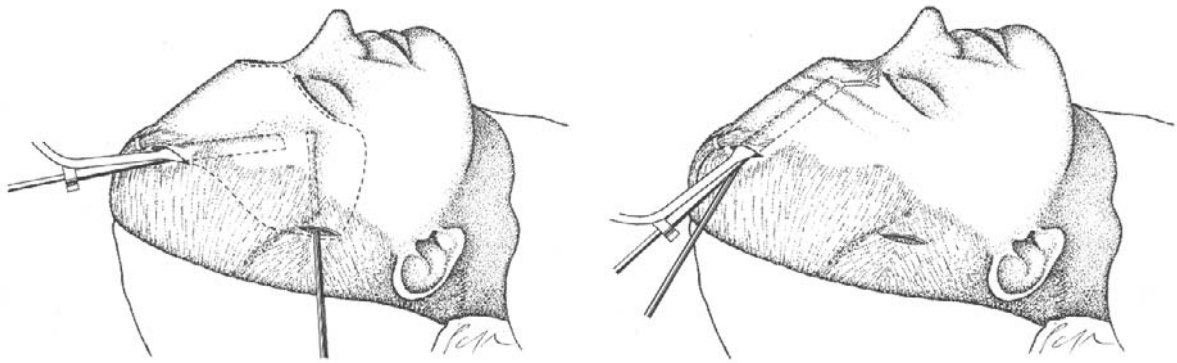

Fig. 28.1. Endoscopic forehead lift

Fig. 28.2. **a** Chemical peeling. **b** Laser peeling. **c** Botox

we can do endo-forehead lift without an endoscope. We would not recommend this, unless the operating surgeon has done many endoscopic surgeries before. An endoscopic muscle-grasper is very useful for removing corrugator and procerus muscle fibres.

For fixation we use neither metal nor resorbable screws. From inside we apply fibrin glue, pull the skin manually, and keep this position for 3 min and close the V incision, temporal incisions, and eventually two more minimal incisions, if needed as an entrance for instruments, with stapled clamps.

The outside fixation starts with suture strips as paper stitching plaster to keep the eyebrows elevated, starting from the midline. Thereafter the adhesive bandages are applied in the same manner and should remain for 8 days. Removal should be done starting from the eyebrows and pulling backwards.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 28.3. **a** Zigzag incision allows an inconspicuous suture line. **b** Exposed frontal bone and the m. procerus and mm. corrugators supercilii. **c** Suture line at the end of the surgery. The same patient **d** before and **e** 2 weeks after surgery

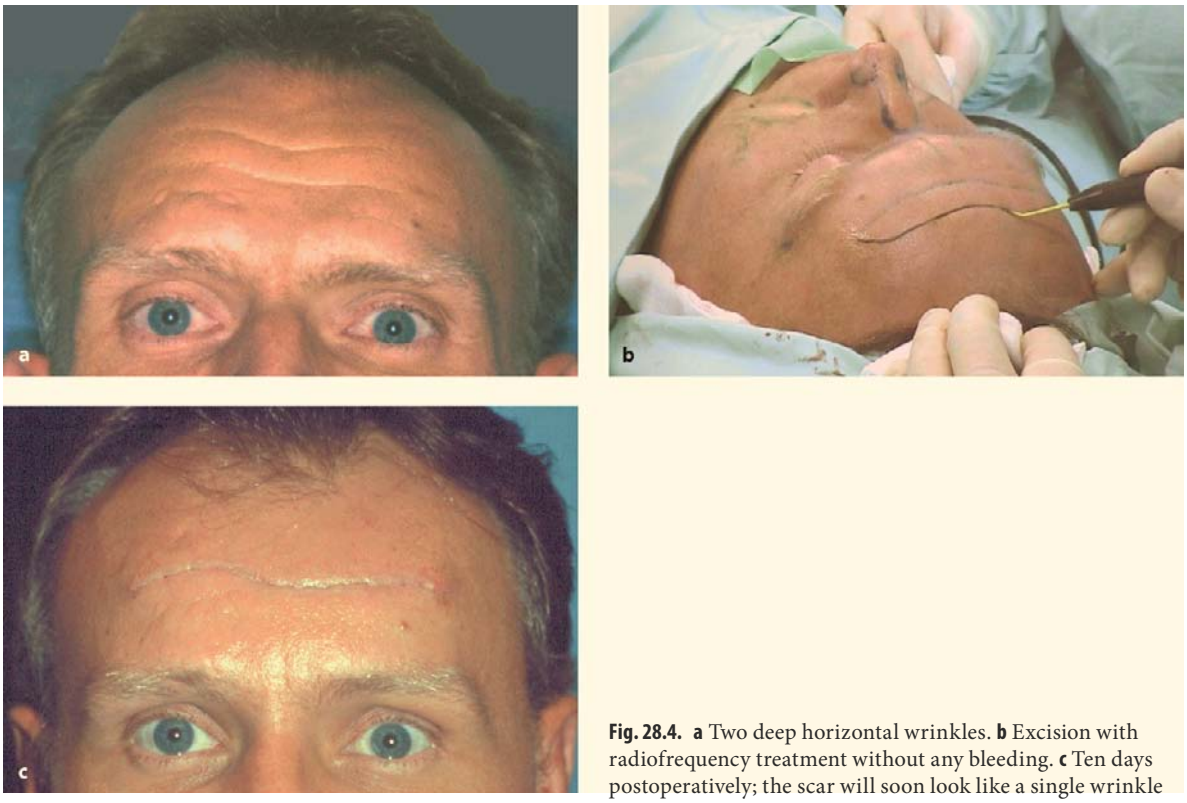

Fig. 28.4. **a** Two deep horizontal wrinkles. **b** Excision with radiofrequency treatment without any bleeding. **c** Ten days postoperatively; the scar will soon look like a single wrinkle

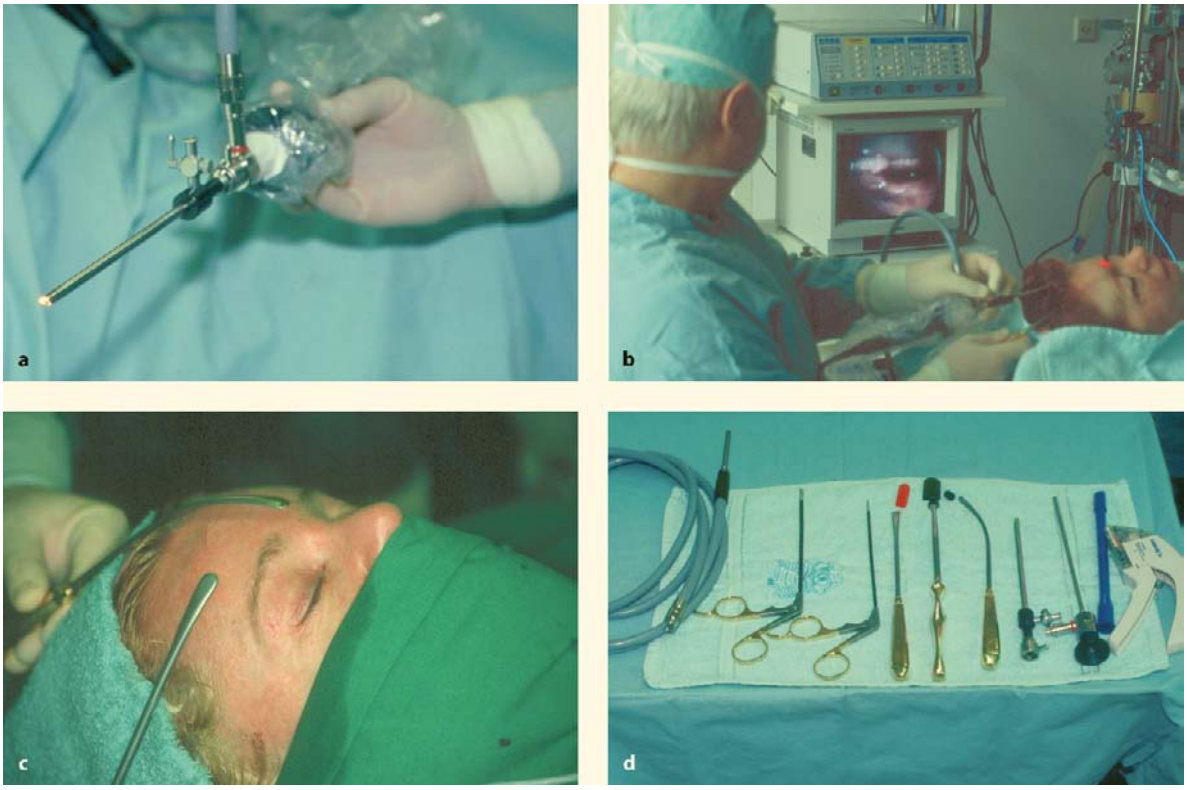

Fig. 28.5. **a** Endoscopic microcamera with a cold-light source. **b** Sitting above the head of the patient, looking at the procerus muscle fibres at the nasal root on the monitor. **c** Nonbleeding surgery with minimal scaring and minimal complications. **d** Four or five well-chosen instruments will do the job

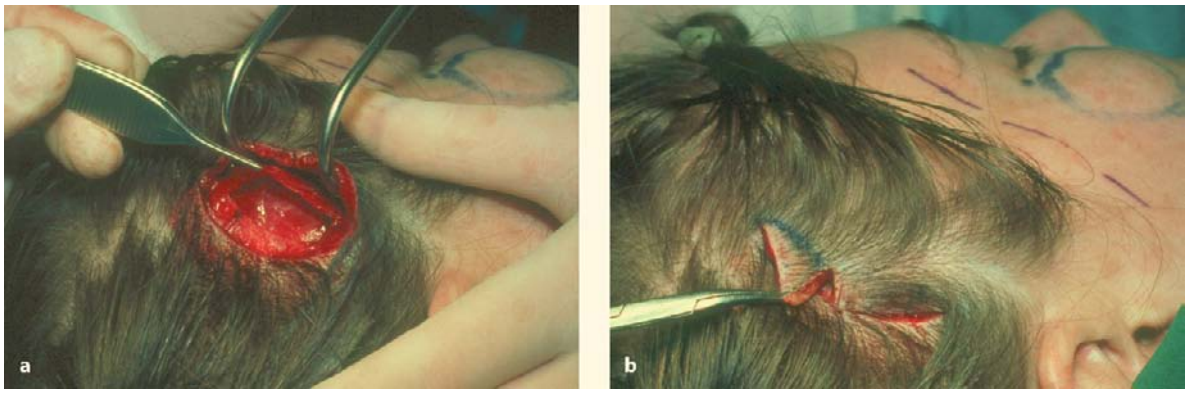

Fig. 28.6. **a** Superficial temporal fascia incised, prepared and tightened backwards to be sutured at the deep temporal fascia. **b** Semilunar area of hairy skin removed and sutured

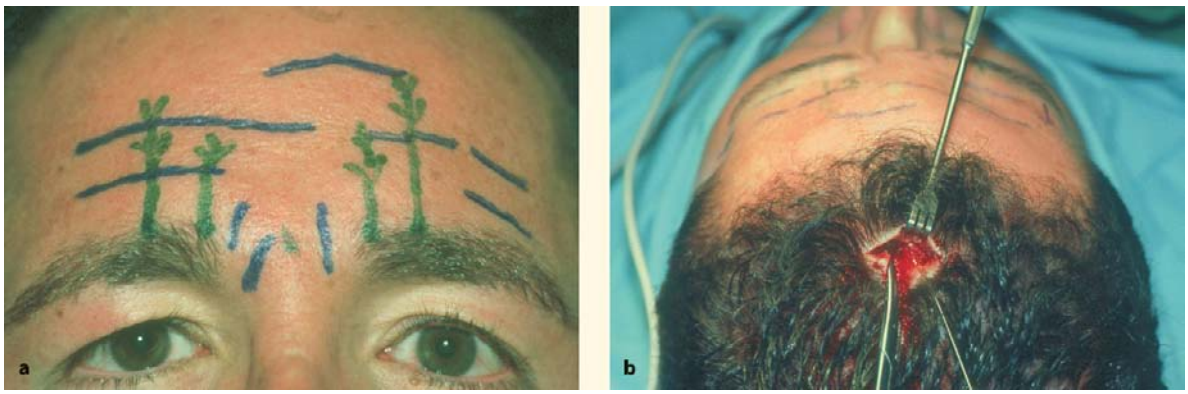

Fig. 28.7. **a** Dermographic markings of the nn. supratrochleares medial and nn. supraorbitales lateral (*green vertical lines*). Wrinkles are marked in *blue*. **b** T-incision: after preparation, the midpart of the frontal skin should be pulled backwards, the lower T wings cut off, and sutured in a V manner: T-V-plasty

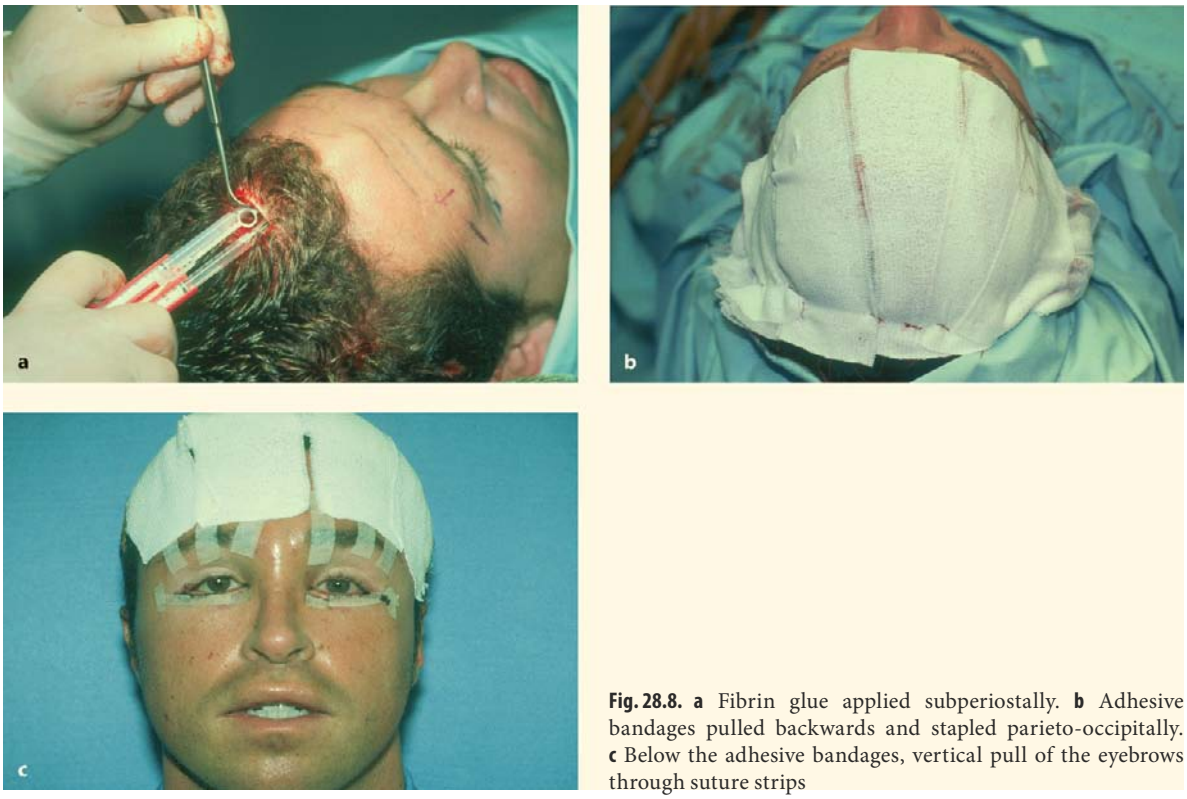

Fig. 28.8. **a** Fibrin glue applied subperiostally. **b** Adhesive bandages pulled backwards and stapled parieto-occipitally. **c** Below the adhesive bandages, vertical pull of the eyebrows through suture strips

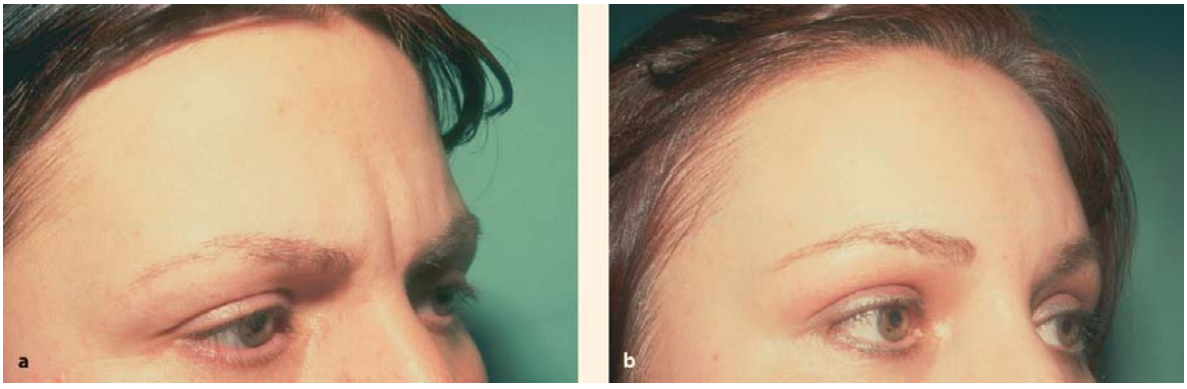

Fig. 28.9. **a** Vertical glabellar, horizontal wrinkles and deep eyebrow position. **b** Removing of wrinkles and opening of the eyes through elevation of the eyebrows – "nonscrewing method"

A More Conservative Open Frontal Lift

29

A. Aldo Mottura

29.1 Introduction

Even though the endoscopic frontal lift appeared to replace the traditional open techniques, the initial enthusiasm has been decreasing in the last few years. According to recent papers, in the USA half of the plastic surgeons still prefer the open techniques [2–5].

There are two standard open frontal lifts: the intracapillary or coronal lift and the precapillary one [3]. In both, surgeons transect the galea and revert the frontal flap to treat the frontal, corrugator and procerous muscles [6–8]. As a disadvantage, these techniques require the incision to be long enough and the galea to be transacted all along the skin incision to turn over the flap. As a consequence of that, long scars should be expected as well as an alteration of the sensitivity of the scalp which is often observed as a result of the section of the sensitive nerves of the scalp. Besides, when the arteries and veins of the scalp are sectioned, there is a diminution of the blood supply of the scalp that in the course of years produces a decrease in the hair population of the scalp.

In accordance with Knize's concept [8] of the lateral subgaleal dissection of the forehead, I began to try another way of doing an open frontal lift without undesirable side effects.

29.2 Indications

In my routine, I use the endoscopic procedures in young patients or in minor or moderate brow ptosis. But when I am confronted with a marked ptosis and a resection of skin or scalp is necessary, the open techniques are selected. If the forehead is a narrow one, so that the hairline can be moved 1–2 cm backward, I use the intracapillary or coronal technique, but if there is a receding hairline that cannot be moved backward, in that case or when the patient would like to have a narrower forehead, I select the precapillary technique. When the patient has a 6–7-cm-wide forehead but with a coronal technique this should be

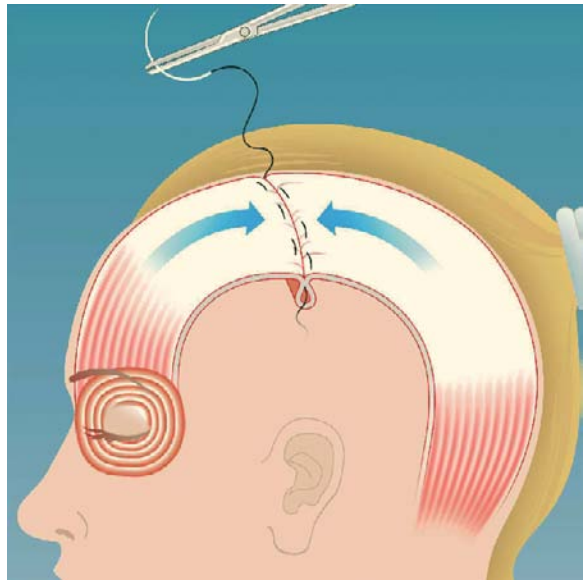

Fig. 29.1. Facia folding in the intracappillary approach

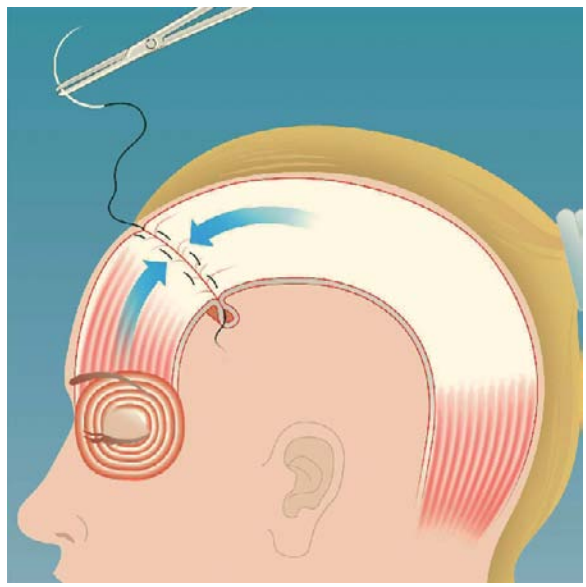

Fig. 29.2. Facia folding in the precapillary approach

moved 2 cm backward, this precapillary technique should also be considered (Figs. 29.1, 29.2).

With the patient in a standing or sitting position, I pencil on the skin or on the scalp the amount of skin I will remove. I consider a ratio of brow elevation to skin removal of 1:1 for the precapillary technique and 1:2 for the intracapillary one.

29.3 Surgical Technique

I infiltrate under the incision lines and in the area to be dissected a solution composed of 10 ml lidocaine, 10 ml bupivacaine, 0.5 ml 1:1,000 adrenaline and 150–200 ml saline solution. Then I do the incision on the skin all along the marks and the skin is easily stripped off the galea.

With the intracapillary technique, a small incision is performed in the middle of the galea from where I introduce a dissector that separates the galea from the periosteum. One additional 5 mm small incision 1 cm posterior to the hairline is made for the introduction of a pair of scissors to have direct access to the orbital rim. The scissors progress in the subgaleal plane and an opening is made perpendicularly to the frontal bone to separate the attachment of the galea from the periosteum and at the orbital rim. In case the incisions extend to the temporal regions, complementary small incisions at the galea facilitate the lateral subgaleal dissection. Once the forehead is completely mobile, the folding of the galea is performed with a 3/0 Vicryl running suture taking big bites at the galea at both sides of the cutaneous wedges. After three to five bites, the thread is pulled strongly and the galea is automatically folded, and this is repeated to the other end of the incision. This way the skin contacts without any tension and can be stapled (Figs. 29.3–29.8).

Fig. 29.3. Intracapillary scalp resection marking

Fig. 29.4. The galea is opened and a dissector is introduced for a subgaleal dissection

Fig. 29.5. The scissor is opened transversally at the orbital rim

Fig. 29.6. A continous running 3/0 Vicryl suture, taking big bites of the galea at the skin edges is shown

Fig. 29.7. Pulling the thread strongly, the galea is folded and the skin edges approach without tension

Fig. 29.8. Skin suture with staples without tension

In the precapillary technique, the skin incisions are marked following the irregularities of the hairline or in a W pattern. The subgaleal dissection and galea folding are conducted in the same way, but the skin sutures are performed using 6/0 mononylon separate sutures.

The treatment of the corrugator or the procerous muscles can be performed through an upper-lid incision or using the assistance of the endoscope trough the galea when, as in most cases, concomitant superior blepharoplasty is performed.

No compression bandage is used and for some hours gauze soaked in cold chamomile tea is applied over the forehead

29.4 Results

I have experience of 34 cases using the coronal approach, and of 30 cases using the precapillary one. I had to touch up a small part of the scar in three cases with the precapillary approach and in one case with the coronal one. I had to review the whole procedure in one case of unsatisfactory brow elevation when I used the coronal technique [11, 12]. Transitory hair loss around the scar was observed in one case of the coronal approach, with the total amount of the hair population being recovered in the fifth month. When the precapillary approach was used, transitory paresthesia of the scalp recovered total sensation before the sixth month. When the precapillary technique was

Fig. 29.9. **a** Precapillary markings. **b** Three-year follow-up

Fig. 29.10. **a** Intracapillary approach, preoperative view. **b** Postoperatively, 3-year follow-up. **c** Oblique preoperative view. **d** Postoperative view. **e** The patient can raise the eyebrows. **f** The patient can lower the eyebrows

Fig. 29.11. **a** Intracapillary approach. **b** Two-year follow-up

Fig. 29.12. **a** Intracapillary approach. **b** Two-year follow-up with the sclera corrected

used, in no case did the patient complain about the scar. There was no case of diminution of the hair population posterior to the scar. Stable results can be observed 3–4 years after surgery (Figs. 29.9–29.12).

29.5 Discussion

The first complete technique concerning the open frontal lift has to be accredited to the Argentinian José Viñas [13], who described in 1967 the coronal and precapillary approaches, transecting the galea and everting the frontal flap. Since then this technique has been carried out with slight variations. According to De la Plaza's ideas [4] of subgaleal dissection, the mobile part of the scalp, I would add that by folding the galea, this tissue is tensed and still remains mobile, thus preserving an important part of the expression. A mobile galea as opposed to a fixed galea obtained after its fixation to the bone. Moreover, resecting a strip of skin contributes to stretching the skin and to smoothing the wrinkled forehead.

Without transecting the galea, the plane where arteries, veins and nerves run, the blood supply of the forehead and scalp is preserved, which is especially important in elderly persons.

At the orbital rim region, opening the scissors in a transverse way and only dissecting and separating the planes do not damage the vessels and nerves [9, 10] (Figs. 29.13, 29.14). The dissection should be gentle, especially at the lateral site where the fine nerves of the frontal branch run.

After some precapillary procedures, some months of paresthesia can be observed, posteriorly to the scar. This can be the consequence of the compression of the galea suturing, but absorbable threads release the possible nerve compression after 3–4 weeks.

Folding the galea with a running suture is a fast, simple and uniform procedure that can also be done with separate stitches, but is more demanding and time-consuming. The whole coronal procedure takes

Fig. 29.13. The supperficial venous system of the forehead and scalp is not interrupted

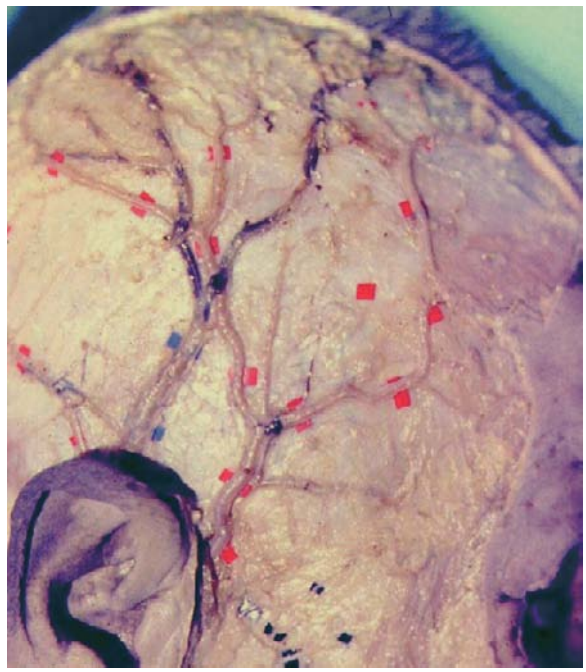

Fig. 29.14. The arteries of the forehead and scalp are not transected

around 20 min to perform, while the precapillary procedure takes about 40 min.

Some difficulties in the dissection can be observed in secondary cases when the galea is fixed to the deep temporal facia or to the bone. The W incisions as proposed by Camirand [1] at the hairline with the scalpel beveled 30°, reduce the skin tension at the scars and allow the hair to grow into and anteriorly to the scars; thus, inconspicuous scars are obtained

With this conservative way of doing an open frontal lift, two of the three drawback of the standard open technique are avoided, i.e., preserving the blood supply of the scalp and the integrity of the nerves. The length of the scars can also be reduced according to each case because there is no need to make large incisions from one earlobe to the other, because the frontal flap is not everted. Comparing some cases of endoscopic frontal lift when three to five incisions are made, we find that in some cases they reach 12 cm, while with the open procedures, the incisions are 14–18 cm long, so the difference is not significant.

Some hours of postoperative pain relief can be obtained with the use of bupivacaine in the anaesthetic solution.

29.6 Conclusions

By using this conservative open frontal lift, the brows can be elevated with a simple and fast technique, leaving acceptable scars, with a minimal rate of allopecias and without the drawbacks of the classic open techniques. It is an excellent alternative for those surgeons who still perform the classic open frontal lift.

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Forehead and Midface Videoendoscopic Surgery 30

Ruth Graf, Daniele Pace, Luiz Roberto de Araujo

30.1 Introduction

Since the introduction of endoscopic brow lifting in the mid-1990s, videoendoscopic surgery has become widely accepted as a method for rejuvenation of the upper third of the face, mainly to achieve eyebrow and forehead elevation. It has many indications and it is performed to correct eyebrow ptosis and to treat glabellar rhytids created by corrugators, and depressor supercilii and procerus muscles.

Several factors, including natural aging, facial nerve injuries and facial trauma, may cause brow ptosis, although congenital or hereditary factors may also cause this condition. Eyebrow lifting and/or forehead lifting is not a new concept; however, videoendoscopic technique for these procedures is relatively new.

Videoendoscopic surgery of the forehead and midface intends to treat forehead wrinkles, elevate the lateral portion of the brow, release the depressor muscles of the glabella, free periorbital ligaments, elevate soft tissue of the midface and correct asymmetries. To accomplish these goals, one must study the frontal, periorbital and midface anatomy. Advantages include visualization and tissue manipulation through very short incisions with image magnification and treatment of wide areas with short scars.

In the physiology of eyebrow ptosis, the depressor muscles pull down the medial portion and the frontal muscle elevates the medial and central portions of the brows, creating horizontal wrinkles on the forehead. On the other hand, there is soft-tissue ptosis on the temporal area owing to the absence of the frontal muscle lateral to the temporal adhesion zone, with descent of the brow tail.

Recent articles report that videoendoscopic surgery of the forehead and midface shows excellent results. The advantages are significant reduction of the incision length, better camouflage of these incisions and less bleeding and surgical trauma. Besides, it reduces the dysesthesia of the scalp because the deep branch of the supraorbital nerve is injured less.

There are several fixation methods, including absorbable and nonabsorbable screws, sutures, cortical tunnel, Endotine and fibrin glue.

The disadvantages include higher cost related to the sophisticated equipment necessary and the long learning curve to achieve proficiency.

Counterindications are previous craniotomy or frontal sinus or bone fracture. Complications include relapse, asymmetry, dysesthesia, paresis, hematomas, burns and alopecia.

30.2 History

One of the earliest reports concerning the use of endoscopic techniques in plastic surgery was in 1992 when Core and Vasconez [2] described the endoscopic coronal lift. In the follow-up article published in 1995, they noted that the complication rate in endoscopic brow lifts was not greater than in the open technique [3]. They reported recurrent ptosis in less than 2% of patients. In addition to using external suture stabilization for 3–5 days, they also excised a triangle of skin just in front of the hairline.

In 1994, Vasconez [27] published a new article describing endoscopic forehead lifting. He detailed the use of an endoscope to guide the release of supraorbital and glabella soft tissues. Dissection was on the subgaleal plane and procerus and corrugator muscles were severed. The fixation technique was not clearly described and seemed to be variable.

Since the first reports, multiple variations of the technique have been used, mostly regarding different incisions, planes of dissection and methods of fixation.

In 1993, Marchac [16, 17] described the use of an endoscope to elevate forehead, malar and maxillary tissues, through a subperiosteal plane and fibrin glue fixation.

Isse [6] in 1994 described the subperiosteal endoscopic technique for the forehead, dissection over the deep temporal fascia in the temporal area, supraperiosteal plane in the midface and lower third, and sub-

cutaneous cervical dissection. He described tissue elevation with vertical and medial vectors with fixation stitches of the forehead to the galea superiorly, and superficial temporal fascia and superficial musculoaponeurotic system (SMAS) to the deep temporal fascia in the temporal area [7, 8].

In 1994, Ramirez [24–26] described the use of videoendoscopic surgery for the forehead, midface and lower face. He used the subperiosteal plane for all these areas, affirming the need to release the periosteum of the superior gingival sulcus. He also described the biplanar approach at the level of the zygomatic arch.

Since 1995, Knize [10–14] has published several articles regarding the frontal and temporal anatomy, where he identified fully in detail all structures and elements that should be well known to facilitate the performance of endoscopic technique in order to avoid neurovascular injuries. He described the depressor muscles of the eyebrows: procerus, corrugators (transverse and oblique head) and depressor supercilii, which should be severed. On the other hand, the transverse head of the corrugator muscle should be left intact to prevent widening of the brows.

Many authors studied fixation techniques in endoscopic surgery, over a long-term period. McKinney [19] and Daniel [4] used central and temporal fixation with screws; however, McKinney[20] uses lateral fixation with galea sutures to the deep temporal fascia and bony fixation in parasagittal incisions. He believes that such maneuvers decrease risks of sagittal sinus and middle meningeal artery damage, alopecia and allow a longer esthetic outcome. Jones [9] compared the use of cortical tunnel suture fixation with fibrin glue. He found sutures were a better method of fixation. De Cordier [5] makes three triangular precapillary incisions that are sutured in a transverse fashion creating additional elevation besides the temporary sutures in the incisions 5 cm posterior to the hairline, kept in place for 3–5 days. Casagrande [1] described in 2000 the transcutaneous fixation of the midface with a needle.

In 2000, Little [15] embraced the idea of volumetric enhancement of the face with special regard to midface elevation.

Mendelson et al. [21–23] described in 2000 new anatomic terms for the periorbital and facial areas, which are zones of adhesion (temporal adhesion), septii (superior and inferior temporal septum, periorbital septum) and real ligaments (zygomatic and masseteric).

Matarasso [18] in 2000 evaluated facial rejuvenation and developed an algorithm for the selection of the appropriate technique, and so in patients with only forehead rhytids with no associated surgery he indicates botulinum toxin injections with a laser; for patients with glabellar creases with no surgery associated he indicates endoscopic surgery; and when there is a blepharoplasty he corrects the depressor muscles through the same incision. Finally, in patients with brow ptosis he performs endoscopic surgery and when there is rhytidectomy associated he makes temporal suspension through the temporal aspect of face-lift incision.

30.3 Surgical Technique

30.3.1 Preoperative Period and Anesthesia

With the patient under sedation, the skin marks and initiated with the temporal fixation zone, the hair is divided exactly where the incisions will be placed, meaning one central, two paramedial (1.5 cm medial to the temporal line to avoid injury of the deep branch of the supraorbital nerve, which crosses within 1.5 cm medial to this line) and two temporal incisions marked as a continuation of a imaginary line drawn from nasal ala to the corner of the eye, 2 cm behind the hairline (Fig. 30.1). Xylocaine (1%) and marcaine with 1:200,000 epinephrine is injected in the areas to be operated on.

30.3.2 Incisions

The anatomy of the orbital and frontal area has a multilayered structure, including skin, subcutaneous tissue, muscles (orbicularis oculi laterally, corrugators, depressor supercilii and procerus medially), galea, periosteum and bone.

Incisions of 1.5 cm each (one central and two paramedial) are made in a vertical fashion to avoid nerve injury and are placed just a few millimeters behind the hairline. The temporal incision is 3 cm long and is placed 2 cm behind the hairline, perpendicular to the direction of the vectors.

30.3.3 Dissection

The undermining on the frontal area is performed at first blindly, with a curved dissector in the subperiosteal plane, down to 2 cm above the superior orbital rim. In the temporal area a blunt round dissector is used, superficial to the deep temporal fascia. Right after this dissection, a 4 mm 30° endoscope is introduced, with a protection sleeve with a curved tip to facilitate undermining and visualization. The subperiosteal plane is used and the dissection is performed under endoscope vision down to the superior

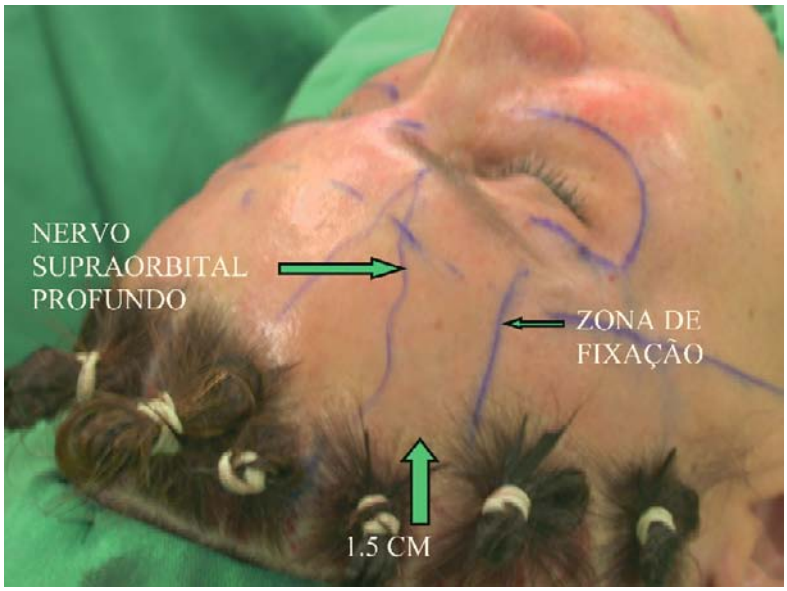


Fig. 30.1. Hair prepping with incisions according to the deep branch of the supraorbital nerve and the temporal zone of fixation

orbital rim, carefully avoiding supraorbital nerve damage bilaterally. Afterwards, with the endoscope placed in the paramedial incision and face-lift scissors in the temporal incision, the temporal ligament is ruptured down to the lateral orbital rim, including its terminal portion, till the superior orbital septum is visualized. The temporal ligament or temporal fusion line (Knize) or medial temporal septum (Mendelson) is a zone of confluence of superficial temporal fascia and galea, and also deep temporal fascia and frontal bone periosteum. This ligament is present till the lateral portion of the superior orbital rim.

The dissection continues medially by cutting the periosteum and galea in the superior orbital rim (arcus marginalis) till the supraorbital nerve is visualized (Fig. 30.2). The arcus marginalis is an area of thickening of the galea in the superior portion of the orbit and acts as an adherence point to the septum orbitalis.

Next, the dissection is completed in the temporal area with visualization of the sentinel vein (medial zygomatic-temporal vein) (Fig. 30.3), which is cauterized to avoid tearing and bleeding of this vessel during endoscope manipulation when working towards the midface.

Lateral to this vein there is the medial zygomatic-temporal nerve that can be preserved or severed (sensitive nerve to the surrounding skin). Medial to the sentinel vein, dissection goes to the lower eyelid, and laterally it goes towards the midface. At that point, the undermining can be subperiosteal or supraperiosteal. Our preference is the supraperiosteal plane, which is the same continuing above the deep temporal fascia with no need to incise the periosteum at the level of the zygomatic arch. The undermining continues below the orbicularis oculi muscle and supraperiosteal in the lower eyelid, releasing the inferior periorbital septum (retaining ligament), responsible for the nasojugal crease (Fig. 30.4). The precantal tendon is released to allow rotation of all periorbital elements superior, inferior and also laterally.

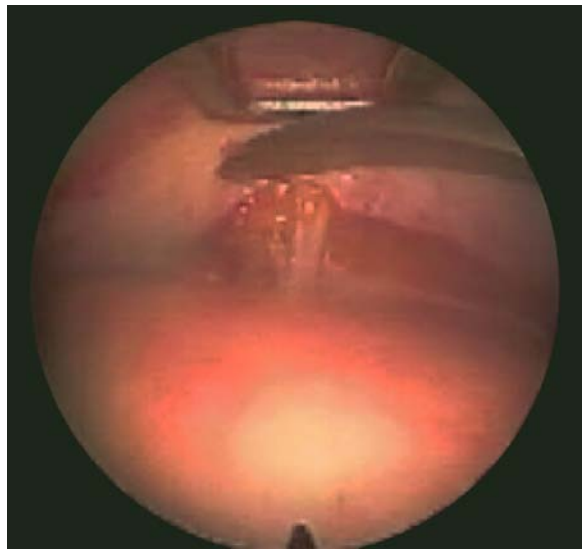


Fig. 30.2. Supraorbital nerve

Right next to the sentinel vein, lateral to it, dissection goes down to the midface in the supraperiosteal plane, below the suborbicularis oculi fat towards the nasolabial fold, undermining below the SMAS and above the zygomaticus major muscle. The medial limit for the dissection is the infraorbital nerve, and laterally the motor nerves for the zygomaticus major muscle, branches of the facial nerve. A blind maneu-

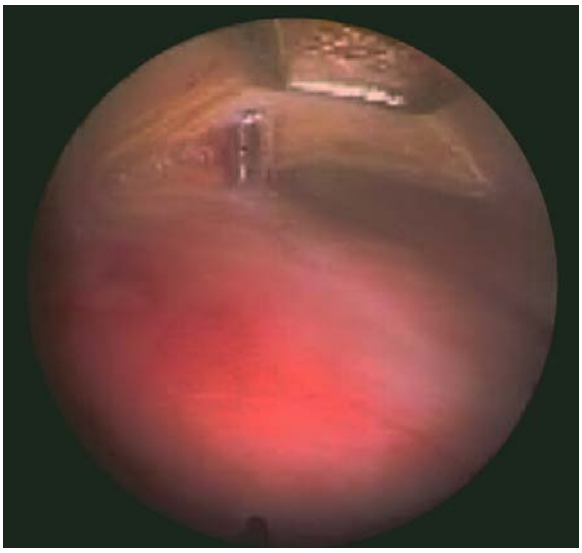


Fig. 30.3. Sentinel vein and medial zygomatic-temporal nerve

ver is made rotating medially and superiorly, to detach the zygomatic ligament laterally. The motor branches of the facial nerve should be preserved during videoendoscopic facial surgery. The temporal branch of the facial nerve runs 1.5 cm above and laterally to the superior orbital rim and should remain in the flap throughout the surgery. The zygomatic branches of the facial nerve run between the orbicularis oculi muscle and the zygomaticus major muscle, penetrating the orbicularis oculi muscle through several branches (lateral, medial and inferior).

After the undermining is finished in the midface and temporal area, dissection is completed in the glabella. The endoscope is placed in the central incision on the subperiosteal plane, and 1 cm above the glabella, the periosteum and galea are ruptured with the curved dissector. As a result, the depressor muscles are visualized, from lateral to medial: corrugators (transverse and oblique portion), depressor supercilii and procerus. With a curved grasper, these muscles

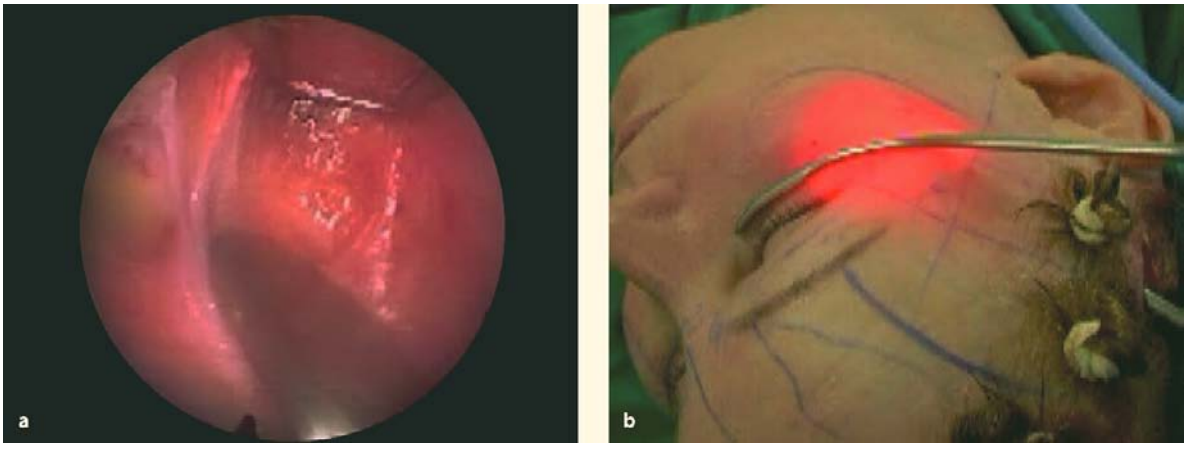


Fig. 30.4. **a** Undermining below the orbicularis oculi muscle and supraperiosteal in the lower eyelid, releasing the inferior periorbital septum (retaining ligament), responsible for the nasojugal crease. **b** External view showing the place of undermining

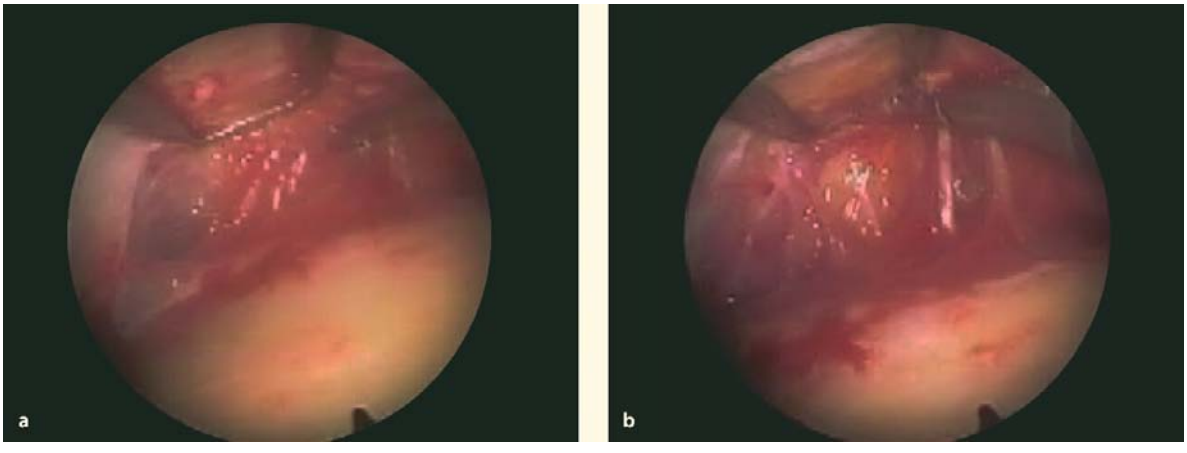


Fig. 30.5. **a** Corrugator muscle. **b** Supratroclear nerves

are divided with gentle maneuvers, beginning from the bony end towards the skin, except for the transverse portion of the corrugator, in order to avoid widening of the brows. During this point of the procedure, the supratrochlear nerves and vessels are identified, and should be preserved (Fig. 30.5).

The nerves observed in videoendoscopic surgery are supraorbital and supratrochlear, which exit from their specific foramen. The correct release of the periosteum in the superior orbital rim and division of procerus muscle, depressor supercilii and corrugators, preserving sensitive nerves in the supraorbital area, is one the most critical steps in videoendoscopic surgery. Obviously, avoiding injury of the temporal branch of the facial nerve is also very important for a successful procedure.

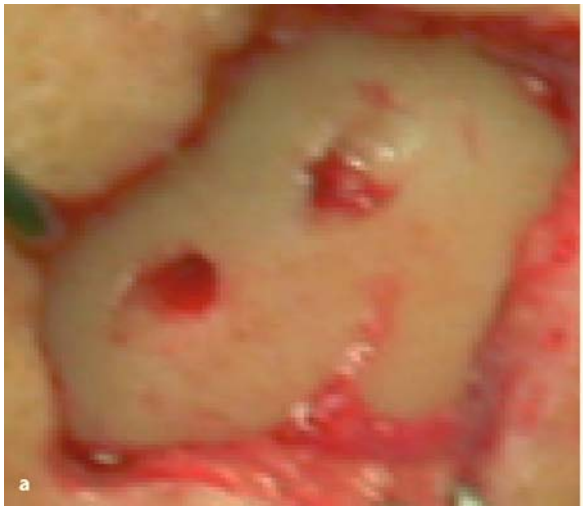
There are six planes of dissection:

1. Frontal dissection: subperiosteal
2. Temporal dissection: between superficial and deep temporal fascia
3. Upper-eyelid dissection: preseptal and suborbicular
4. Lateral orbital rim dissection: supraperiosteal
5. Lower-eyelid dissection: supraperiosteal and suborbicular
6. Zygomatic-malar dissection: suborbicular and suprazygomaticus major muscle

30.3.4 Fixation

Finally, after all the dissection is completed, the flap can be easily mobilized. Fixation is then started with demarcation of three points of reference in the following order: (1) inferior and lateral malar area; (2) central malar area; and (3) lateral cantal tendon. With the endoscope, a Casagrande needle is introduced in the points previously marked (Fig. 30.6). The introduction begins externally and then with the endoscope (to avoid nerve damage), reaching the temporal incision, where 3.0 colorless nylon is placed in position and finally the needle is pulled back to the entry orifice, grasping around 1 cm of the midface flap, going back to the temporal incision, where the suture line is withdrawn from the needle. The third point passes also in the periosteum superiorly, so to fixate the miocutaneous orbicular flap in a superior position. These three points are sutured in the deep temporal fascia at the level of the temporal incision. Fixation of the forehead is performed with cortical tunnels in the paramedial incisions, fixating the periosteum to the cortical tunnel (2.0 nylon), with the goal to elevate the forehead, mainly in the lateral portion of the brows (Fig. 30.7).

Fig. 30.6. Fixation of midthird of the face



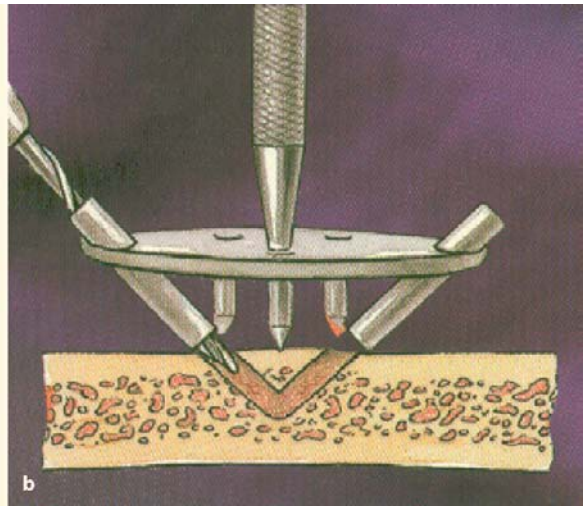


Fig. 30.7. **a** Cortical tunnel for fixation of the forehead. **b** Note the tunnel just in the cortical bone.

Fig. 30.8. Forty-year-old female patient submitted to videoendoscopic surgery of the forehead and midface, preoperative and postoperative period 2 years later. The *lower photographs* show an increase of the distance between the brow and the upper eyelid

The last step is scalp sutures without skin resection and no tension. Tape over the area dissected is kept for 1 week to decrease the possibility of hematomas and seroma.

30.3.5 Results

There are good outcomes in a long-term period, with maintenance of brow elevation, reduction of glabellar creases, lateral rotation of periorbital elements and midface elevation (Figs. 30.8–30.10). Swelling is effaced in 30–60 days, persisting rarely for more than

Fig. 30.9. Sixty-three-year-old female patient submitted to videoendoscopic surgery of the forehead and midface associated with blepharoplasty, preoperative and postoperative period 2 years later

3 months. Relapse and asymmetry may occur, and sometimes surgical revision is necessary. Dysesthesia and paresis may occur owing to nervous compression by the endoscope or surgical manipulation, or even through cauterization. Therefore, only the sentinel vein should be cauterized; further bleeding should be controlled by external compression and cold saline only. If there is a permanent nerve injury, the nerve on the opposite side should be divided as well to achieve balance. Skin burn may happen if cauterization is extensive, so it should be avoided. Hematoma is rarely described. Alopecia may appear owing to overly manipulated tissue or excessive suture tension. Prevention is always the best treatment.

30.4 Conclusions

Videoendoscopic surgery of the forehead and midface is less invasive, with short discrete incisions, where treatment is performed under direct vision with the endoscope. It is indicated at any age, as a single procedure or associated with rhytidectomy, blepharoplasty, chemical peeling, laser and facial fillers. The learning curve may be long, as appropriate training with specific surgical instruments is needed. Anatomy study is absolutely mandatory and workshops on the technique as well as observation of experienced peers is very important.

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Fig. 30.10. The same patient as in Fig. 30.4 showing action of frontal muscle and supercilii depressors in the preoperative period, and absence of this action in the postoperative photograph and an increase in the distance of the brow to the upper eyelid

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31 The Subperiosteal Browlift

Carl A. Troilius

31.1 Introduction

Most surgeons today practicing aesthetic surgery advocate an endoscopic subperiosteal technique for elevation of the brow and elimination of the glabella furrows and wrinkles [1–10]. The reason for this is of course the ability to avoid the bicoronal scar with possible hair loss [7, 11], the avoidance of transection of the supraorbital nerves and the subsequent numbness of the scalp behind the scar. The transection of the supraorbital nerves at the incision is also believed to be the cause of a prolonged period of itching of the scalp. The bicoronal subgaleal browlift also gives the patient a markedly raised hairline, usually in the ratio of 2–3 times the distance the eyebrows are elevated [12].

It is true that also the subperiosteal browlift raises the hairline, but not more than the distance that the brows are raised [13].

The operative time of the two procedures is about the same in the hands of a trained surgeon. It has also been proven that the long-term result of a subgaleal approach is less reliable and stable compared with that of the subperiosteal approach [14].

The stability and well-proven efficacy of the subperiosteal method are independent of whether the procedure is done openly or with the aid of an endoscope. The two factors that matter for the result are the plane of dissection and the altering of the muscle balance in the brow [9, 10, 15] (Oscar Ramirez, personal communication, May 1996).

If the brow is raised with applied tension and some kind of fixation is used, the tension is applied to the periosteum – a strong and inelastic structure. The height-altered periosteum will stick to the bone within a few days, after which fixation is really not needed.

If, however, you try to correct the height of the brows by cutting and shortening the galea, you are relying on a totally elastic structure, which over a few months will elongate and the brow will resume its earlier position.

By following our patients over the last 10 years, we have recently concluded that in most cases where only a minor to moderate raising of the brow is indicated, we really do not need a fixation at all. We rely only on changing the balance of muscle vectors around eyebrows, the release of the forehead and raising of the brows as well as the excision of parts of the corrugator supercilii, dpressor supercilii and the procerus muscles. Scoring and damage to the frontalis muscle should be avoided. The habit of scoring the frontalis muscle comes from a misunderstanding of the cause and nature of the wrinkles in the forehead. The frontalis muscle should be regarded as our friend as it is the only muscle that actually lifts the eyebrows [12, 16–18].

A natural eyebrow lift is achieved by interrupting the restrictive forces of the corrugator supercilii and procerus muscles, against the upward action of the occipitofrontalis muscle [19].

Use of a subperiostal, endoscopic method can have some disadvantages. The fact is that the method is so effective and the skin can be pulled so tightly that the eyebrows end up unnaturally high. This can occur through a primary factor of applying too much pull between the periosteum and the fixation in the bone, if such is used. The other possible reason for exaggerated results is a later development. It is the slow raising of the forehead and eyebrows owing to the changed muscle balance in the glabella area. This development is also support for the conclusion that fixation is not necessary at all for forehead lifts where the desired result is a moderate lift of the eyebrows, less than 4 mm [20] (Fig. 31.1).

Long-term studies spanning 5 years indicate that if you measure the height of a patient's eyebrows from the center of the pupil to the top edge of the eyebrow before surgery and then again 1 year after, there is often a harmonic, natural rise of about 4–7 mm net. If the same patient is measured digitally 4 years later, their eyebrows are now a further 1–2 mm higher (Figs. 31.2, 31.3). This is a statistically significant result that can only be explained by the change in muscle balance occurring around the eyebrows when the negative, downward-pulling vectors through the musculus procerus, depressor supercilii and corrugator supercilii are eliminated or greatly weakened to the benefit of the upward-pulling vector through the

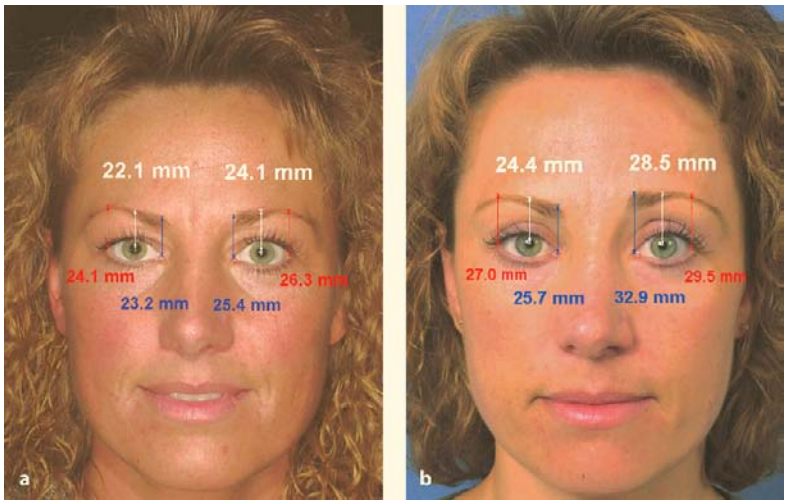

Fig. 31.1. **a** The postoperative result (**b**) 1 year after a subperiosteal browlift without any fixation of the scalp. There is a definite increase in the height of the medial brows

Fig. 31.2. **a** The preoperative condition. **b** The postoperative result 1 year after a subperiosteal browlift with fixation. **c** The increase in the height of the brows 5 years postoperatively compared with the height 1 year postoperatively

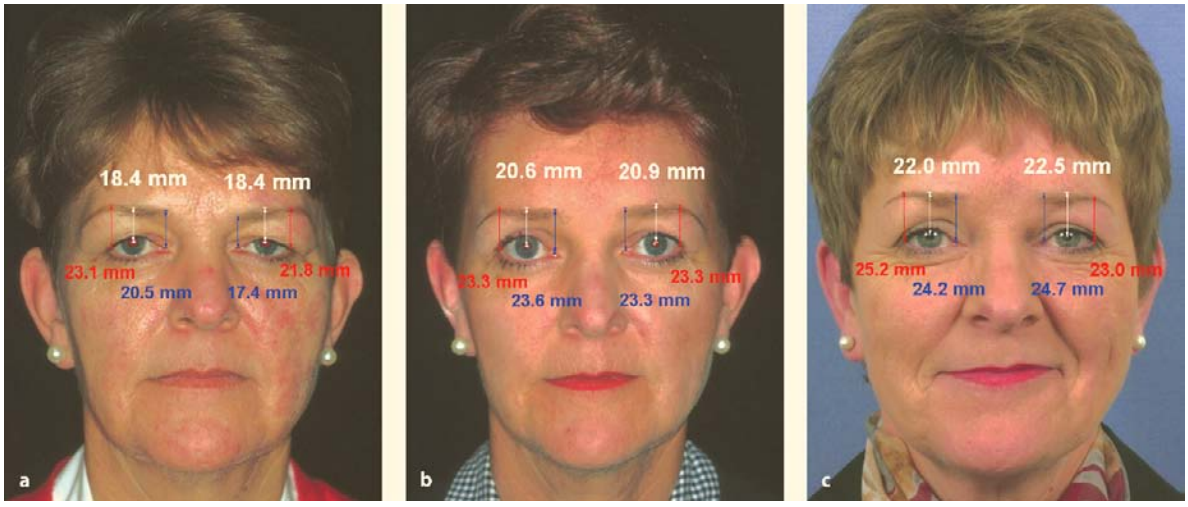

Fig. 31.3. **a** The preoperative condition. **b** The postoperative result 1 year after a subperiosteal browlift with fixation. **c** The increase in the height of the brows 5 years postoperatively compared to the height 1 year postoperatively

musculus frontalis, which intact over time can slowly affect the eyebrows and forehead, causing them to rise. A natural conclusion is that fixation is not necessary or perhaps even not desirable for small or moderate eyebrow lifts or often when the indication for surgery is a desire for a change in eyebrow shape, that is to say a lift of either the lateral or the medial ends, perhaps in combination with elimination of vertical wrinkles in the glabella or general horizontal wrinkles in the forehead.

31.2 Indication for Surgery

A forehead lift is an extremely special operation. Very few of the patients that sit in our consultation chair ask specifically for a forehead lift. It is more common for them to ask about eyelid surgery, mentioning that they have a tired appearance. As surgeons, we can often identify the problem as a combination of excess skin at the upper eyelid with eyebrows that sit low or that have lateral ends that lie lower than the medial ends. This contributes to a tired appearance. If you do not first adjust the eyebrows to a normal level and reshape them, upper-eyelid surgery has little chance of success and there is little chance that the patient will be satisfied afterward. It is also a well-known fact that if you solely perform upper-eyelid surgery on a patient, the eyebrows will be lowered 3–4 mm [16] (Fig. 31.4). This is because prior to the surgery, the patient felt the weight of the extra skin on the upper eyelid and tried to compensate for such over many years by raising the forehead with the help of the musculus frontalis. After upper-eyelid surgery, this stimulus to the musculus frontalis disappears and the muscle begins to relax, causing the eyebrows to lower. This is not always a negative development, but it is something the surgeon must take into consideration during the consultation.

Other patients that sit in our consultation chair may have been told by others that they look angry or sad. There has been no case where the patient saw a clear connection between this appearance and their eyebrows, so patients in this situation do not tend to ask about a forehead lift. That is why it is up to us as experts in the field to help the patient understand the connection between his/her appearance and the procession and shape of the eyebrows, perhaps in combination with deep vertical wrinkles in the glabella area. An alternative treatment of the latter condition can be a Botox injection in the area. If done well, this can imitate the effects of a forehead lift with muscle resection. The effects, however, are only temporary.

We should, however, under no circumstances contribute to an indiscriminate raising of the eyebrows,

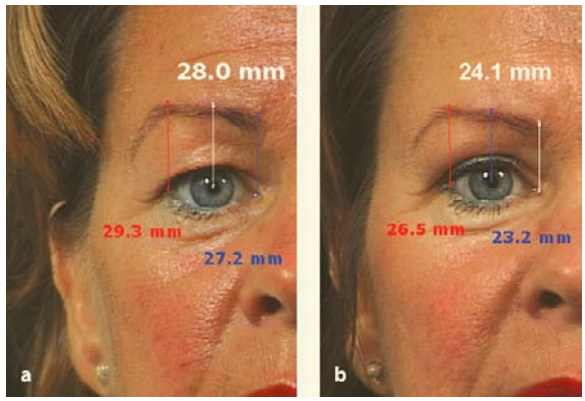

Fig. 31.4. **a** Postoperative result 6 months after an upper blepharoplasty (**b**) shows that the brow descends 4 mm when no browlift is done simultaneously

Fig. 31.5. The height of the brow of a young model is usually a lot lower than we create in our browlifts today

which often results in an unnatural appearance. We should instead analyze the shape of the eyebrows and their position in relation to the eyelids. If we as surgeons honestly examine our results with different types of forehead lifts and compare them with the appearance of a young, beautiful model (Fig. 31.5), we will unfortunately find that our surgical browlifts often have an unnaturally high position. For this reason, I now only use fixation in any form in about half of all my forehead lifts.

31.3 Surgical Technique

You start by examining the patient from the front while he/she is in a sitting position. You then mark the

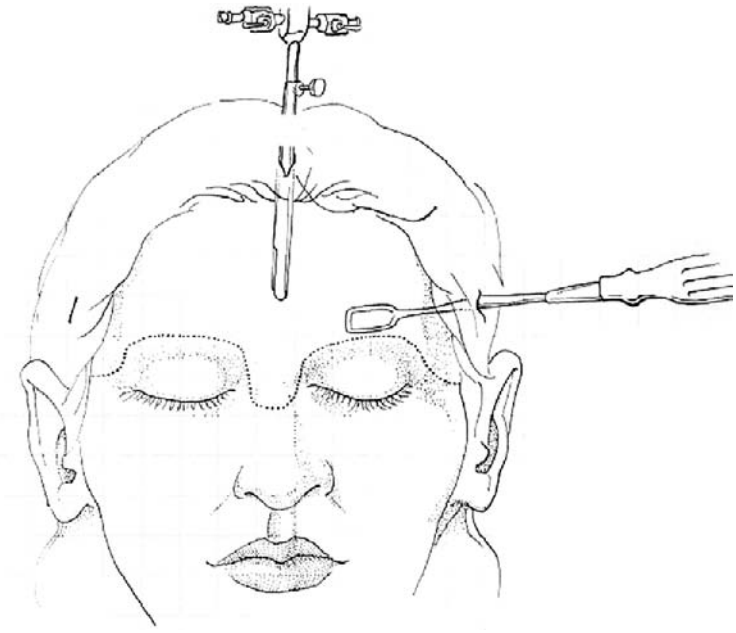

Fig. 31.6. The incisions in the scalp

shape and position of the eyebrows. It is important to examine which part of the eyebrow needs to be raised the most and which needs to be raised the least. The point in the eyebrow that is to be raised the most is transferred vertically up to the hairline.

First you make an incision at the front edge of the hairline along the midline, followed by two vertical incisions on each side, which correspond to the marked point of each eyebrow (Fig. 31.6). If the patient has an abnormally high or receding hairline, these incisions can be made in non-hair-bearing skin provided that intradermal sutures are used upon completion. Hereafter, you begin dissection from the central incision and release the periosteum blindly but without destroying it. Use slow, steady movements with the elevator. From the central incision, it is important to lift the periosteum on each side of the two lateral incisions in order to keep the periosteum as intact as possible in these two lateral incisions if you wish to apply a fixation suture here. There is no dissection rearward behind the incisions over the scalp. An important factor in how easy the dissection is, how little blood there is and whether the periosteum can be lifted in a piece that is as whole as possible is the infiltration anesthesia administered prior to surgery. By applying the needle with the beveled side down, slightly tangential to the skin, you can with hydrodissection facilitate the later release of the periosteum. The endoscope is then introduced from the center incision and an elevator is introduced in one of the lateral holes, depending on at which side you begin (Fig. 31.7). Dissection occurs under the eye all the way down to the orbital rim. Dissection releases the periosteum all the way out to the lateral orbital rim, where the sentinel vein is often hit and bleeding must be stopped. You then dissect along the temporalis muscle so that the dissected pocket is well outside of the lateral edge of the eyebrow. Exercise care around the supraorbital nerve, which runs approximately 2 cm laterally of the midline. As you know, the nerve can lie in a channel a bit up the bone, which is why you may come across it before coming to the orbital rim. This is the case about 15% of the time. Perform dissection in the glabella area as far as the instruments allow.

The next instrument is an elevator that is curved downward and makes it possible to release the periosteum around the orbital rim. When the pocket is completely open from one lateral end to the other, a scalpel, honed elevator or laser is used to cut the periosteum from one lateral orbital rim across to the other. Try to make this incision as low as possible while watching for nerves and blood vessels in the supraorbital area. The next step is to use an upward-bent elevator to lift the periosteum and spread it, to make it possible to see the underlying nerves and muscles. The most important part of the entire operation comes next: muscle resectioning in the glabella area. At this stage, it is good to have a long instrument that is insulated and can be used to coagulate bleeds. The best is a long, insulated, curved suctioning device that can suction smoke and blood while you coagulate a source that is being suctioned. We use graspers as we not only cut the muscles but also resect so much of them that it is not possible for the ends to rejoin. Unless the patient has deep, vertical wrinkles in the glabella area, it is not necessary to completely resect all muscles. At this stage, you do not need to worry that

Fig. 31.7. The endoscope is introduced after the initial dissection

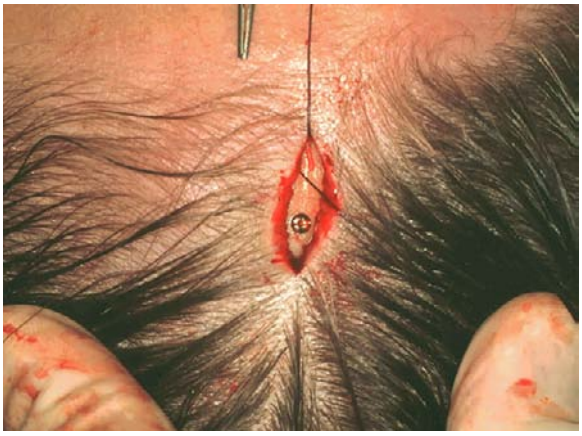

Fig. 31.8. A small titanium screw is used for fixation if needed

there will be a depression after muscle resectioning in the glabella area as experience tells us that this does not occur. The resected area is filled out rather quickly with fibrous tissue. After ensuring that all bleeding has stopped and inspecting the area, we remove the endoscope. If fixation is to be used, now is the time. We never use external fixation with staples as this undoubtedly leads to unnecessary hair loss and is uncomfortable for the patient. We use one of two internal fixations. The first possibility is a 4 mm titanium screw that is drilled into the bone at a drill speed of ten revolutions per second with cooling, where the drill has a stop at 3 mm.

A suture is then placed through both sides of the periosteum in front of the incision and is then pulled back to be tied around the screw before it is screwed as flat into the skull as possible (Fig. 31.8). As stated earlier, we avoid pulling this fixation suture too hard as you can expect a few more millimeters of lift in the future in addition to the immediate results of the eyebrow lift directly after surgery. Choice of suture is irrelevant as the periosteum fastens within 72 h. The second possibility for fixation is a so-called Endotine device (Coapt Systems, Palo Alto, CA, USA), which is a small bioabsorbable plate that is fastened in a predrilled hole in the skull. The plate has several small, 2-mm-long upward-pointing tines in which you fasten the periosteum. This method works wonderfully, but is quite costly.

The incisions are then closed with staples if they lie behind the hairline or with intradermal sutures if they lie in front of the hairline. We do not use drains or dressings. The hair is washed with water on the operating table and then washed thoroughly with shampoo the next morning. We recommend to our patients that they allow 1–2 weeks for convalescence

31.4 Complications

Bleeding and infection are two possible complications, but luckily they are very rare. We have experienced one instance of bleeding in 1,000 operations and have yet to experience any infection. This is likely due to the extremely good vascularization in the area. The patient commonly experiences a temporal lack of sensation in the area of the forehead and backwards. This usually returns within a few months.

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32 Eyebrow Manoeuvres

Dimitrije E. Panfilov

The form and position of the eyebrows signalize various moods. Knitted eyebrows and a lined brow betray worry and apprehension. If one eyebrow is lowered and the other raised, this pattern resembles a horizontal question mark and indicates suspicion. Eyebrows drawn obliquely together betray sorrow. A quick movement with the eyebrows is interpreted as a signal of greeting among humans. The lowering of eyebrows is seen as expressing an unpleasant surprise. Wide-open eyes indicate a real surprise. Knitted eyebrows are looking for protection, while tightly closed eyes express revulsion. The eyebrows of a man are bushier than those of a woman. Women pluck their eyebrows to look even more feminine.

Surgical treatment of eyebrow position can harmonize the facial expression. Very often we can see the asymmetric position of eyebrows owing to unilateral hyperaction of the corresponding m. frontalis. This can be corrected through grasping more frontalis fibres on the more elevated side.

If one eyebrow is positioned too deep, it can be elevated by a unilateral endoscopic procedure and unilateral – not central – T-V-plasty.

In bushy male eyebrows, the asymmetry can be reached by asymmetric direct skin excision more over the lower eyebrow.

The Brazilian surgeon Antonio Graziosi suggested in 1998 his browlifting with threads without undermining, using minimum incisions. There could be one to three threads per brow as a single procedure or it can be combined with other facial surgeries. Eyebrows have to be suspended to the periosteum behind the hair limit. For a single procedure we need only two instruments: the hollow probe and small Dechamp and one colourless nylon 4-0 suture.

Porfirio Castillo-Campos from Mexico has suggested a hook which is covered with plastified sheet in the middle, so that only the hook itself and the other end expose metal. Through medial or one of the lateral incisions behind the hair limit, this hook can catch either the corrugator or the frontalis muscle.

With electrocautery we touch the outside end of this hook and by pulling on it we divide the muscle partially or totally.

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Please see the general bibliography at the end of this book.

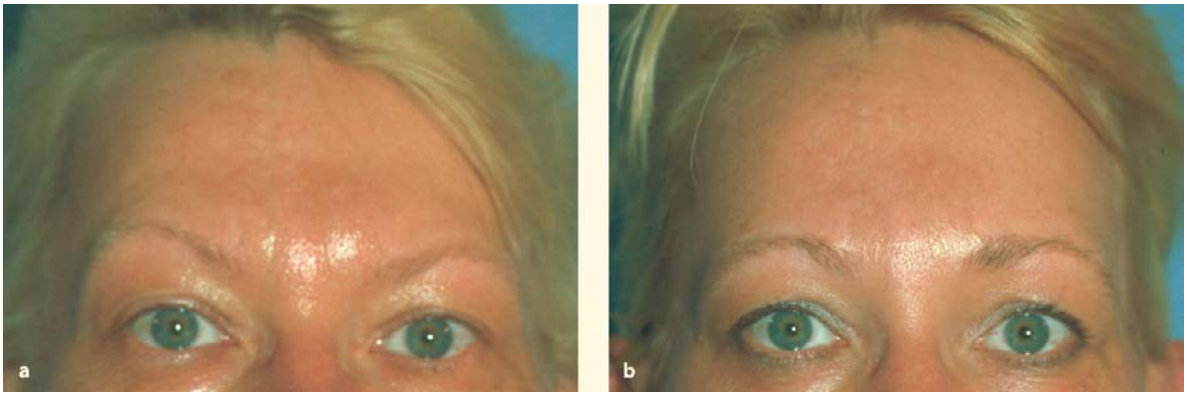

Fig. 32.1. **a** Hypertrophic m. procerus and mm. corrugators supercilii and threatening shape of both eyebrows – right more than left. **b** Harmonizing of glabellar region and symmetrizing of eyebrows by grasping the procerus, corrugators and frontalis – right more than left

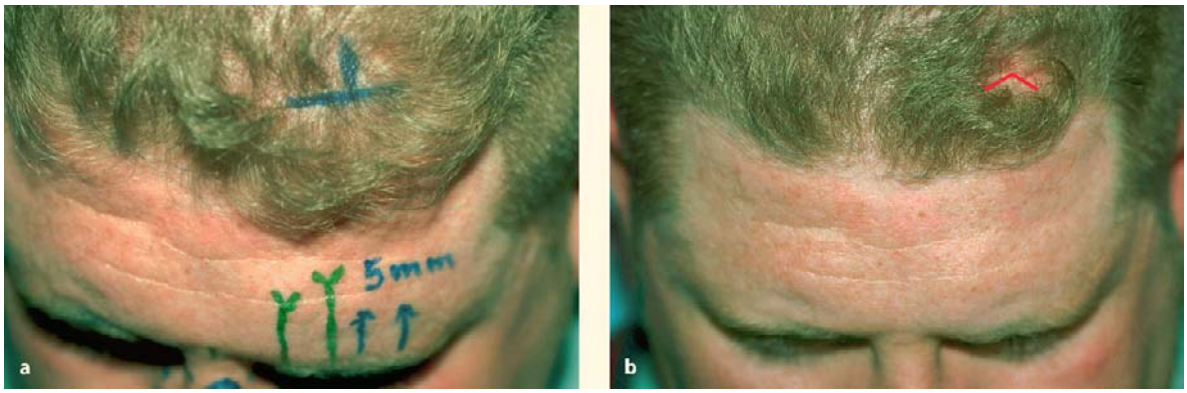

Fig. 32.2. **a** Dermographic planning to elevate the left eyebrow endoscopically and through T-V-plasty. **b** Symmetrical eyebrow position 3 weeks later. Slight hair loss will recover after 6 months

Fig. 32.3. **a** Lower right eyebrow. **b** Dermographic planning. **c** Symmetric, elevated eyebrows and "opened eyes"

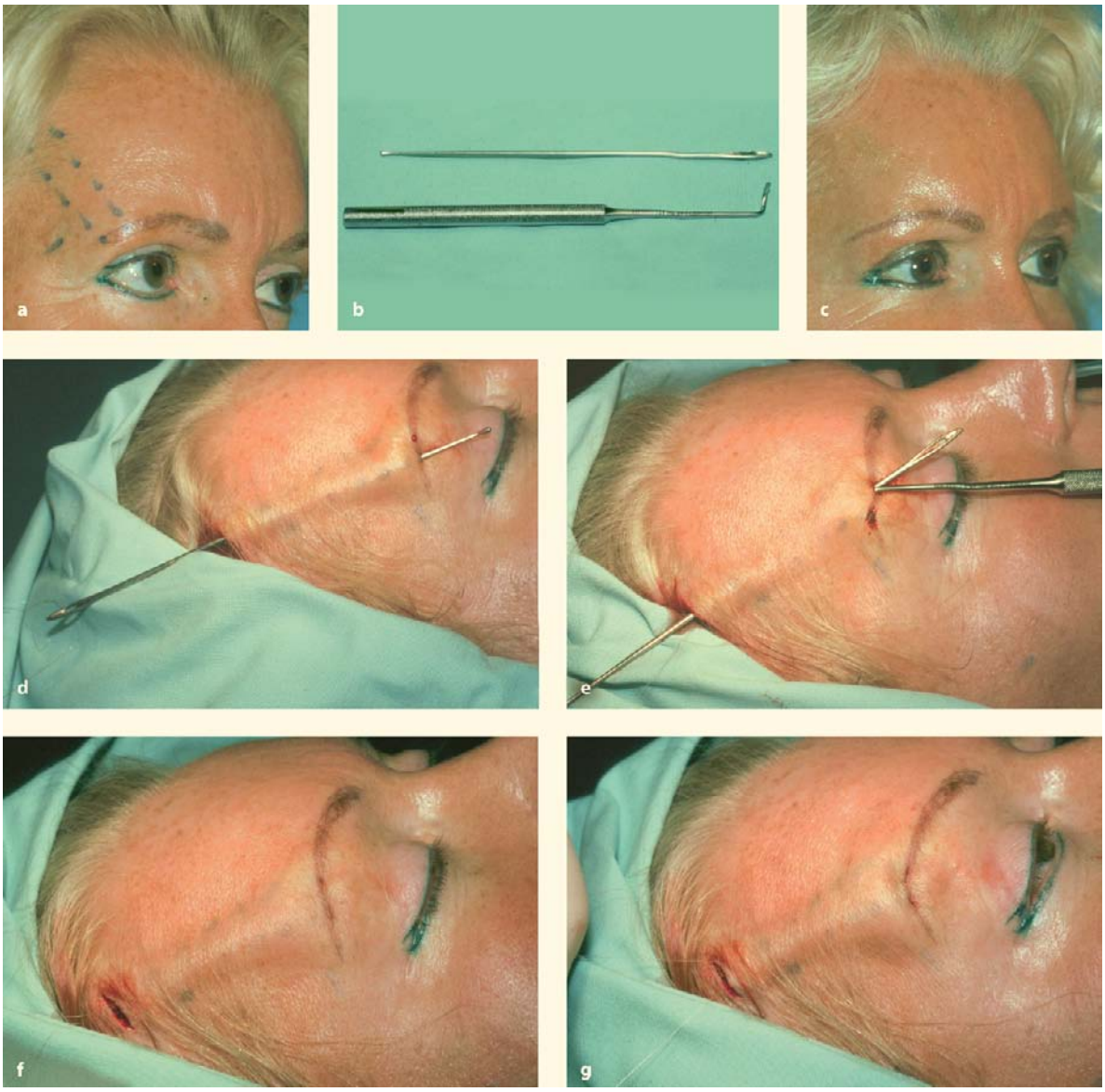

Fig. 32.4. **a** Demographic planning. **b** Only two instruments are needed. **c** Slight elevation of eyebrow tail. **d**–**g** This simple procedure just to elevate the "tail" of the eyebrow is demonstrated in four steps. Notice the slight overcorrection through a tightened suture in step 4 (**g**)

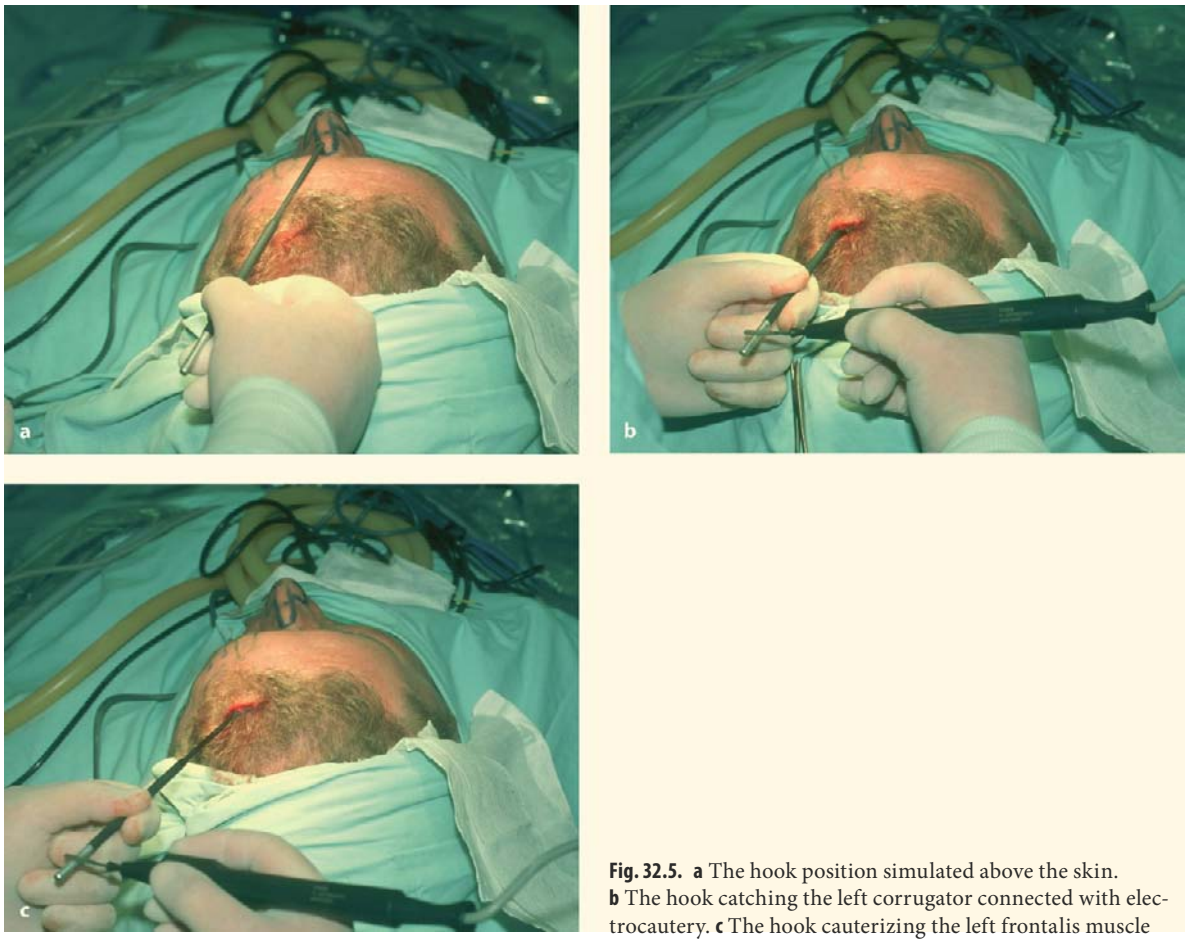

Fig. 32.5. **a** The hook position simulated above the skin. **b** The hook catching the left corrugator connected with electrocautery. **c** The hook cauterizing the left frontalis muscle

33 Eyelids

Dimitrije E. Panfilov

The first type of skin to become wrinkled is the skin of the eyelids, because it is the thinnest skin of the entire human body. When we communicate with each other, we usually look each other in the eye. Lax eyelids do not allow the inner energy of a person, which is possibly present to a large extent, to become apparent; such a person's capability and even vitality go unrecognized.

Excessive reading, PC work, watching TV, working under neon-light illumination, and hereditary factors play a role in this process. The eyelids can reveal changes associated with disorders of the kidneys, heart, and thyroid gland, or which become apparent from alcohol or drug abuse. The swollen eyes of someone with a psychosomatic disorder may reflect "uncried tears", originating from unexpressed emotions. An eyelid lift will therefore convey the impression of an altogether much fresher person.

With its relatively low cost and little effort, this operation has a relatively high effect and is therefore very popular, not only amongst women. It is the most frequent aesthetic surgery performed for outpatients and also the most common aesthetic procedure which plastic surgeons undergo themselves. The author of this book is not an exception to this rule.

There are three indications in periorbital rejuvenation:

1. Ptotic "baggy" upper eyelids
2. Puffy lower eyelids
3. Multiple fine wrinkles in the lateral part of the orbita: crow's-feet

What are criteria of aesthetically pleasing eyes?:

- Rima oculli (palprebral fissure) should be vertically between 12–14 mm in the adult.
- The horizontal eye axis (distance between the commissures) should be between 28 and 30 mm.
- The lateral commissure should be positioned superior to the medial commissure.

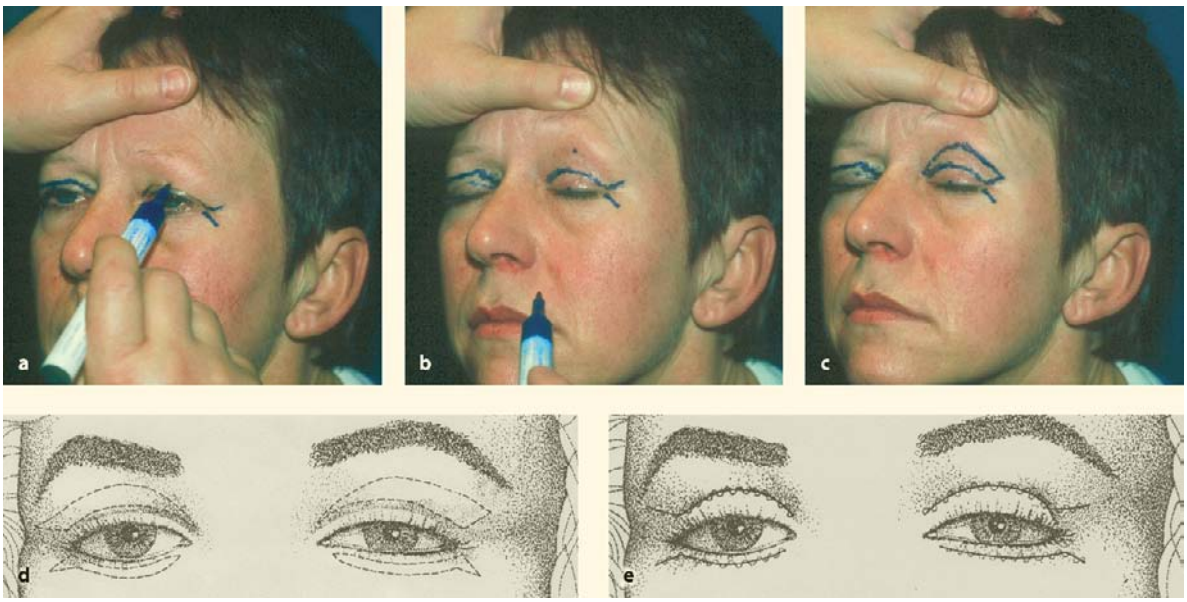

Fig. 33.1. **a** The patient is looking at the root of the surgeon's nose. The overlapping skin has been marked. **b** Closed eyes. **c** Semilunar excision area – completed markings. **d** Skin excisions and **e** pull-out running intradermal sutures

Fig. 33.2. **a** Excess skin check with T-forceps. **b** Precise excision with radiofrequency waves (4.0 MHz). **c** After 10 days the scar is still visible, but could be hidden with cosmetic camouflage. **d** Unobtrusive scarring after 3 months

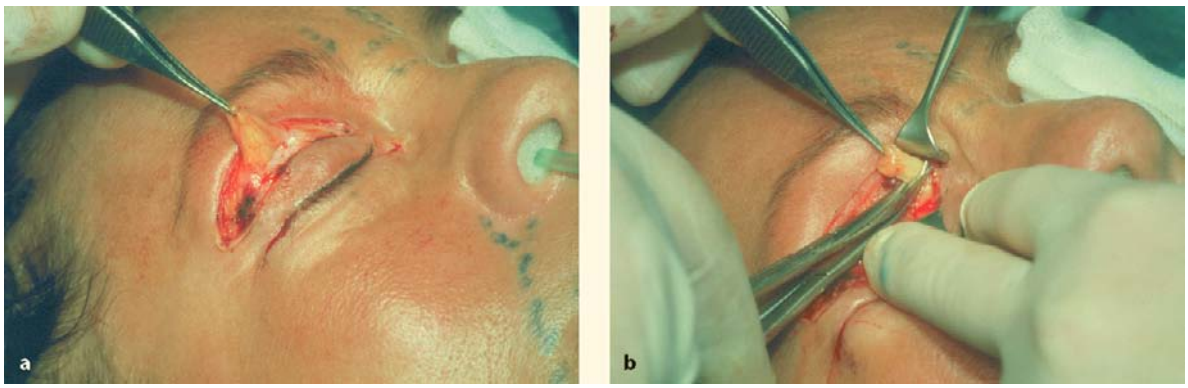

Fig. 33.3. **a** Central fat pad and **b** medial fat pad to be clamped with forceps, cut off, and coagulated for haemostasis

- The highest point of upper-eyelid curvature is slightly nasal from the pupil.
- The lowest portion of the lower-eyelid curvature is slightly temporal from the limbus.

Before starting to do eyelid surgery, we have to recapitulate many anatomical details. To understand the physiology of eyelids we should realize the complexity of the orbicularis oculi muscle. After myocardium muscle, this is the second-most active muscle of the human body–it contracts on average every 4 s when we are awake. It is the mechanical protector of the eyeball (corneal reflex) and the collector and distributor of lacrimal secretion. Owing to its delicate synchronic movements, this muscle is the protagonist of fine mimic expressions.

Some surgical techniques produce dysfunction of the orbicularis oculi muscle. In upper eyelids we also

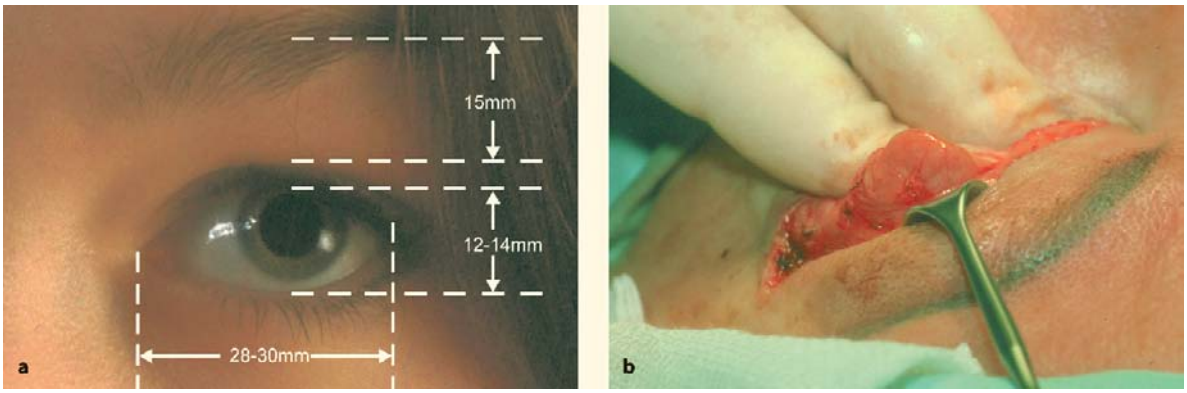

Fig. 33.4. **a** Pleasing eye: palpebral fissure: 12–14 mm horizontal eye axis: 28–30 mm. **b** Sometimes in the lateral part of the upper orbita the lacrimal gland could show prolapse. It should be repositioned and closed by septal sutures

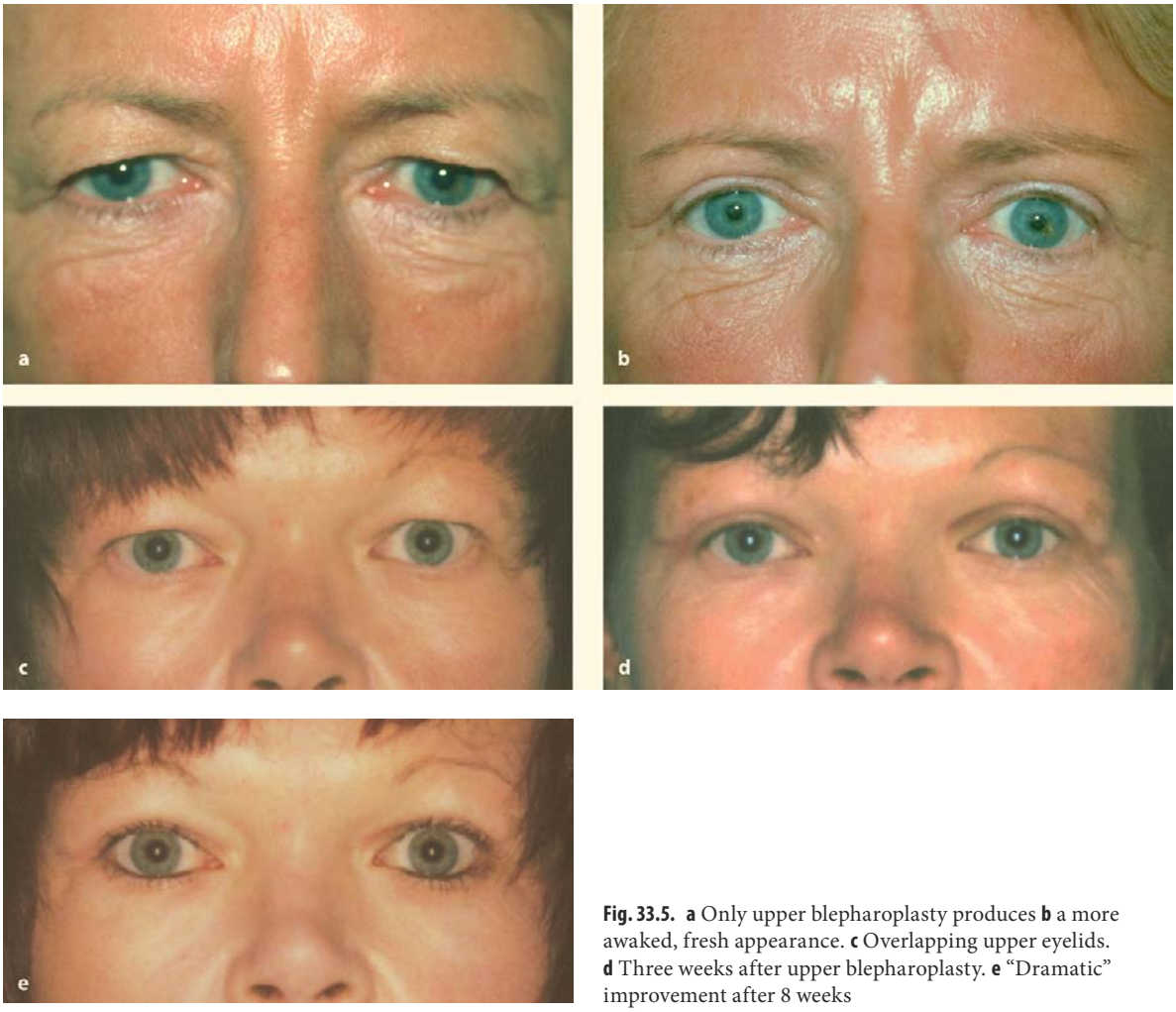

Fig. 33.5. **a** Only upper blepharoplasty produces **b** a more awaked, fresh appearance. **c** Overlapping upper eyelids. **d** Three weeks after upper blepharoplasty. **e** "Dramatic" improvement after 8 weeks

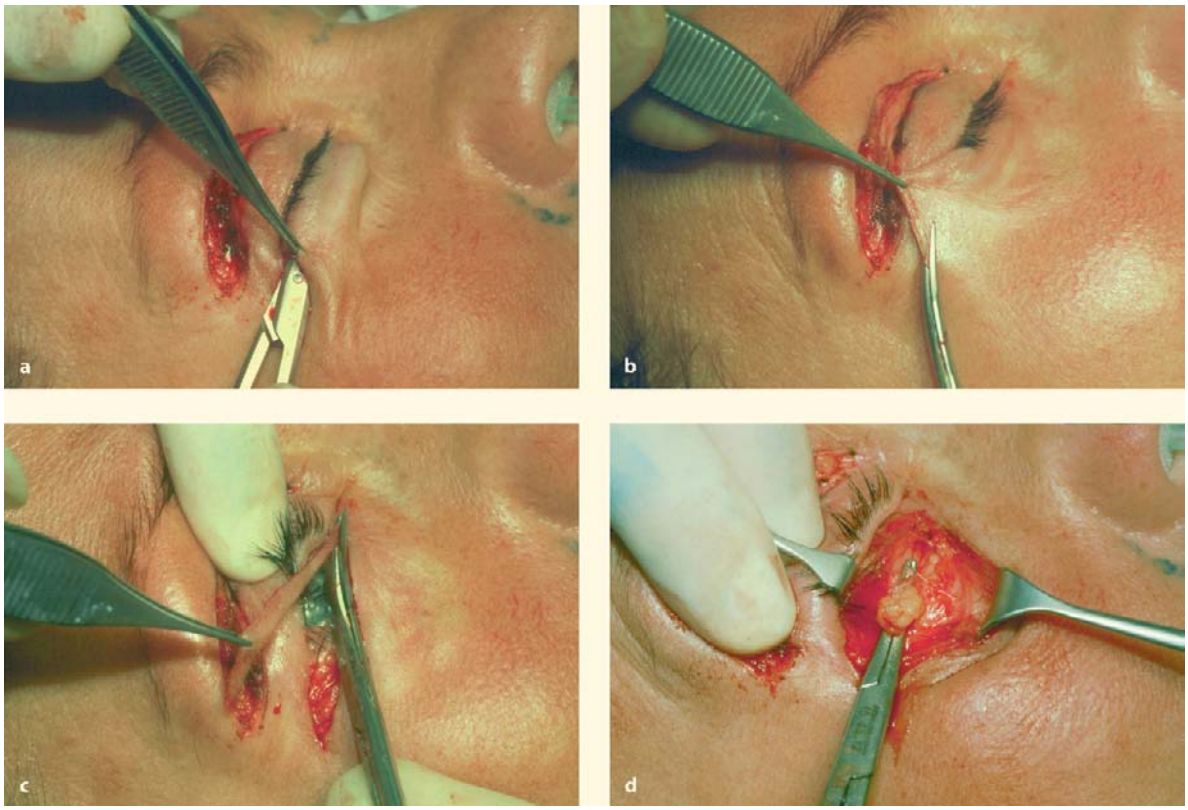

Fig. 33.6. **a** The skin should be carefully separated from underlying fibres of orbicularis oculi muscle. **b** More skin excision from the lateral triangle than **c** from the subciliar region. **d** Removal of central extruded fat pad

sometimes preserve fibres of the orbicularis oculi muscle to restore the fullness of them, but in the lower eyelids nowadays we almost regularly preserve them to save the innervation which comes from temporofrontal and zygomatic branches of the facial nerve. Some 15 years ago it was usual to take out a strip of orbicularis oculi muscle fibres in lower blepharoplasty. Today it would be done just in the case of muscle hypertrophy that is obvious preoperatively.

Today's trend is "less is not more but very often more than enough". Or to use a German saying: "Enough is better than too much." We should operate on eyelids as conservatively as possible, that is the advice of Glenn Jelks from New York.

For lower blepharoplasty the special "no-touch technique" has been developed. "No touch" is related to the orbicularis oculi muscle and its innervation. Access to the infraorbital herniated fat should be done transconjuctivally – through a 1-cm-long incision parallel to the lower eyelid rim and 3 mm below it. The fat pads could be repositioned or carefully reduced. The excess skin should be removed superficially without touching the fibres of the orbicularis oculi muscle from both sides!

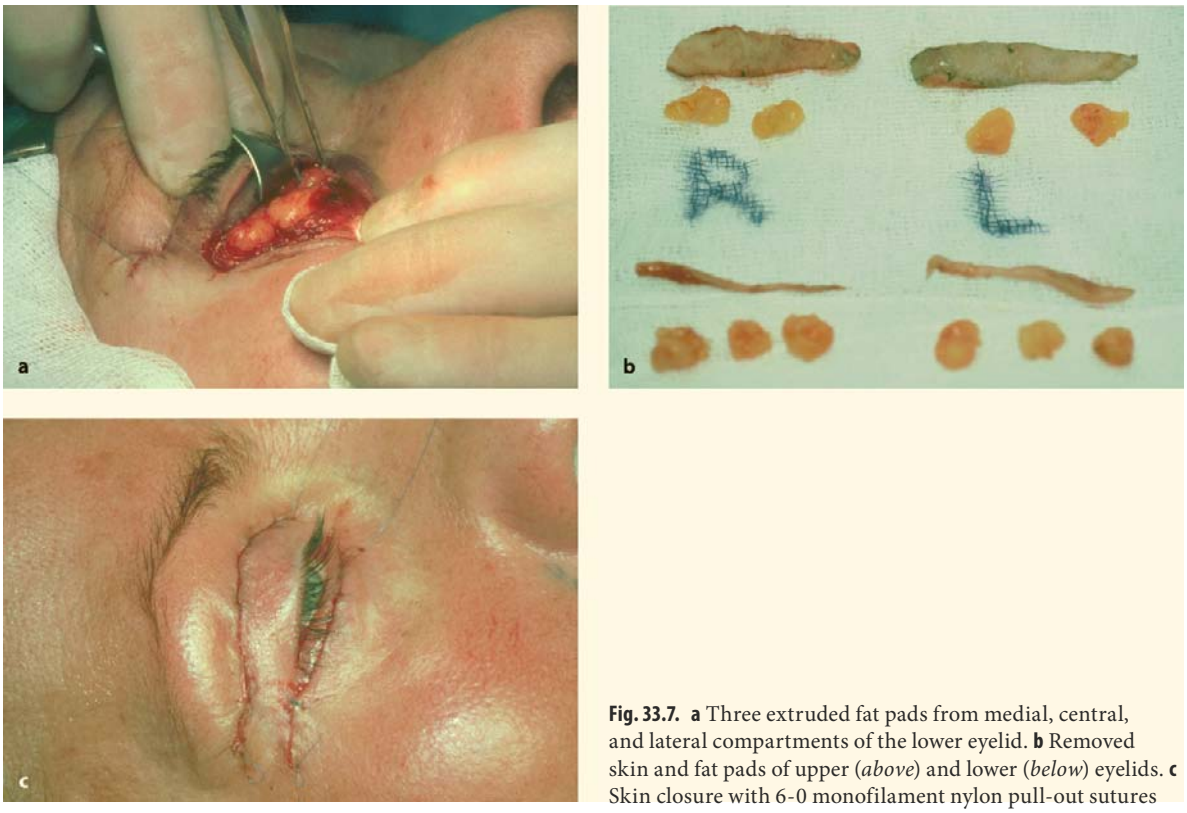

Fig. 33.7. **a** Three extruded fat pads from medial, central, and lateral compartments of the lower eyelid. **b** Removed skin and fat pads of upper (*above*) and lower (*below*) eyelids. **c** Skin closure with 6-0 monofilament nylon pull-out sutures

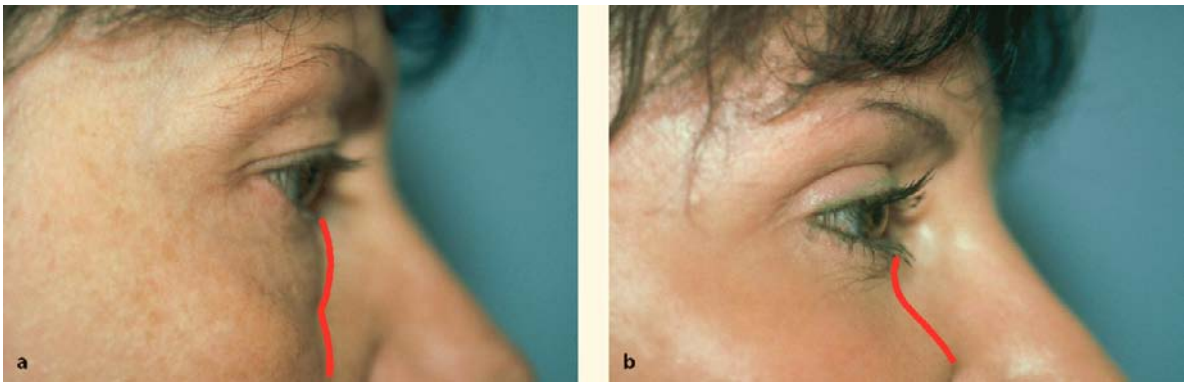

Fig. 33.8. **a** "Baggy" upper eyelids and negative vector of lower eyelid cheek junction. **b** Much smoother appearance postoperatively

Photographic documentation pre- and postoperatively is very important:

- For analysis: preoperatively what should be done, postoperatively to check the results achieved
- To show the change (improvement) to the patient
- For scientific reasons
- Sometimes for forensic reasons

There are six standard views which can be recommended: (1) straight look into the objective – open eyes, (2) closed eyes, (3) look 45° above and (4) 45° below the horizontal line, (5) left profile, and (6) right profile.

The eyebrow position can influence the upper-eyelid appearance through medial, lateral, or complete brow ptosis. Upper-eyelid ageing may include medial bags, lateral bags, dermatochalasis, and levator weakness or dehiscence.

Fig. 33.9. **a** "Heavy" upper and lower eyelids due to muscle hypertrophy. **b** "Evil look" turns to "mild look". **c** Hypertrophy of orbicularis oculi muscle fibres only below. **d** Partial resected strip of muscle fibres of lower eyelid

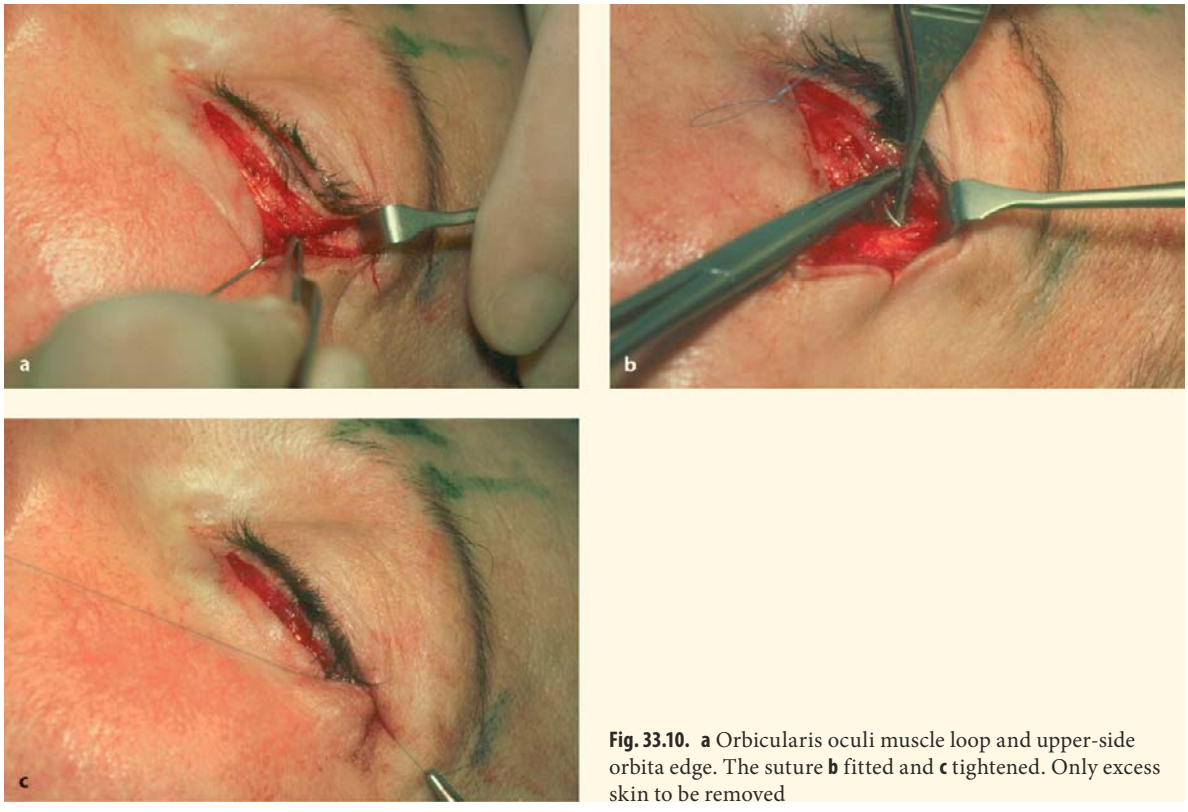

Fig. 33.10. **a** Orbicularis oculi muscle loop and upper-side orbita edge. The suture **b** fitted and **c** tightened. Only excess skin to be removed

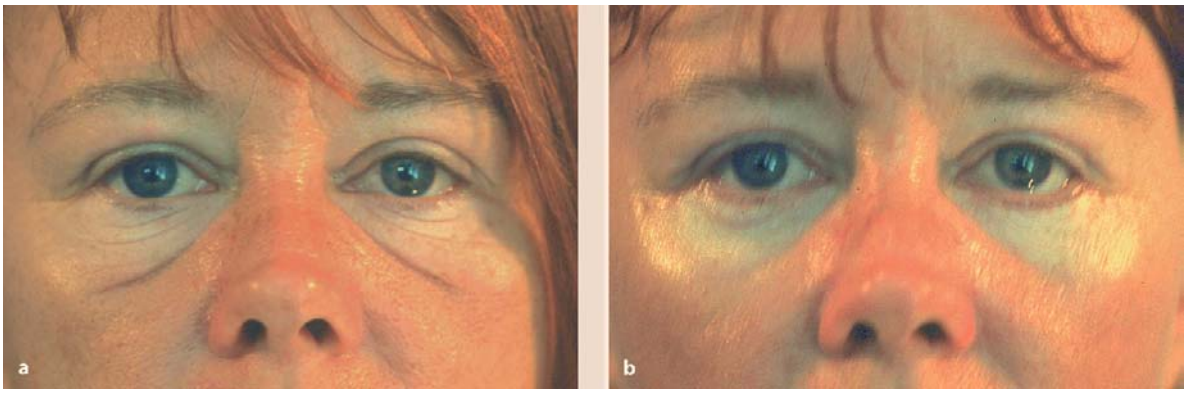

Fig. 33.11. **a** Festooned skin of lower eyelids. **b** Appearance 2 weeks postoperatively

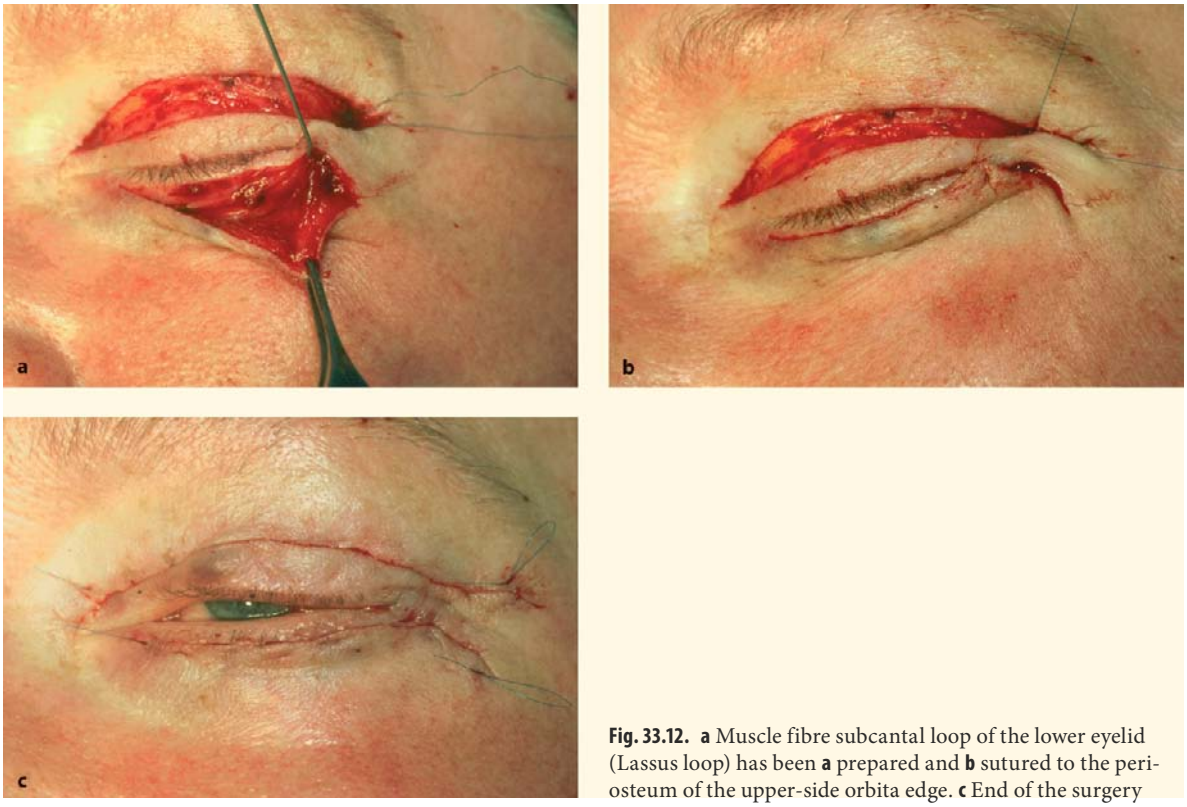

Fig. 33.12. **a** Muscle fibre subcantal loop of the lower eyelid (Lassus loop) has been **a** prepared and **b** sutured to the periosteum of the upper-side orbita edge. **c** End of the surgery

Lower-eyelid ageing can produce skin excess, fat herniation, scleral show, orbicularis hypertrophy, and festooning.

Patient selection is very important. Good candidates have obvious deformity and psychic stability. Relative contraindications are patients with:

- Significant orbital pathology
- Exophtalmos
- "Dry eye" syndrome
- Unrealistic expectations

Before surgery we perform dermographic planning. First the lower incision should be marked between 9 and 13 mm above the rim, on closed eyes. Then the patient opens her/his eyes and looks at the root of our nose when we face each other symmetrically. Now we mark the corresponding point of excess skin overlapping the lower incision line. The patient closes his/her eyes again and we complete marking semilunar skin area to be excised. At the same time we mark a 2–4 mm incision in one of crow's-feet as access to the lower blepharoplasty, which should be 7–10 mm below the upper-eyelid incision line.

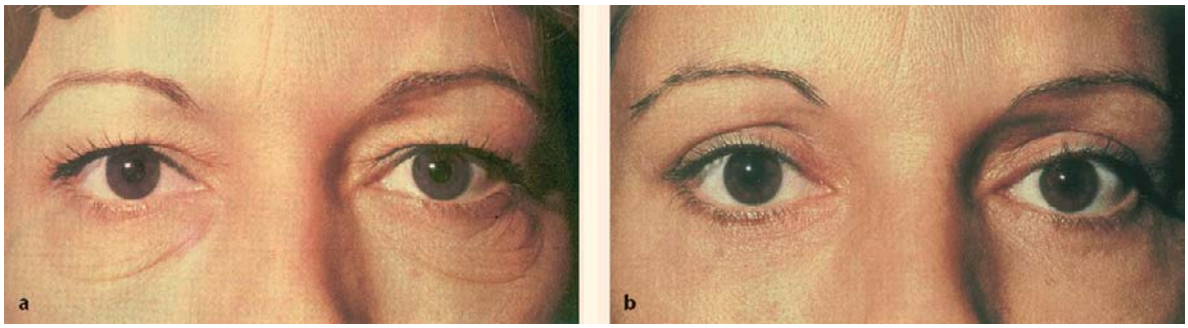

Fig. 33.13. **a** Thirty-four year old women who worked for 10 years under neon light illumination. **b** Appearance 3 months postoperatively

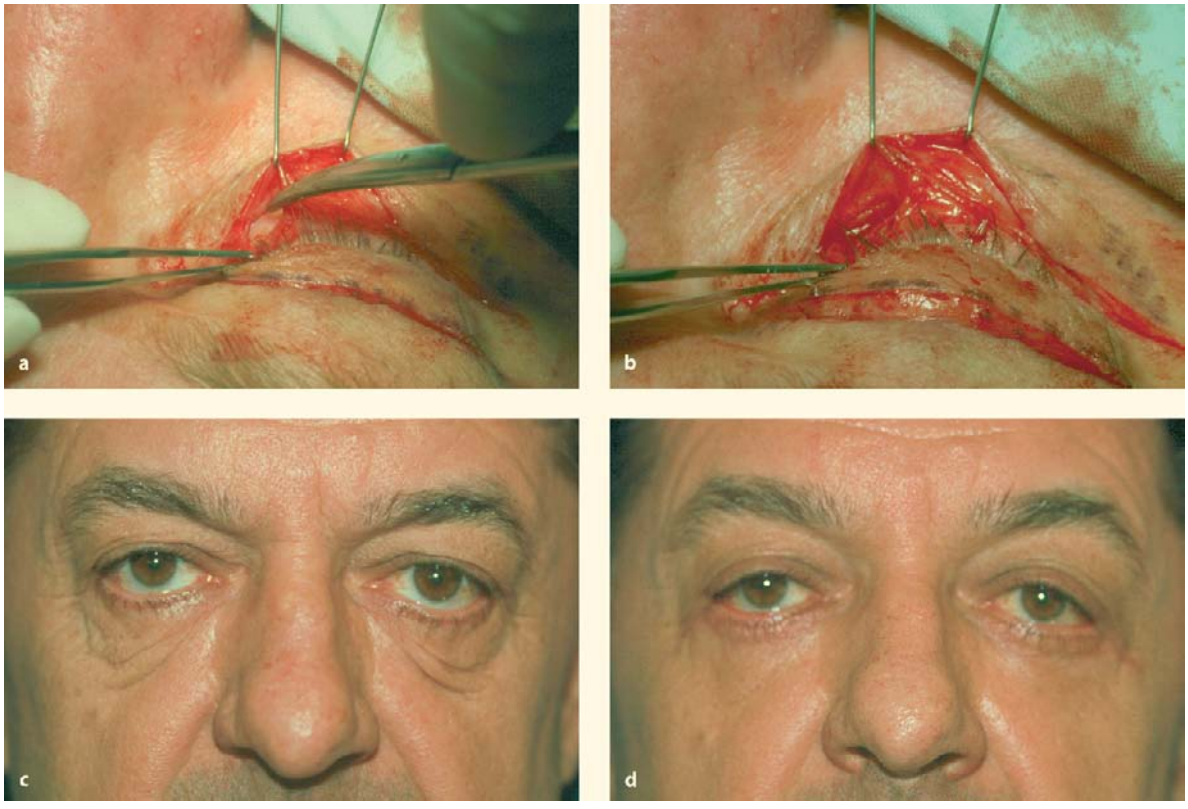

Fig. 33.14. **a** Septum orbitale to be sutured to the arcus marginalis. **b** Finished suture. **c** In this patient on the right side the fat has been repositioned and the septum orbitale closed (Hamra) and the left side suspended per muscle loop (Lassus). **d** There is no obvious difference 2 weeks postoperatively

Doing dermographic markings in the standing position, we should remember that inexperienced plastic surgeons make usually the mistake of not excising enough skin from upper eyelids, and much worse excise too much skin from lower eyelids. Then, sometimes full skin grafts have to be inserted to mitigate the mistake. The mistake with the upper eyelids is easy to correct: just remove the small strip of still excess skin. We control the proposed skin excision by asking the patient to open and close his/her eyes several times.

With local anaesthesia and intravenous analgosedation, we remove now sufficient redundant upper-eyelid skin; if the eyelids are "heavy" we remove also a strip of orbicularis oculi muscle and finally one to two fat pads. We should remove well-defined supratarsal skin so that the scar will clearly fit into the orbitopalpebral sulcus.

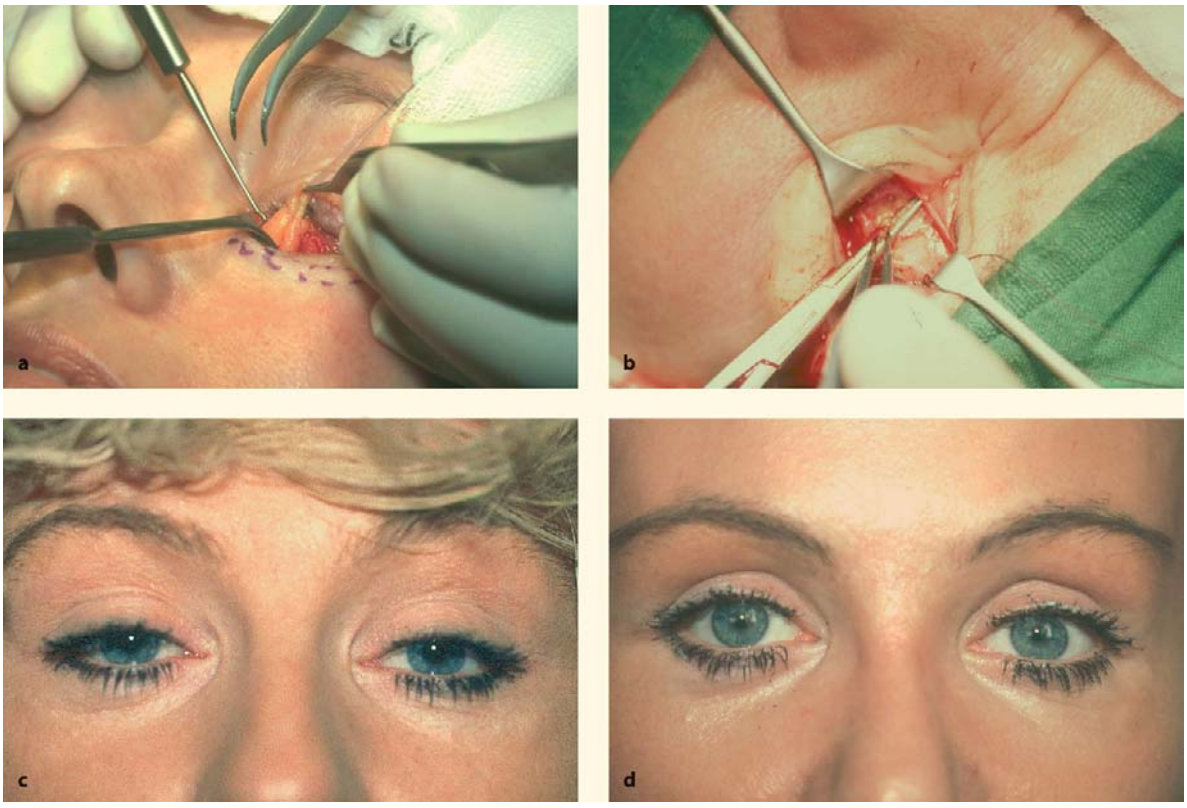

Fig. 33.15. **a** Transconjunctival fat pad expulsion. **b** Squeezing the fat pad with forceps, removal, and haemostasis. The patient **c** before and **d** after "no-touch technique" of lower eyelid – only a small strip of external skin has been removed and classic upper blepharoplasty

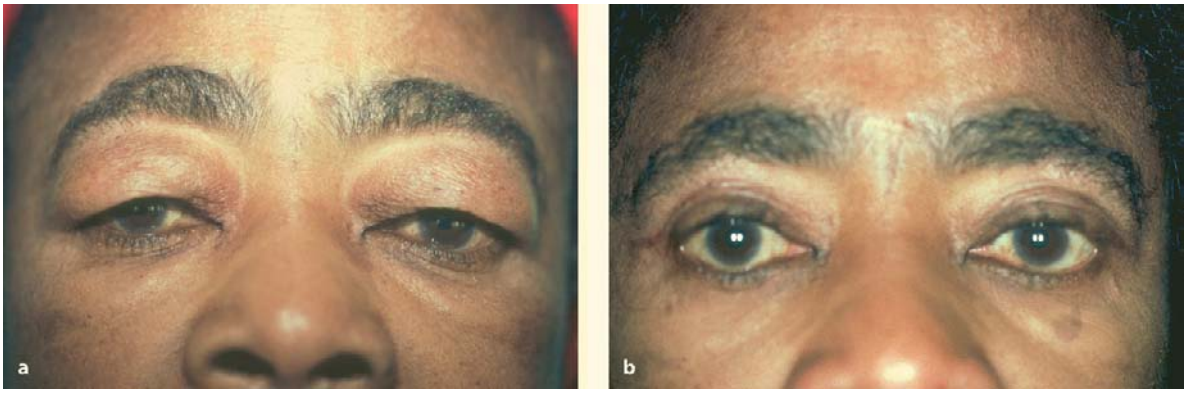

Fig. 33.16. **a** A lot of excess skin and fat. **b** Six weeks postoperatively In dark skin the ends of scars are visible longer

The goal of lower blepharoplasty is modest removal of excess skin because the overcorrection is unforgiving. If we perform both upper and lower blepharoplasty, it is advisable to suture the upper eyelid first, before resecting the skin of the lower eyelid. Some amount of tension will arise and prevent us from resecting too much skin from lower eyelid.

When we undermine the skin of the lower eyelid by spreading scissors or forceps, we continue the short 2–4 mm lateral incision 1 mm below the ciliary margin in the medial direction and it looks like a bayonet. This may be done with scissors, radiofrequency waves, or a scalpel blade. The skin flap should be carefully separated from the underlying orbicularis oculi muscle fibres. When resecting the skin, we remove more

Fig. 33.17. **a** Malar fat pads are hardly correctable with lower blepharoplasty. **b** Dermographic markings for conventional upper blepharoplasty and direct excisions of malar fat pads – reverse lower blepharoplasty (of Juarez Avelar). **c** The scars look like skin folds

from the lateral triangle than from below the eyelashes to prevent ectropion!

There are mostly three compartments of the lower eyelid with fat pads: medial, central, and lateral. The central herniated and extruding fat pad is usually the largest one. In the past, we used to moderately resect them – otherwise we would deepen the hollow lower eyelid, which is aesthetically disadvantageous. The fat pads can appear with slight digital pressure on the eyelid and they "jump out" if we incise the tiny sheet which surrounds them. We squeeze the fat pad with small forceps, remove the excess fat with scissors, and electrocoagulate the stump for haemostasis. Today, most prominent plastic surgeons prefer the reposition of the fat pads into the infraorbital space to raise the eyeball and to prevent enophtalmos. The septum orbitale should be sutured on the arcus marginalis to close the infraorbital space after herniated fat has been repositioned.

The semilunar excision of the upper eyelids is related to the excess skin and should not be extended onto nasal skin. Otherwise a transverse scar contracture or webbing will occur. We end the operation with haemostasis by a electrocautary device and skin closure with 6-0 monofilament nylon intradermal pull-out sutures and paper stitching plaster or we can also use Dermabond if the wound edges are adaptable.

If we do both upper and lower blepharoplasty, it is advisable to put a single interpalpebral fixation some 3 mm medial to the lateral eye angle for 4–7 days. Doing so, we can prevent in most cases the reactive inflammatory ectropion.

Postoperative treatment should include light cooling of eyes in the first 6 h to prevent bleeding and swelling. Eyedrops of physiological solution are recommended for the first few days as well as cleaning the eyelashes with small cotton wool sticks. We remove the pull-out-sutures after 3–6 days.

There are numerous things that can go wrong. Some of them are extremely seldom, like blindness:

1. Dry eye syndrome (lubrication should be done).
2. Scar hypertrophy and keloids (rare).
3. Epiphora (tearing) and chemosis.
4. Prolonged discoloration.
5. Postoperative bleeding (oestrogen hormones? aspirin? coffee?).
6. Atrophy resulting from steroid injections.
7. Retrobulbar haematoma.
8. Loss of vision (retinal artery occlusion associated with retrobulbar haematoma). In Moser's classic article there were seven cases of postoperative unilateral blindness.
9. Overresection of fat pads.
10. Ptosis ("lazy eye" preoperatively?).

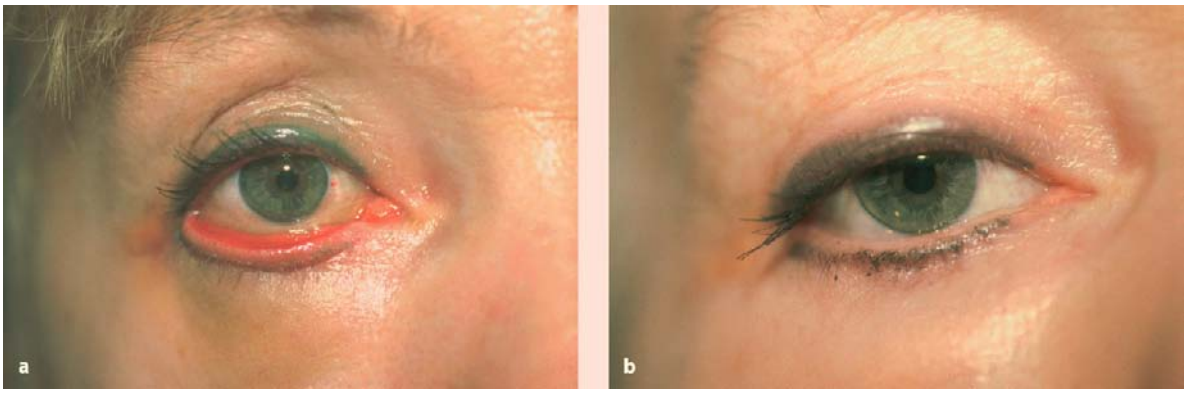

Fig. 33.18. **a** Severe conjunctivitis with inflammatory ectropion after lower blepharoplasty (2 years before, laser peeling was done). **b** Condition after 3 months of conservative therapy (eyedrops, steroids, lymphodrainage)

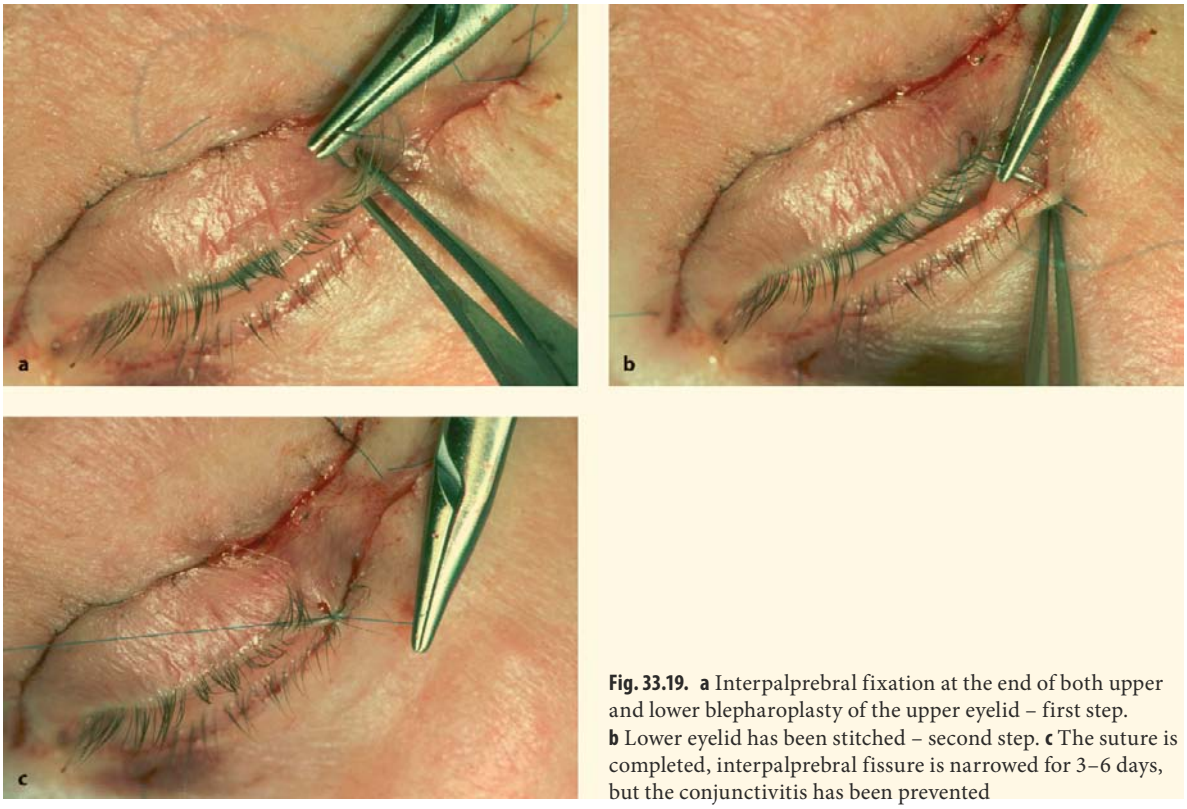

Fig. 33.19. **a** Interpalprebral fixation at the end of both upper and lower blepharoplasty of the upper eyelid – first step. **b** Lower eyelid has been stitched – second step. **c** The suture is completed, interpalprebral fissure is narrowed for 3–6 days, but the conjunctivitis has been prevented

11. Persistent small wrinkles (Patient: "Look at me when I smile!" Surgeon: "If you don't smile, you will get wrinkles on your soul, and then you are really old.").
12. Temporary paresis of the lower eyelid (spontaneous recovery within a few days).
13. Damage to the inferior oblique muscle (diplopia!): too deep preparation between the medial and the central fat pad could damage the attachment of this muscle.
14. Wound dehiscence (too early setting of contact lenses? – they should not be worn for 3 weeks postoperatively).
15. Infection.
16. Blepharitis.
17. Inability to close the eyes (temporarily).

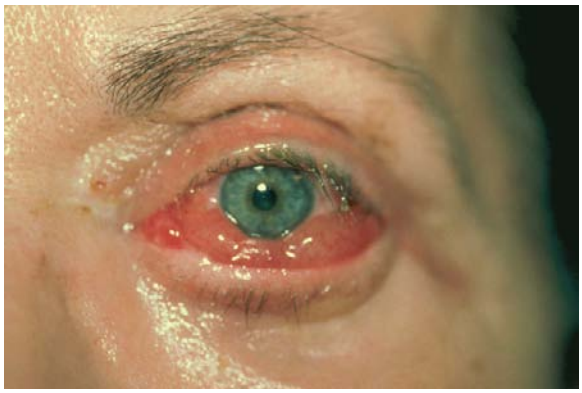

Fig. 33.20. Severe postoperative blepharitis had been treated conventionally and operatively by partial conjunctivectomy; 5 months of treatment requires extreme patience from both patient and surgeon

Fig. 33.21. Real ectropion (from another office): 4 mm deficit of eyelid closure on both sides due to too early blepharoplasty with removal of wrinkle filler 2 weeks before; the patient lost her job, wedding cancelled – personal catastrophe

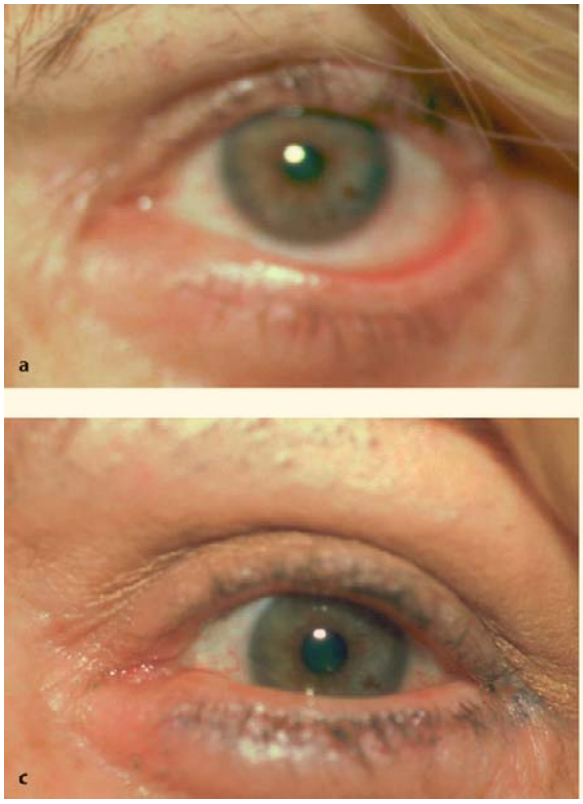

Fig. 33.22. **a** Threatening conjunctivitis with reactive ectropion 5 days postoperatively after removal of pull-out-sutures. **b** Interpalprebral suture on fifth day postoperatively. **c** After 3 weeks, scleral show and ectropion disappeared

18. The real ectropion.
19. Too much upper-eyelid skin remains.
20. Irregular or unsightly scars (dramatic improvement within 8–10 weeks is possible)
21. Prolapsed lacrimal glands.
22. Persisting malar pouches.
23. Lower-eyelid laxity.

The most common complication in our clinic is irritative conjunctivitis mostly starting from a lateral angle sometimes on both eyes, but mostly just as unilateral conjunctivitis causing inflammatory ectropion, which is reversible if conservatively treated (eyedrops, steroids, massage) but could take months to be cured. Steven Fagien from the USA has suggested bepalpebral fixation at the end of surgery to prevent this

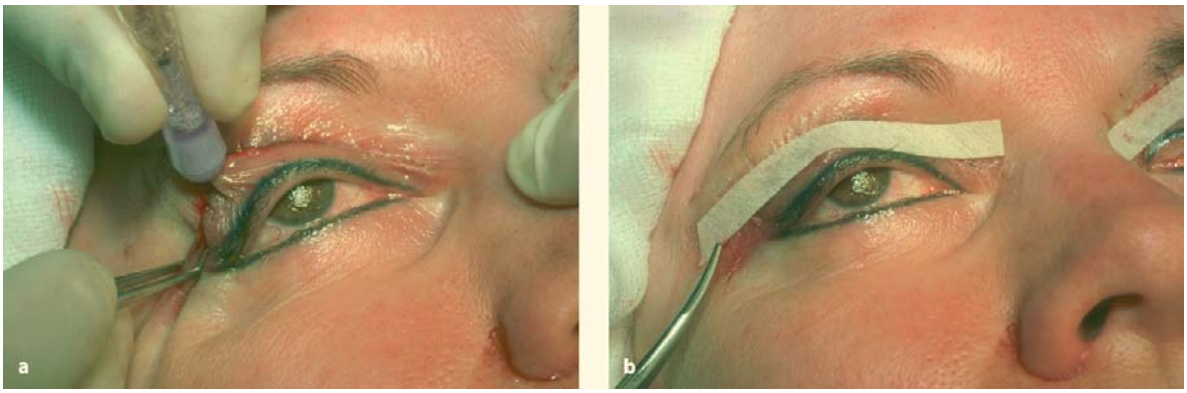

Fig. 33.23. Instead of sutures, skin closure could be made by **a** skin adhesives (Dermabond). and **b** suture stripe; peroperative sclera protection by vitamin ointment (Bepanten)

irritative ectropion. When doing both upper and lower eyelids, we now use routinely this suture. Once we applied it on the fifth day. When we were removing the pull-out sutures, conjunctivitis and unilateral inflammatory ectropion developed. When the bepalpebral suture was applied for 3 weeks the inflammation and ectropion disappeared.

When I was starting my career as a plastic surgeon, I thought blepharoplasty would be one of the simplest surgeries to perform. Now I know it is one of most demanding operative procedures in aesthetic plastic surgery and the failures are often "unforgettable".

Bibliography

Please see the general bibliography at the end of this book.

Periorbital Rejuvenation

34

André Camirand

34.1 Introduction

In managing periorbital ageing, one must evaluate the brow, the upper lid, the lower lid (position, amount of skin, muscle and herniated fat pads), the anti-Mongoloid fissure, the wrinkles (frontal, corrugator, procerus, static and dynamic crow's-feet), the width of the forehead (level of the hairline), the tear trough deformity and the very important position of the globe in the orbit (enophthalmia).

34.2 Brow Lift and Upper Blepharoplasty

As we age, the hairline recedes and the brow comes down. The width of the forehead increases, an obvious sign of ageing. The brow coming down below the orbital rim will come closer to the eyelashes (the normal distance being 2.5 cm in women and 2 cm in men) creating a pseudodermachalasis of the upper lid. This will camouflage in many cases the ageing of the shallow upper lid. The lowered brow will be partly responsible for the static crow's-feet and the chalasis in the glabellar area. We develop frontal wrinkles because we soon learn that when we look in the mirror, we improve our appearance (brow and upper lid) and eventually we develop a reflex of raising one's brow when we recognise someone on the street, thus giving a better impression of our physical appearance. We also raise our lowered brows to see better, all of this accentuating the frontal wrinkles. An upper blepharoplasty with an unaddressed lower brow will further activate the frontal muscles and make the frontal wrinkles more obvious. Besides, it will further reduce the distance between the brow and the eyelashes.

An open brow lift will raise the brow, reduce the pseudodermachalasis of the upper lids, and improve the glabellar wrinkles and static crow's-feet. One can simultaneously do an upper blepharoplasty but I prefer to wait 3 months longer to do it. I cut and coagulate the procerus, the corrugator and occasionally the vertical fibres of the lateral orbicularis oculi muscle. This will prevent or delay a recurrence. Sectioning the vertical fibres will reduce the dynamic crow's-feet.

A subcutaneous, a subgaleal or a subperiosteal approach can be utilised; I prefer the subperiosteal approach and go below the orbital rim and I section the periosteum with small scissors from one side to the other. This can give me a more permanent result and reduce the tension on skin closure.

Only the open hairline incision can reduce the width of forehead, the most obvious signs of the ageing face (man or woman) and, in practice, this has been the greatest source of satisfaction. The hairline incision can be inconspicuous if it is bevelled in order to cut the hair follicles of the proximal flap as the hair will grow through the distal flap provided it is bevelled with the same angle as the incision (approximately 45°) (Figs. 34.1, 34.2). Besides bevelling the incision, we "W" plasty it [9, 10].

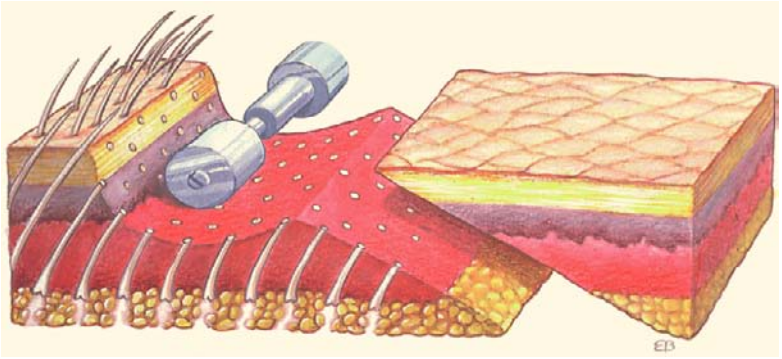

Fig. 34.1. After dermabrasion on a man's cheek, hair will grow back and he will have to shave. When a hairline incision is bevelled (as well as the distal flap), hair will grow in front of the scars as the superficial cells of the distal flap are shed

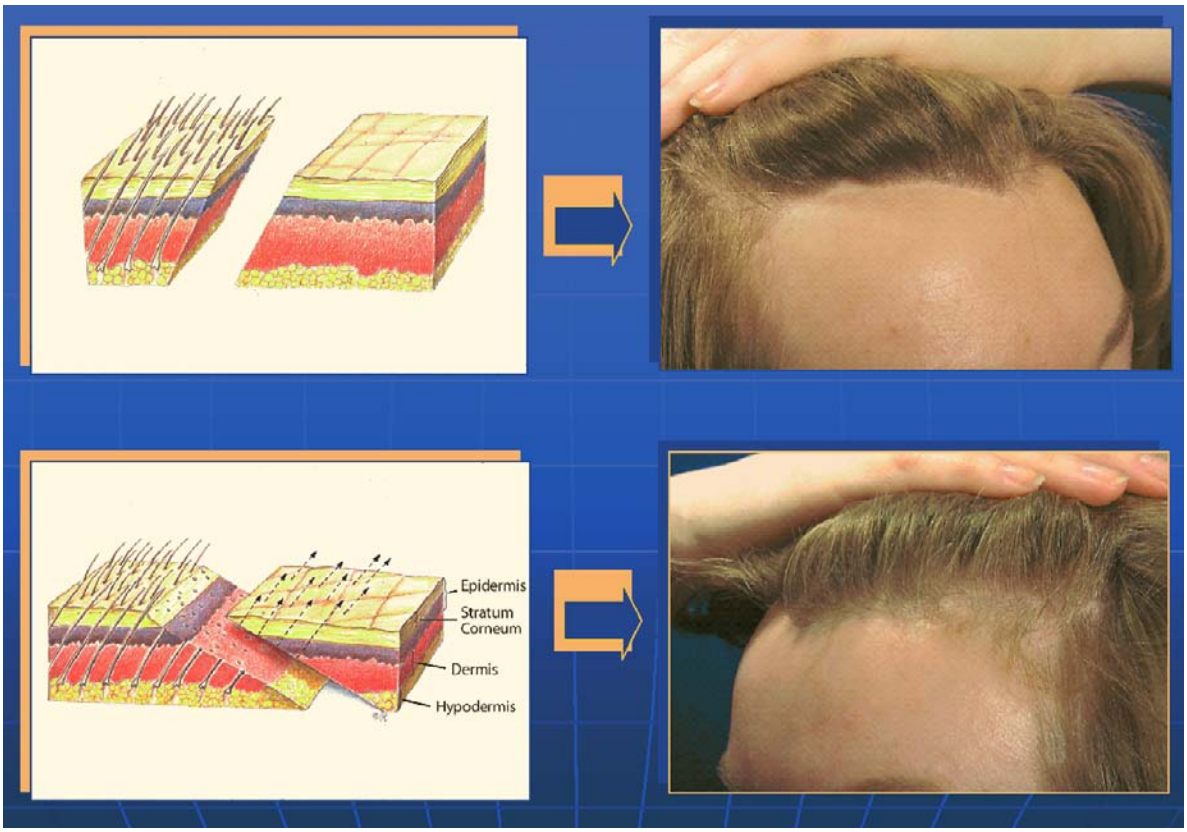

Fig. 34.2. *Top*: Scars with an incision done parallel to the hair follicles (it is visible, linear, nonpigmented and without hair growing into and in front of the scar). *Bottom*: An invisible scar and advanced hairline because hair grows in front of the scar

The endoscopic lift is very efficient in raising the median forehead and brow but remember the frontal muscle does not raise the tail of the brow and therefore it would not help much to improve crow's-feet. In most patients, the lateral part must be raised more than the medial counterpart. The same applies for the transpalpebral corrugator and procerus resection [12]. We can say the same for the use of Botox. So, the lateral brow being lower than its medial counterpart will become more obvious by weakening the central depressor as it gives an unnatural and older look.

The majority of my patients need more of a lateral raise than a medial raise and mostly the incomparable benefit of advancing and lowering the hairline makes the open brow lift my procedure of choice and this can be done with a resulting inconspicuous scar.

34.3 Upper Lid

As the brow comes down, we get a pseudodermachalasis of the upper lid, which is best managed by a brow lift.

Also, one can have a chalasis with a high brow, then an upper blepharoplasty is indicated. Often, the descended brow will bring abundant skin, muscle and orbital fat in the supratarsal space, giving the illusion of fullness even in the presence of a sunken upper lid. So, before doing a blepharoplasty, always raise the brow approximately 2.5 cm from the upper eyelashes, as you will likely observe a sunken upper lid. You will then often decide to perform a conservative skin resection, without an orbicularis oculi and herniated fat resection. As we age, the levator may stretch or detach from the tarsus, but remains attached to the proximal skin, thereby raising the supratorsal fold, and occasionally you get an associated ptotic lid. The sunken upper lid gets worse as the orbital fat moves out of the orbit and is herniated in the lower lid (Table 34.1) – the Rouleau phenomenon. This is aggravated by the fat atrophy of ageing. All of these factors aggravate the sunken upper lid and enophthalmia.

While performing upper blepharoplasty, I only remove skin and rarely some fat from the medial compartment. Exceptionally, I create a deeper supratarsal fold (by removing orbicularis oculi and fat) when a patient insists.

Table 34.1. Lowering of the Lockwood suspensory ligament

A ↓ space between globe and floor of the orbit	B ↓ space between globe and roof of the orbit	→ *Sunken upper lid* made worse by: 1. Periglobular fat rotation into the lower lid hernia 2. Senile fat atrophy

Extraconical fat herniated anteriorly and we get:
1. *Herniated fat pad* in lower lid
2. Hernia above nonstretchable orbital malar ligament: *tear trough deformity*
3. As fat comes out of the orbit, *enophthalmia* is made worse with
   a) Senile fat atrophy
   b) Surgery
      – Excision
      – Mobilisation into the cheek
      – Coagulation
4. Sunken upper lid

The volume of the nonstretchable bony orbit is constant and the volume of the noncompressible orbital fat is constant until ageing and this then atrophies, making things worse

Now, I make my excisions much lower, approximately 5 mm [11] above the ciliae to recreate a lower supratarsal fold and lid fullness of youth. Remember with age, the levator stretches and detaches itself from the superior tarsus, but its skin attachment raises the supratarsal fold, an obvious sign of ageing. It is wise to reverse this sign of ageing.

One might have to shorten the levator in cases of ptosis.

34.4 Ageing Lower Lid

As the lateral canthus stretches the lateral commissure comes down, and with ageing we reduce our Mongoloid appearance. Also, it gives less support to the lower lid and it results in a pseudodermachalasis, a rounded lower lid and scleral show. Anatomically, we know that the Lockwood suspensory ligament, which is a hammock-like structure anchored to the medial and lateral canthi, maintains the level of the globe in the bony orbit (Figs. 34.3, 34.4). As the lateral canthus comes down, so does the Lockwood suspensory ligament and this will reduce the space between the globe and the floor of the orbit [1–8]. Inevitably the noncompressible infraorbital fat will be projected anteriorly (the path of least resistance) and this fat will herniate anteriorly and above the orbitomalar ligament, which is not stretchable: we get herniated fat pads and a tear trough deformity (Table 34.1). By the same mechanism, we get an enophthalmia and sunken upper lid (Fig 34.5).

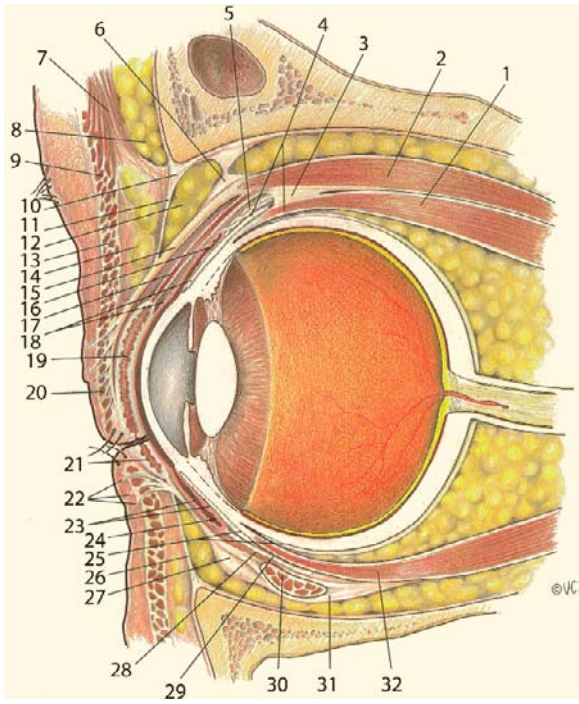

Fig. 34.3. Parasagittal section to show anterior orbital structures. *1* Superior rectus muscle, *2* levator muscle, *3* conjoining of superior rectus muscle with levator muscle sheath, *4* Tenon's capsule, *5* suspensory ligament of superior fornix, *6* Whitnall's ligament, *7* frontalis muscle, *8* brow fat pad, *9* orbital orbicularis, *10* arcus marginalis, *11* orbital septum, *12* preaponeurotic fat pad, *13* preseptal orbicularis, *14* postorbicularis fascia, *15* levator aponeurosis, *16* superior conjunctival fornix, *17* Müller's muscle, *18* conjunctiva, *19* superior tarsus, *20* pretarsal orbicularis, *21* inferior tarsus, *22* musculocutaneous rectrator insertion, *23* conjunctiva, *24* inferior conjunctival fornix, *25* Tenon's capsule, *26* inferior orbital septum, *27* Lockwood's ligament, *28* inferior tarsal muscle, *29* suspensory ligament of inferior fornix, *30* inferior oblique, *31* capsulopalpebral fascia, *32* inferior rectus muscle

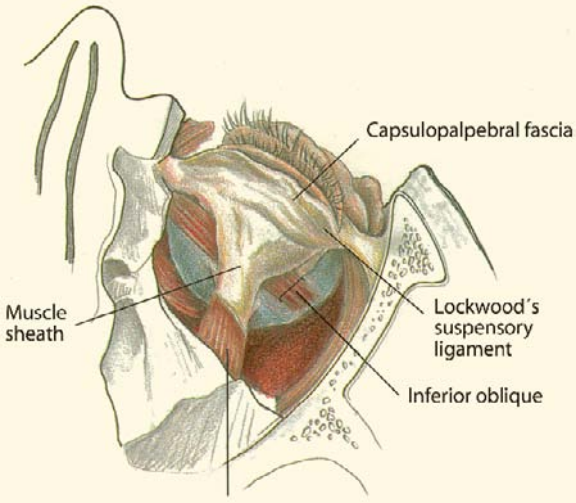

Fig. 34.4. Left orbit viewed from below showing Lockwood's suspensory ligament. It will support the globe in position within the orbit even after the floor has been surgically removed

In young patients, for congenital reasons, the Lockwood suspensory ligament, or even the lateral canthus, can stretch prematurely and it ends up with herniated fat pads and enophthalmia. If we relocate the fat pad, we do not create exophthalmia, which proves the volume of fat was always normal.

The enophthalmia is inevitable because the volume of the rigid bony orbit is constant, so is the volume of the noncompressible or extensible volume of the orbital fat. If fat comes out of the orbit, the eyeball has to move back and down. It is inevitable.

The sunken upper lids result mostly because of the lowering of the globe but also because the orbital fat herniates into the lower lid and because of the reduction of the volume of the orbital content. In older age, senile atrophy also plays a role. The sunken upper lid might be masked by the ptosis of the brow. As the distance between the brow and upper lid is reduced, the volume of the redundant skin orbicularis oculi is larger than the volume of the herniated extraconical fat, which is approximately 1 ml. By raising the brow, the deep upper lid becomes obvious.

34.5 Tear Trough Deformity

If you have a herniated fat pad it will move anteriorly and above the nonstretchable (with time it will stretch) orbitomalar ligament and we get the tear trough deformity (Fig. 34.5). It will be managed by relocating the herniated fat pad into the orbit where it belongs.

A tear trough deformity cannot exist without a herniated fat pad. We feel our approach is more physiological and anatomical than sectioning the orbitomalar ligament and then splaying the fat into the cheek. By freeing the orbitomalar ligament and relocating fat onto the cheek, you add bulk that never was there when younger. Besides, you might reduce the fat pad volume or its projection, but never by as much as if you relocated it completely into the orbit where it was located before ageing; in other words, you only get a partial correction of the herniated fat pad, some of which is left in place. Beside the orbitomalar ligament is an osseocutaneous ligament giving support to the cheek and indirectly to the premalar fat pad. Will they lose support with time? Should it not be left intact?

34.6 Technique

In 1993, while performing a transconjunctival lower blepharoplasty, we sutured the lower flap (conjunctiva, inferior tarsal muscle, and capsulopalpebral fascia) to the arcus marginalis, which is the fusion of the orbital septum with the periosteum of the orbital rim (Fig. 34.3). We removed the double-pronged hook and replaced the eyelid on the eyeball. Pressing on the globe, we noticed two hernias, one on each side of the stitch.

Encouraged by this observation, we placed two more stitches to suture the lower flap to the orbital rim. Then, pressing on the eyeball, we could not recreate the herniated fat pad nor the enophthalmia. On the opposite side, we used a continuous suture, and this has been our only management of the herniated fat pad since [1–8]. The level of satisfaction of our patients has been very high (Fig. 34.6). As you perform your next tranconjunctival blepharoplasty, try one, two, or three stitches, as I did the first time. Then if you do not like it, remove your stitches and remove the fat as usual. One can use the conventional transconjunctival incision. You must keep away from the inferior tarsus because you can damage anteriorly the orbital septum and adjacent orbicularis oculi. They converge with the capsulopalpebral fascia as they enter into the inferior tarsus (Fig. 34.3). You must avoid scarification at this level, and you must avoid the numerous vertical motor nerves innervating the pretarsal orbicularis oculi muscle from behind (the nerves run deep to the orbicularis oculi muscle; although there is a multiplicity of nerves and it is difficult to denervate the orbicularis oculi, one must be cautious).

Before prepping and draping, I use 1% Xylocaine 1% with epinephrine to anaesthetise the lower lid and

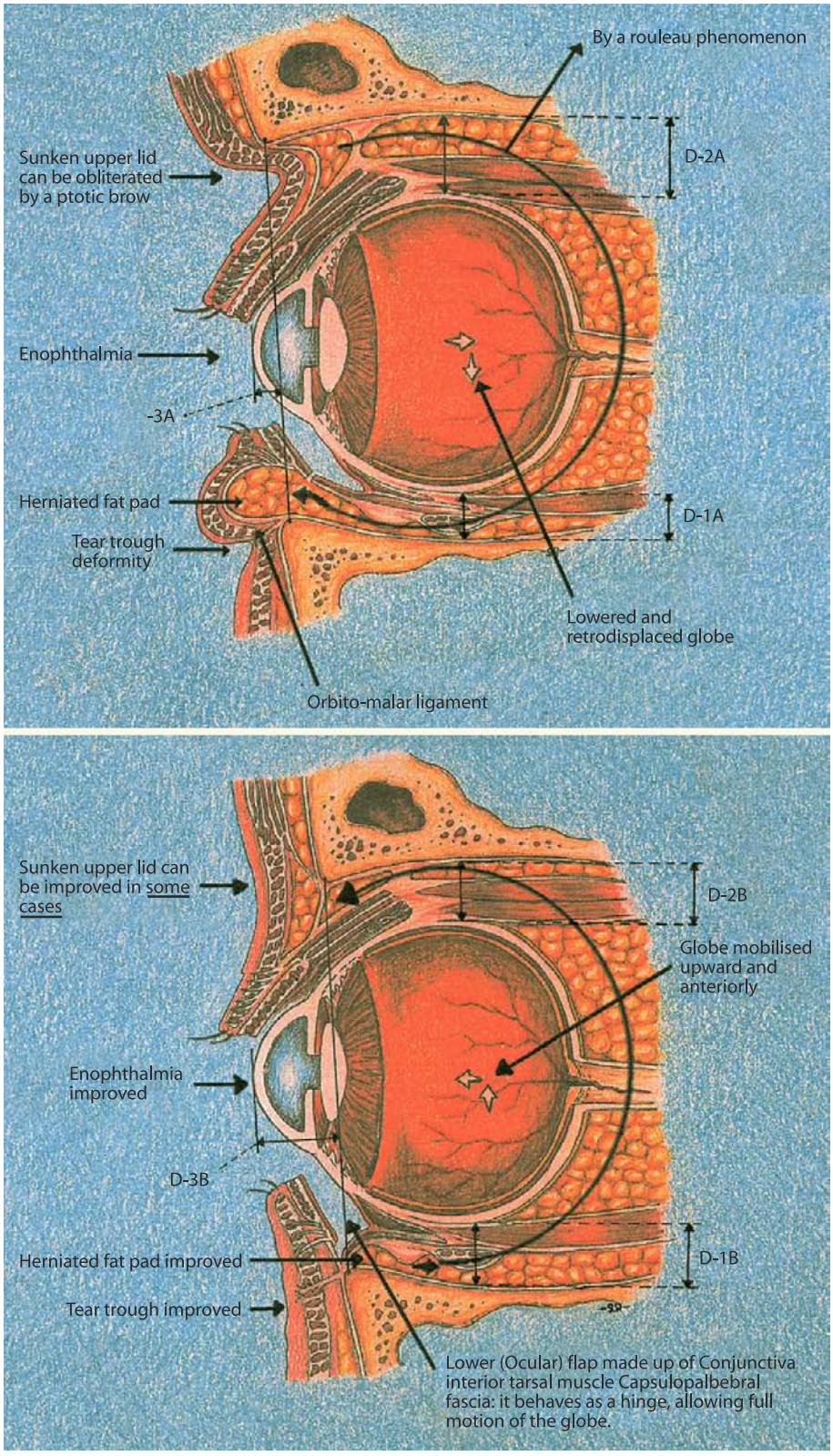

Fig. 34.5. As the globe comes down, the extraconical orbital fat must herniate anteriorly, which reduces the orbital content and makes enophthalmia inevitable. Because the fat herniates above the orbital malar ligament, tear trough deformity occurs, as well as a sunken upper lid that can be masked by a ptotic brow

Fig. 34.6. Two different patients. Before and after pictures of our technique, which improves the herniated fat pad, and the tear trough deformity and the enophthalmia

into the orbital floor. Once draped, I use two drops of 0.5% Alcaine and two drops of Proviodine in each conjunctival cul de sac it is always very contaminated according to my ophtalmologist colleagues. Then, I insert a corneal lens and raise the upper lid by suturing it to the forehead with a nylon 3×0 suture. Using a double-pronged hook, I evert the lower lid and with curved pointed scissors, I palpate and incise just below the orbital rim and expose the fat as in any transconjunctival blepharoplasty. With Adson–Brown forceps and curved scissors, I free from the anterior surface the herniated fat pad and expose the orbital rim, which is easily palpable with the finger, the forceps or the scissors. An assistant, using a Desmarais retractor, or a double-pronged hook in one hand to evert the lower lid and using a freer in the other hand to push the herniated pad back over the orbital floor, exposes the orbital rim. If any difficulty is encountered, then we do not hesitate to perform a lateral cantholysis. It is easily done, there is minimal morbidity, no cosmetic sequelae and it makes everything so simple. I use an absorbable Bondex 4×0: a PE2 needle or any equivalent needle is indispensable because it is very small and very strong (there is very little space available). I use a continuous suture to fix the lower flap of the transconjunctival incision, which consists of the conjunctival inferior tarsal muscle and the capsulopalpebral fascia to the arcus marginalis. It is always present medially (because of the origin of the orbicularis oculi[1]), and laterally I suture the lower flaps to the tissues surrounding the inferior orbital rim; the suture does not have to be very strong, because the tension required to maintain the herniated fat within the orbit is minimal; this can be verified by using your fingers and reducing your pads while fac-

1) The arcus marginalis is often absent laterally.

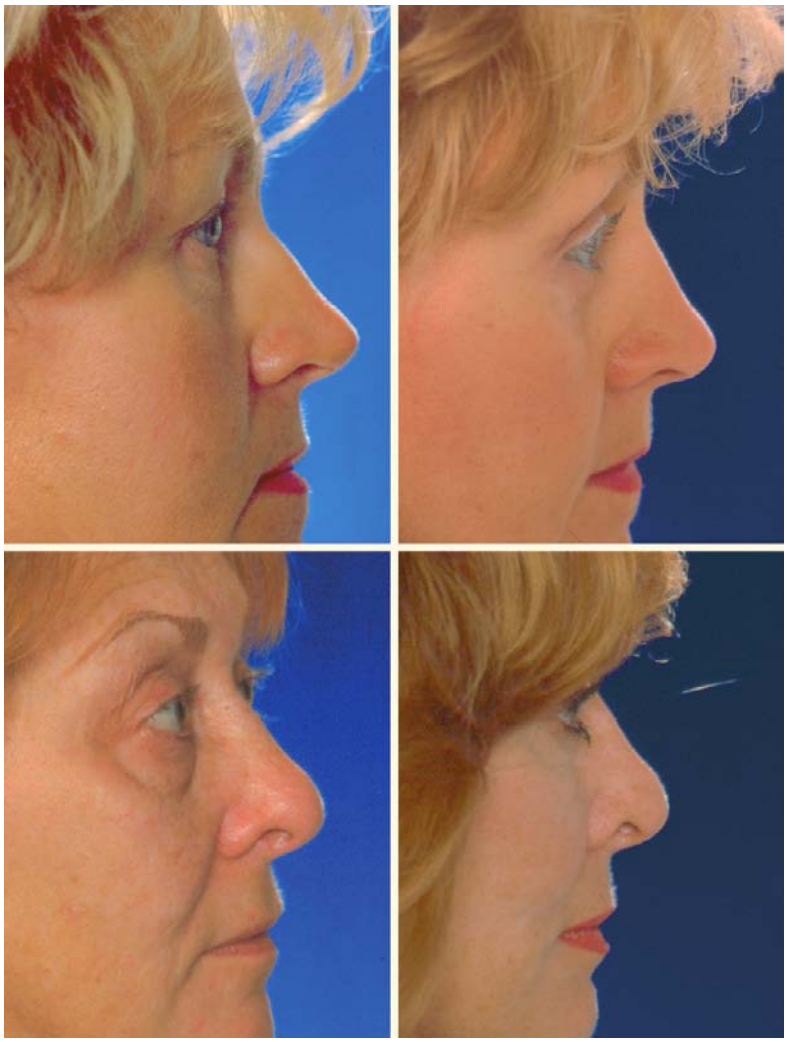

Fig. 34.6. *Continued*

ing a mirror: it is minimal! If any fat ever herniates between stitches, we push it back with forceps or use the bipolar instrument to cauterise it; the resulting scar would prevent a recurrence.

Once the suturing is complete, we always make sure we have full movement of both the lower eyelid and the eyeball. Using Adson–Brown forceps, we pull the lower lid above the superior limbus and mobilise the eyeball with the forceps to eliminate any possibility of tethering. Because the lower flap is sutured anteriorly to the orbital rim, the flap becomes almost horizontal (in the upright position) or perpendicular to the globe, behaving as a hinge (Fig. 34.5) and not interfering with the motion of the globe. Besides, the capsulopalpebral fascia is a very stretchable membrane. Even so, the amount of tension required to stretch the capsulopalpebral fascia is much greater than the amount of tension required to maintain the relocated fat pad within the orbit. With our technique, the resulting conjunctival defect is no greater than that resulting from transconjunctival blepharoplasty. The conjunctiva has a great propensity to regenerate, and this could be the reason why no one has ever needed to graft a posttraumatic conjunctival defect. We never suture our conjunctival defect. With our incision, we button-hole the inferior tarsal muscle, which maintains its medial and lateral attachment to the tarsus, so it remains functional. One must remember this is an autonomous involuntary muscle for emotional expression, as in a state of surprise or fear it lowers the lower lid. Under normal circumstances, the lower lid comes down because of gravity as we relax the pretarsal orbicularis oculi, the push of the more convex cornea and the downward voluntary pull of the inferior rectus muscle and sheath, none of which are manipulated with our technique.

Postoperatively, we recommend 0.3% Ciloxan (ciprofloxacine chlorhydrate) drops four times a day for

1 week and Ciloxan ointment H.S. for 4 days, FML (fluorometholone, a steroid by Allergan) four times a day for 1 week then three times daily for 2 days, twice daily for 2 days and daily for 2 days. For pain, we give 1–2 caplets of 500 mg acetaminophen every 4 h as required.

34.7 Cantholysis

When the commissure is short or too tight, or when facing a technical difficulty, we should not hesitate to do a lateral tarsorhaphy or tenolysis; it is most simple and useful, with minimal mobidity. I use straight scissors at the level of the lateral commissure and in one motion cut horizontally the whole thickness from skin to conjunctiva.

Then, we cut vertically the lower lateral canthal ligament. This will expose the fat and orbital rim very well and give us plenty of space to visualise and facilitate the suturing of the lower flap (containing the capsulopalpebral flap) to the lower orbital rim.

If the lower lid has insufficient support, I remove a few millimetres of the inferior lateral tarsal ligament or inferior tarsus. Then, I put one stitch (Bondex) to reapproximate perfectly the ligament and suture the skin with a continuous 6x0 plain catgut. This manoeuvre will tighten the lower lid and improve the chalasis and ageing of the lower lid.

Even if I do not resect some ligament, I put one stitch, but some ophthalmologists tell me there is no need for it. This manoeuvre creates very little swelling and is unlikely to cause more morbidity, but it certainly facilitates the procedure.

34.8 Canthoplasty

In cases of a marked anti-Mongoloid slant (because of marked downward movement of the weak lateral canthus), a well-performed canthoplasty alone can overcome most of the signs of ageing provided the brow is not too low, in which case one would almost suture the lateral ocular commissure to the brow. In such a case, therefore, a concomitant brow lift would be imperative. However, if the Lockwood suspensory ligament stretches more than the lateral canthus, which is usual in younger patients, our technique is indicated. Our technique of relocating the herniated fat pad can be performed concomitantly with a canthoplasty if necessary, but a good canthoplasty should be sufficient when indicated, usually in older patients.

34.9 Complications

Rarely, we have seen allergies to topical medication and using a protective lens, we never saw a corneal abrasion.

At first, we did have some recurrences, but very rarely has this happened over the past 9 years. Rarely, we had to use the transcutaneous approach to remove a vestigious lateral fat pad. The transconjunctival approach would have been an alternative. On a few occasions we had conjunctival granulomas. These are easily removed with a few drops of ophthalmic local anaesthesia with or without local infiltration. We grab the granuloma with forceps and cut the stalk with small pointed scissors. We never had a granuloma recur. The incidence was reduced considerably by the use of resorbable sutures, and the application of a few drops of Betadine before incising; the cul de sac is always contaminated.

On a few occasions, we had downward retraction and scleral show from scarification (not from pretarsal paresis or paralysis because we do not touch or damage the orbicularis oculi and its innervation). Massage could improve this with time. If not using local anaesthesia to the lower lid or around the infraorbital rim and waiting 25–30 min, we use a double-pronged hook on the conjunctival side of the lower lid to pull and evert the lower lid.

Holding the hook between the thumb and the index finger of the left hand, we apply our third finger (of the left hand) to the skin of the lower lid and feel bands of scar if weeks or months have passed since surgery.

If this procedure is performed early after surgery, we can palpate a tightness through the skin or with the tip of the scissors. Using small curved and pointed scissors and penetrating the conjunctiva above the original suture of the flap to the rim, we cut this scar until the third finger cannot feel transcutaneously any tethering throughout the whole lower lid. The lower lid must be free to move above the upper limbus. This manoeuvre must be performed thoroughly whether it is done early or late postoperatively.

The following observations should be kept in mind:

- Chemosis is a rare occurrence and will vanish with conservative management.
- Use of a contact lens will eliminate any corneal irritation.
- Allergies to drops or ointments and bacterial conjunctivitis can occur.

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35 Crow's-Feet

Dimitrije E. Panfilov

Lateral to the canthus there are often radially spread wrinkles, especially if the patient smiles. It is possible to reduce these "smiling" wrinkles by Botox injections – temporarily. For permanent removal, there is a possibility to treat them from outside through epidermal ablation with laser resurfacing or radiosurgical, chemical, or mechanical peel (dermabrasion).

Bruce Connell has shown that we can mark these smiling wrinkles on the skin and by doing the facelift surgery we remove these wrinkles caused by the lateral fibres of orbicularis oculi muscle – theses are the cutaneous attachments of this muscle, and we can seal them with radiofrequency treatment, which does not produce overheating like a laser or electrocautery. This is very important because the frontal branch of the facial nerve underlies these muscle fibres and could be terminally damaged.

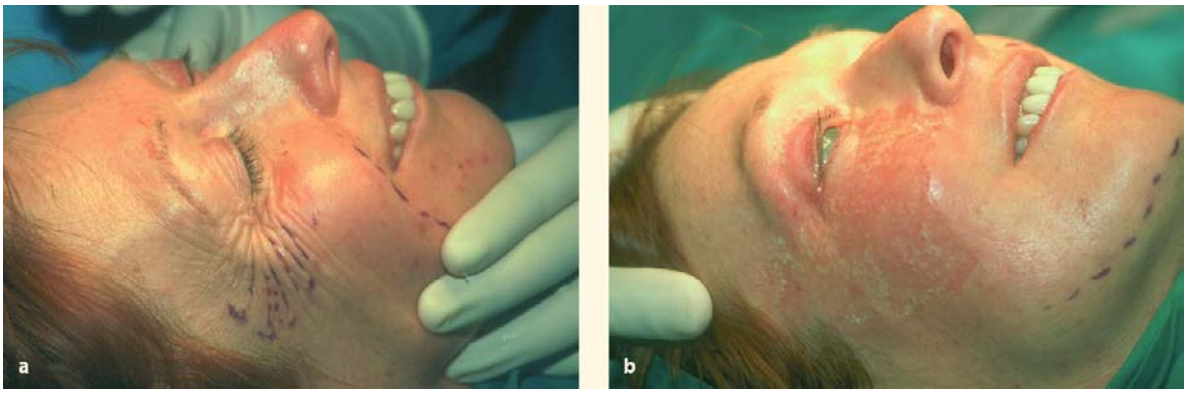


Fig. 35.1. **a** Smiling patient before CO_2 laser resurfacing. **b** Immediately after the procedure

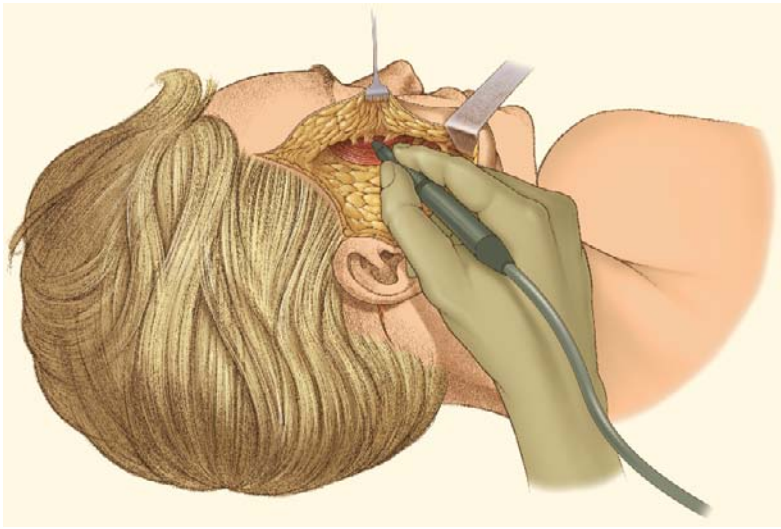


Fig. 35.2. Radiosurgical sealing of cutaneous attachments of the orbicularis oculi muscle

Fig. 35.3. **a** Sterile markings over cutaneous attachments of the orbicularis oculi muscle. **b** Muscle attachments destroyed and sealed by radiofrequency treatment. Another patient **c** before and **d** after such treatment

Bibliography

Please see the general bibliography at the end of this book.

36 Rhytidoplasty – Step by Step

Dimitrije E. Panfilov

36.1 Introduction

Volumetric sculpturing of the lower two thirds of the face and neck is the contemporary attempt to beautify the facial appearance which has been called for many decades classic facelift. Since the 1970s we have done it in two layers, including superficial musculo-aponeurotic system (SMAS) manoeuvres, and since the early 1990s the third dimension has been included and we have started to think and act volumetrically.

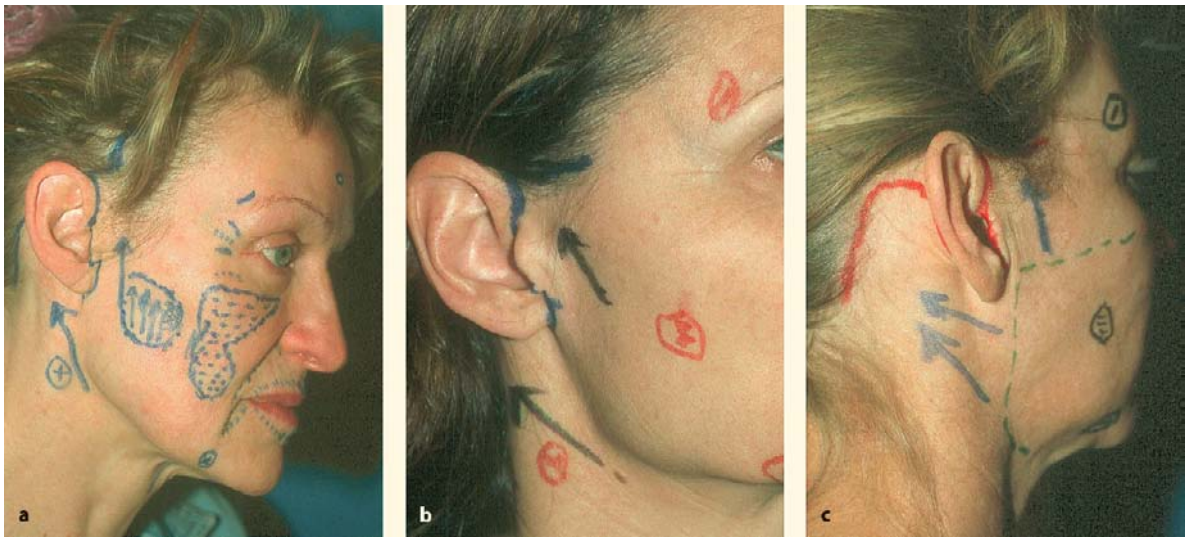
36.2 Preoperative Preparations

At home, before coming to the clinic or office, patients are advised to take shower with Betadine solution mixed with their hair shampoo. Before surgery we prepare photodocumentation and make dermographic markings on the facial skin and the patient can ask "last-minute questions" and bring her/his ideas.

The patient lies on the operating table with a slightly elevated head. After the anaesthesiologist has introduced intravenous sedation, the head is completely prepared with mucosa-compatible antisepticum (octenidine hydrochloride and phenoxyethanol–water solution). The following are administered: premedication, 2–5 mg Midazolam (atropine and metoclopramide); introduction of anaesthesia, 7.5–15 mg Piritramid, 75–150 mg Clonidin, 20–30 mg Propofol; maintenance of anaesthesia, 20–30 mg/h Propofol, 2–3 l oxygen per nasal tube. Then, the incision lines are instilled with 1% lidocaine hydrochloride with 1:200,000 adrenaline. The cheek and neck area, which will be tunnelled or undermined, should be anaesthetized with 20 ml of 1% lidocaine 1 with 1:200,000 adrenaline and 40 ml of 0.9% NaCl solution on each side, with a blunt tumescent cannula. By doing so, we generally do not need haemostatic electrocoagulation. The exceptions are sometimes McGregor's malar ligament and wound edges in the retroauricular region.

Operative arrangements vary from surgeon to surgeon and from one surgical school to another. Some Brazilian schools prefer endotracheal anaesthesia: they suture sterile operative cloths (sterile operative covering) to the skin and shave the hair where the incisions will be made. They also mark the sinuous line from the cheek bone, lateral to the mouth angle, reaching the paramedical line on the neck, where the perforant vessels should not be damaged as they provide blood supply for the skin flap. It is the border till which the undermining would be safe.

European patients mostly prefer not to shave their hair. We band tufts of hair with rubber bands to liberate the incision line and prefer intravenous sedation combined with local anaesthesia.



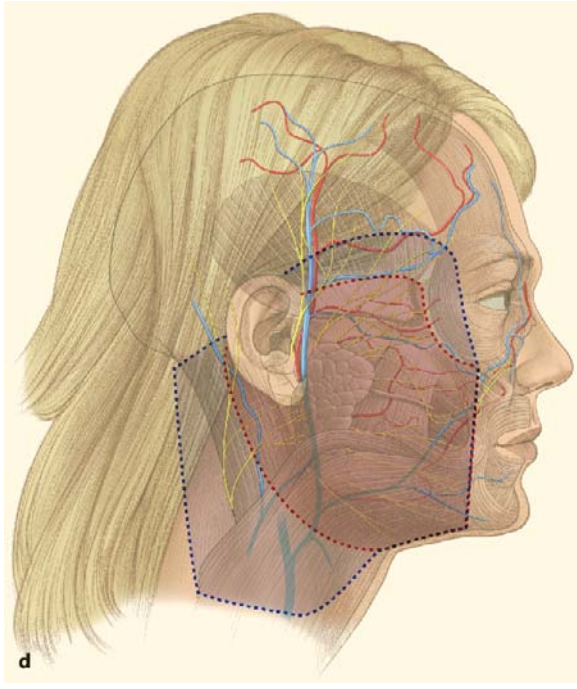


Fig. 36.1. **a** Incision line reaches the temple: temporal lift and correction of crow's-feet can be adjusted. **b** Design of incision lines if access for correction of lower two thirds of the face (and neck) has been planned. **c** Retroauricular incision line (*red*),vectors of traction and presumed superficial musculo-aponeurotic system (*SMAS*) flap. **d** Extent of skin mobilization in minimal-invasive, deep-intensive (*MIDI*) facelift (*red dotted line*) and face–neck-lift (*blue dotted line*)

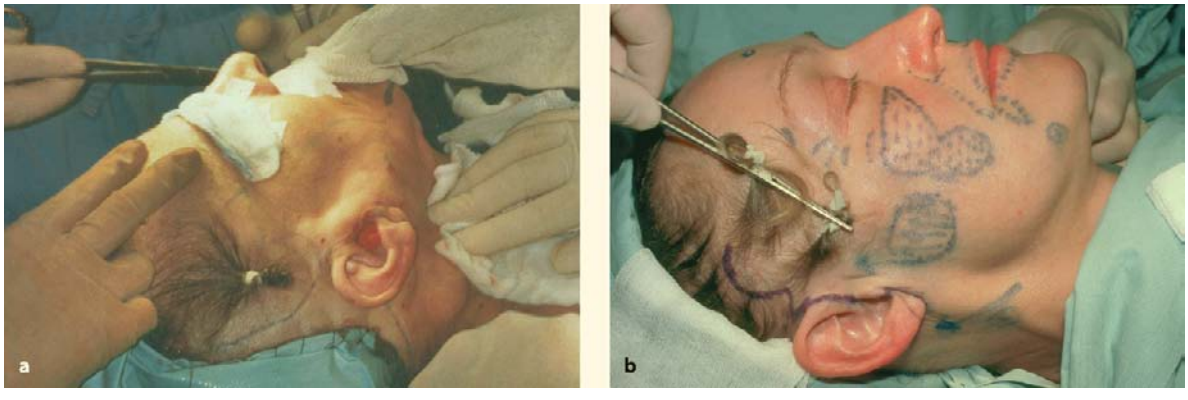


Fig. 36.2. **a** Shaved incision lines; sutured operative covering to the skin; protective plastic plug in the ear. **b** Personal way of operative arrangement for facelift

36.3 Preferable Incision Lines

A scalpel blade is mostly used to make incisions for facelift. If one has a 4.0 MHz radiofrequency instrument, it is possible to divide the skin by touch, without any pressure on the skin and without bleeding.

If we incise the border of the hair-bearing skin, we should cut the skin perpendicular to the hair roots. This will allow the hair to regrow, otherwise we will have a more visible scar at the hair-bearing skin border.

If female patients have more hair in the preauricular region, similar to male hairy pattern (like sideburns), it is desirable to remove this part of the hair-bearing skin and it will look more feminine through appropriate planning of excisions.

After facelift surgery comes the traction of the skin and SMAS flap on the ear and frontal underlying Loré fascia in the caudal direction, so we can presume the dislocation of the ear downwards. Anticipating that fact, we can prevent this by excising a smaller or larger triangle of skin in the direct supraauricular region. We make a preauricular incision in men 3–5 mm pretragal. This scar will be hardly visible because the border of the sideburns will just correspond to this scar and will hide it accordingly.

In women it is of advantage to make a retrotragal incision, which is very unobtrusive. To do so we trim the skin miniflap which surrounds the tragus – we have to remove excess fat below this skin flap. Additionally it is advisable to make the "dimple suture" which takes a bit of skin-flap base and the perichondrium at the frontal base of tragus. In this way, the tragus will have its projection. Otherwise it would have an "amputated" look.

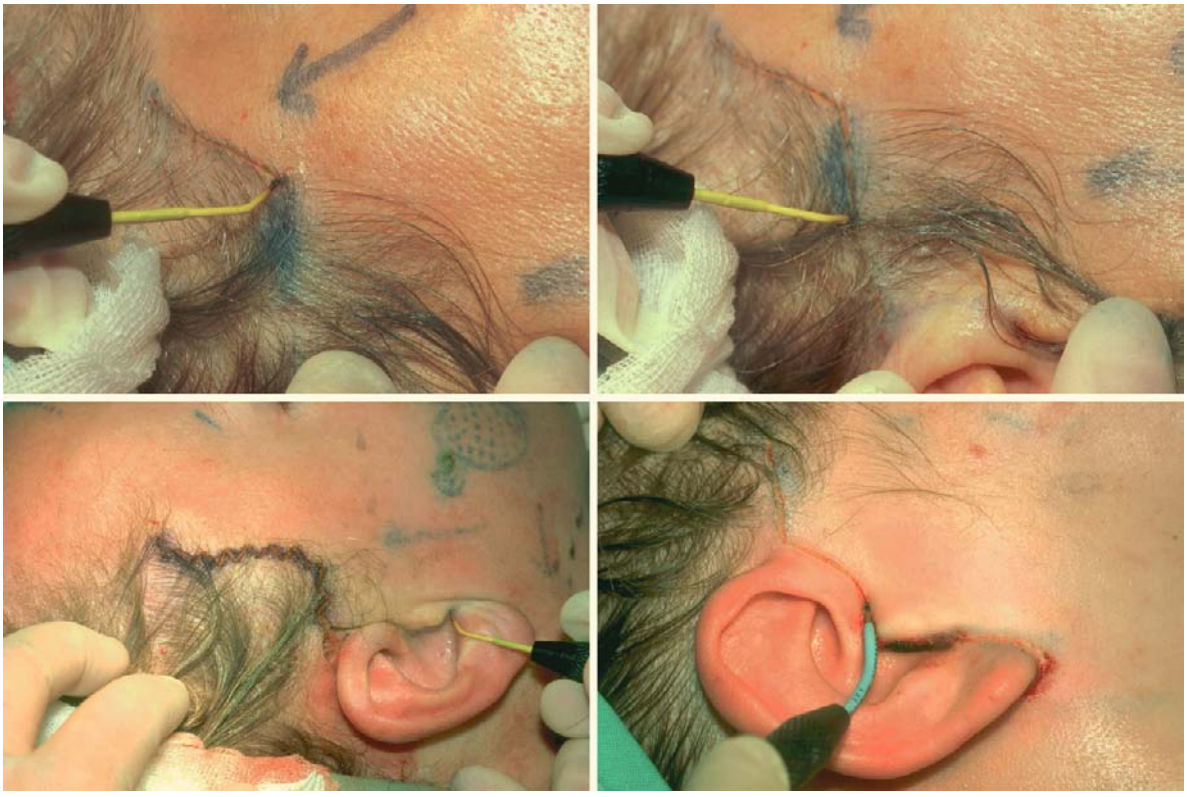


Fig. 36.3. Precise incision lines with radiofrequency treatment without bleeding

Fig. 36.4. **a** Unobtrusive temporal prehairline scar. **b** Improper, visible temporal prehairline scar (another clinic). **c** Prehairline scar: normally not visible. **d** If we seek the terrace prehairline scar, we may find it

Fig. 36.5. Reducing excess hair-bearing skin of the preauricular region in a woman

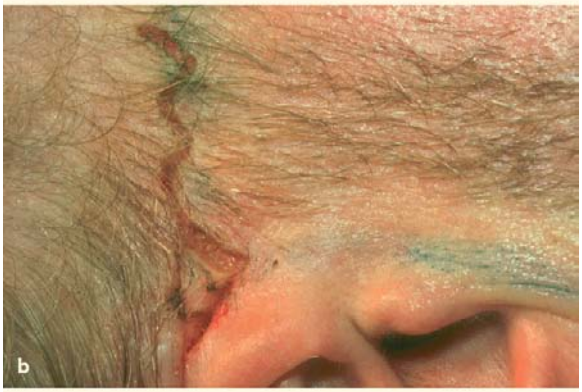


Fig. 36.6. **a, b** Excision of supraauricular skin triangle prevents caudal dislocation of the ear due to the SMAS and skin traction. We make a pretragal preauricular incision in men. **c** Such a scar is already hardly visible after 12 days

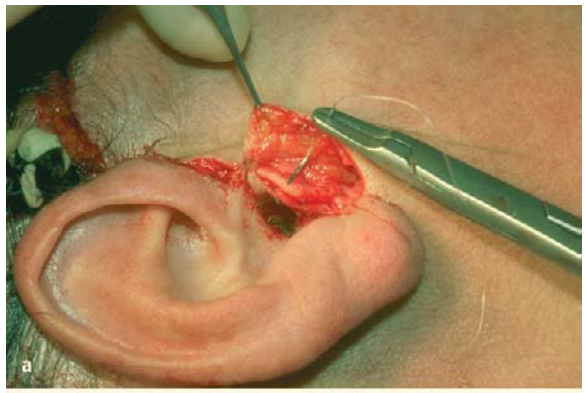


Fig. 36.7. **a** Subdermo-epichondrial suture for creating a pretragal dimple. **b** Intradermal 3.0 Prolene suture. **c** Proper tragus projection 2 weeks postoperatively

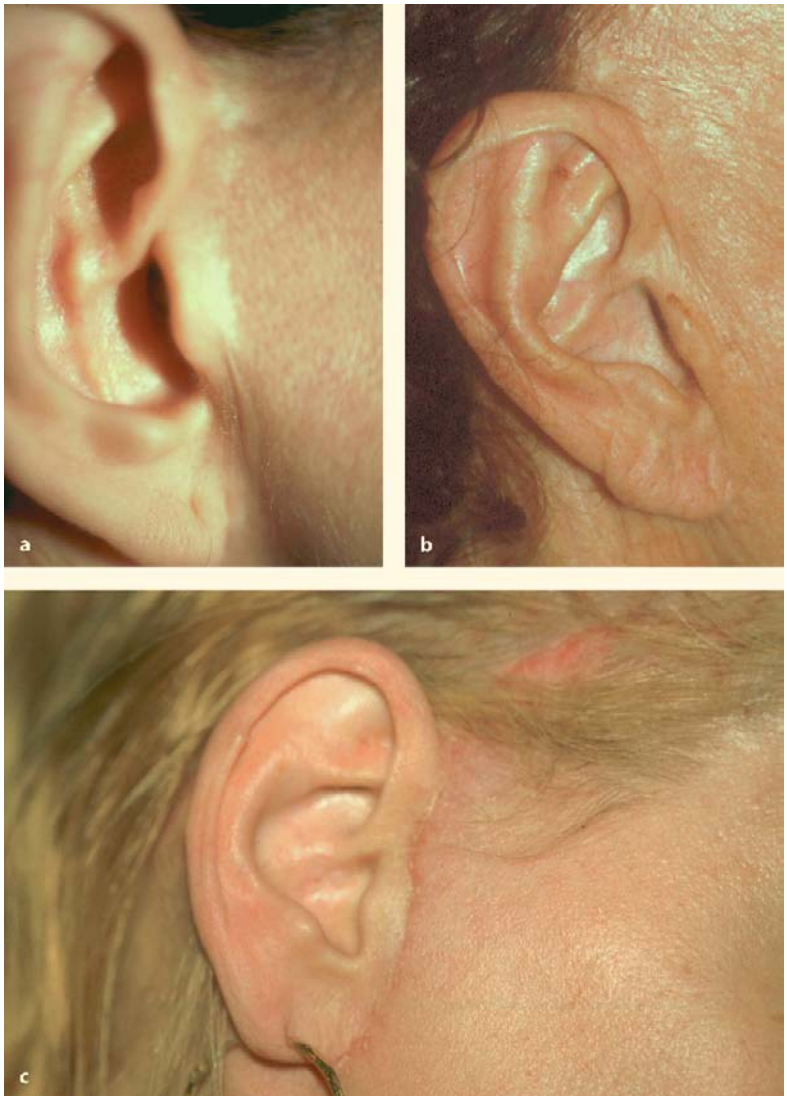


Fig. 36.8. **a** Improper visible preauricular scar. **b** "Amputated" tragal look without styling of the tragus. **c** Visible preauricular and supraauricular scars

When we finish the surgery, we leave anchorage sutures supraauricular (one) and retroauricular (two), where main tension of the skin flap is. An additional anchorage suture with slight tension is above the tragus. There should be *no* tension at the ear lobe.

When we perform retrotragal incision, our radiosurgery needle or scalpel blade should "jump" on the back side of the concha. Traction of the retroauricular skin flap will pull the scar into the retroauricular sulcus. If our incision were in the sulcus, the skin flap would pull it back and downwards, and it would become visible.

We perform subcutaneous instillation of dilute local anaesthetics with adrenalin with a blunt 1.6-mm-diameter cannula. When we were using a sharp long needle for that purpose, sometimes we cut small vessels and produced haematomas. Even damage of nerve branches could occur. Since we have used blunt cannulas we have had almost no haematomas.

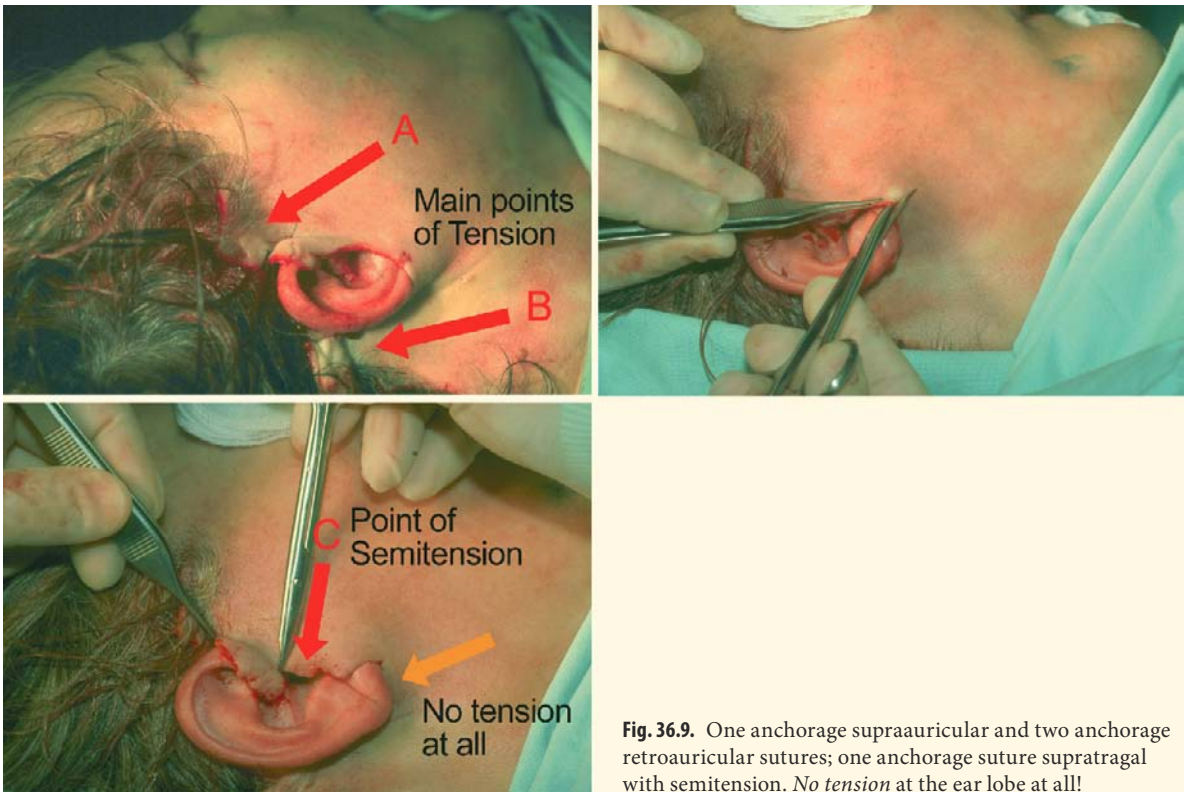


Fig. 36.9. One anchorage supraauricular and two anchorage retroauricular sutures; one anchorage suture supratragal with semitension. *No tension* at the ear lobe at all!

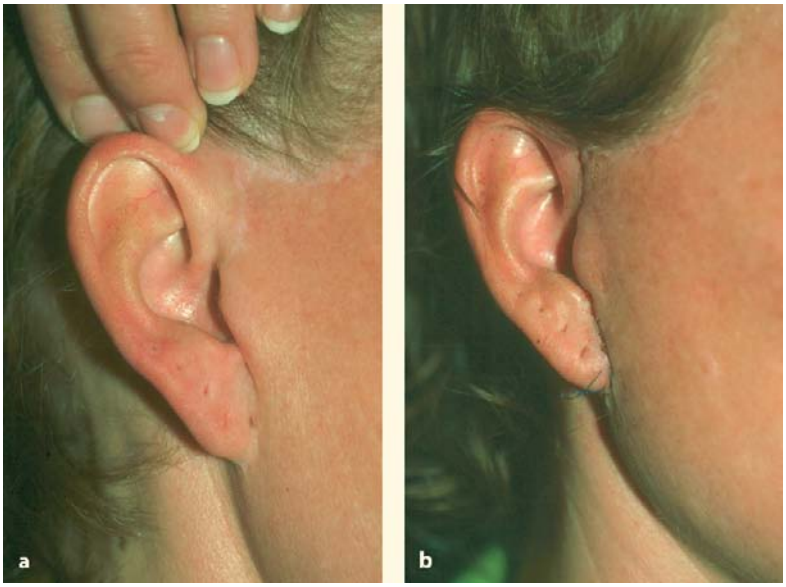


Fig. 36.10. **a** Flattened tragus after face-lift in another office. **b** Reshaped tragus through advanced and trimmed skin miniflap and "dimple suture"

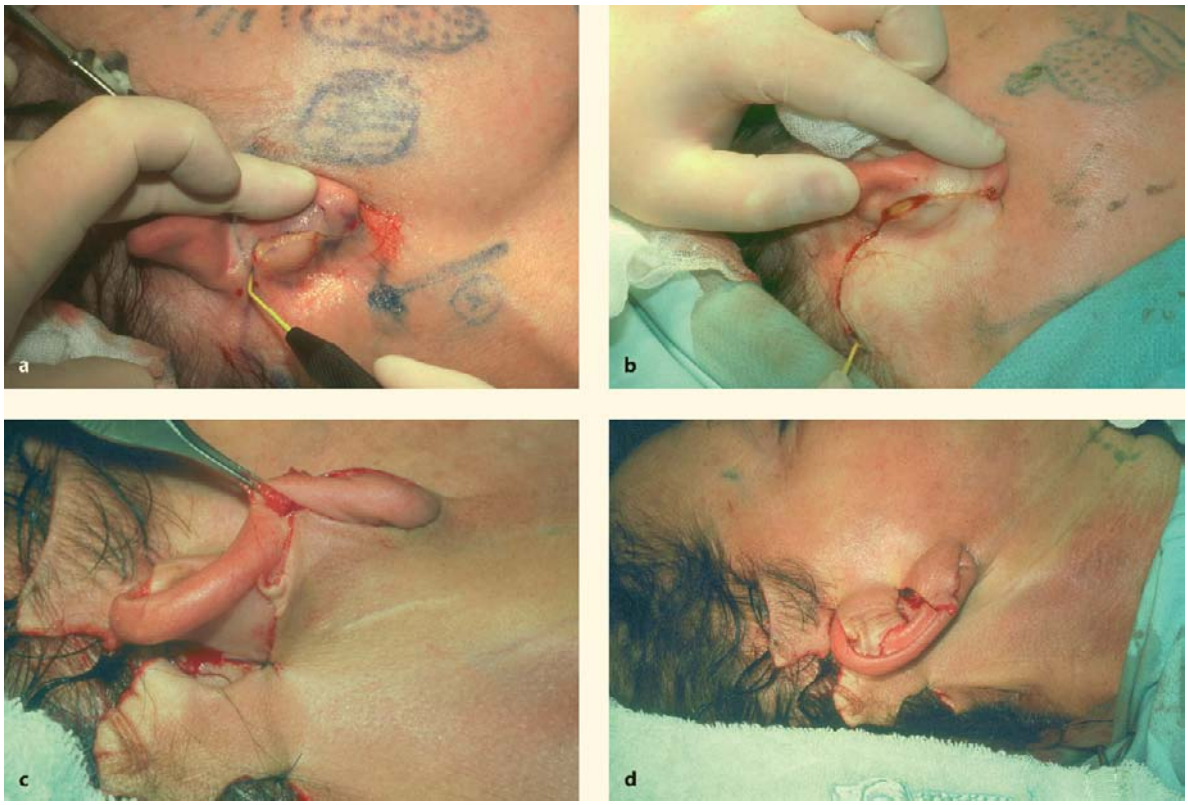


Fig. 36.11. **a** Retrotragal incision "jumping up" onto the back of concha. **b** Another patient – same procedure. **c** Advanced retroauricular skin flap, fixed with two anchorage sutures to be resected at the level of the retroconchal skin incision. **d** Advanced supra-, pre-, and retroauricular skin flaps to be resected

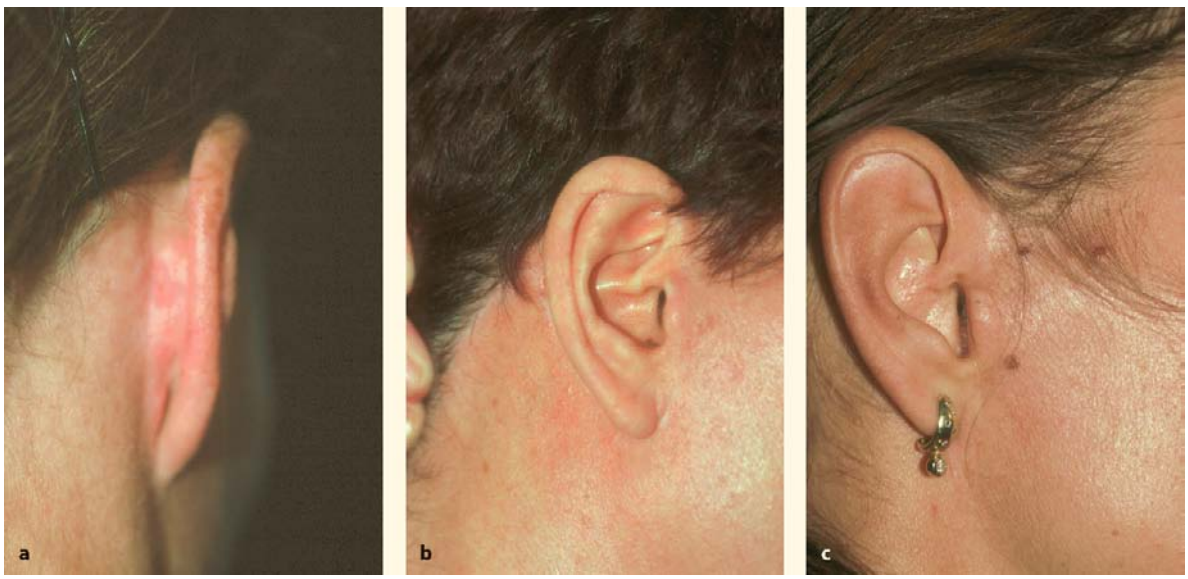


Fig. 36.12. **a** Unobtrusive scar settled down into the retroauricular sulcus, 2 years postoperatively. **b** Retroauricular hair margin scar hardly visible 1 year postoperatively. **c** Preauricular scar above and below the tragus; unobtrusive proper tragal projection and hidden retrotragal scar

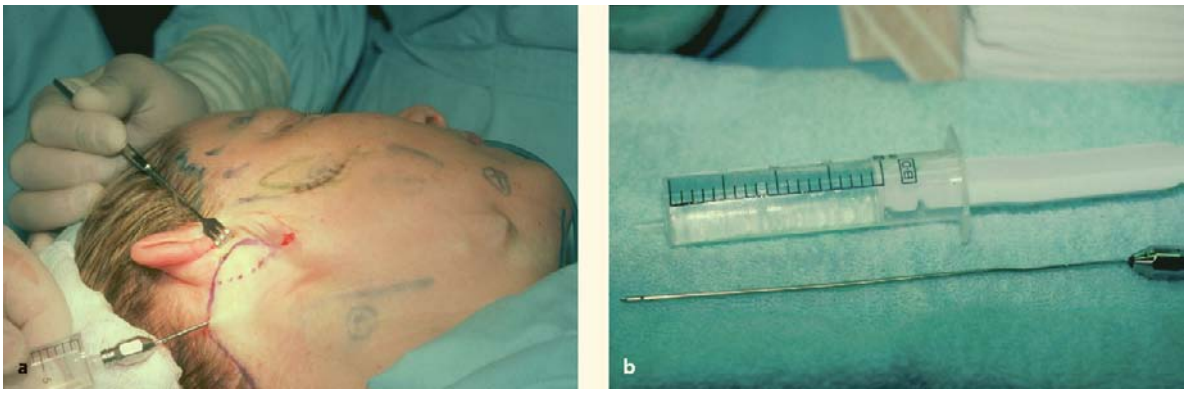


Fig. 36.13. **a** Administration of local anaesthetics and suprarenin with blunt cannula prevents subcutaneous haematomas. **b** Instillation cannula has to be blunt – it does not cut small vessels (and nerves!) and does not cause bleeding and consecutive haematomas

36.4 Skin Flap Preparation

With local anaesthesia and preparation of subcutaneous separation with liposuction cannula of 2 mm diameter we can achieve optimal preparation of 2 mm of underlying fat attached at the skin flap. Juarez Avelar has produced very useful instruments for this purpose.

After the incisions have been made, tumescent anaesthesia infiltrated, and the subcutaneous layer of fat determined by liposuction cannula or special dividing instruments (see Chap. 39 by Juarez Avelar and Yves Gerard Illouz), we start to elevate the skin. There are two sorts of surgeons: one group prefers scalpel division of the skin flap and the other one prefers using scissors. Preparation by scalpel is faster, but requires virtuosity and absolute anatomical precision. After all, there is danger that even with very experienced surgeons the scalpel blade will run 1 or 2 mm too deep. Then superficial nerve branches could be damaged: n. auricularis magnus, marginal, buccal, or the frontal branch of the facial nerve.

We prefer the technique with spreading scissors. We drive with closed scissors below the skin. At the end of this movement, we spread the scissors. Doing so, we separate the tissue layers from each other. The nerve branches can be stretched, but not cut! It requires a couple of minutes longer for each side, but this technique is safer regarding nerve damage and enables a restful sleep for both surgeon and patient.

Further preparation could be done by radiofrequency or fingers, like Sherell Aston described for his finger-assisted facelift. Also Yves Gerard Illouz developed his nontraumatic technique of liposuction by asking his instrument manufacturer to create a blunt cannula which would be able to divide tissue layers like his fingers at facelift preparation. In fact the feeling and preparing finger is the most reliable "instrument" for detachment of skin adhesions.

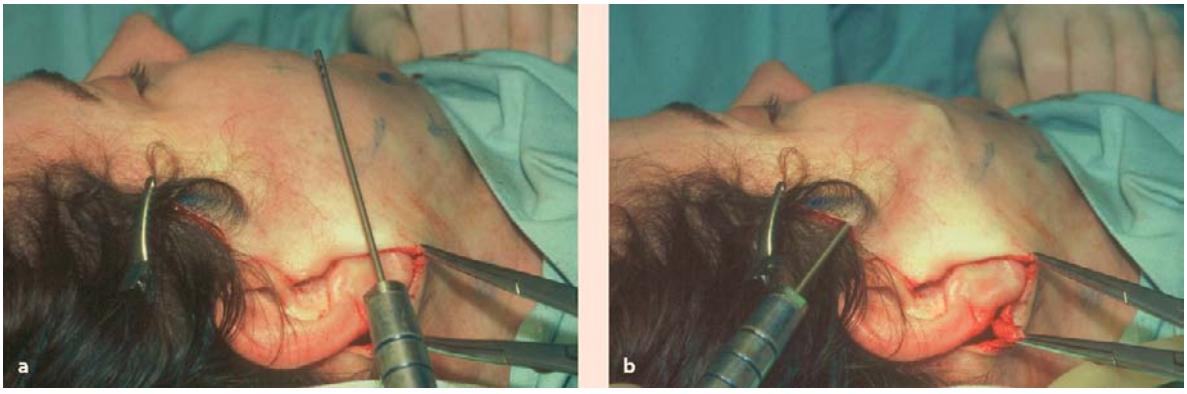


Fig. 36.14. **a** Liposuction cannula simulated over the skin **b** helps to separate the proper layer of underlying fat attached to the skin flap (should be about 2 mm)

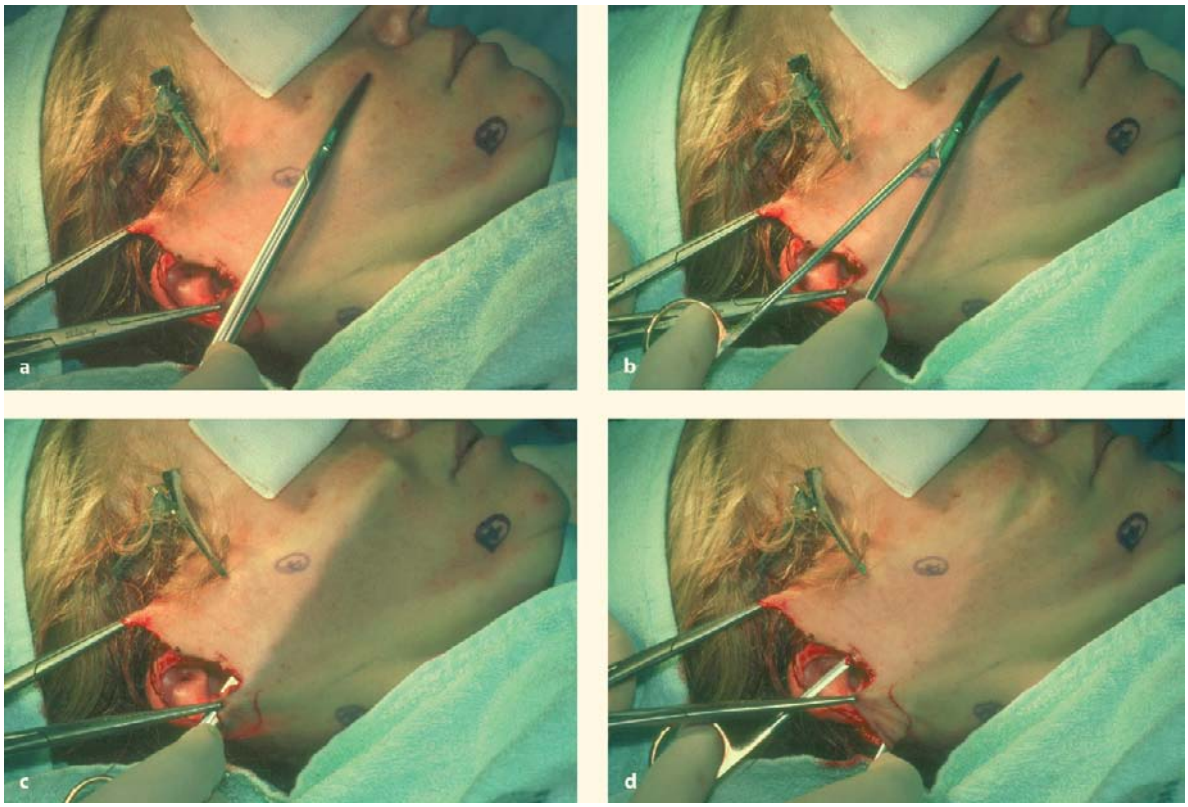


Fig. 36.15. **a**, **b** Technique of spreading scissors simulated over the skin. **c** Closed scissors advanced below the skin. **d** Spreading of scissors at the end of their advancement

Blunt dissection does not provoke bleeding because the vessels roll intraluminarly and plug themselves. By sharp cutting, the vessels stay open and the muscular layer protrudes at the cutting edge and can cause bleeding. When I was starting my carrier as a plastic surgeon, I spent almost one third of the operating time stopping bleeding, to do haemostasis. Now with blunt preparation I do almost no haemostasis; exceptions being sometimes the malar retaining ligament – McGregor's patch–when it has to be divided sharply and sometimes the retroauricular region and its skin edges. Additionally, electrocautery can temporally damage the nerve branches by overheating them even when they are separated from coagulated vessels. This can cause mimetic disorders for a couple of weeks.

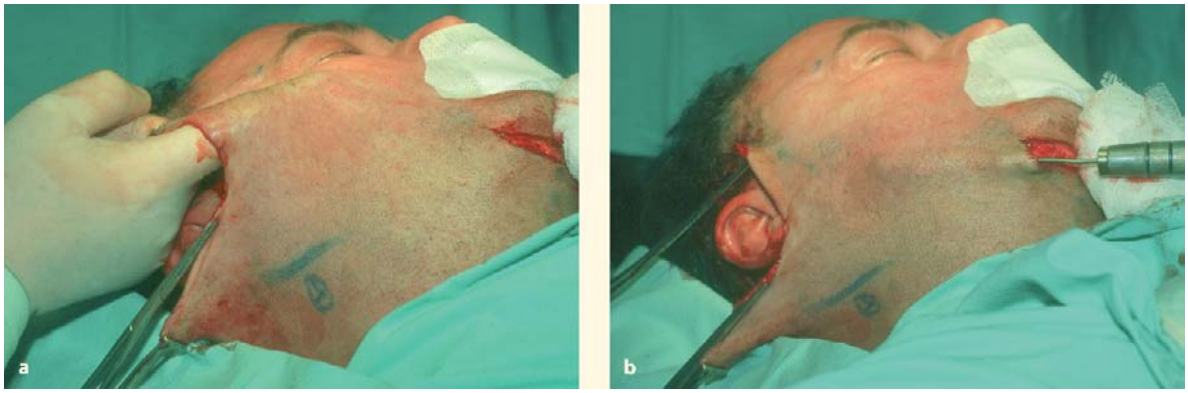


Fig. 36.16. **a** Aston's finger-assisted malar elevation (*FAME*) technique. **b** Technique of the same author: open liposuction of submandibular fat and communication between incisions of periauricular and submental access

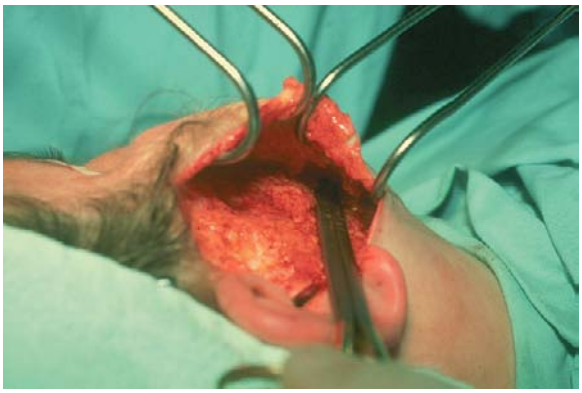


Fig. 36.17. Blunt preparation with scissors

Some 3–5 cm in front of the tragus we meet the malar retaining ligament or McGregor's patch. It is very firm structure and it is not always possible to divide it bluntly. Electrocautery should be applied when we have to cut it. This ligament is visible on aging faces as a dimple 3–5 cm in front of the ear.

To have the best possible view below the skin flap in the cheek or neck region we need sufficient illumination. Some surgeons use head lights, but they have cables fixed at the surgeon's back and this reduces his mobility. We prefer a cold light source transmitted through a special hook.

For skin flap release of persistent fibres of connecting tissue similar to retaining ligaments between the skin and the deeper SMAS–platysma layer, we use the technique which has been popularized by Hector Gonzales Miramontes. He grasps such fibres near skin attachments and pulls them downwards. The advantage of this manoeuvre is that this does not produce bleeding like if we were to cut these rigid structures sharply. This is the "grasping forceps" technique. Transillumination is a simple way to check the vessel pattern of the skin flap. The light source is directed onto the skin surface and we look from the other side (below the flap) "through" the skin.

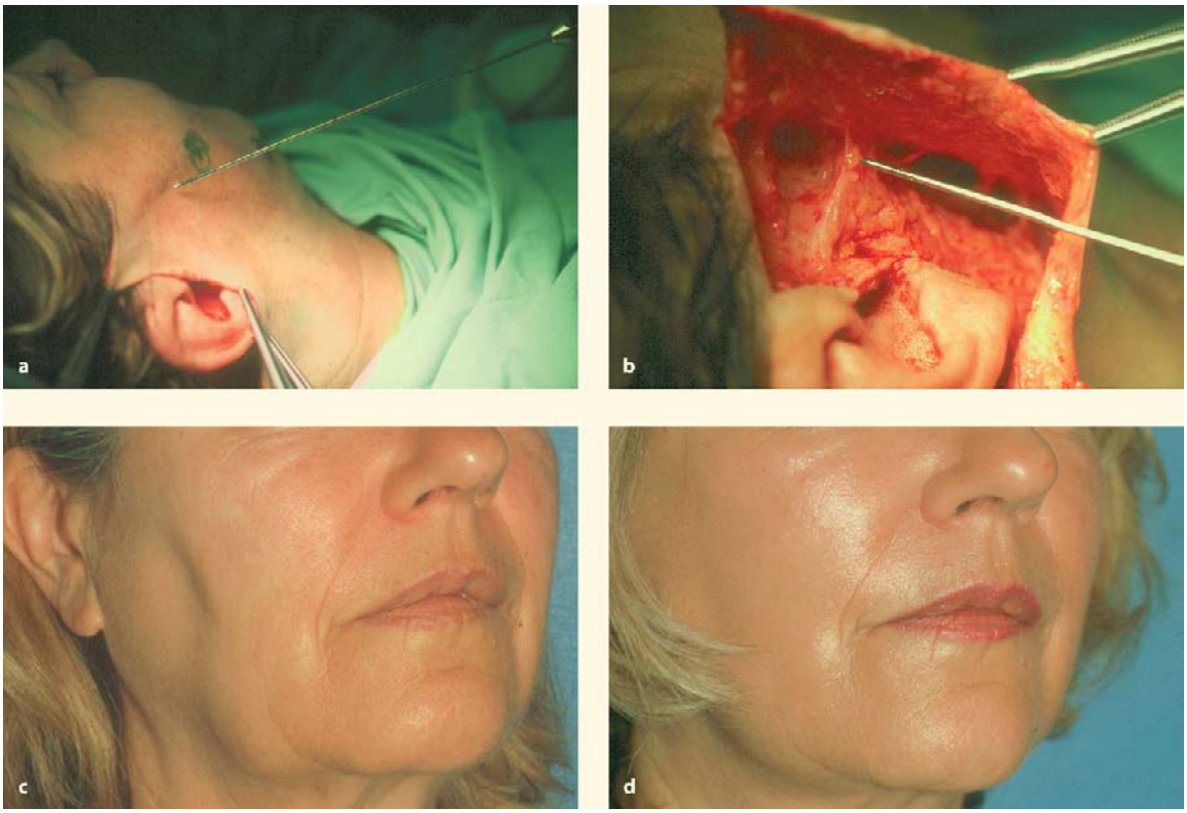


Fig. 36.18. **a** Undetached malar ligament makes free advancement of the skin flap impossible. **b** Closed forceps indicating the malar ligament which has to be detached to liberate the skin flap. **c** Soft tissue from the cheek is drooping into jowls; McGregor's ligament retains skin, creating a typical dimple. **d** Appearance after volumetric skin and SMAS rearrangement and malar ligament detonchment

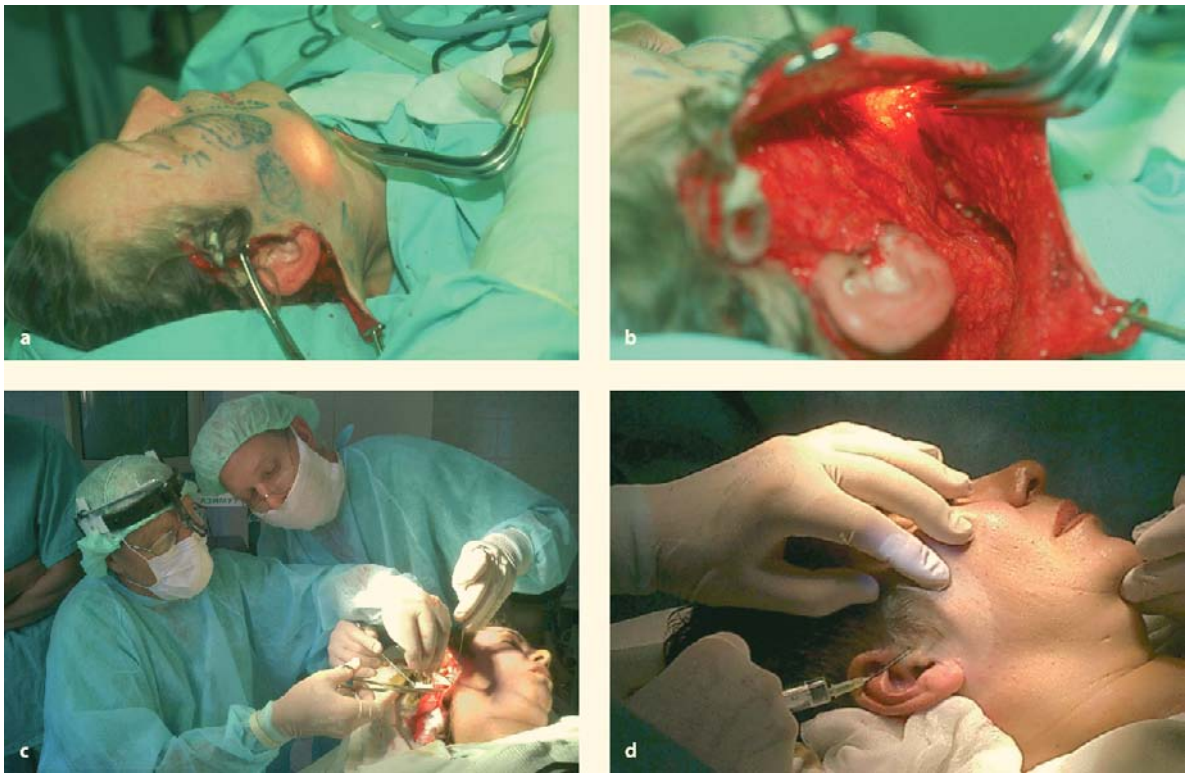


Fig. 36.19. **a** Hook with cold light over the skin. **b** The hook below the skin illuminating anatomic structures. **c** Operating with a head light. **d** Head light illuminating the operating field

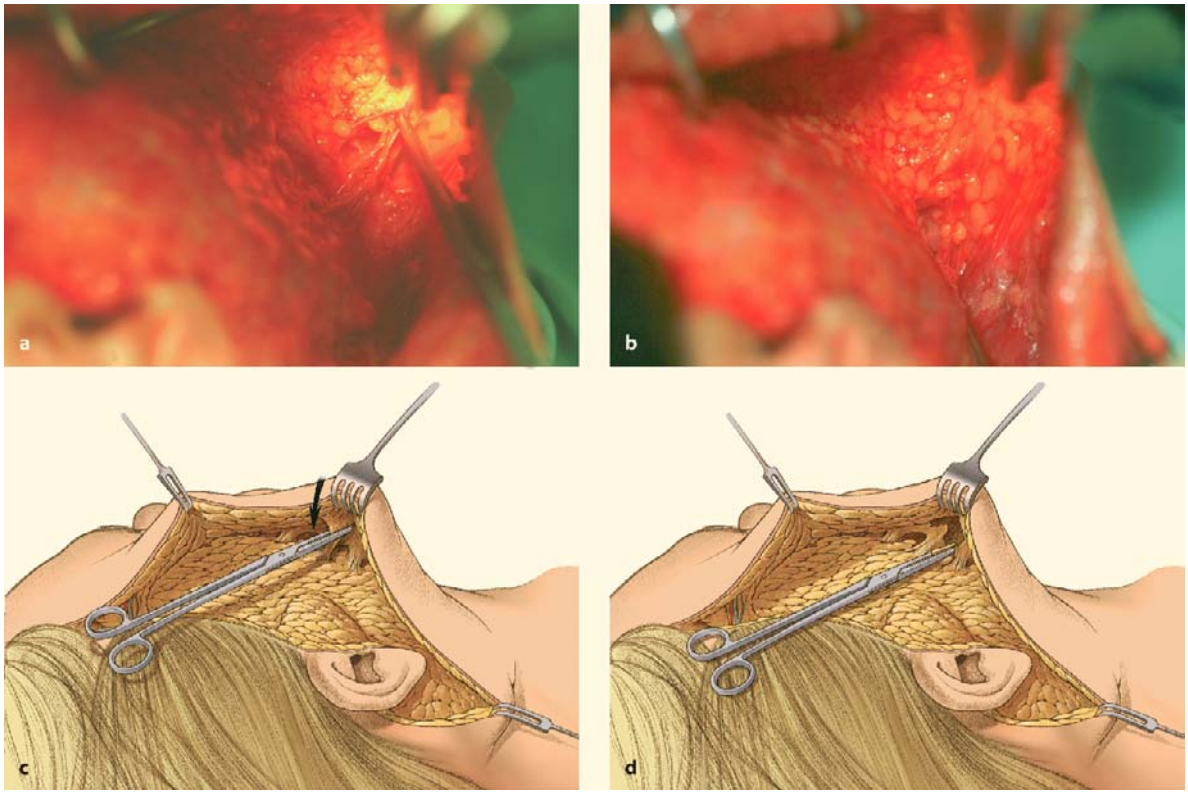


Fig. 36.20. **a** Forceps grasping the persistent fibres from skin attachment and **b** pulled down. **c**, **d** Grasping method of skin liberation

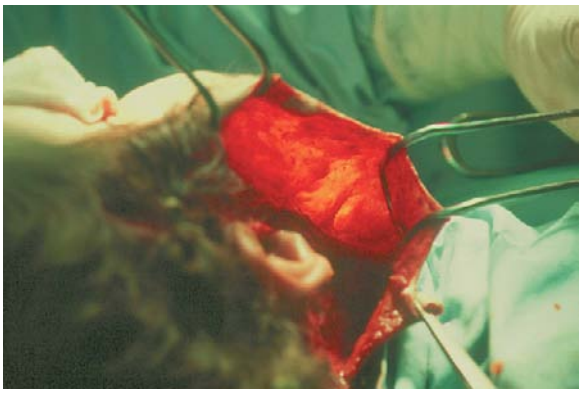


Fig. 36.21. Transillumination to check the irrigation of the skin flap

36.5 SMAS Variations

The skin flap has been raised, we have free access to the deeper layer: SMAS and platysma. Pulling them with forceps, we check their mobility.

Now we have to decide if the SMAS plication will be enough to fill up the "empty cheeks" and to harmonize the face. José Guerrerosantos has done a series of facelifts where on one side he did SMAS-flap advancement and on the other side SMAS plication. Ten years later he revisited these results and was not able to say which side was done by which method without looking at the patients' records!

When we place sutures for plication or for SMAS-flap fixation we should try to stitch the tissue of the cheek in a radial direction from the ear lobe – not perpendicular to that imagined direction. In this way the chance of getting branches of the facial nerve, which follow this direction, into our suture is lower and the surgery is safer.

In about 25% of all facelifts we perform, especially in younger patients, we find plication of the SMAS layer to be enough.

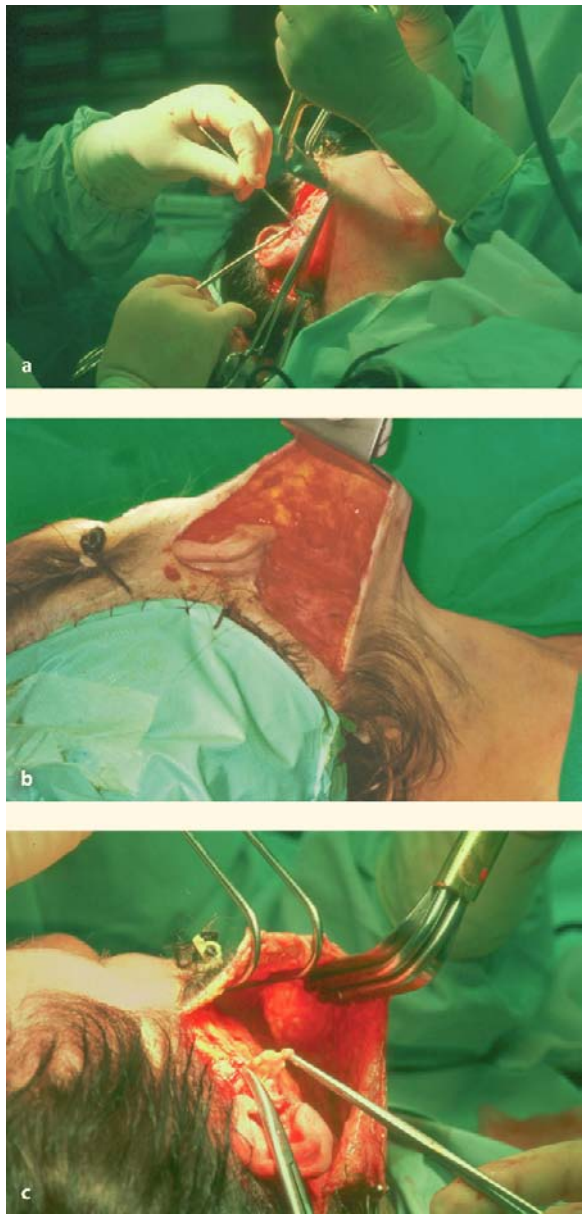


Fig. 36.22. **a** Skin flap elevated with sufficient mobility. **b** Deep layer exposed. **c** Check of SMAS mobility

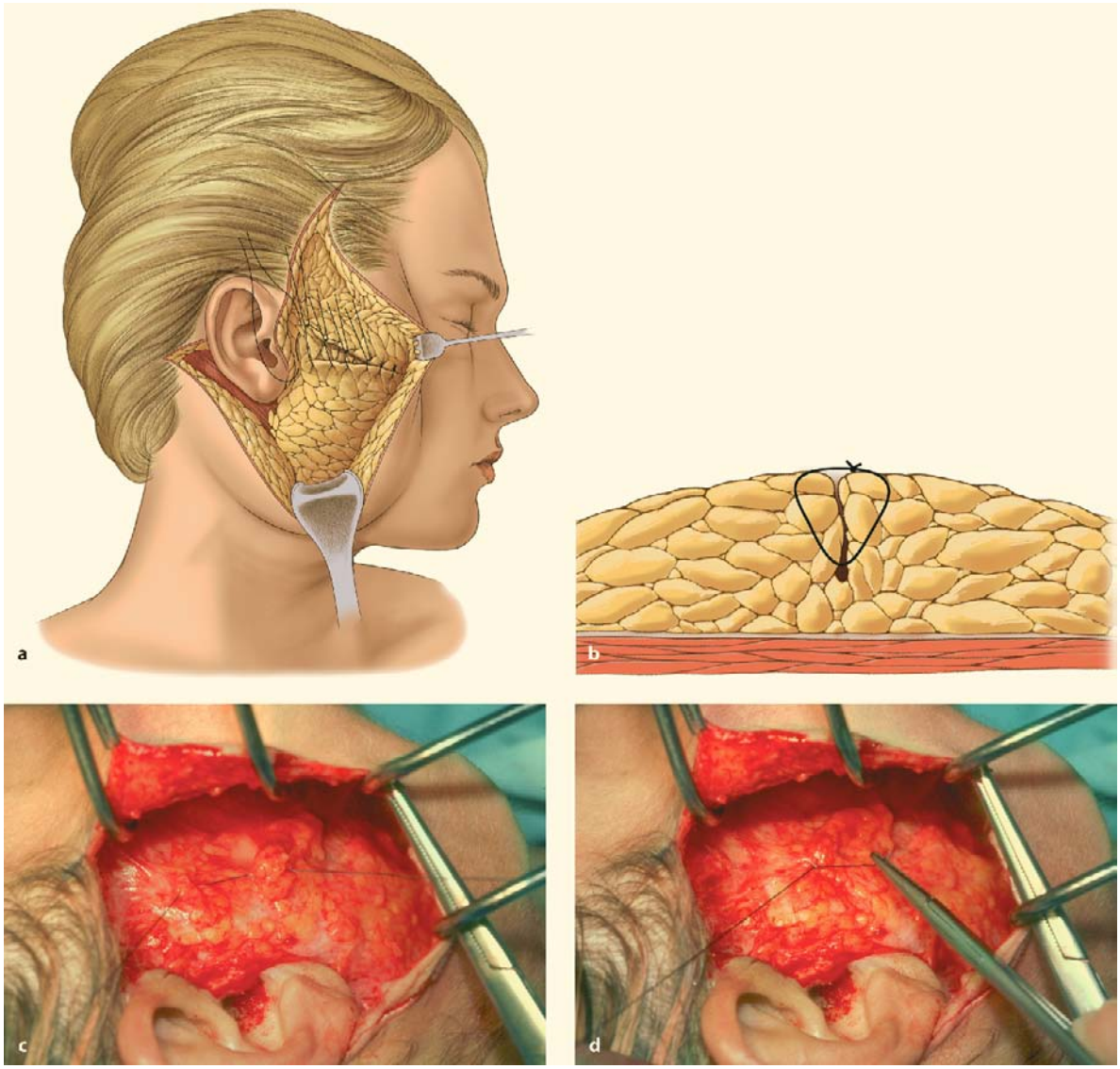


Fig. 36.23. **a** SMAS plication sutures as the surgeon sees them. **b** The volumetric effect which we gain with plication. The plication suture is **c** placed **d** tightened

Fig. 36.24. Patient with hollow cheeks **a** before and **b** after SMAS plication with volumetric effect

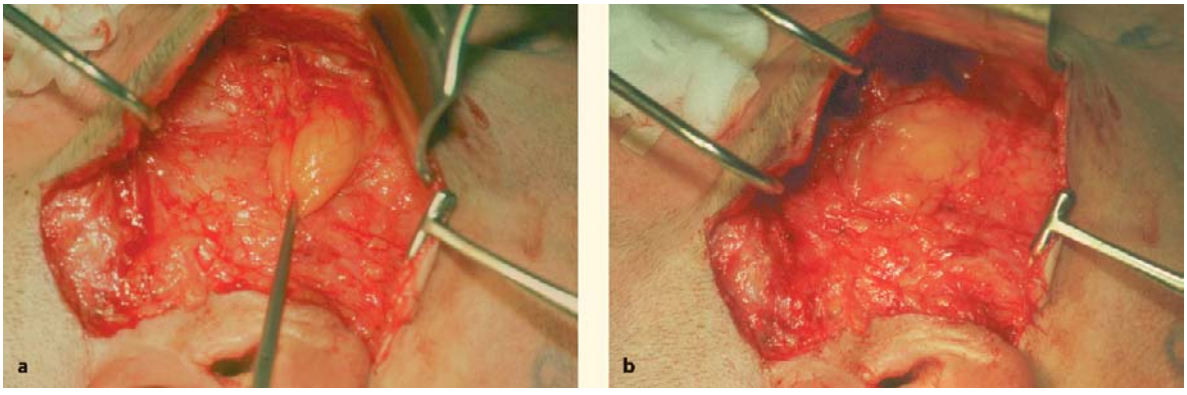


Fig. 36.25. Bichat's fat pad **a** protruded and **b** sutured over the depressed area. Patient **c** before and **d** after Bichat's fat pad advancement combined with MIDI facelift

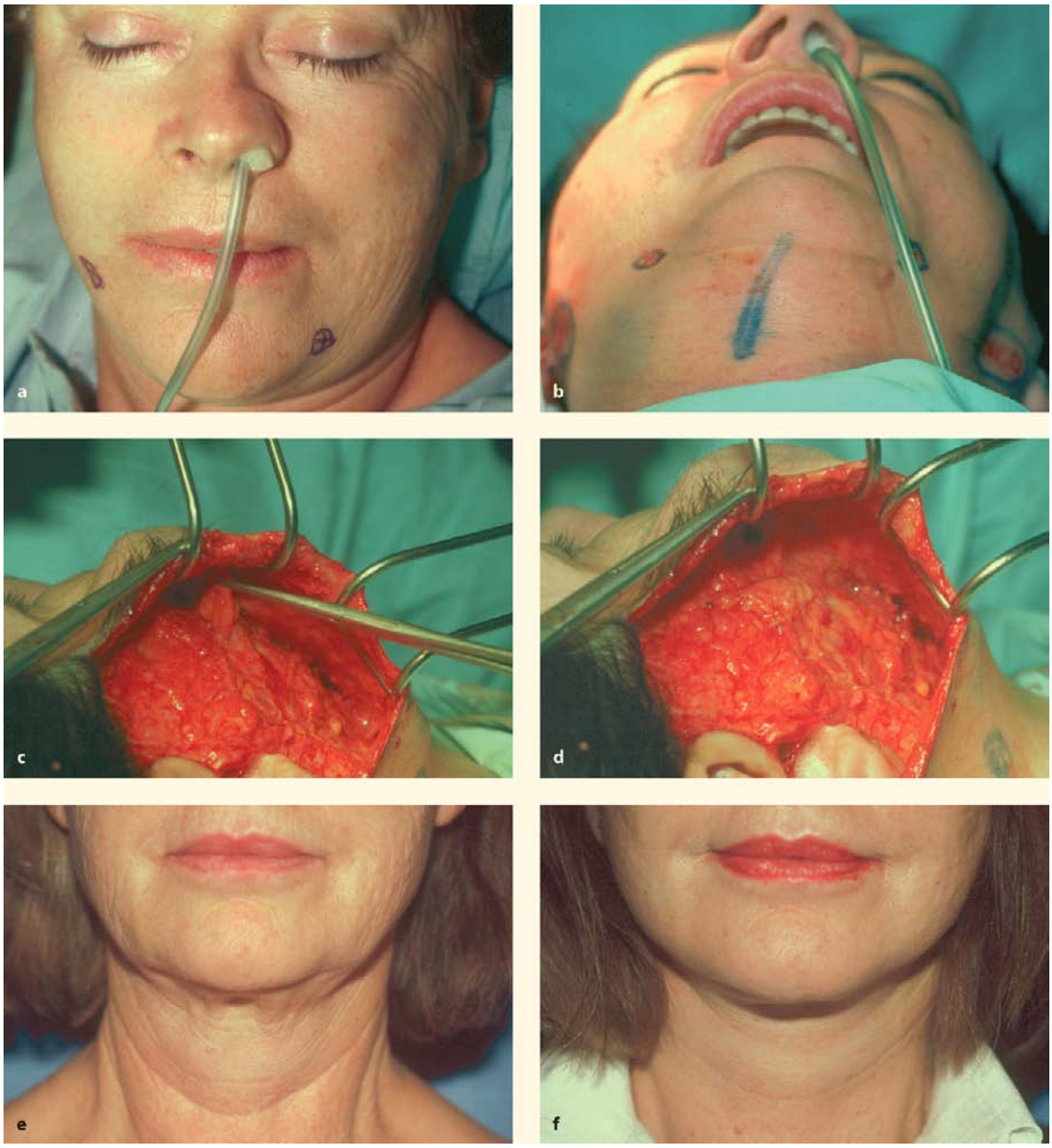


Fig. 36.26. **a** Patient with plication and jowl advancement when the right side has been done and the left has not bee done yet. Notice the difference in the dermographic markings. **b** Preoperative midline deviates to the right; after completing the left side, the marking line should be in the midposition again. Jowl miniflap **c** advanced and **d** sutured. The same patient **e** before and **f** 2 weeks after surgery

Sometimes it is useful to fill up the depression of the deep cheek layer by protruding Bichat's fat pad and by advancement of it. Usually we can add this manoeuvre to some other volumetric procedures. To perform it alone will be very rarely sufficient to solve all the problems.

After SMAS fixation – by plication or flap advancement – we can sometimes find that the fatty tissue of the jowl is still mobile. If so, we can cut it off or advance it upwards and fix it to gain volumetric improvement.

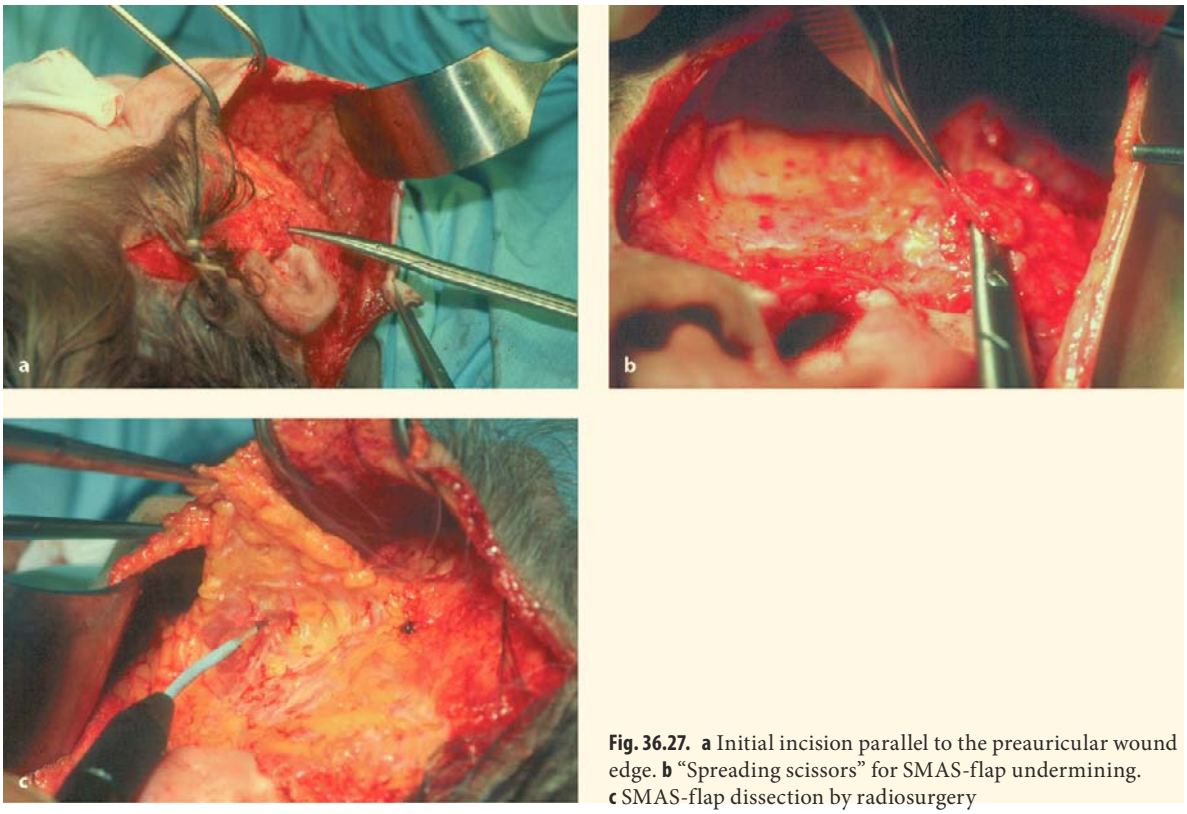


Fig. 36.27. **a** Initial incision parallel to the preauricular wound edge. **b** "Spreading scissors" for SMAS-flap undermining. **c** SMAS-flap dissection by radiosurgery

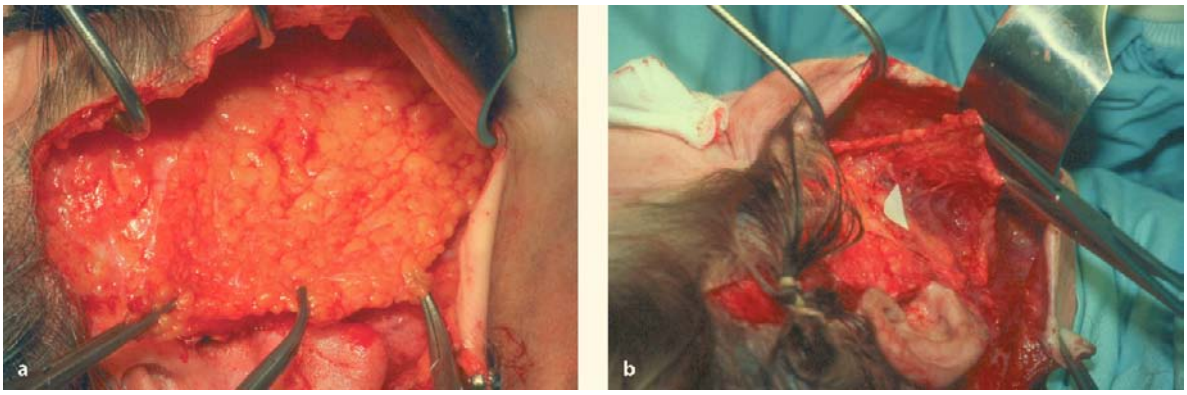


Fig. 36.28. **a** High SMAS flap elevated. **b** Buccal branches of the facial nerve are indicated with a *white triangle*

We have decided to elevate the SMAS flap and to advance it. Five to ten millimetres in front of the preauricular incision we cut an about 1-cm-long incision in the vertical direction and undermine it with spreading scissors.

We mostly make a horizontal incision at the lower edge of the zygomatic arch, which is palpable directly in front of the tragus. Sometimes we need to cut the upper horizontal incision at the upper edge of the zygomatic arch. We call this "high SMAS". In that case we have to respect the imagined line from the ear lobe aiming some 5 mm above the lateral end of the eyebrow. This is the position of the frontal branch of the underlying facial nerve. By advanced dissection of the SMAS flap, at the frontal border of the parotid gland there are buccal branches of the facial nerve which should not be cut. As a safe technique we use the "spreading scissors" and "grasping forceps".

Fig. 36.29. **a** SMAS flap advanced from above with marked line of resection. **b** SMAS flap advanced from below with marked line of resection. **c** "Heavy face" with full cheeks. **d** The same patient after SMAS L-shaped resection

In the past, since 1974 the regular procedure with the SMAS flap was that after advancement of it we resected the cranial and lateral part of it in an L shape or a boomerang shape. Nowadays we do it too, but mostly in full cheeks of "heavy faces". We achieve full mobilization of the cheek skin with "back-cut" at the malar end of the horizontal zygomatic SMAS incision.

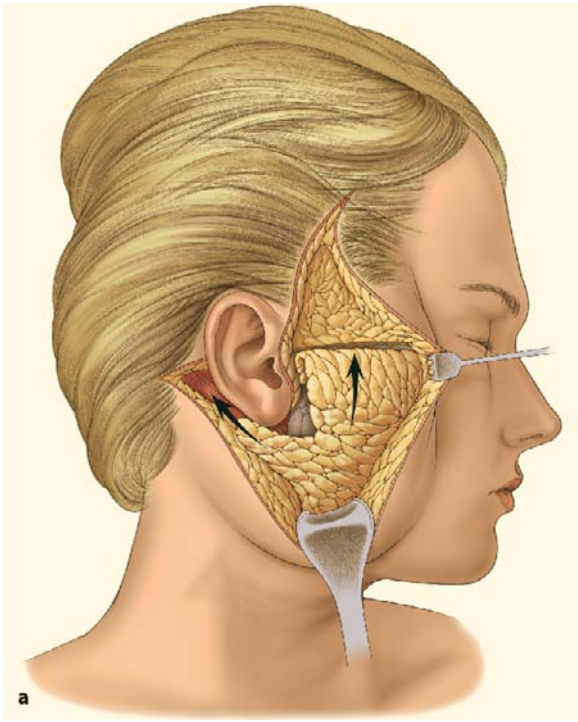
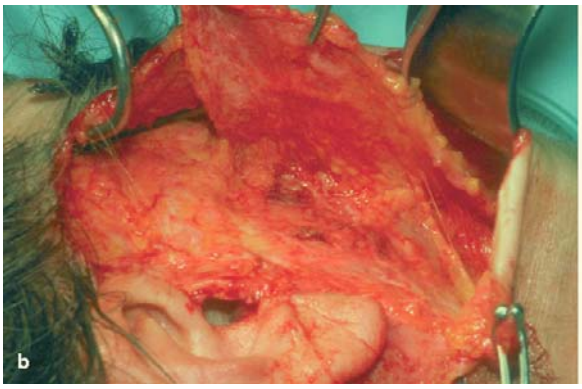
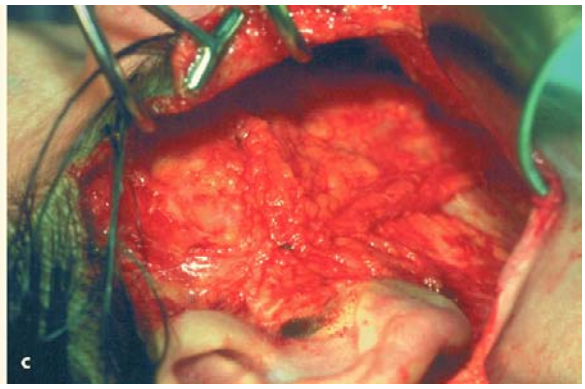


Fig. 36.30. **a** "Horizontal snail SMAS flap". SMAS flap **b** raised and **c** rotated inwards and fixed over the zygomatic arch as a "horizontal snail flap"





Since the early 1990s, we have learned to think in third dimension: the volumetric face was born. Bill Little introduced his malar imbrication with accentuated zygomatic prominence and deepening of the nasolabial fold. The work of Oscar Ramirez also went into the third dimension. The results were more natural, youthful faces.

We know that many film actresses and actors have had silicone implants for this purpose as a prominent zygoma increases the attractiveness in members of the Caucasian race. But these are foreign bodies after all and they can be distorted. Even slight asymmetry is visible for everybody and this looks very disharmonic. There are a variety of SMAS manoeuvres for how to elevate and accentuate the so-called malar bone with rearrangement of the deep layer of the cheek. One of the options is the SMAS advancement on the top and dividing the smaller preauricular SMAS flap to be pulled and fixed over the mastoid bone from larger buccal flap. This should be pulled upwards and rotated inwards and fixed over the zygomatic arch as a "horizontal snail flap".

Fig. 36.31. Patient **a** before and **b** 10 days after "horizontal snail flap" rotation. The same patient in semiprofile **c** before and **d** after this procedure with augmented malar prominence

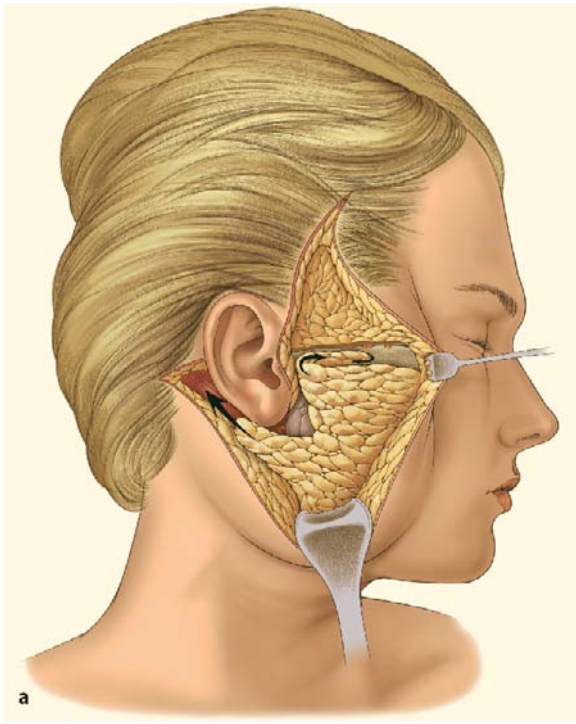


Fig. 36.32. **a** "Simple vertical snail SMAS flap". **b** Preoperative view of a patient with this type of SMAS rearrangement. **c** Same patient of 39 years, 6 days postoperatively (MIDI facelift)

After we have prepared the SMAS flap we can divide the retrotragal portion and advance it in the retroauricular direction and we rotate the buccal portion of the SMAS flap inwards in the horizontal direction, producing a "simple vertical snail SMAS flap", the upper part of which we fix again over the zygomatic arch, augmenting the malar region at the same time.

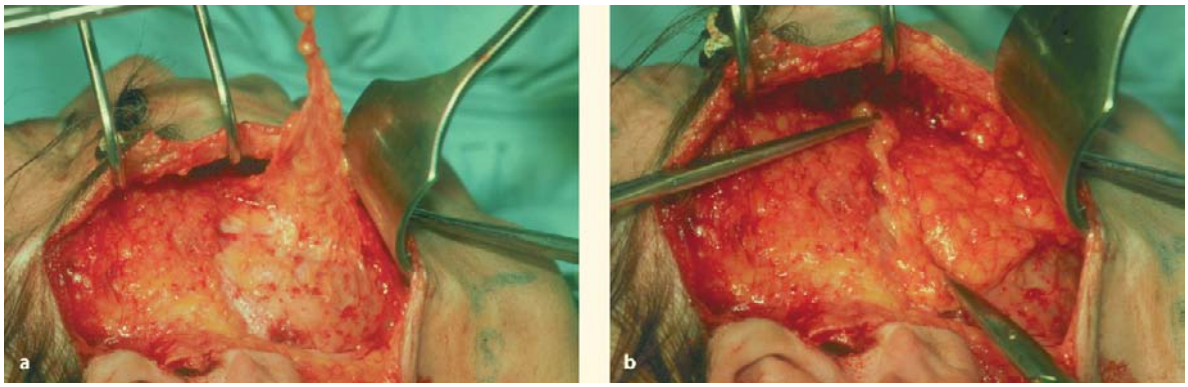


Fig. 36.33. **a** SMAS flap raised. **b** The tip of it to be rolled inwards to build a "simple vertical snail SMAS flap"

If we need more volumetric effect we can roll the vertical snail SMAS flap once more, rotating it inwards, building in such case the "double vertical snail SMAS flap".

We can gain the greatest volumetric effect in augmenting the malar prominence by tripling the SMAS flap first divided into three leaves by means of a "tricuspidal SMAS flap". For that purpose we mark preoperatively the zygomatic arch and those three SMAS leaves.

After complete SMAS preparation, the SMAS flap should be divided into three leaves, as shown in Fig. 36.37.

The operative setup with four steps to be done is shown in Figs. 36.38 and 36.39. An obvious volumetric effect can achieved with this technique (Fig. 36.40)

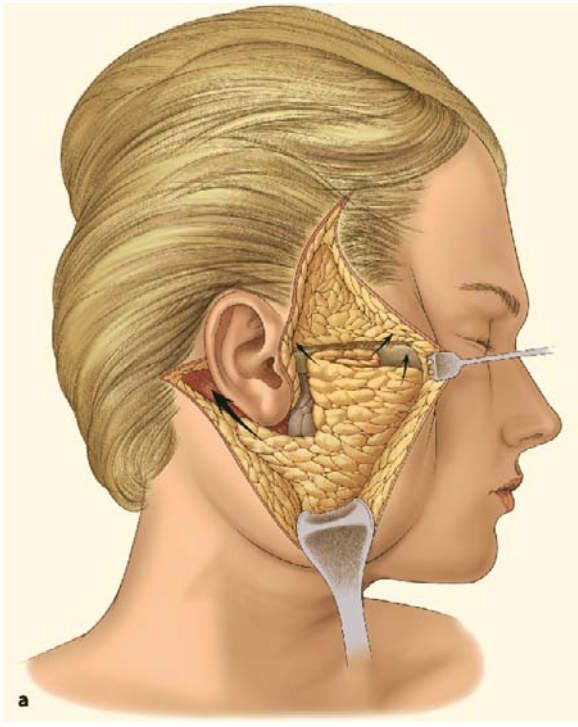


Fig. 36.34. **a** "Double vertical snail SMAS flap". Patient **b** before and **c** 2 weeks after this procedure

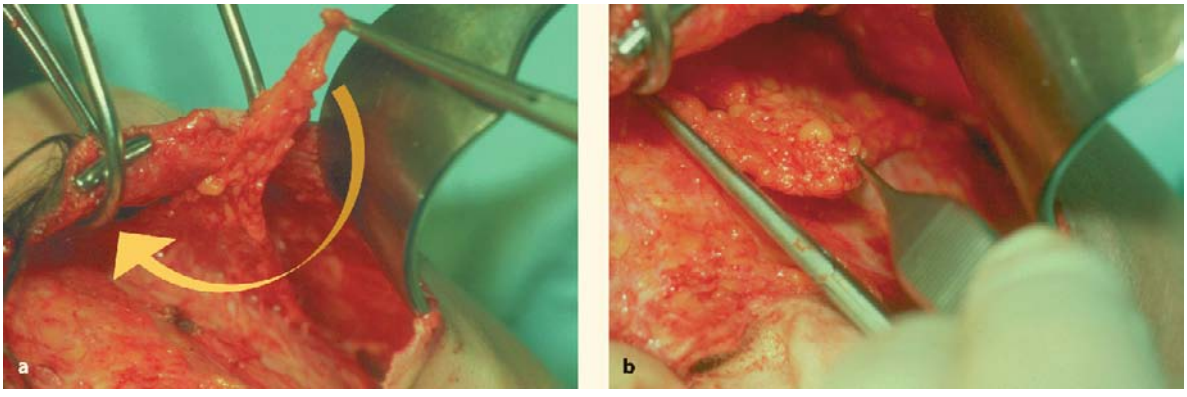


Fig. 36.35. **a** SMAS flap raised. **b** First rotation done, to be done once more, and then to be fixed onto the zygomatic arch: "double vertical snail SMAS flap"

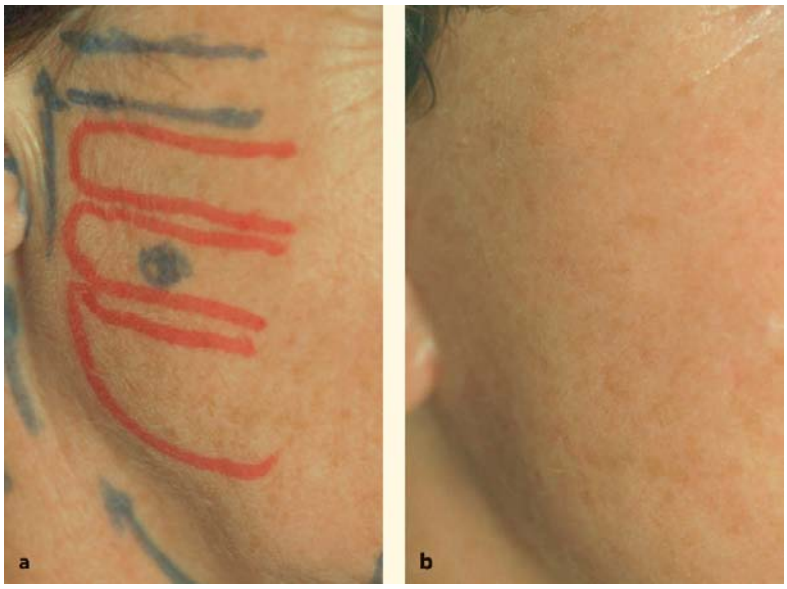


Fig. 36.36. **a** Zygomatic arch in prolongation of the tragus, marked in *blue*. **b** Accentuated malar prominence, 2 weeks postoperatively

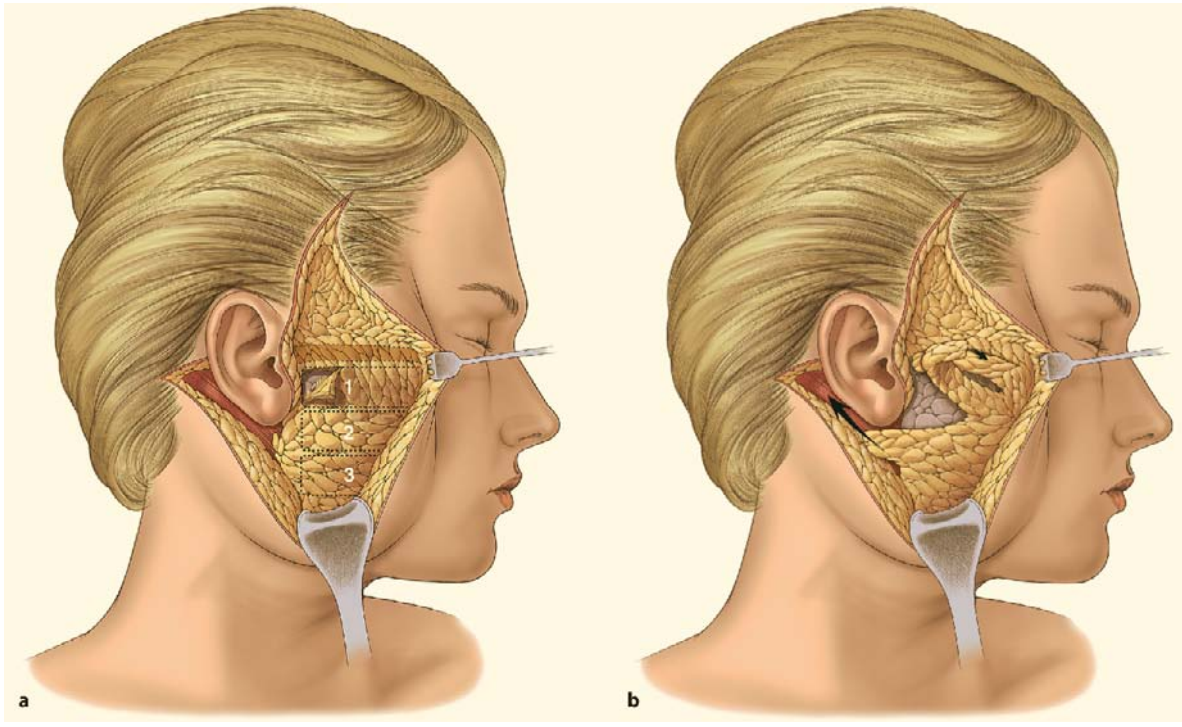


Fig. 36.37. **a** SMAS flap prepared, ready to be divided. **b** Tricuspidal SMAS flap with assumed directions of rotation

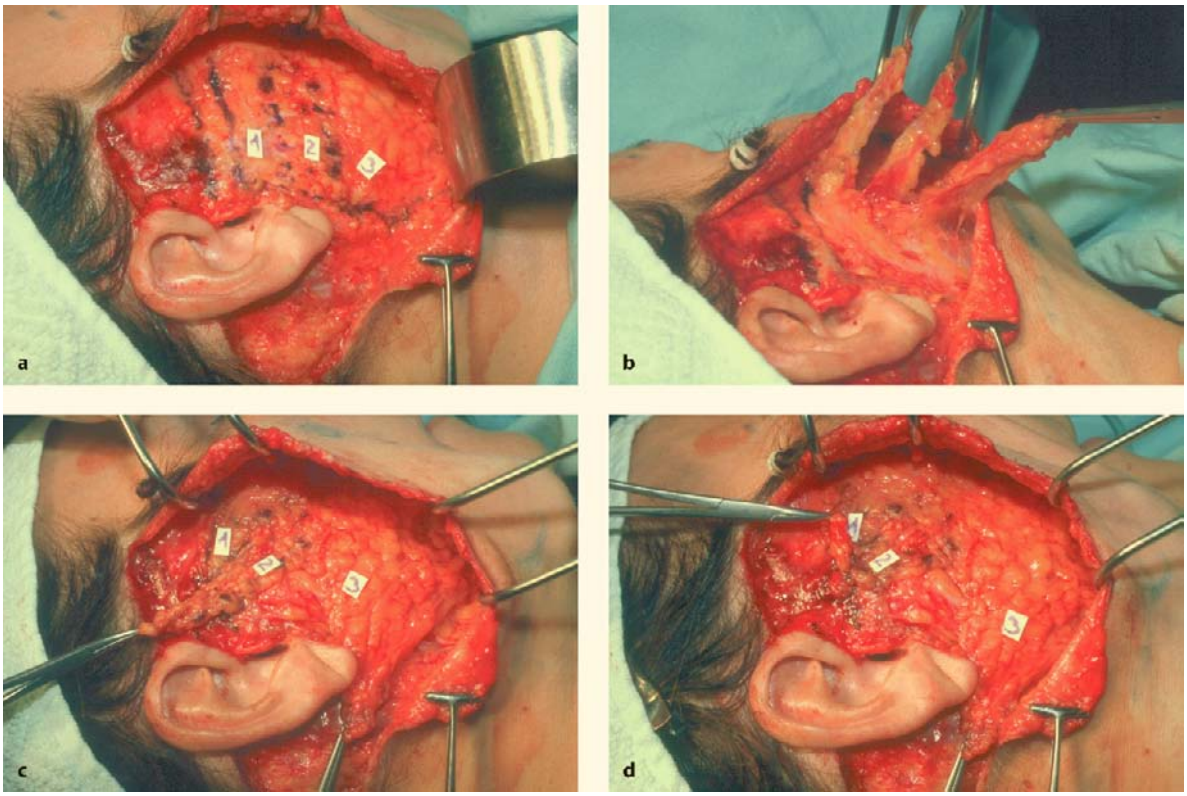


Fig. 36.38. **a** Tricuspidal SMAS plication: the prepared SMAS flap could be divided into three leaves. **b** The upper leaf should be elevated and sutured over the zygomatic arch. **c** The middle leaf should be elevated and fixed at the half length onto the middle portion of the zygomatic arch (already covered with the first leaf), overlapped, and sutured so that the tip of this flap should be fixed over the highest malar prominence. **d** The third, lowest leaf of the SMAS flap should be advanced and sutured over the mastoid region

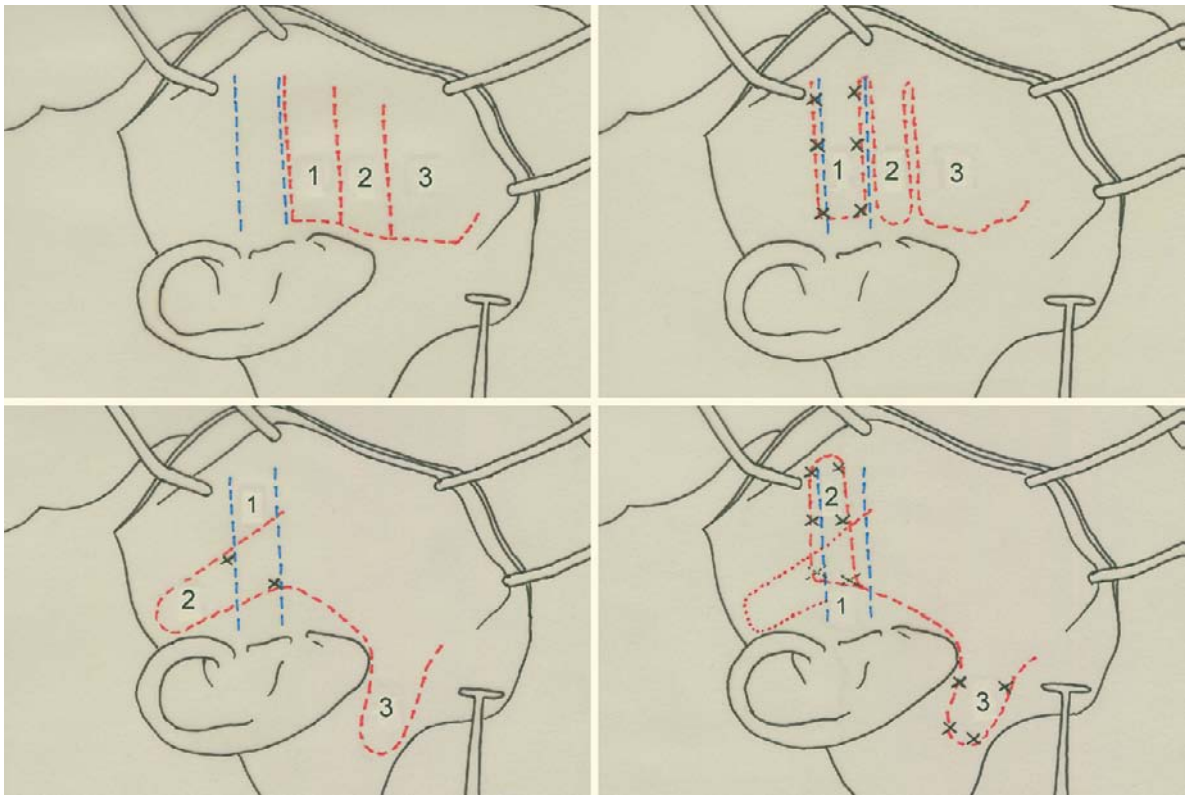


Fig. 36.39. The tricuspidal SMAS flap (*red dotted line*) and the zygomatic arch (*blue dotted line*)

Fig. 36.40. Patient **a** before volumetric facelift and **b** 1 week after facelift with a tricuspidal SMAS flap

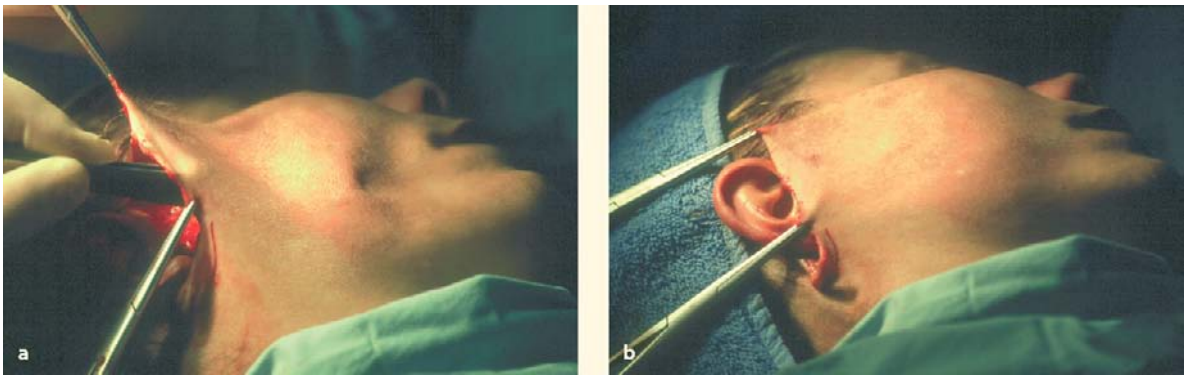


Fig. 36.41. **a** Dimple at the K-point where different vectors of traction come together. **b** K-point released by "spreading scissors" or "grasping forceps"

How do we choose which SMAS procedure to apply? We respect the following factors:

- The patient's idea of his/her facial appearance.
- Inspection, palpation of facial structures, and pulling them in different directions while the patient faces the mirror.
- As professionals we can propose to the patient one or the other manoeuvre, but the patients desire stays *suprema lex*.
- In the operating theatre, after having finished the skin flap preparation, we should check the SMAS mobility. At that point we make the final decision of which procedure should be done.

For all SMAS fixations we use 4-0 monofilament colourless nonresorbale nylon sutures.

When we elevate and rotate the SMAS flap in the vertical direction and the flap of neck skin in the oblique backward direction very often there is a K-point 3–5 cm lateral to the lip commissure where those two vectors come together. There is an impression of the skin which is sometimes hardly visible. It becomes more visible when we put tangential light on it. We have to release it with "spreading scissors" or "grasping forceps", otherwise this dimple will be visible especially when smiling as a facelift stigma of an "operated look". It takes no more than 10–15 seconds, we just have to think of it.

We should often incise at the caudal end of the vertical SMAS incision as a "back-cut" of the platysma for better definition of the mento-cervical angle.

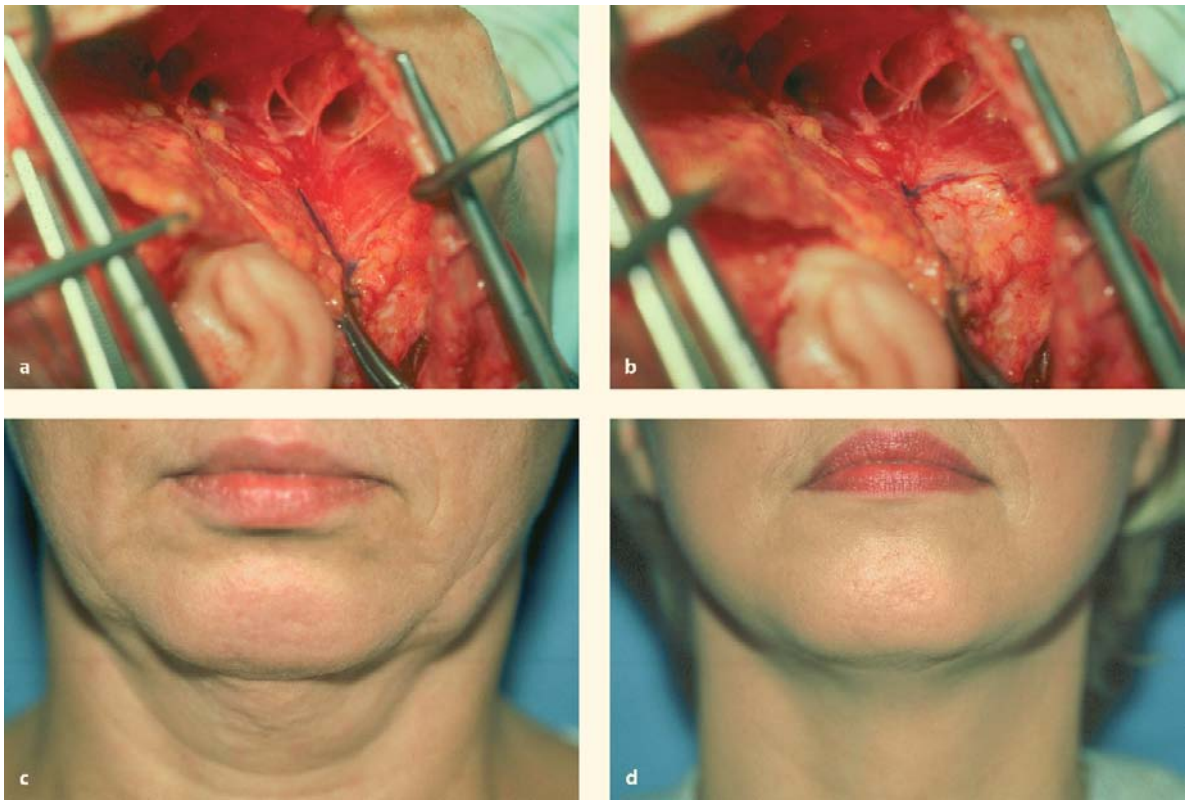
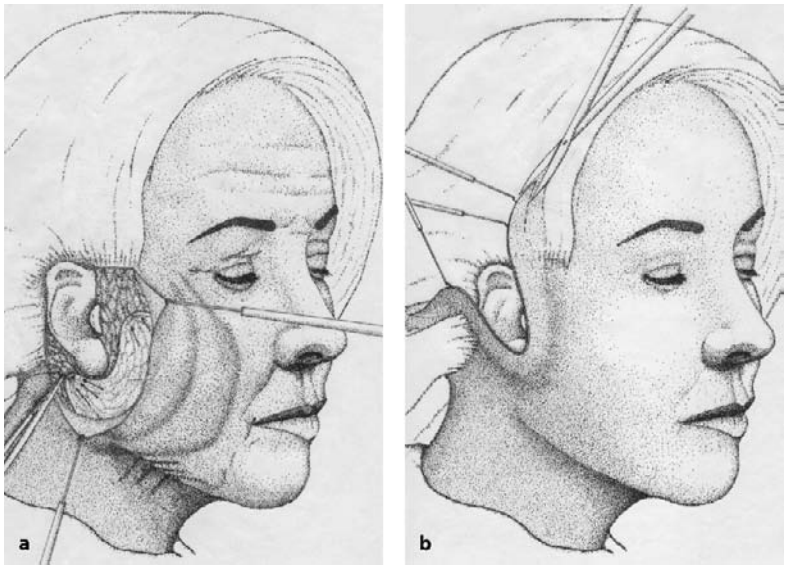


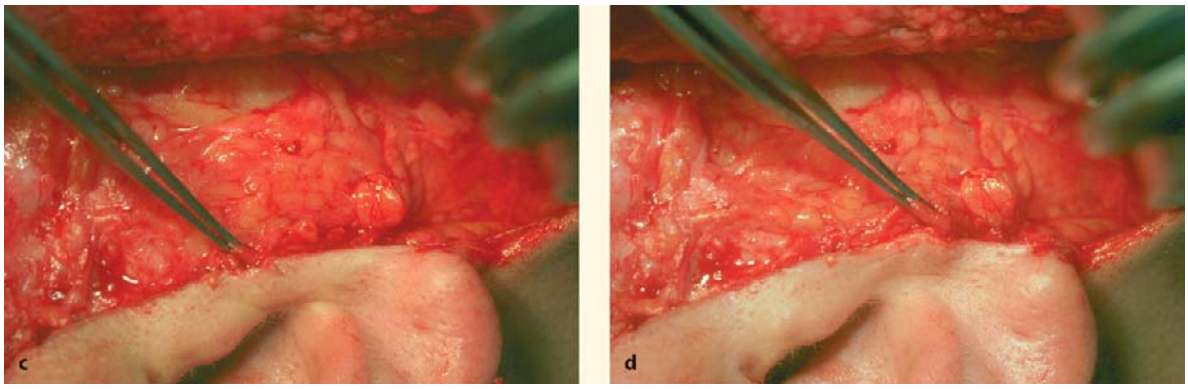
Fig. 36.42. **a** Platysma "back-cut" for better projection of the mento-cervical angle. **b** "Back cut" done: be aware of marginal branch of n. facialis. The same patient **c** before and **d** after facelift with platysma "back-cut"

Fig. 36.43. **a** Liposuction enables better skin retraction. **b** Direct removal of supraplatysmal fat. The same patient **c** before this procedure and **d** after 3 days. Note some facial haematomas after endoscopic forehead lift but no cervical haematomas

In "heavy necks" it is safe to respect supraplatysmal fat for better shape. In the middle of the neck and if the fat layer is not too thick, we are advised to do closed liposuction. We have noticed that liposuction is useful even if there is hardly any submental fat, because it is easier to achieve a stretching effect of the skin.

Fixation of SMAS flap has the best stability if we suture it to the Loré fascia below the tragus. We can divide the latero-caudal part of the SMAS flap and advance it in a retroauricular direction, suturing it over the mastoid. We should direct the stitches directly obliquely upwards following the direction of the auricularis magnus nerve. Doing so, we avoid the danger of catching this nerve in our suture.





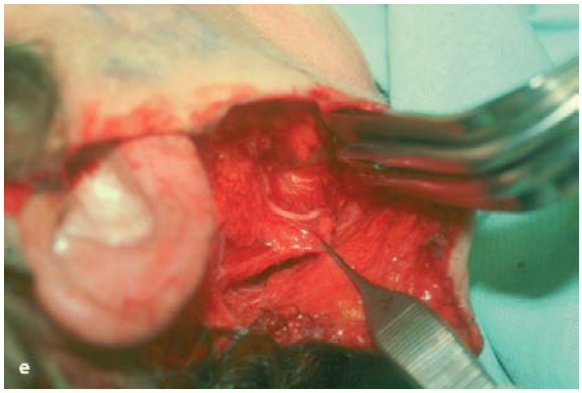


Fig. 36.44. **a** Pre- and retroauricular vector of SMAS fixation. **b** Skin mobilization prior to its resection. Firmness of the Loré fascia by pulling it **c** upwards and **d** downwards. **e** Forceps pointing to the greater auricular nerve. Stitches should be placed parallel to its direction

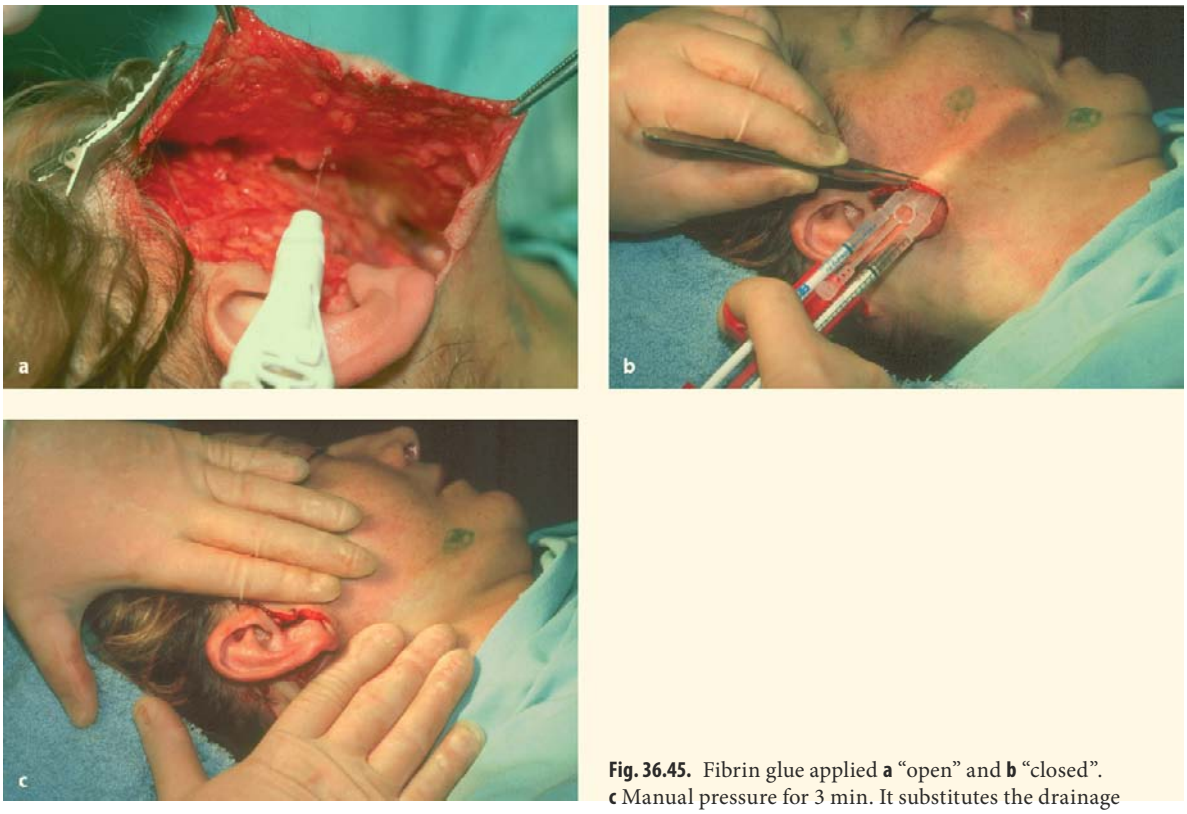


Fig. 36.45. Fibrin glue applied **a** "open" and **b** "closed". **c** Manual pressure for 3 min. It substitutes the drainage

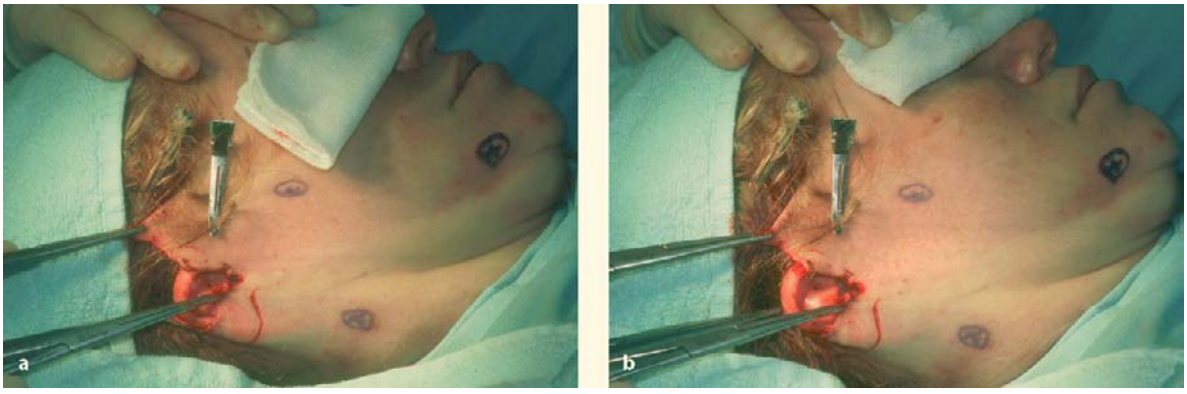


Fig. 36.46. **a** Maximal tension onto the skin flap **b** to be released for 2–3 mm, to achieve harmonious results

Application of fibrin glue at the end of surgery seals small vessels, so we do not need drainage after facelift surgery anymore.

At the end of the surgery we apply maximal tension on the skin flap and reduce it to 2–3 mm. In such a way we can avoid 90% of wound-healing problems and we achieve a harmonious appearance of the face, not making it mask-like without the possibility of mimetic expressions. We achieve long-lasting results through firm tightening of the deep layer.

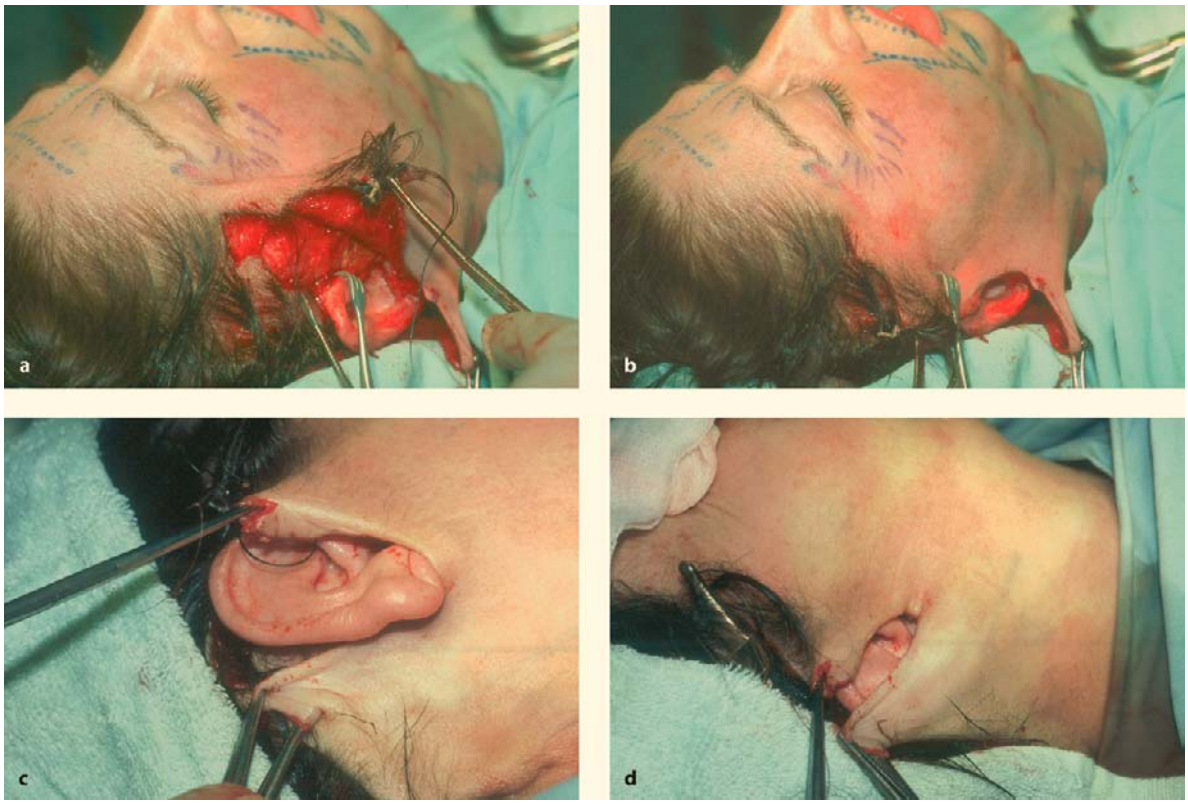


Fig. 36.47. Forceps are **a** placed onto lower incision edge and **b** closed over the moderately pulled skin flap. **c**, **d** When the skin flaps can hide the ear (**d**) the preparation is finished

There are special "pitanguy forceps" which indicate the point up to which the skin should be resected. The lower arm of it is adjusted over the wound edge, with the skin flap pulled moderately. The upper arm stitches the point of skin resection. It can also be demonstrated if the top of the upper arm has been dipped into methylene blue.

If we have incisions running through hair-bearing temporal or retroauricular skin it is faster to close those sutures with staples. To close the skin in preauricular, retrotragal, and retroauricular regions, we use running pull-out sutures of 3-0 or 4-0 monofilament nylon. There are two to three anchorage single knot sutures in supraauricular and retroauricular angles of skin excision.

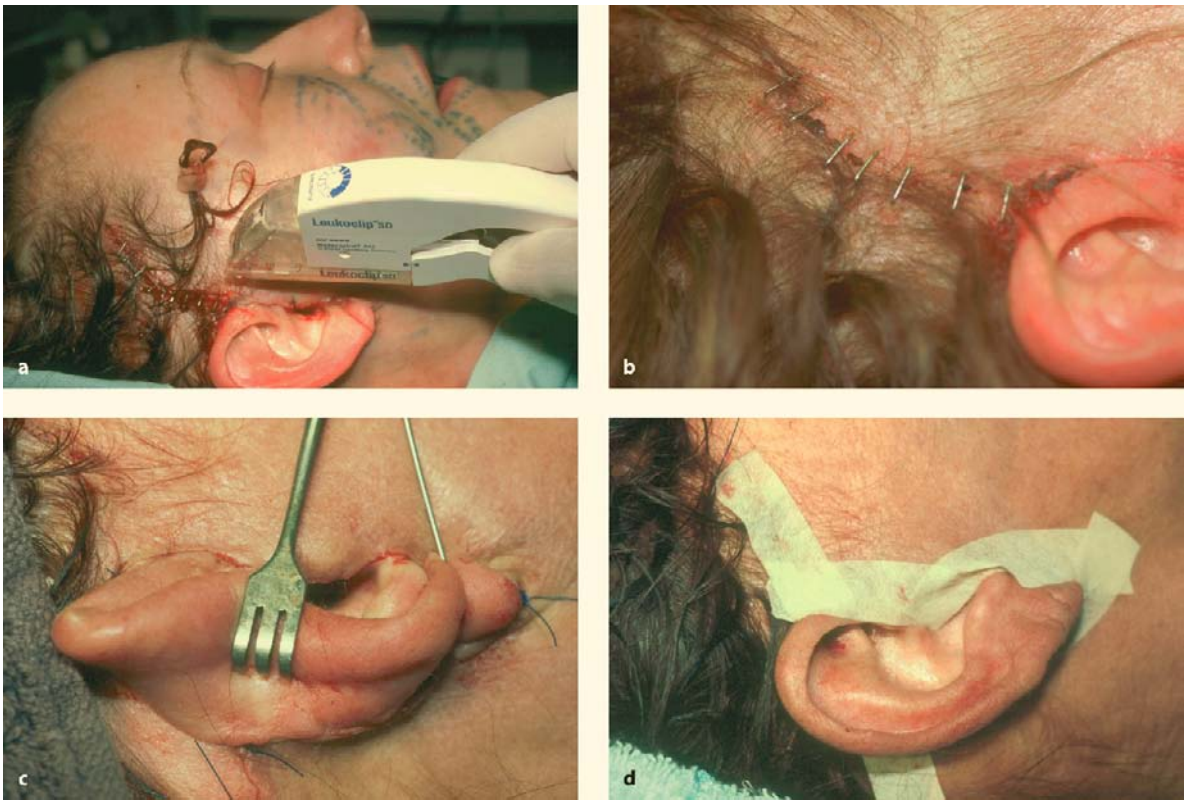


Fig. 36.48. **a** Stapler for temporal wound closure. **b** Temporal staples. **c** Periauricular intradermal and anchorage sutures. **d** Suture strips to cover the suture lines

36.6 SMAS Elevation in Smokers

Nicotine is a vascular poison and can compromise our skin flap, leading to healing problems at wound edges up to extensive necrosis of the skin. This is why many plastic surgeons refuse to do rhytidectomy in smokers.

Usually we ask our patients not to smoke 3 weeks preoperatively and 3 weeks postoperatively. If they were not able to follow this restriction, we make either a subcutaneous bridge at the mandibular angle and prepare separately face and neck, or we use *en bloc* preparation of skin and SMAS together.

For *en bloc* preparation of the SMAS together with the skin flap we use the longest rhino-speculum, as suggested by Helga Eder from Belgium. First we cut the SMAS layer with radiosurgery.

In both cases we tell our patients that we cannot achieve such excellent results as we could by playing with different vectors for traction of skin and the SMAS flap. The results we are able to achieve in smokers will be for some 5–10% less excellent or more modest than in cases if they had not been smokers, because we cannot "play" with different vectors of traction to optimize the outcome.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 36.49. **a** This patient did not smoke 3 weeks prior to the surgery, but started to smoke again 1 day postoperatively. Her look 7 days postoperatively. **b** Three weeks postoperatively, after she has stopped smoking again. **c** Six weeks postoperatively. **d** Three months postoperatively

Fig. 36.50. **a** Smoker with *NICO* marking where the subcutaneous bridge between the SMAS and the skin should stay to support the skin irrigation. **b** The subcutaneous bridge to be preserved.

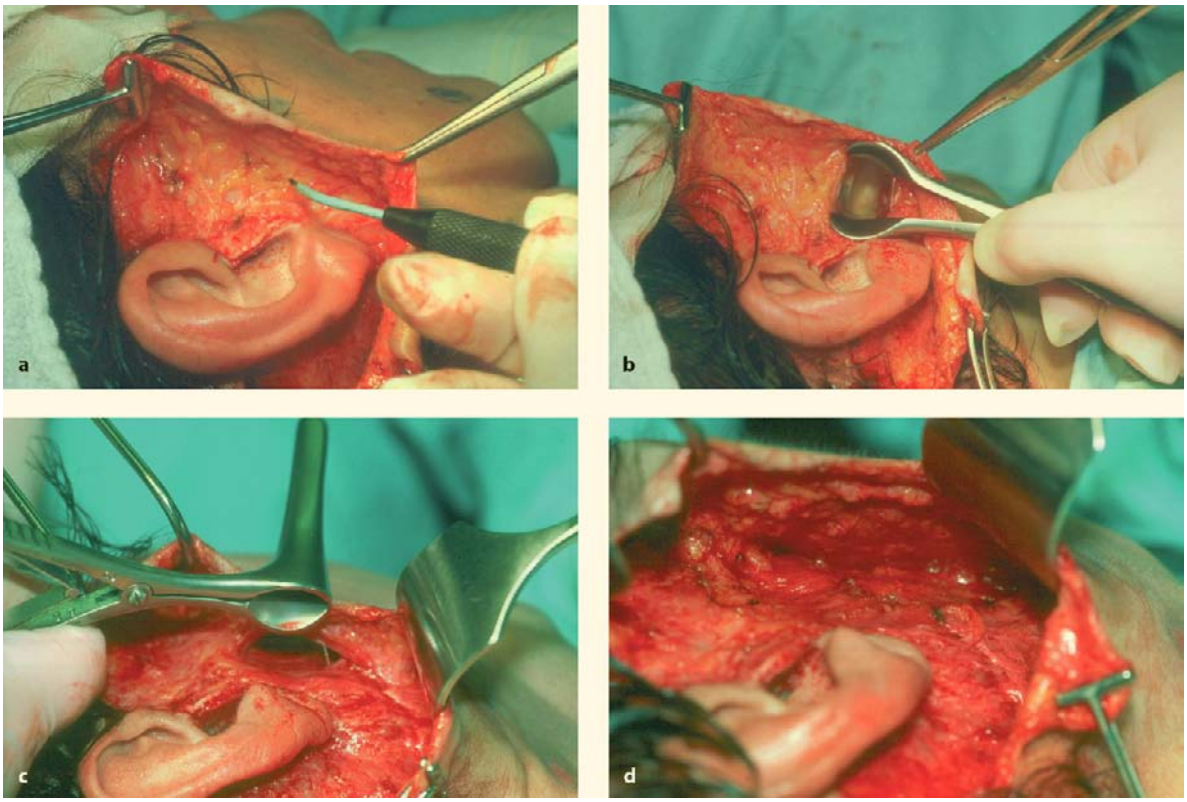


Fig. 36.51. **a** Vertical SMAS incision with radiowaves. **b** Gradual sub-SMAS preparation with gentle pushing and spreading of a rhino-speculum in a horizontal and an oblique downward direction. **c** Removal of the speculum – there is no bleeding at all. **d** After horizontal and vertical SMAS division, parotis fascia is visible at the bottom and skin vascularization has been well provided for

Fig. 36.52. **a** Heavy smoker: preoperative look. **b** Dermographic markings. **c** Her appearance after 4 weeks: "monovectoral facelift"

Biplanar Face Lift

37

Vladimir Mitz

37.1 Introduction

Different vectors for skin and superficial musculoaponeurotic system (SMAS) redraping are useful in order to achieve an efficient and natural face lift. Our technique fulfills the rotation and advancement concept described by Millard [16] for cleft-lip repair.

In the cure of a double-chin pelican's neck, the SMAS is rotated up and inward, the platysma is advanced toward the mastoid area and pulled backwards after being freed.

We have used this technique since 1975, and are greatly indebted to Bruce Connell, John Owsley and Ralph Millard, the last being a magician in skin redraping (for the time we spent with him in Miami) [21, 22]

37.2 Anatomy

The superficial anatomy we find useful is very simple (Fig. 37.1):

1. In the fronto-temporal area, the SMAS and skin are treated as a composite layer: the dissection is performed below the galea until a frontier placed 2 cm above and parallel to the zygomatic arch.
2. Below the temporal area, skin and SMAS are dissected separately.
3. The most useful and solid part of the SMAS is the parotid area; the SMAS is thin and fragile in the anterior cheek area [10, 19, 20]. Dissection below the SMAS without entering the parotid gland is possible in most cases and safe, because the facial nerve runs deep there [14].
4. Platysma and parotid SMAS are in the same surgical layer, thus, a plane of dissection below this complex structure is both possible and safe, while the superficial jugular vein and the great auricular nerve must be carefully preserved. Their exact position is well known and is easy to detect prior to making any incision.

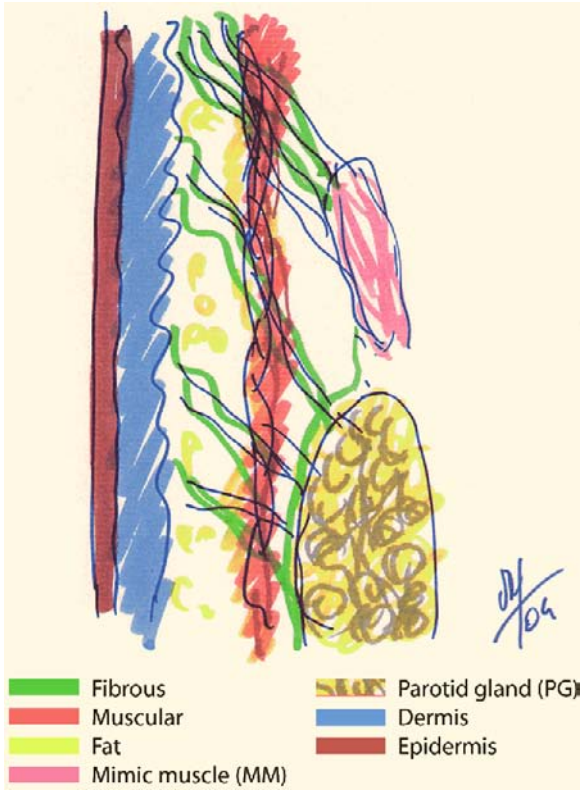


Fig. 37.1. Structural anatomy of SMAS

5. Facial fat components may be useful as subdermal fat, nasolabial fat, or a submalar fat pad or may be detrimental as jowl fat, neck fat, or supraplatysmal fat in the neck area (Fig. 37.2). Liposuction with a 3 mm cannula is the best way to retrieve nonuseful fat compartments, prior to any dissection [1–5].
6. Midline division of platysmal bands is not mandatory and no incision should be made, except in exceptional neck deformities. Platysmal bands are the consequence of muscle contraction and not of muscular laxity. Midline pull (corset platysmaplasty as advocated by Feldman [9]) is a nice technique but is unnecessary in most cases: upward rotation of the SMAS and backward advancement of lateral

Fig. 37.2. Fat compartments of the face

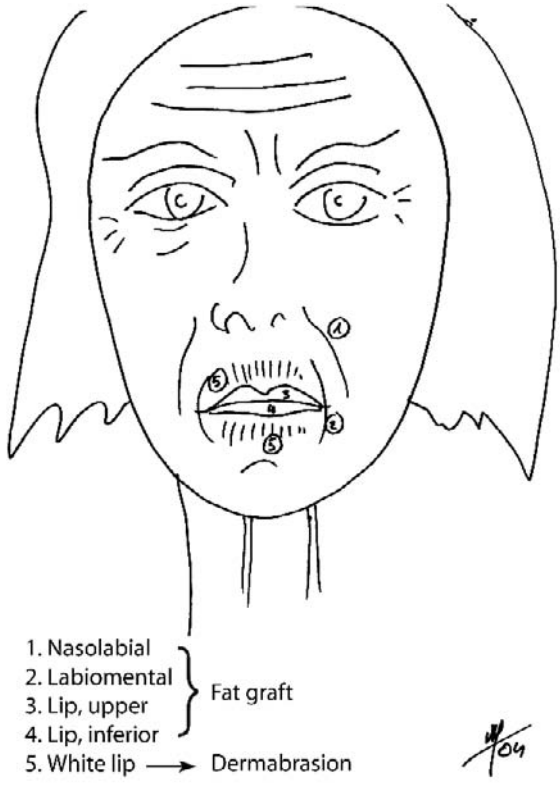


Fig. 37.3. Targets for face rejuvenation

border of the platysma is generally sufficient to redrape the neck.

7. Volumetric enhancement during face lift is not achieved by biplanar face lift: only in the zygomatic and malar area it is useful [13]. The central parts of the face, perioral, lips, chin, nasolabial folds, have to be separately augmented by any means favored by the surgeon.
8. The strongest attachment of the divided SMAS is in the pretragal area and the subzygomatic line. Plication of the SMAS in any direction is an elegant trick but with no solid attachment to a fixed point of the face [8, 18, 19, 23, 24].
9. Facial retaining ligaments (as advocated by Furnas [10]) have to be cut in order to have a good facial redraping without distortion; an extended subskin dissection is mandatory.

37.3 Goals

The biplanar face lift has several targets, and as with every technique, it does not fulfill all of them (Fig. 37.3).

37.3.1 Skin Redraping

Skin redraping has to be done on a large scale, from the temporal fossa (thus we always use a high temporal incision) toward the neck and the perimastoid area.

Limited skin dissection ("minilift") may be useful in limited and well-selected cases:

1. Very young patients with no skin laxity
2. Risky dissection in heavy smokers
3. Imposed quick recovery time by a very demanding patient
4. Early face redo

Extensive skin redraping has the advantage of a good distribution of skin, with no concentration lines by exaggerated pull through scars that are too short.

37.3.2 Jowl Enhancement

Dealing with jowls has taught us that they are a complex structure combining:
- Fat excess
- SMAS laxity
- Skin redundancy

Thus, we use a mild liposuction though a tiny incision in the front of the ear lobe; this liposuction is performed below the mandibular line and the submaxillary area:
- The upward pull and rotation of the facial SMAS allows the jowl to be lifted up between 2 and 4 cm depending on the case.
- Skin redundancy is corrected by the periauricular skin resection in the desired amount.

37.3.3 The Neck Area

This is the most difficult part to treat, and the first to relapse when the tissues have lost their good elastic properties. The treatment combines liposuction, platysmal plication or horizontal separation, and skin redraping mostly along a 45° vector directed toward the mastoid and occipital area.

37.3.4 The Malar Area

This area has to catch the light. It is mandatory in order to fulfill this goal to relocate the submalar fat pad attached and sitting on the SMAS, below the skin. The proper vector to do this is to follow the direction of the zygomatic major muscle and to slide the submalar fat pad toward the infraorbital area and the bony malar eminence. This is why it is advisable to cut the SMAS until the zygomatic major muscle is visible.

37.3.5 The Zygomatic Arch

This area is scarcely in focus. But we think that it is part of the facial rejuvenation when the SMAS is relocated along this structure. Like a curtain detached in the front of a window, the SMAS in some aging patients is falling down, and should be reattached in the zygomatic arch area.

37.3.6 The Temporal Area

In my opinion there is no good face lift which does not include a temporal upward rotation: moving up the face and blocking the elevation below the zygoma is artistic and surgical nonsense.

Elevating the temporal area below the galea allows a lateral browfill, giving the patient a younger appearance.

37.3.7 The Mastoid Area

There is a new trend in avoiding mastoid scars: this may be considered for some young patients (who would need just a vertical lift with mostly a vertical vector). But only the mastoid incision (horizontal or oblique or Z plasty) allows a perfect neck skin redraping. The scar is more acceptable than residual neck skin redundancy or a neck which appears artificially tight.

37.3.8 Volumes

A biplanar face lift cannot enhance volumes in the central face. Only the zygomatic and malar areas benefit from the rotation and elevation of the parotid and cheek SMAS. But nasolabial folds, lips, hollow cheeks, and rhytids are out of the range of simple tissue removal. We need to replace there what the aging process has atrophied.

In the beginning of the 1980s we used SMAS strips. But with time, some irregularities become apparent because the SMAS is a composite structure with muscle fibers, fat cells, and fibrous tissue. Some results are still remarkable and each year some younger authors discover a new trick in SMAS strip grafting. The strips need to be inserted with fat grafts especially in the perioral area and the cheek hollow.

Repeated fat grafts seem to work magnificently; new fillers are also well tolerated. Polyglactic acid (New-Fill) is difficult to use but is very stable and efficient, despite the pain during injection, even under local anesthesia

37.3.9 Additives

During the face-lift session, and in addition, frown lines in the front and rhytids in the orbicularis area benefit from botulinum toxin A. Nowadays, we rarely perform an endoscopic frontal lift; we simply insert an elevator through tiny incisions into the skin, scratch the corrugator muscles from below, and control the position of the instrument with a finger on top of the skin. Blepharoplasty is performed at the end of the face lift. Perioral wrinkles are no longer treated by us with a CO_2 laser, but by dermabrasion: a diamond-covered hand piece inserted in a very high speed rotat-

ing machine. It is a very efficient technique to be redone 6 months later, if necessary. Chemical peel is performed as a secondary procedure, by a qualified dermatologist, who judges the best way to do it.

37.4 Operative Technique

1. Careful patient selection and information.
2. Black-and-white photographs including present and childhood appearance.
3. Local anesthesia with sedation.
4. Betadine shampoo; no hair removal or even hair tied back: just comb wet hair.
5. Diluted Xylocaine infiltration (approximately 300 ml).
6. Incisions depending on the individual case (Fig. 37.1). Usually intratragal approach and inside the scalp.
7. Extended skin dissection with a no. 15 blade and very long powerful scissors (designed by Mitz) (Fig. 37.4).
8. Skin undermining may be continuous in the neck area , enter the lips beyond the nasolabial folds (V. Mitz, personal communication, Madrid), and free the arcus marginalis [19]. The extent of skin undermining depends on each case. Limitation of it is a nice trick. But rotation of the skin flap has to be achieved without any distortion.
9. Entering the SMAS is done through a tiny hole in the pretragal infrazygomatic space. Scissor dissection above the parotid fascia is done if the SMAS test is positive: elevating the SMAS with forceps with a 2 cm excursion is a good sign of SMAS laxity. If no laxity is found, a horizontal SMASectomy below the zygoma is performed. If the SMAS is perfect (5% of our cases), we just perform a skin lift. The SMAS is dissected horizontally until the zygomatic muscles area is reached (Fig. 37.5). The SMAS flap is cut vertically along the tragus down to the anterior border of the external jugular vein. The platysma is freed in front of the vein, and is transected horizontally 7 cm below the mandible with control that the anterior border of the platysma has been reached and will be cut.
10. Hemostasis is extensive.
11. The SMAS and the platysma are dealt with using different vectors
    - Upper and inside rotation to enhance the malar and zygomatic area (Fig. 37.6)
    - Relocation of the submalar fat pad
    - Posterior pull of the platysma sutured to the sternocleidomastoid fascia (Fig. 37.7); all deep sutures are made with inverted knots of nylon 3/0

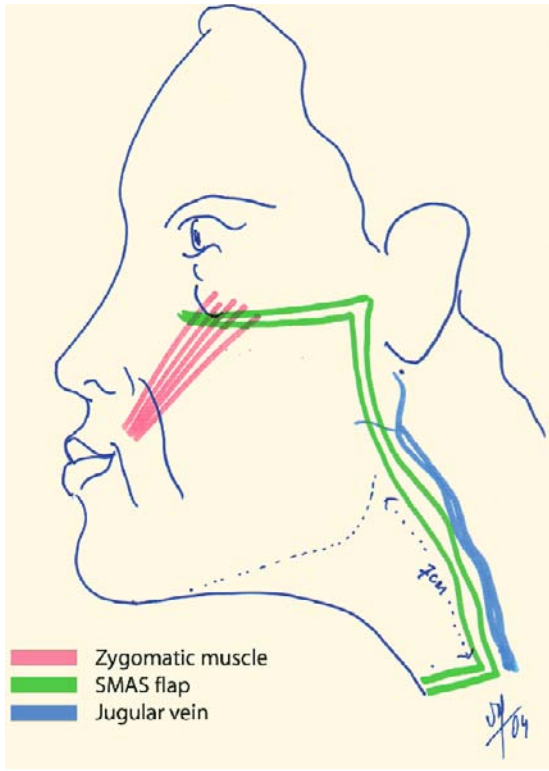


Fig. 37.4. Lines of SMAS surgical division

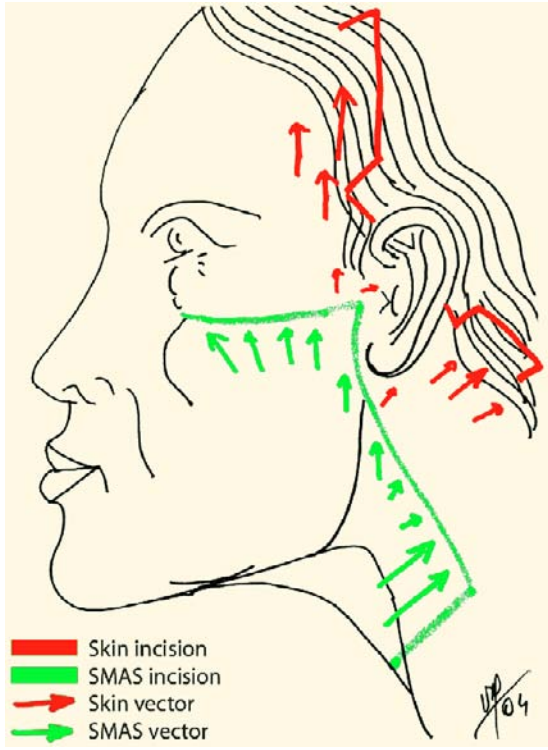


Fig. 37.5. Malar SMAS and fat pad rotation

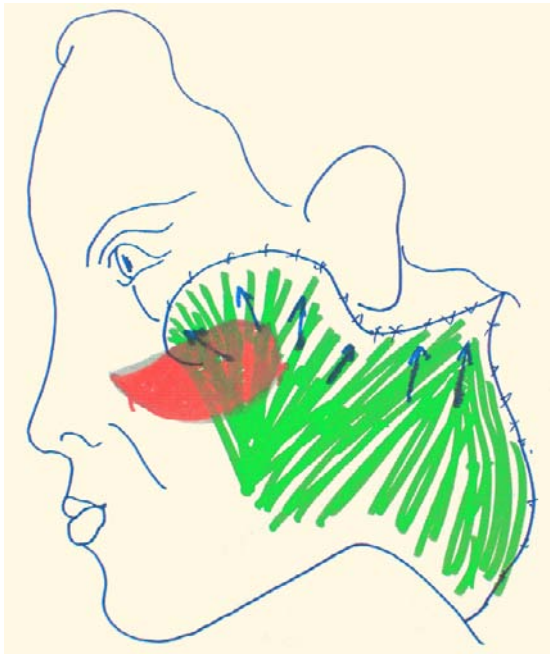


Fig. 37.6. Platysmal back pull toward the sternocleido-mastoid aponerosis

12 Drainage on both sides.
13 Skin suturing with two planes
   – Absorbable polylactic acid 3/0
   – 5/0 nylon around the ear; staples in temporal and mastoid area
14 No coverage of the face. But hair shampoo to remove the blood clots with saline water. No dressing at all. Clean sheets on the bed with a roll put behind the back part of the neck.
15 One overnight stay in hospital. Removal of the drains one day later. Hand shampoo before leaving the hospital.
16 Then aftercare routine at home and removal of stitches.

37.5 Remarks

- In some cases, the SMAS is too thin to be undermined properly: then use horizontal infrazygomatic area SMASectomy
- When the planned procedure is a graft to the nasolabial folds (which is done through an intranasal approach), you should not undermine the skin in the nasalfold area.
- Use suction drains. These may be responsible for iatrogenic hematomas but at least they take out 20–60 ml of lymph and blood on each side.
- Do not use fibrin glue.

37.6 Complications

We share the same number of complications and incidents as other medical colleagues.

Among them, here are a few points:

- *Hematomas*: Giant hematomas occur in 2% of our cases: agitation, hypertension, error in positioning the suction drain, and postoperative skin massaging are the main causes. I do not agree with Pitanguy's opinion that aspiration of the hematoma and compressive bandage may cure this. I would prefer to reoperate in the operating room, reopen the wound, and wash and coagulate a small perforating vessel often found in the temporal, jugal, or mastoid area.
- *Skin slough*: Always use conservative treatment, and make no effort to excise or suture again. The best surgeon is the one who is prepared to allow time handle the problem.
- *Frontal or buccal branch palsy*: No treatment for 6 months: 95% of patients recover spontaneously. If there is still a problem, deal with it by standard treatment: botulinum toxin in the opposite side.

Fig. 37.7. Mitz sissors

– *Facial fasciitis*: we described this condition as a subcutanous fibrous contraction, like Dupuytren disease. It disappears within 2–4 months. Frequently it is associated with a depressive character and a kind of automanipulation. Steroid injections may be useful in selected cases if this condition persists too long.
– *Early deterioration of the result*. Five percent of our patients have a significant recurrence of skin deterioration. We accept a touch-up after 1 year postoperatively; sometimes with minimal fees, when the deterioration is of low grade in order to make the patient know that the skin situation is unpredictable.

37.7 Results

Most of the surgeons doing face lift use a biplanar-like type of face lifting procedure.

Our results have been rewarding in the last 25 years (Fig. 37.8); the number of patients is growing and our students now regularly perform this procedure; out of many cases only one patient was not happy.

This patient asked to have an operation that nobody in her family would notice. After 2 years, her son said that there is not enough difference which could be seen for the money that had been paid; the patient decided to recover her fees instead of being reoperated on.

A face lift procedures in our hands takes no longer than 2.5 h. Most of our patients are still very happy with their result even after 10 years.

37.8 Conclusions

The biplanar face lift procedure including skin undermining and a SMAS platysma flap treated as separate layers is still our procedure of choice.

The concept of rotation advancement is of valuable interest in both layers dealt with different vectors in order to relocate in depth and redistribute in the surface.

Complications may still arise and good results can be achieved with this precise, difficult, and lengthy procedure compared with the result which can be achieved from the minimal lifts advocated today. But who knows the most can accomplish the least.

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Fig. 37.8. Before/After results

Fig. 37.8. *Continued*

SMAS for Face and Neck Lifts

38

Bruce F. Connell

38.1 The Importance of the Superficial Musculoaponeurotic System in Rejuvenation of the Face

Skin is elastic and accommodates changes in the shape of our faces during movement and expression. It cannot provide sustained support for sagging deeper facial tissues (Fig. 38.1). Skin is a covering, not a support.

The superficial musculoaponeurotic system (SMAS) is closely connected to sagging facial tissues and is a logical vehicle to reposition them. The SMAS is *in*elastic and can provide a strong and sustained support of the midface, cheek and jowl and periorbital area (Figs. 38.2–38.4). Pulling on the skin flattens facial contours, whereas pulling on the SMAS enhances contours.

Using the SMAS to reposition sagging deep facial tissue allows skin to be redraped under normal tension, which preserves normal skin function and results in a natural appearance (Figs. 38.1, 38.5). Healing of skin incisions is without tension. Preauricular natural contours are preserved. In addition, using the SMAS extends the longevity of a facelift.

Fig. 38.1. **a** Detailed knowledge of the anatomy including frontal and zygomatic branches of the facial nerve is required for high superficial musculoaponeurotic system (*SMAS*) transection at the top of the zygomatic arch, which permits a more cephalad vector for midface, lid–cheek junction, nasojugal groove, elevation at the angles of the mouth and eversion of upper-lip vermilion. **b** One year postoperatively with improvement by SMAS support and release of the crow's-feet, which enabled the skin to shift the nasojugal groove from diagonal of old age to horizontal of youth and give the appearance of youthful shorter lower eyelids

Fig. 38.2. **a** Preoperative view of a 19-year-old patient whose neck contour was interfering with her modeling career. A necklift can be performed without a facelift by utilizing a submental incision, combined with an incision above the occipital hair so that the short platysma muscle could be transected along the anterior border of the sternocleidomastoid and across the neck at the cricoid. **b** One year later showing improvement made by removal of subcutaneous cervical fat by open liposuction, removal of subplatysmal submental fat by scissor dissection along with transection of the platysma muscle along the anterior border of the sternocleidomastoid and across at the cricoid. The platysma muscle was shifted laterally over the fascia of the sternocleidomastoid in the upper neck. No skin was excised and no chin implant was used

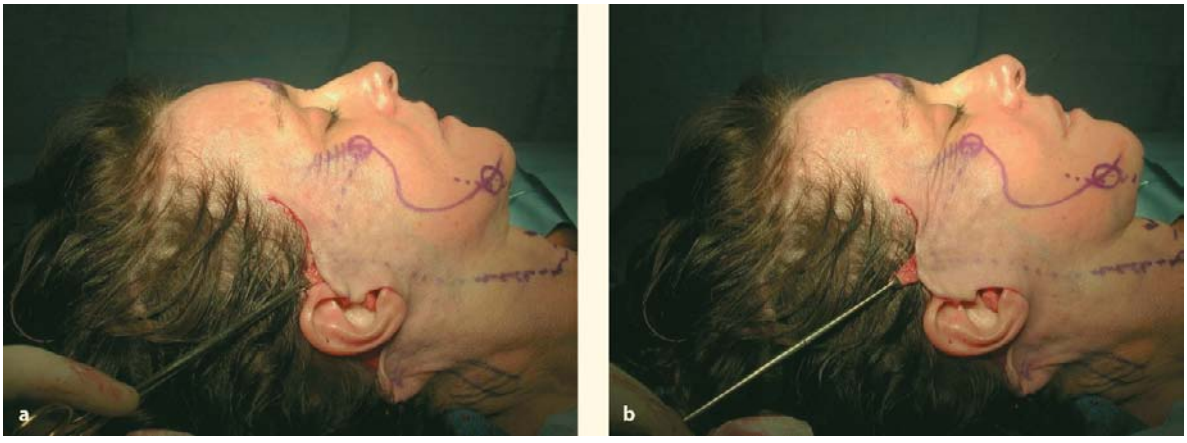

Fig. 38.3. **a** The two *circles* show the point of rotation of the SMAS at the malar bone and the attachment of the osseocutaneous mandibular ligament, which is to be released for the SMAS to have a supportive affect across the midline of the chin. The markings locate the crow's-feet to be freed from the attachment to the orbicularis oculi muscle so that the facelift skin shift can extend across the entire lower eyelid. The *dotted line* on the neck is the location of the incision of SMAS and platysma muscle and follows the anterior border of the sternocleidomastoid and crosses at the cricoid. **b** Only one Allis clamp pulling on the SMAS flap shows shortening of the appearance of the lower eyelid, shift of the skin past the crow's-feet into the lower eyelid, elevation of the angle of the mouth, eversion of the lateral vermilion of the upper lip, shifting of the skin beyond the malar ligament and beyond the mandibular ligament along with a slinglike submental support

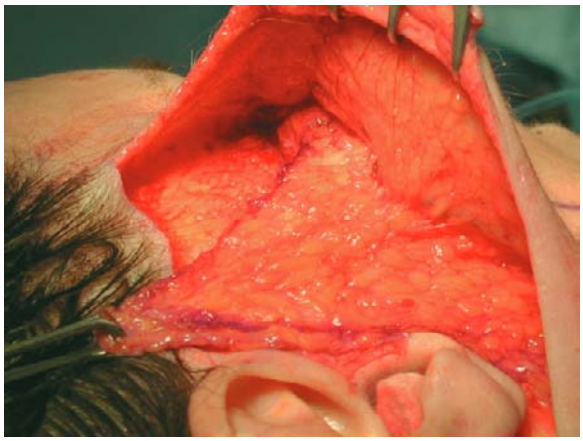

Fig. 38.4. Overlapping that is frequent with shifting of the platysma muscle in a precise vector to achieve the desired results

Fig. 38.5. **a**, **c** The release of osseocutaneous submental creases along with transection of the short platysma muscles, correction of sagging skin of the face and neck and lateral brow ptosis are corrected by utilizing deep-layer SMAS support and appropriate vectors for both the SMAS and the skin. **b**, **d** One year later the improvement has been accomplished by releasing the crow's-feet attachment to permit shifting of the skin across the entire lower eyelid and redirection of the nasojugal groove from diagonal to horizontal, high SMAS incision at the top of the zygomatic arch along with complete transection of the platysma muscle along the anterior border of the sternocleidomastoid and across at the cricoid for correction of the short playtsma. In addition, there has been release of the osseocutaneous malar ligament and the submental creases. No chin implant was used

38.2 Techniques for SMAS Utilization

Experience has confirmed the utility of the SMAS in rejuvenating the face and it has come to be an integral part of many techniques. How the SMAS is used, however, determines its overall effectiveness, and not all procedures can be expected to produce equivalent results.

Many techniques have evolved for utilization of the SMAS. These include Skoog or composite dissections in which the SMAS and skin are elevated as a single unit and advanced along the same vector, "bidirectional" dissections in which skin and SMAS layers are elevated independently and advanced along different vectors, plication techniques in which the SMAS is not elevated but is invaginated with sutures, and SMASectomy procedures in which the SMAS is partially resected and then repaired. High SMAS dissections in which the SMAS flap overlaps the zygomatic arch provide an effect on the midface and recruit and redistribute tissue over the upper malar region.

Composite and Skoog-type dissections are quick to perform and result in a thick, durable flap of both skin and the SMAS. The flap raised in these procedures has good blood supply. Consequently these techniques might be safer in smokers or when skin resurfacing is performed at the same time. They have the disadvantage, however, that skin and the SMAS must be advanced along the same vector and suspended under more or less the same amount of tension. Skin and the SMAS age at different rates and descend along different vectors. Therefore, optimal treatment of each layer is not possible. Skin overtightening, hairline displacement, "wrinkle shift" from the neck to the cheek and other unnatural appearances can result. In addition, if the orbicularis oculi is included in a "composite" flap, its motor nerve supply is often divided and lid dysfunction can result.

Separation of the skin from the SMAS has the advantage that skin and the SMAS can be moved along separate vectors and suspended under different tensions. This produces a better rejuvenation, a natural appearance and fewer secondary deformities. These two directional techniques require a high degree of surgicial skill to elevate the skin flaps without thinning the SMAS flap and are time-consuming (Table 38.1).

Plication techniques are quick to perform and do not require the level of technical skill necessary for a more tedious and potentially more hazardous SMAS elevation. Properly performed plication at multiple

Table 38.1. Superficial musculoaponeurotic system *(SMAS)* suppor

SMAS support goal	**SMAS support produced by:**
1. Submental area	1. SMAS separated from parotid and masseter muscle
2. Tissues at the hyoid.	2. Preauricular SMAS flap to mastoid fascia
3. Anterior cheek	3. Support anterior cheek tissues a) Large SMAS flap posterior–superior shift b) Sometimes sutures to the malar bone periosteum c) Separate superior transposition flap with vector directed toward angle of mouth d) Release of malar retaining ligament adjacent to zygomaticus major muscle
4. Angle of the mouth elevation	4. Same as point 3
5. Lower nasolabial fold	5. Posterior-superior SMAS shifting perpendicular to the fold
6. Upper nasolabial fold	6. a) Major flap incised above zygomatic arch for support of upper nasolabial fold b) Separate transposed flap of the superior portion of the SMAS c) Suture to the malar bone with support directed toward the upper fourth of the nasolabial fold d) Combination approach
7. Nasojugal groove change from aged oblique direction to youthful, horizontal direction	7. High location of SMAS transection at or above the upper border of the zygomatic arch or third flap for upper vector directed toward lower eyelid and upper nasolabial fold
8. Decrease lower-eyelid excessive skin and support by facelift skin shift	8. Release of all of the attachments of the orbicularis oculi muscles to the skin (smile crease)
9. Support to the periorbital fat of the lower lid	9. Extension of SMAS flap and transection into the lateral portion of the orbicularis oculi muscle and shifting upward in a lateral direction with a high SMAS transection or a third flap component

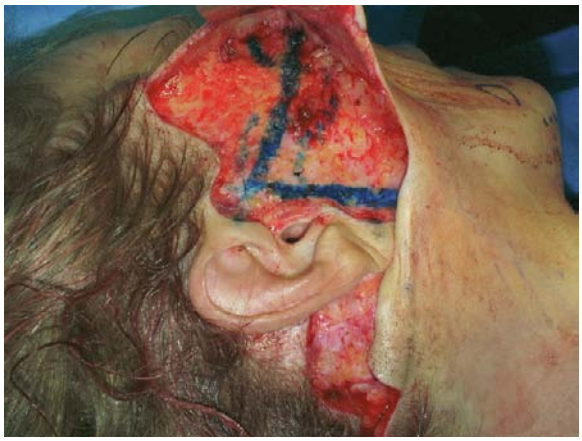

Fig. 38.6. Incision on the upper part of the zygomatic arch can often be made high enough so that a third flap is not necessary to achieve the desired vectors for the cephalad support of the cheek, jowl, midface, submental area, periorbital region, lid-cheek junction and angle of the mouth

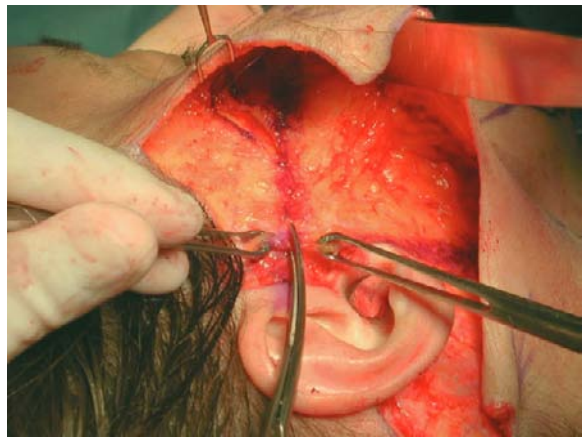

Fig. 38.7. High SMAS flap transection is safe with a detailed knowledge of the anatomy of the frontal and zygomatic branches of the facial nerve. The elevation with Allis clamps gives a clearance over the motor nerves of more than 1 cm

sites and along multiple vectors can produce long-lasting improvement in patients with moderate deformities. It has the disadvantage, however, that cheek skin must be widely undermined, and plicated tissue may result in visible contour irregularities. Plication techniques often only result in elevation of perioral tissues and the jowl, and provide limited improvement in the midface, cheek, and infraorbital and submental region. Usually plication techniques do not distribute tissue over the upper malar region where it is often needed most.

SMAS excision (SMASectomy) techniques are similar to SMAS plication, except that tissue is excised rather than invaginated. SMASectomy procedures are, however, often limited to tightening of the deep tissues along one vector only. SMASectomy and plication procedures may result in similar changes in the topography of the face. Plication at multiple sites and in multiple directions may produce better results than SMASectomy alone.

The technique we use most often liberates the SMAS from its attachments to the parotid gland, masseter muscle, zygoma and mandibular ligament and offers the advantage that the full potential of the SMAS can be realized and maximum repositioning of ptotic tissue to its youthful position can be obtained. If the SMAS is not fully released and mobile, its effectiveness will be compromised. More extended dissections with a high SMAS incision (Figs. 38.3, 38.6–38.8) have the disadvantage that it is time-consuming, technically demanding and, theoretically at least, the facial nerve branches are placed at a potentially greater risk.

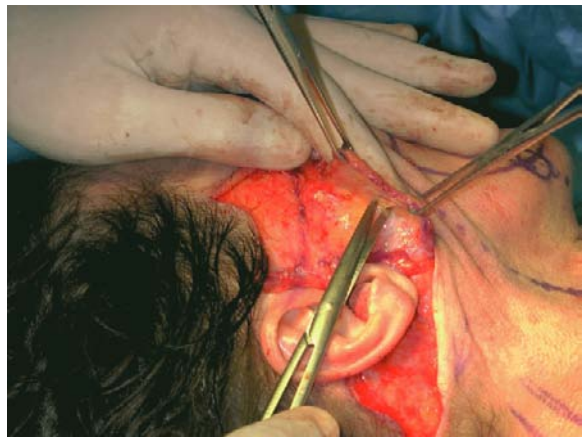

Fig. 38.8. Sharp scissor dissection is used to separate the SMAS from the parotid gland and masseter muscle and the SMAS malar connection. The SMAS flap is always adequate for support of the face unless damaged by the surgical technique of elevation of the skin overlying the SMAS

SMAS flaps are planned with a transverse incision over the upper part of the zygomatic arch, as opposed to too low, which loses 75% of the SMAS support potential. This has the distinct advantage that a more cephalad effect can be obtained on the cheek, jowl, midface, periorbital region and lid–cheek junction, and tissue can be redistributed over the upper malar region (Figs. 38.1, 38.55). The high flaps require detailed knowledge of the anatomy of the frontal and zygomatic branches of the facial nerve (Figs. 38.7, 38.8).

38.3 An Overview of Surgical Strategy

The surgical procedure described comprises a variety of designs, which must be applied as indicated by the patient's specific needs. Each patient will present with a unique set of problems, which require precise anatomical diagnosis and an appropriately planned and individualized repair.

The SMAS and the platysma are used to reposition ptotic tissues and reestablish a more youthful cervicofacial contour and make a deep support to the submental area, which skin tension alone is not capable of producing.

The skin and the SMAS are elevated independently, and the SMAS is advanced along a mostly *superior* vector. Composite tissue shifts do not permit the restoration of the beauty of the patient's younger face and neck as well as separate skin and SMAS flaps.

Additional modifications are made to the platysma and other deep-layer structures, including the orbicularis oculi muscles, submandibular glands and digastric muscles, when indicated. If problems of these structures are not identified and addressed, improvement will be compromised (Fig. 38.9).

Skin is redraped under normal tension along diagonal or *posterior* vectors. Skin tension is unnecessary for rejuvenating the face. Dismissing the skin tension concept exists as a major stumbling block to achieving a natural postoperative appearance (Fig. 38.5b).

Skin is trimmed in such a manner that wound edges touch and no gaps are present before sutures are placed to make one-layer closure, which approximates the deep and superficial skin edges without any buried suture. Support of ptotic tissue and improvement in face and neck contour are by modification of the SMAS, platysma and other deep-layer structures, and not by pulling on the skin. The use of incisions along hairlines, rather than within the scalp, may prevent objectionable hairline displacement. Hairline displacement is a major shortcoming of poorly planned incisions and is a common cause of unnatural appearances. Incisions made along hairlines will result in scars, which are usually difficult to detect once healed when deep-layer support is provided by the SMAS and skin incisions are carefully planned, placed, made and closed under no tension. A fine scar along the hairline is less noticeable and is preferable to deforming hairline displacement.

The SMAS, which has been used for more than two decades, is safe and can restore a natural youthful appearance as well as produce new, beautiful contours. This basic technique is modified for each patient and for each side of the face according to the specific and precise anatomical findings. The patient's younger photographs are reviewed for designing a natural-appearing surgical rejuvenation [1–3].

Fig. 38.9. **a** The transverse sausage like fullness in the submental area is typical of a very large anterior belly of the digastric muscle. **b** A face and neck lift using a high SMAS flap and a rotated flap from anterior to the ear under the angle of the jaw and sutured to the mastoid area along with tangential excision of 90% of the large anterior belly of the digastric muscle

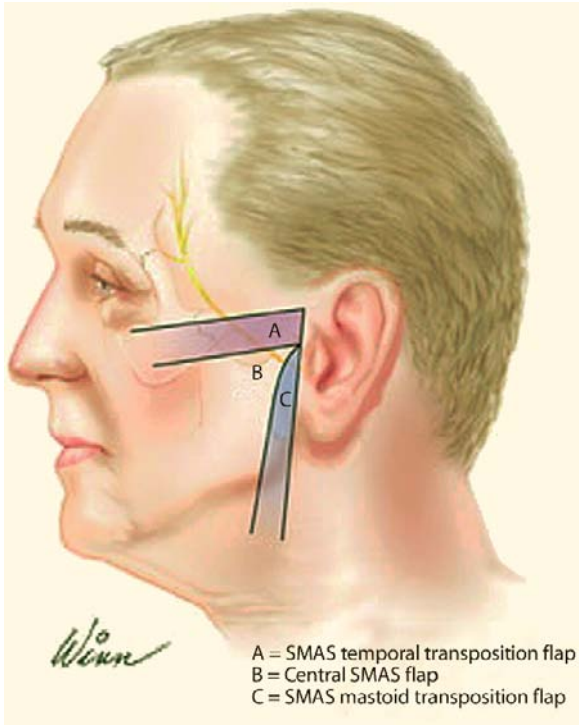

Fig. 38.10. On rare occasions when the transverse transection of the SMAS at a high level does not permit a precise vector to elevate the angle of the mouth, upper nasolabial fold and nasojugal groove, a third flap can be made from the upper portion of the SMAS to move to the desired precise vector needed for elevation. Excellent surgeons use this design for almost all facelift patients

Unfortunately utilization of the SMAS for rejuvenation is not an easy surgical technique. Skill for precise separation of the overlying tissues from the SMAS is essential [4]. This dissection must neither thin the SMAS nor injure the subdermal plexus of arteries and veins. The SMAS is always thick enough to hold sutures unless the dissection thins or removes some of the SMAS while elevating the skin flap. If during the surgical dissection the ability to recognize the SMAS layer and to precisely surgically uncover the intact SMAS is lacking, then some other less efficient technique for deep-layer support must be used [1, 5].

For all except those with only excessive skin, a satisfactory facelift result requires modification of the deep-layer support composed of the SMAS, which includes fascia and the platysma [6–8]. When utilized appropriately, the SMAS will move cheek fat into the eyelid–cheek depression and change the direction of the nasojugal groove from diagonal of old age to horizontal as it was at a younger age (Figs. 38.3, 38.10).

Rotation and posterior–superior cheek SMAS shift can provide support to the cheeks, restore the jowl fat to the youthful cheek contours, eliminate the hanging jowls, flatten nasolabial folds and even form a sling support to the submental area across the midline between the hyoid and chin (Fig.38.5). If the transverse incision of the SMAS is made over the upper part of the zygomatic arch, a very good support to many additional areas is possible. These areas include the orbicularis oculi and orbital septum, nasojugal groove, movement of cheek fat into the depressed lid–cheek junction, the upper nasolabial fold, and exposure of more vermillion of the lateral upper lip. Also, elevation of the angle of the mouth can change a down-in-the-mouth or "fish mouth" to a more pleasant and content appearance [9, 10].

Patients with vertically short platysma muscles or tight bands are treated by muscle interruption and release at the level of the cricoid cartilage. The vertical SMAS incision overlying the parotid is about 1 cm anterior to the ear and continues to become the platysma incision anterior to the sternocleidomastoid muscle. When complete platysma transection is planned, the incision is passed within the approximately 1 cm wide avascular area anterior to the anterior border of the sternocleidomastoid muscle and crosses the neck at the cricoid level. Usually anterior submental platysma muscle invagination is planned. Approximation of the platysma muscle completes the three-vector sling formed by upward cheek-SMAS shift and rotated SMAS flap to mastoid fascia [11].

Bulges in the submental area must be assessed as to bands or sagging platysma muscles, fat, digastric muscles or submandibular glands (Figs. 38.9; 38.11) [12]. As indicated by the anatomical findings, the SMAS sling support is used for sagging platysma muscles, transection for platysma bands, partial excision of fat and submandibular glands and tangential transection of large digastric muscles [13]. The osseocutaneous connections of the mandibular ligament and mental crease should be completely liberated for the SMAS support to extend to the midline of the chin and submental area (Fig. 38.11).

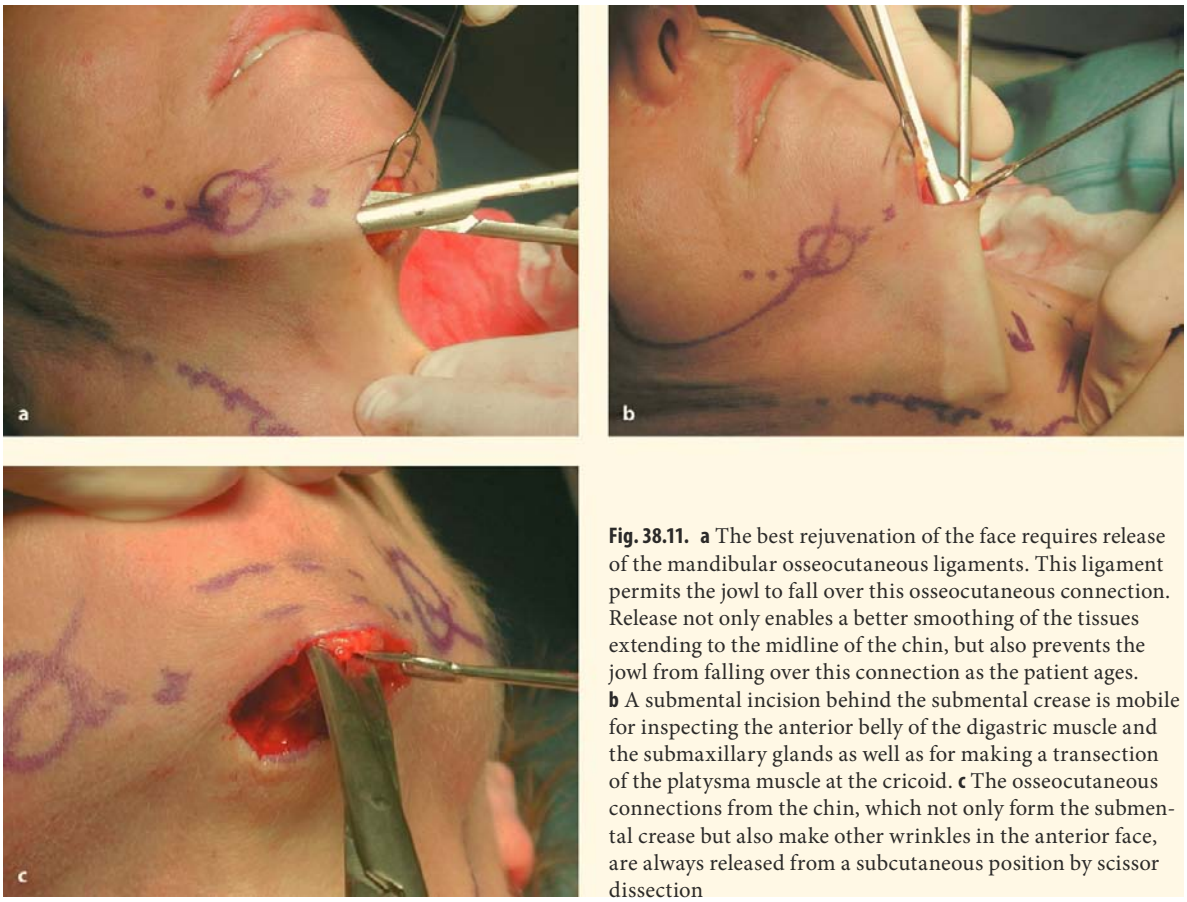

Fig. 38.11. **a** The best rejuvenation of the face requires release of the mandibular osseocutaneous ligaments. This ligament permits the jowl to fall over this osseocutaneous connection. Release not only enables a better smoothing of the tissues extending to the midline of the chin, but also prevents the jowl from falling over this connection as the patient ages. **b** A submental incision behind the submental crease is mobile for inspecting the anterior belly of the digastric muscle and the submaxillary glands as well as for making a transection of the platysma muscle at the cricoid. **c** The osseocutaneous connections from the chin, which not only form the submental crease but also make other wrinkles in the anterior face, are always released from a subcutaneous position by scissor dissection

38.4 Cheek and Neck Exposure of the SMAS

The most common cause of damage to the SMAS or to making the SMAS appear thin is a lack of precision in elevating the skin. If the dissection is not precise, part of the SMAS may be carried upward with the skin flap and the utilization of the SMAS will be limited and then the less efficient method of plication or other techniques may have to be used. This precision and elevation of the skin-cheek without damaging the SMAS is greatly helped by transillumination of the skin; however, for surgical elevation of the skin over the mastoid, direct illumination is preferred because the mastoid fascia is followed and skin is left as thick as possible.

Special technique is required to separate the skin from the SMAS overlying the sternocleidomastoid muscles because of the retaining ligaments connecting the skin to the sternocleidomastoid muscles. These sternocleodomastoid retaining ligaments are thick and run parallel to the muscles. For right-handed persons, the surgeon's body should be shifted while dissecting over the right muscle so that the sharp scissor dissections is parallel to these ligaments, which can be demonstrated by blunt dissection. If the dissection is directed perpendicular to these ligaments, injury to the greater auricular nerve and exposure of raw muscle is very likely.

Skin flaps should be elevated sharply under direct vision, preserving approximately 3 mm of subcutaneous fat. In areas of firm skin attachments, shoving scissors or blunt dissection may be traumatic to the subdermal microcirculation and might produce focal areas of raw dermis or destroyed SMAS.

Preservation of the anterior cheek-SMAS-cutaneous skin supporting ligaments ("fingers") will produce a pleasing effect on the cheek unobtainable by other methods. These variable fascial condensations anchor the SMAS and upper platysma to the dermis of the cheek and provide a means of creating a youthful slight concavity beneath the zygoma. This also results in an attractive enhancement of the malar projection (Figs. 38.1, 38.3).

For utilizing SMAS support for rejuvenation, all patients will benefit from release of the SMAS retaining ligaments at the malar bone, masseteric muscle,

parotid gland and the mandibular ligament [14]. These releases are necessary to obtain the good results seen at surgery by a SMAS posterior shift and upward rotation (Fig. 38.3). A key in the SMAS incision is selecting the malar pivot point upon which the flap will rotate (Fig.38.3). By placing the flap pivot point at the malar eminence, fullness gained during rotation is converted to a significant augmentation of this region; consequently, the need for malar implants is usually eliminated. This point will produce to the high projection and must be chosen individually for each face and each side of the face. It lies about one finger breadth below and lateral to the lateral canthus. Likewise, overlap of the SMAS along the zygomatic arch enhances the skeletal projection. From this malar pivot point, a methylene blue line is drawn laterally over the upper part of the zygoma to a point 1 cm in front of the tragus. This line is turned inferiorly and passed 1 cm in front of the ear. At the tail end of the parotid, the line continues within the avascular muscle 1 cm anterior to the sternocleidomastoid muscle to the level of the cricoid cartilage. If complete platysmal transection is planned, the mark is then passed transversely to join a line of similar design on the opposite side.

When continuing the incision from the tail of the parotid to the anterior border of the sternocleidomastoid, a safety space from the marginal mandibular nerve is maintained by using blunt dissection. This dissection is more precarious and thus tedious with secondary procedures where the anatomy may be distorted. The external jugular vein and the transverse cervical nerves are large and easy to identify. The anterior border of the sternocleidomastoid muscle is relatively avascular and a visible cut edge would blend with the muscle border. By transecting the platysma low in the neck, accentuation of the larynx is avoided and there will be a smooth transition with a concave curve from neck to submental area.

Tracing the SMAS/platysma incision locations with methylene blue insures that each cut edge of the flap will be marked for identification. SMAS scissor incision and dissection over the zygoma is begun just anterior to the ear. Allis clamp traction to elevate and provide tension to the SMAS layer will make dissection safe and easy because scissors will follow the tense plane, leaving the nerve down (Fig. 38.7). The vertical limb SMAS incision is then made in a similar manner. With the assistant stabilizing the SMAS flap with two Allis clamps, we carefully elevate the SMAS flap until the desired result and motion at the upper nasolabial fold, philtrum, outward turning of the lateral vermillion of the upper lip, elevation of the angle of the mouth, elimination of jowls and support to the submental area are achieved (Fig. 38.3). Usually, this does not require an extended dissection across the cheek because most retaining fibers lie just anterior to the zygomaticus major muscle malar attachment.

Once elevated, the posterior edge of the flap is then grasped by three Allis clamps to see which directional shift produces the best facial result. This direction is often posteriorly with a superior rotation about its malar pivot point (Fig. 38.4). The superior SMAS flap margin is sutured to the deep temporal fascia or the superficial temporal fascia. This latter fascia may require fixation to the deep temporal fascia if it appears mobile. The SMAS overlapping augments the zygomatic arch and adds fullness to the temporal concavity, which becomes deeper with aging. This SMAS cheek flap moves thick SMAS over and below the zygomatic arch where a secondary SMAS incision could be made through thick SMAS fibrous tissue. Folding the upper edge of the flap has not been found to be needed to provide thicker fixation tissue or to augment the zygomatic arch and will limit the proper direction shift.

38.5 Occipital SMAS Flap

If there is a need to provide support to the hyoid area or maximum support to submaxillary glands, an occipital transposed cheek SMAS flap may be useful [11]. A flap as wide as possible is made from the posterior margin of the SMAS flap by closure of the donor site before cutting the flap. The donor site closure is made from the posterior margin of the SMAS flap anterior to the tragus of the ear and below the mandibular angle (Fig. 38.12). This SMAS flap is rotated to the mastoid area and sutured in place with the chin-neck angle at 90° so that when the patient looks upward there is no increased tension along the direction of the SMAS flap. When looking downward, there is submental support across to the opposite SMAS flap. The support produced by submental platysmal invagination completes the hammocklike support to the upper part of the neck and submental area. The SMAS flap rotated to the occipital area completes a three-direction support which has increased SMAS tension directed toward the temporal area, toward the occipital area and toward the midline muscle approximation in the submental area. This rotated mastoid SMAS flap produces a wide choice of direction and precision support individualized to each patient's need and avoids shifting of the sternocleidomastoid muscles (Fig. 38.12d).

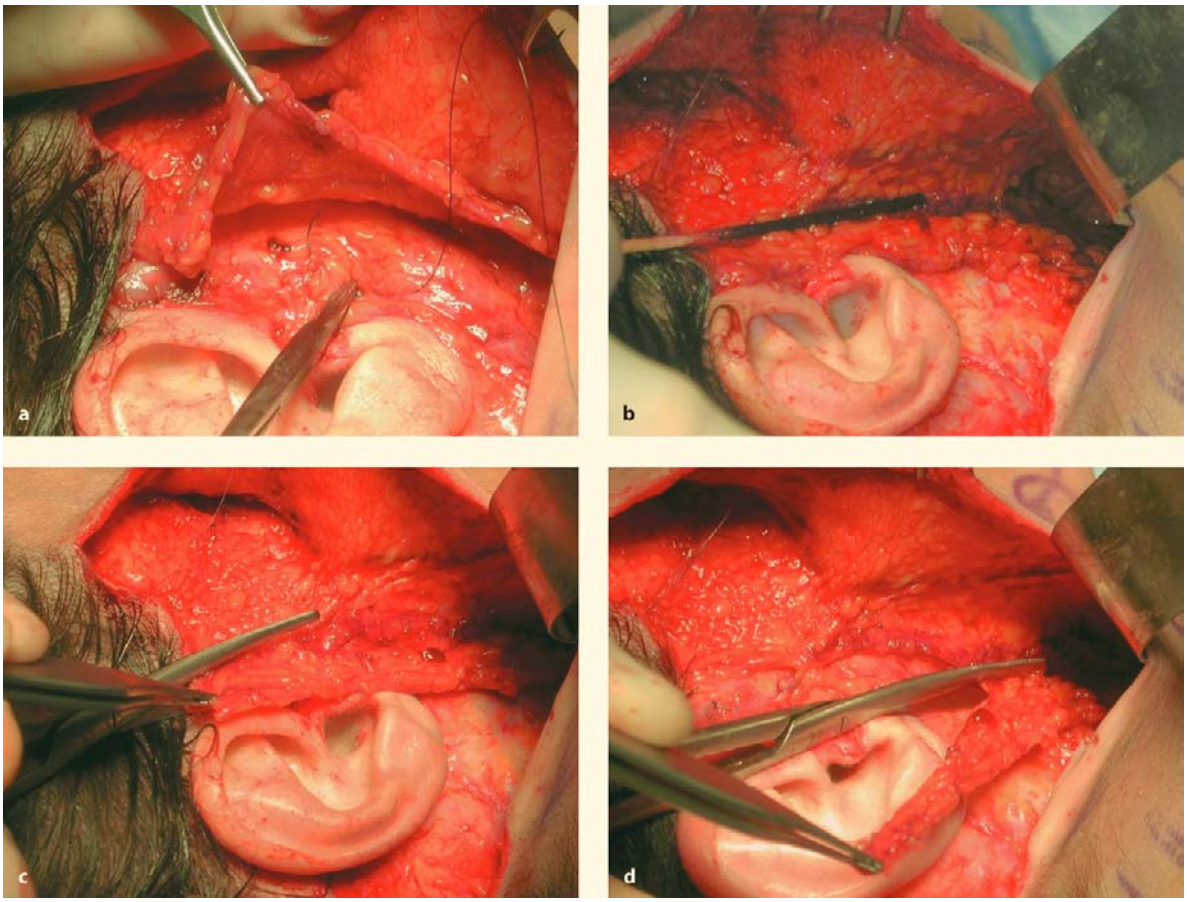

Fig. 38.12. **a** The occipital flap is formed after elevation of the SMAS by closing the donor site before the flap is excised. **b** The flap as outlined by the sutures closing the donor site is marked and then this flap, which is usually 1.5 cm in width, is separated down below the angle of the jaw so that the flap can be rotated underneath the angle of the jaw and sutured to the mastoid fascia. **c** Formation of SMAS flap. **d** Rotation of flap to mastoid fascia

38.6 Platysma Muscle Transection

Appropriate division of the short platysma muscle or platysmal muscle bands at the level of the cricoid is sometimes necessary for a beautiful neck. Wide undermining of the platysma is not necessary because no ligaments exist in the neck to restrain it.

38.7 Suture Closure

The addition of the SMAS/platysmaplasty deep-layer support has made possible precision closure of facelift incisions under minimal tension with no tension at the helix, tragus and earlobe. This produces a great reduction in detectable scars (Fig. 38.9). Nonetheless, attention to detail is the key to a top-quality result.

38.8 Dressings

Once, dressings were thought to prevent edema, seromas and hematomas. Most surgeons now acknowledge this to be not true. Some surgeons claim their dressings provide increased patient comfort and improvements in neck contour. Experience and common sense argue against these convictions.

There are many rational arguments against the use of a facelift dressing. The most obvious of these is the danger in placing pressure on delicate skin flaps. None will reduce edema and most, in fact, create a tourniquet effect, decreasing venous return and contributing to edema. Finally, little about a facelift dressing is comfortable.

38.9 Postoperative Care

Proper postoperative care of the facelift patient will insure the best result with the fewest complications. All patients are discharged to the overnight care of a skilled nurse well versed in the postoperative plan of care. A physician is always available.

All patients return the day after surgery and are carefully examined. The drain is removed if the output is less than 20 ml. Any sutures appearing unduly tight are snipped and left in situ. This avoids tension alopecia but averts annoying bleeding from the stitch hole. All flaps are carefully inspected. Patients are forbidden to hold a book or magazine in their hands, sit up straight without a headrest or lay supine or on their side without the chin–neck angle being more than 90° for 10 days. These activities all result in inadvertent neck flexion. Patients must rely on a second-party observer to remind them to keep the chin elevated since proprioception of the chin–neck angle is lacking. A good position that insures an open cervicomental angle is one in which the patient sits with "elbows on knees." This posture allows reading, writing, eating, TV watching, etc. Any time compromise of the postauricular flap is noted, and a check should be made to insure that a tight closure has not created lateral tension across its base strangling it. If in doubt, offending sutures should be removed without hesitation, as secondary healing is always superior to slough.

Sutures are removed as indicated usually in stages over a period of 6–9 days. Fine sutures are removed from areas of low tension first, usually on postoperative days 3 and 5. Half-buried vertical mattress sutures are removed later over postoperative days 5–10. Sutures in relatively higher tension areas at the sideburn and behind the ear are removed last.

38.10 Complications

Our experience has shown that longer and more extensive facelift procedures have not resulted in an increased rate of complications. Hematomas, the most common complication reported in the literature, are thought to be more common in men. Because our procedures are long and tend to outlast the effect of epinephrine, bleeding is usually discovered and corrected before wound closure. During the past 30 years in our practice only one male patient and no female patient undergoing facelift has been returned to surgery from the recovery room for evacuation of a hematoma.

There have been no zygomatic buccal nerve injuries, one marginal mandibular nerve palsy and one permanent injury to the frontotemporal branch of the facial nerve during this period. Three patients experienced temporary unilateral weakness of the frontalis muscle, but all recovered without residual effects within 12 weeks. Four patients had temporary unilateral weakness of the lower-lip depressor muscle even though we do not require patients to stop smoking.

Skin necrosis is extremely rare and in only five cases has it exceeded 1 cm, all less than 2 cm. We attribute this to precise planning, atraumatic and gentle skin handling, lack of skin tension due to support of the SMAS, and a thoughtful postoperative plan of care including no pressure dressings for all patients.

38.11 Summary

SMAS utilization is of two types: adequate to obtain the best results possible and limited utilization. This concept directs attention to the artistic goal rather than focusing on technique by using terms such as high, low or extended SMAS. If the SMAS is utilized with precision, there can be great periorbital rejuvenation along with decreasing the excessive lower-eyelid skin, supporting the periorbital fat of the lower eyelids, improving smile creases and restoring the nasojugal grove to the horizontal direction of youth from the diagonal direction of the aged appearance along with changing the long oval older appearance of the lower eyelid to a shorter youthful appearance.

For the maximum sling support to the submental neck, the SMAS must be freed from the osseocutaneous restraining ligament at the malar bone and the anterior mandibular jowl border along with release of the restricting connections to the parotid fascia and masseter muscles.

The contour correction in the submental area always gives the appearance of stronger chin projection and release of the submental osseocutaneous ligament permits a great improvement of the ptotic chin appearance.

Occasionally, excision of ptotic chin muscle is indicated. Also at times a chin implant of alloplastic material or injected fat transfer may improve the vertical height of the chin and lower lip as well as being indicated for improving the mandibular angles and jaw line.

A youthful-appearing neck as well as rejuvenation of the upper third of the face is very important for patient satisfaction following a facelift procedure.

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Nontraumatic Undermining in Rhytidectomies 39

Juarez M. Avaler, Yves G. Illouz

39.1 Introduction

Facial aging is a complex phenomenon for which there is no precise age at which it starts. The whole body, even internal organs and tissues, undergoes significant changes as time goes by. These alterations are more visible and noticed on the face owing to physical and psychological aspects that were not well known until today. For these reasons rhytidoplasty is one of the most frequent operations in plastic surgery since the whole population potentially may think about self-image. The aim of the operation is not to provide eternal youth, but to improve the physical appearance to an image which is more pleasant and better accepted. Vanity is a necessity for each person to value himself/herself as an individual but not as a product of social competition. When face lifting is planned, the surgeon should analyze the biological age of the patient besides the chronological and psychological aspects.

Rhytidoplasty has been performed since the early twentieth century, starting with Passot in 1919, who removed multiple elliptical areas of skin at the hairline. A short time later, Joseph in 1921 and Lexer in 1931 introduced similar concepts into the "classic" rhytidectomy which was essentially a large rotation–advancement skin flap [24]. Malbec in 1957 was a pioneer in Latin America, and improved the technique with his superb talent [17]. Remarkable systematization of the direction of traction of the skin flap introduced by Pitanguy [21] is a substantial contribution to the concept in rhytidoplasty. Skoog [27] set the stage for new development when he described the subfascial facelift. Then, the superficial musculo-aponeurotic system (SMAS), described by Mitz and Peyronie [20], platysma flaps [10, 25, 28] opened a new era. The development of the deep-plane and composite rhytidectomies by Hamra [11] is a valuable step for the standard operation. Recently, Stocchero [29] introduced roundblock SMAS treatment, which is a new concept by suspension in rhytidoplasty.

To analyze the characteristics of the aging face besides senescence, skin and muscle flaccidity, localized adiposity may give significant alterations to the facial contour. Since 1980 when Illouz [12–15] introduced liposuction, facial contouring procedures have changed and improved the results to achieve a smooth and natural appearance. The importance of the repositioning of the skin and treatment of the facial soft tissues initially by lipectomy [8, 18, 19] and later by lipoplasty [1–4, 12, 25, 26, 30, 31] has been widely described. However, providing appropriate treatment of the SMAS requires wide cutaneous undermining, which is a quite traumatic procedure since all vascularity underneath the skin is damaged [16].

We have performed a nontraumatic cutaneous undermining procedure through which it is possible to treat adequately the muscular flaccidity, to remove the subcutaneous excess of fat and resect the redundant skin with minimal trauma to the tissues. In our first publications [1, 2] we classified four types of liposuction in order to improve facial contour with smooth results. The technique described in the following is recommended for the first group of patients, and is rhytidoplasty combined with liposuction.

The main point for choosing the technique is a careful preoperative examination of the anatomical structures of the face and neck, to evaluate the flaccidity of the platysma muscle and the adiposity in submental and submandibular regions. It is well known that to perform adequate lipectomy extensive cutaneous undermining is required and the risk of excess fat removal may leave skin retractions with an ungracious final result. When lipoplasty is properly done, the Illouz cannula should not damage the subdermal fat in order to provide good thickness to the skin flap with a smooth facial and neck contour. Nevertheless, even during liposuction of the face and neck combined with rhytidoplasty it is mandatory to perform wide cutaneous undermining for treatment of the SMAS, plication and traction of the platysma by rotation or resection laterally or medially as well. Since our first publications [1, 2] we have not recommended liposuction beneath the platysma muscle owing to the risk of severe or even moderate trauma to the nerves which may bother patients and surgeons.

39.2 Technique

Our preference is to perform the operation under local anesthesia combined with intravenous sedation under the care of an anesthesiologist. General anesthesia can also be used on anxious patients or if the physician recommends it after clinical examination preoperatively. In any case, local infiltration is a mandatory step before surgery itself. The operation is performed all over the face and neck on one side first, following seven sequential steps:

1. Local infiltration
2. Liposuction
3. Tunnellization
4. Cutaneous incisions with limited undermining
5. Treatment of the SMAS
6. Direction of the traction of the cutaneous facial and neck flap and its resection
7. Suture

39.2.1 Local Infiltration

Two types of infiltrations must be done: (1) local anesthesia, even if the operation is performed under general anesthesia; (2) hyperinfiltration or tumescent infiltration.

39.2.1.1 Local Anesthesia

Local anesthesia is done with 0.4% lidocaine with epinephrine with a dilution of 1:200,000. A practical formula is 40 ml 2% lidocaine, 1 ml 1:1,000 epinephrine and 160 ml water, giving a total volume of 201 ml.

This volume is enough to infiltrate local anesthesia throughout the entire area just under the dermis, in order to reduce bleeding and facilitate undermining, all over the face and neck, simultaneously on right and left sides. This a routine procedure which is done by an assistant similar to that performed during traditional rhytidoplasty. However, the next type of infiltration as well as other steps of the technique must be done by the surgeon first on one side of the face. After performing completely the operation described in the following, on one side, the surgeon may carry out the same procedure on the other side of the face and neck.

39.2.1.2 Hyperinfiltration or Tumescent Infiltration

After local anesthesia infiltration, it is very useful to perform hyperinfiltration with physiologic serum underneath the skin all over one side of face and neck

Fig. 39.1. Peroperative rhytiploasty of a patient under general anesthesia. Local anesthesia had already been carried out. Hyperinfiltration with physiologic serum using a special microcannula beneath the skin and above the platysma is done

(Fig. 39.1). It is convenient to emphasize that it must be performed by the surgeon, only on one hemiface and neck, since the surgery must start immediately. We do not recommend using a needle to perform this type of infiltration because it may change the plane of the tissue cleavage. We use special microcannulas just beneath the skin of the face and neck in order to separate the skin from the subcutaneous fatty layers (Fig. 39.2) and soft deeper tissues as well. Approximately 300 ml is used on one side of the face and neck. The next step of the operation, which is subcutaneous tunnelization, should be performed immediately. Owing to hyperinfiltration, the skin is separated from the subcutaneous adipose tissue beneath the skin, on areas with localized adiposities (Fig. 39.3), even on those regions where the panniculus is very thin as occurs on the postauricular and mastoid areas. For patients with a thin face without localized adiposities, this procedure is very useful in order to preserve all anatomical structures below the cutaneous flap (Fig. 39.4).

39.2.2 Liposuction

An incision of 0.4–0.5 cm in length is done at three points around the ear: near the earlobe, near the upper pole and on the posterior sulcus and also on submental region (Fig. 39.2). Those reference points are placed on the incision line marked for rhytidoplasty. A 3 mm Illouz cannula is introduced and, with the suction machine not connected, back and forth movements are done just below the overlying skin all over the face and neck on one side. The surgeon must fold the skin while he/she does the movements with the cannula with its opening turned toward the depth in

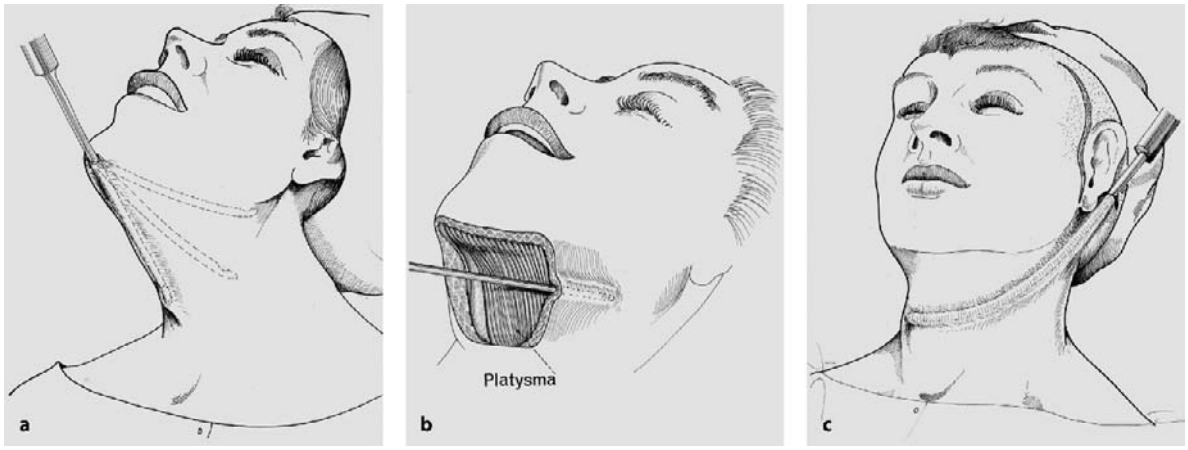

Fig. 39.2. Liposuction procedure beneath the skin and above the platysma. **a** Through submental incision. **b** The Illouz cannula is above the platysma and below the skin. **c** Through incision on mastoid area

Fig. 39.3. A 59-year-old patient presenting skin flaccidity with very flabby platysma with localized adiposities on the face and neck. **a**, **b**, **c** Before surgery. **d**, **e**, **f** Nine months after rhytidoplasty with plication of the platysma laterally combined with lipoplasty

Fig. 39.4. A 72-year-old male patient presenting very flabby skin with wrinkles with muscule flaccidity on the face and neck. **a**, **b**, **c** Before surgery. **d**, **e** and **f** One year after rhytidoplasty with plication of the platysma laterally combined with lipoplasty. The medial borders were not sutured

order to perform tunnelization all around. If the opening is turned to the deep raw surface skin flap it may damage the subdermal fat layer with its small vessels. The skin may become very thin and there is a risk of necrosis postoperatively. This maneuver is done even when liposuction is not performed, since it is an important step for the next step of the operation, which is a tunnelization procedure.

According to the surgical planning, when a patient presents with localized adiposity, liposuction should be performed, then the machine is turned on and the regions with fat tissue are treated. At the end, the thickness of the skin flap is appropriate with all anatomical structures which provide normal vascularization avoiding any damage postoperatively.

39.2.3 Tunnelization

After liposuction itself or when creating small tunnels with a cannula without suction, we start tunnelization with nontraumatic instruments with progressive width, specially developed for this purpose (Fig. 39.5). These instruments are introduced one by one – first the thinnest one (Fig. 39.6) and then progressively a wider one (Fig. 39.7) until the widest one

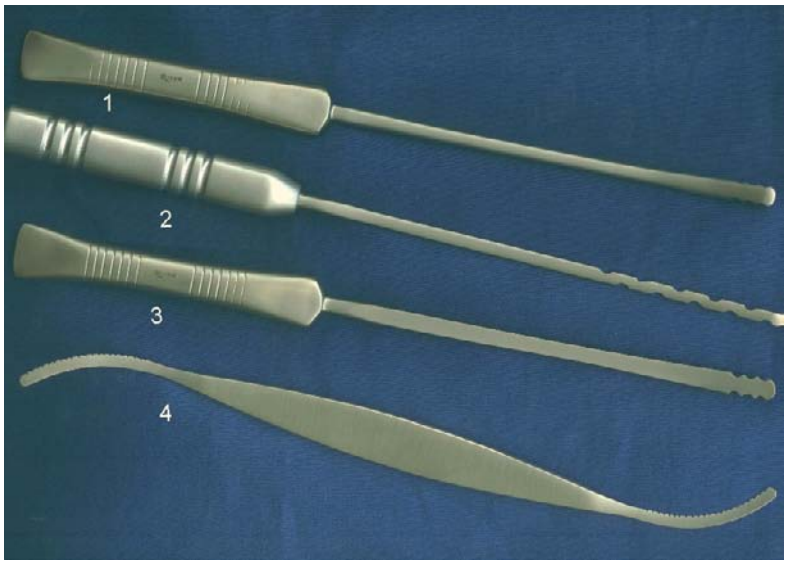

Fig. 39.5. Surgical instruments specially developed to perform rhytidoplasty. *1* An instrument similar to an Illouz cannula, but without an opening. *2* A straight instrument with a small depression on each border to be used after instrument no. 1. *3* Similar to instrument no. 2, but even wider. *4* A nonsharp S-shaped instrument with a very small depression on the border of the concavity extremity and on the convexity on the other end

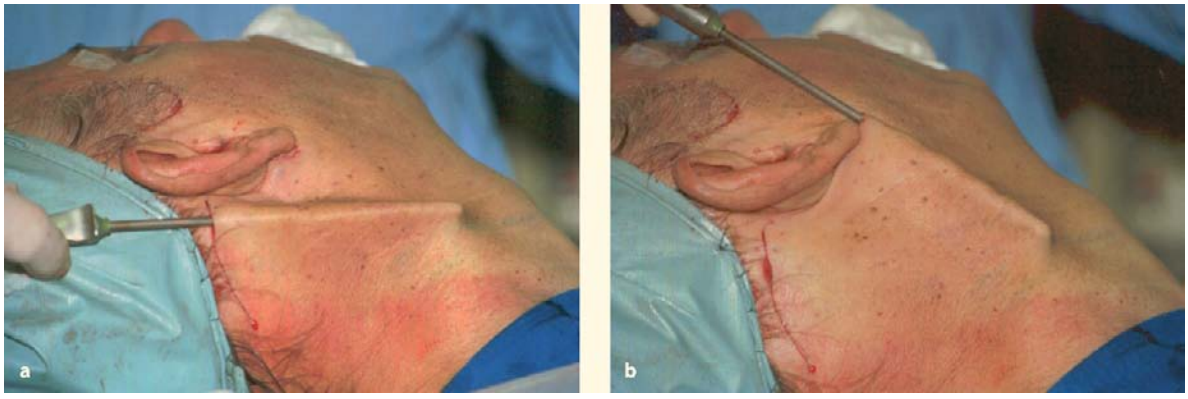

Fig. 39.6. Subcutaneous tunnelization of the neck after hyperinfiltration. A straight instrument no. 1 is used to start the procedure. **a** It is introduced through the incision on the mastoid. **b** The instrument no. 1 is introduced through the earlobe incision

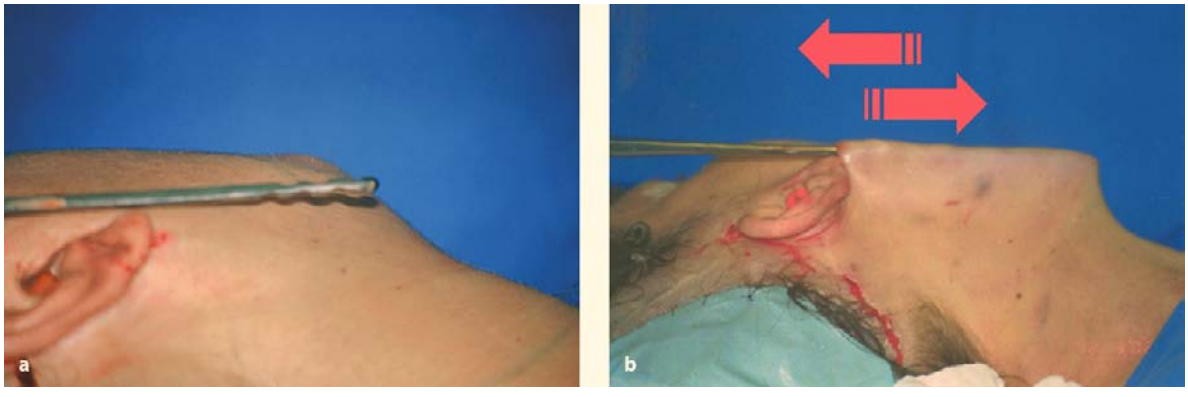

Fig. 39.7. The use of instrument no. 2. **a** External view . **b** It is introduced beneath the subdermal level through the earlobe incision with back-and-forth movements to perform subcutaneous tunnelization

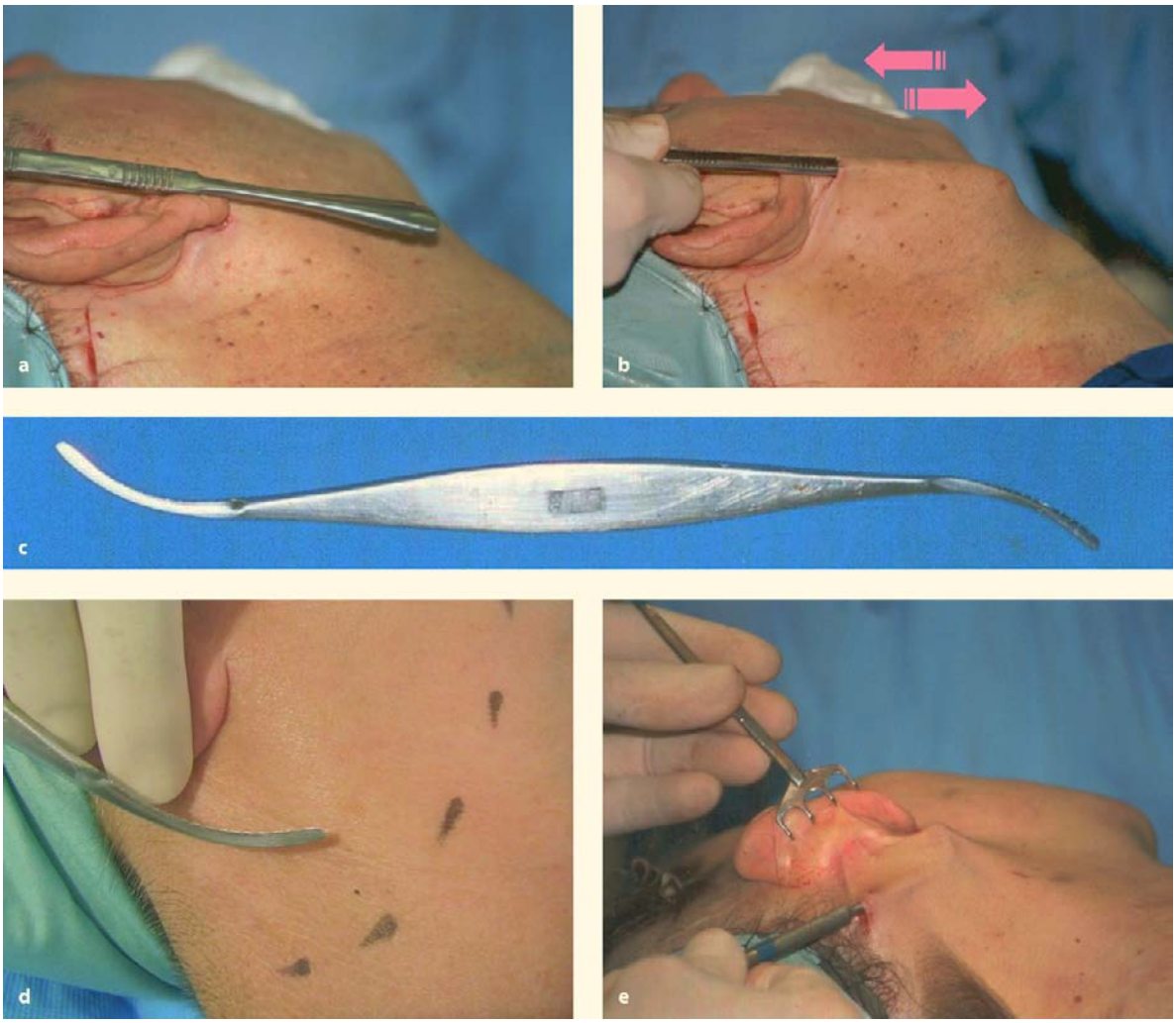

Fig. 39.8. The use of instrument no. 3 and 4. **a** External views of instrument no. 3 on the right side of the face and neck. **b** It is introduced through the earlobe incision with forth-and-back movement just beneath the skin. **c**, **d** External view of instrument no. 4. **e** It is introduced subcutaneously through the incision on the mastoid area in order to saw the remaining "bridges" after tunnelization

(Fig. 39.8). Thus, the small tunnels created by the Illouz cannula are progressively widened all over the face and neck. These instruments are introduced through the same cutaneous incisions where liposuction was done all over the hemiface and neck and are responsible for undermining without cutting the blood and lymphatic vessels or the nerves. Therefore, all vascularization from the depth to the cutaneous flap is preserved (Figs. 39.9, 39.10b). The tunnelization procedure on the cheek until the mandible arch goes farther, close to the nasolabial fold. On the neck it goes even father until it crosses over the midline. The thickness of the skin flap which includes the subdermal layer is quite thick. On the area above the zygomatic arch, the tunnelization procedure is done beneath the temporal fascia in order to avoid any damage to the capillary hair bulbs. In that area the vascular network passes parallel to the skin in the galea. Therefore, there are no vessels coming from depth to the cutaneous flap.

So the whole area of the skin of the face and neck is dissected by tunnelization with minimal bleeding, since the vessels are preserved (Figs. 39.9, 39.10b). All these procedures are done in a closed-pocket system since the cutaneous incisions have not yet been performed. In addition, using extensive supraplatysmal tunnelization undermining communicates in the midline, from one side to the other, which makes the skin flap slide over the muscle.

This sort of tunnelization with a blunt and flat instrument, with some irregularities on the border of each side, is the fundamental difference between our

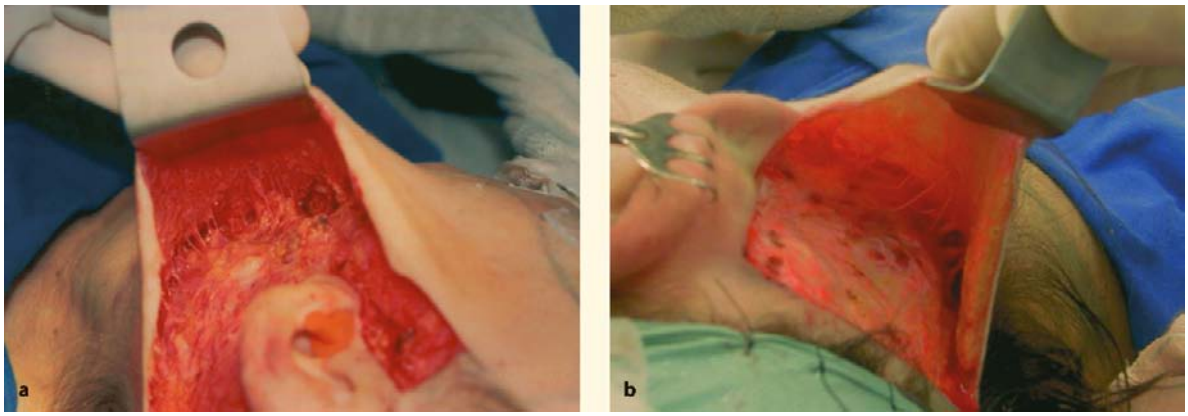

Fig. 39.9. After tunnelization with nontraumatic instruments, the vessels are preserved with minimal bleeding. **a** Peroperative photograph of the left side of the face and neck of a patient. **b** Right side of another patient

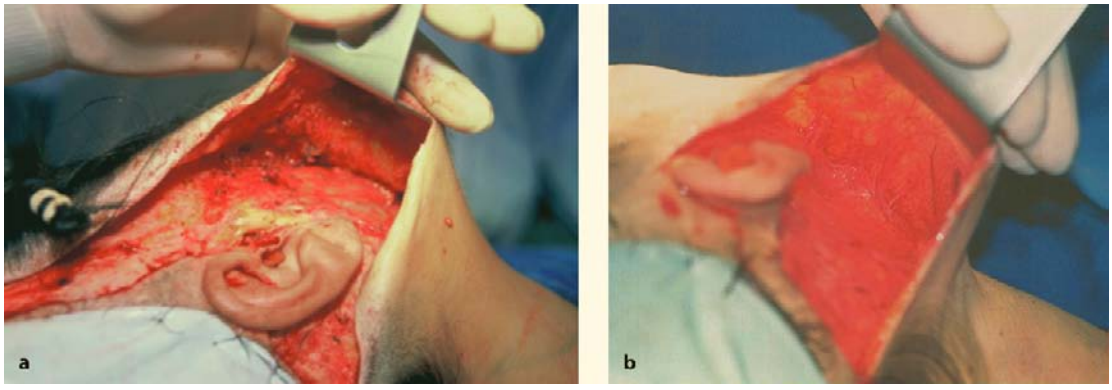

Fig. 39.10. Comparison between cutaneous undermining. **a** Through traditional techniques, all perforator vessels were cut. **b** Through tunnelization undermining, most vessels were preserved

procedure and that of other techniques using scissors for cutaneous undermining which cut all vessels from the depth to the skin flap with abundant bleeding during and after (Fig. 39.10a).

Our idea came by observing male rhytidoplasty since men have very thick skin and normally abundant bleeding is present which bothers greatly the surgeon during and after the operation, and there is severe seroma formation. In fact, we do not use any kind of drainage since there is no bleeding during or after surgery. We have not had any case of severe hematoma in the postoperatory recovery. Since we published our new concepts for abdominoplasty as a closed vascular system [5], we started to employ a similar procedure in rhytidoplasty since the surgical principles are the same, i.e., to preserve most vessels in the cutaneous flap. In fact, the arteries maintain regular blood supply to the skin and the venous and lymphatic circulations work normally like multiples pedicles (Figs. 39.9, 39.10b).

Traditional rhytidoplasty with lipectomy on the submental and submadibular regions is a quite traumatic procedure since the dissection by scissors and removal of excess fat at the same time may provide good results but the skin flap may present excessive scarring and adhesions with an unpleasant aspect. Before the lipoplasty era, lipectomy was a very popular method, but was very radical and aggressive, with a high rate of complications [32]. Skin necrosis, infection and dehiscence of the wound are frequent problems after rhytidoplasty. Also trauma to the nerves may happen when scissors are used, although careful operation is performed by outstanding surgeons.

Therefore, nowadays a proper evaluation is a mandatory step before surgery and it is possible to choose a less traumatic technique.

39.2.4
Cutaneous Incisions

The next step of our rhytidoplasty is to perform the traditional cutaneous incisions with a knife. Owing to tunnelization the whole cutaneous flap is already loose and if any "bridge" remains between the cutaneous flap and the depth it is sawed with a nonsharp S-shaped instrument (Figs. 39.5, 39.8c–e) specially developed for this procedure without cutting the connective tissue and vessels. For this reason there is hardly any bleeding. With the use of these instruments minimum cauterization is done (Fig. 39.9, 39.10b).

In the postauricular region and in the mastoid area, the subcutaneous layer is very thin and after tunnelization many of those "bridges" of connective tissues and vessels remain, and the "S"-shaped instrument is very useful in order to saw them (Fig. 39.8c–e). Although there is no bleeding during the operation, careful hemostasis must be done (Figs. 39.9, 39.10b).

39.2.5
Treatment of the Superficial Musculoaponeurotic System

The treatment of the SMAS is performed according to the surgical planning when the surgeon evaluates the degree of muscular flaccidity. Usually when the platysma muscle is flabby one can see its border laterally and medially (Fig. 39.11).

After the tunnelization procedure the lateral border of the platysma is pulled using fine forceps with-

Fig. 39.11 a–f. A 75-year-old patient presenting abundant wrinkles with skin and muscle flaccidity on the face and neck. The medial borders of the platysma are visible. **a**, **b**, **c** Before surgery. **d**, **e**, **f** One year after rhytidoplasty with plication of the platysma laterally combined with lipoplasty. The medial borders of the platysma were not sutured

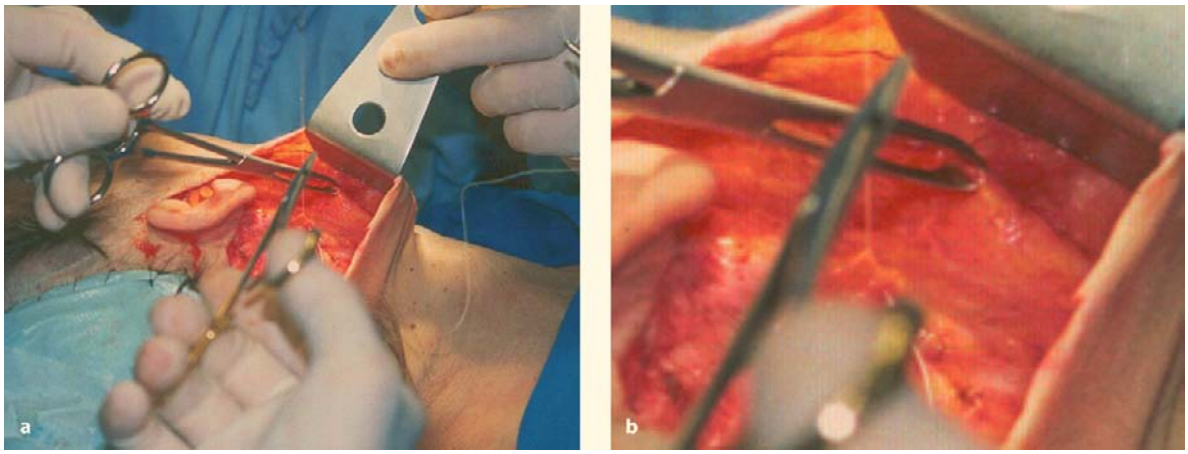

Fig. 39.12 a, b. Lateral plication of the platysma muscle. **a** Peroperative photograph showing the plication. **b** Close-up showing forceps holding the lateral border of the platysma to be sutured by the plication procedure

out any undermining (Fig. 39.12). By traction the plastysma is lifted up and backward to be sutured to the aponeurosis of the sternocleido muscle posteriorly. On the face, in front of the ear, the fascia is grasped with small hooks and also pulled and overlapped so it can be sutured along a line that begins at the lower margin of the zygomatic arch and extends downward around the ear. We use clear or colorless slowly absorbable material with isolated stitches. If colored suture is used it may show through the final cutaneous flap on thin skin. After suture ,the soft tissue may be palpable as a bridge over the deeper structures.

We do not do any suture medially on the submental region because it may create a thick and fibrotic tissue which is ungraceful and hard, forming a bridge from the chin to the neck. Regarding the anatomy of the platysma, according to Cardoso de Castro's [9] descriptions, the medial borders have a significant distance between them. Even when the medial margin of the platysma is visible owing to its projection on the skin, we do not perform any plication on the submental region (Fig. 39.11). We found that performing only the lateral suture with suspension of the platysma improves the whole area on each side of the neck with a natural and smooth result. The platysma flaps described by Skoog [27], Guerrerosantos [10] and others may present beautiful results, but our preference is for a single plication and suture to the aponeurosis laterally.

39.2.6 Direction of the Traction of the Cutaneous Facial and Neck Flap and its Resection

This step of the operation is done by pulling the cutaneous flap posteriorly and superiorly (Fig. 39.13). Using Pitanguy's forceps (Fig. 39.13) to mark the projection of the incisions on the skin, we do a temporary

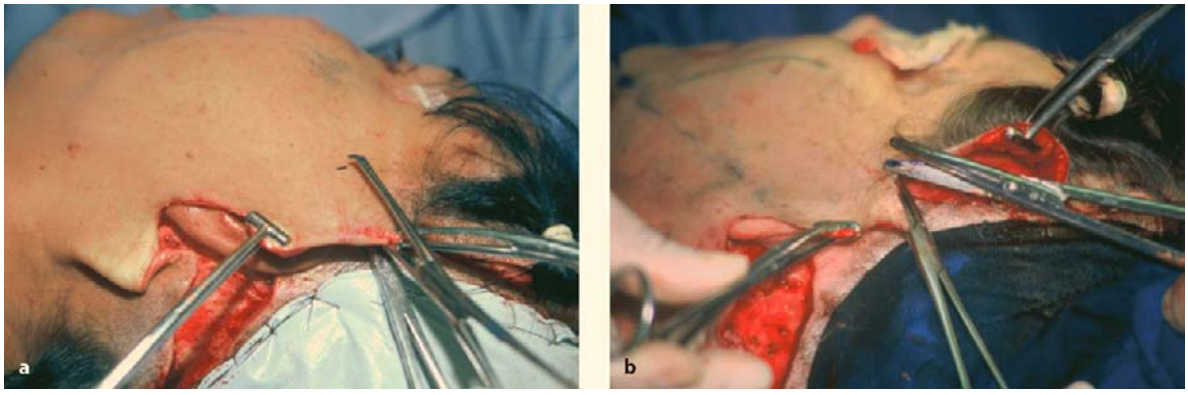

Fig. 39.13. Peroperative photographs showing the direction of traction of the skin flap of the left side of the face. **a** Two forceps hold the facial flap. Using Pitanguy's marker to determine the excess of skin to be resected. **b** An incision is done with scissors where a temporary stitch is carried out

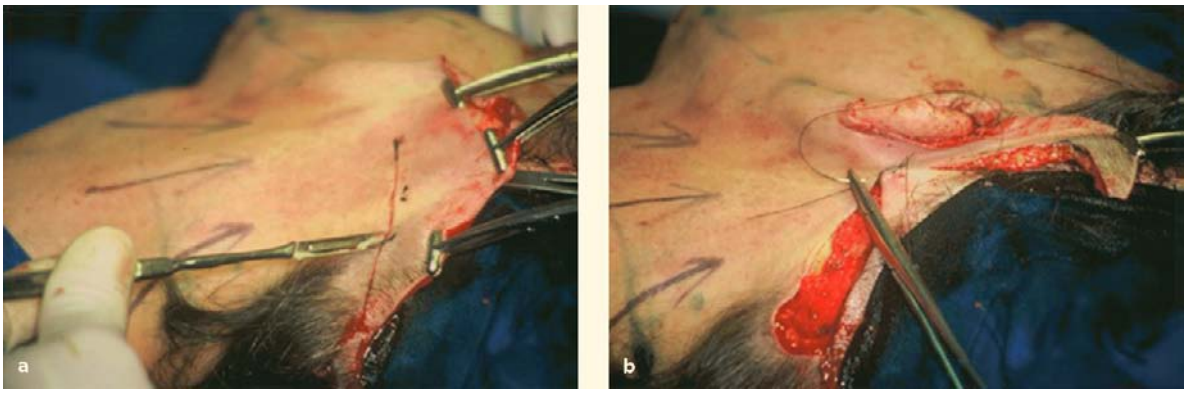

Fig. 39.14. Peroperative photographs showing the traction and resection of the excess skin of the neck similar to Pitanguy's rhytidoplasty. **a** Using three forceps, we pull the cervical cutaneous flap on the left side pulled upward following the axial direction of the neck and the excess is incised with a knife. **b** After the incision, the excess skin is pulled upward behind the ear and a temporary stitch is done

Fig. 39.15. A 63-year-old patient presenting skin and muscle flaccidity with adipositias on the face and neck. **a**, **b**, **c** Before surgery. **d**, **e**, **f** One year after rhytidoplasty with plication of the platysma laterally combined with lipoplasty

stitch on the projection of the anterior border of the ear in order to block the skin flap as emphasized by Pitanguy [21–24], providing a natural result avoiding the stigma of the surgery. Afterwards using three forceps, we pull the cervical skin flap upward following the direction of the neck and again the excess skin is marked and incised (Fig. 39.14a) and a temporary stitch is done posteriorly on the mastoid area (Fig. 14b).

Once the cutaneous flap has been pulled, the redundant skin is excised with a knife all around the ear. The amount of traction which is applied depends on the state of the skin and the nature and degree of correction required. It is time to emphasize that rhytidoplasty is a palliative procedure since the aging process does not stop. Fore this reason the operation should achieve a natural and smooth result (Figs. 39.11–39.15).

39.2.7 Suturing

The first suture with 4-0 colorless absorbable isolated stitches is done on the subdermal tissue near the border of the skin already excised all around the incision. It will support the tension of the skin flap after traction. In front of the tragus, stitches are done in order to create a depression which gives a very natural sulcus with a graceful result. Afterwards a running intradermal suture is done with absorbable stitches on the borders of the skin incisions. We do not do any external stitches to be removed postoperatively.

39.2.8 Dressing

To immobilize the area and to avoid the possibility of postoperative capillary hemorrhage, a gentle compression is applied over the entire head and neck, leaving the mouth and nostrils free. We do not use any kind of drain. The bandage is changed on the day after the operation and a new one is placed over the face and neck, and this is completely removed on the next day.

39.3 Discussion and Conclusions

It is important to emphasize that rhytidoplasty with atraumatic cutaneous undermining offers a good skin thickness. The natural appearance is due to the direction of traction of the skin flap according to adequate technique. Postoperative recovery is calm and comfortable and patients do not complain about pain. This technique has been used during the last 8 years since we [5] described new concepts for abdominoplasty through a closed vascular system. There is minimal bleeding during the operation, but careful hemostasis is done and no drain is used. We have not had major complications such as hematoma postoperatively which required evacuation as happened sometimes when traumatic undermining with scissors was performed. Skin necrosis or even cutaneous slough did not occur since the vascularity is well preserved when performing undermining by tunnelization. Before we developed our method we usually avoided operating on smokers owing to the possibility of skin necrosis or any other complications. Nowadays we perform rhytidoplasty on those patients without any major problems.

Hyperinfiltration is a mandatory and fundamental step of the operation and should be performed by the surgeon since it creates a plane of tissue cleavage which requires perfect knowledge of the anatomy of the underlying the skin in the operative field. Also the surgery should start immediately after hyperinfiltration. The surgical instruments specially developed make subcutaneous tunnels progressively wider, reaching the whole area of the skin of the face and neck. The perforator vessels are preserved during cutaneous undermining work as multiple pedicles which provide normal vascularization to the remaining skin flap. Nerve injury does not occur since the plane of dissection is just beneath the skin. Even when liposuction is not necessary, the tunnelization procedure is also done using initially a instrument like an Illouz cannula but without opening (Fig. 39.5), followed by other wider ones. We already presented this method at international congresses [6, 7] to demonstrate the possibilities of performing rhytidoplasty with minimal tissue trauma with minor complications.

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Aesthetic Facial Surgery: The Round-Lifting Technique

40

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40.1 Introduction

The aging process is inherent to human beings. Senescence causes changes to the skin and underlying tissues. Skin loses its tightness, typical of youth, and acquires an irregularly colored and drier surface in older age. Aging also involves skeletal and muscular atrophy, laxity of the subcutaneous tissue and consequent flaccidity of the skin with the accentuation of furrows and rhytids. Different factors hasten these changes, such as excessive sun exposure, stress and systemic diseases, and personal habits such as alcohol consumption, smoking and poor nutrition.

In our beauty-centered culture, where life is fast-paced and people are rapidly judged as regards their appearance, the face is frequently the main focus of anxiety, especially in individuals who have attained a certain stage in their lives. Job competition, interpersonal relationships and physical well-being are reasons that many times motivate the patient to come to the plastic surgeon, seeking for a more youthful look. The surgeon should understand that the purpose of any procedure for the aging face is to help the individual cross with enhanced self-confidence the sometimes difficult path to a mature age, and not to return the patient to an earlier stage of life. Experience is necessary to investigate and appreciate these subjective motivations. This evaluation requires both empathy and openness towards the patient.

In the last few decades, facial aesthetic surgery has undergone enormous progress, with a greater understanding of anatomy and the development of newer technology and products that complement the operation. The surgeon must be knowledgeable in details of different surgical approaches and variations thereof to attain the best result for each individual case. Ancillary procedures present the surgeon with a vast array of surgical and nonsurgical techniques that should be used in an individualized manner, as each patient presents differences not only in anatomy but also regarding regional complaints.

A satisfactory outcome of an aesthetic facial procedure is obtained when signs of an operation are undetectable and anatomy has been preserved. Visible scars and dislocation of the hairline are among the most common complaints and everything should be done to avoid these stigmas.

In this chapter, the author's personal approach to surgical treatment of the aging face will be presented, giving emphasis to the correct traction applied to the facial flaps (the "round-lifting" technique) and the forehead (the "block" lifting), assuring that all anatomical landmarks are precisely preserved. These principles, which have evolved in over 40 years of experience, have offered consistent and satisfactory results. Patient assessment is discussed and technical aspects are detailed and illustrated.

40.2 The Round-Lifting Technique

Rhytidoplasty is one of the most frequently performed surgeries in the author's private practice. A total of 7,927 personal consecutive cases have been analyzed to date (Fig. 40.1). More recently, a noticeable increase in male patients has been noted. In the 1970s, men represented 6% of face-lifting procedures; in the 1980s, approximately 15%; currently, 20% of patients who seek aesthetic facial surgery are men (Fig. 40.2).

After appropriate intravenous sedation and prepping, local infiltration is performed. The standard incision is demarcated, beginning in the temporal scalp, and proceeds in the preauricular area in such a way as to respect the anatomical curvature of this region. The incision then follows around the earlobe, and, in a curving fashion, finishes in the cervical scalp (Fig. 40.3). (This S-shaped incision creates an advancement flap that prevents a step-off in the hairline, allowing the patient to wear her hair up without revealing the scar).

Variations of this incision are chosen depending on each case. The choice of which incision is most appropriate should have the following goals in mind: the treatment of specific regions for optimal distribution of skin flaps; the resection of previous scars in secondary rhitidoplasty; and the maintenance of ana-

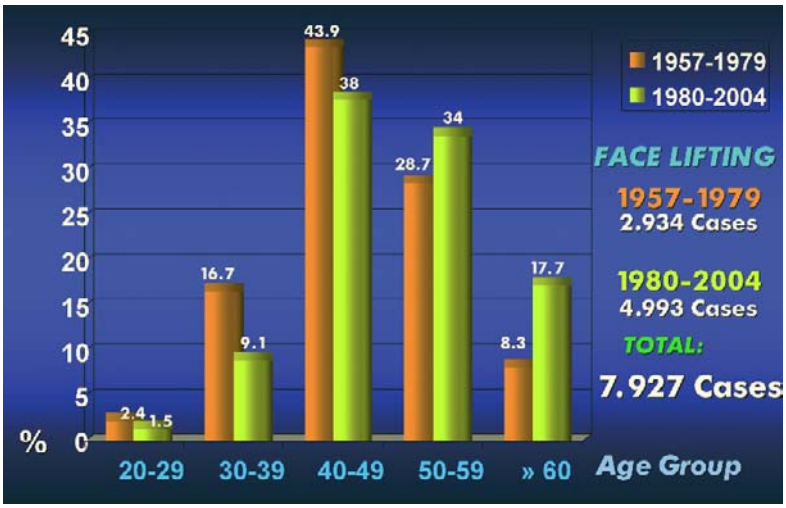


Fig. 40.1. Personal consecutive cases that have been analyzed to date

Fig. 40.2. Proportion of face-lift cases

tomical landmarks. Secondary face-lifts especially present elements that require different incisions. An earlier publication has established the indications and advantages of each different incision.

Undermining of the facial and cervical flaps is performed in a subcutaneous plane, the extension of which is variable and individualized for each case. A danger area lies beneath the non-hair-bearing skin over the temples, that we have called "no man's land," where most of the temporo-frontal branches of the facial nerve are more frequently found. Dissection over "no man's land" should be superficial, and hemostasis carefully performed, if at all. Larger vessels should be tied (Fig. 40.4).

The treatment of the very heavy, fatty neck requires that the dissection proceed all the way to the other side under the mandible. With the advent of suction-assisted lipectomy, submental lipodystrophy is mostly addressed by liposuction, in a crisscross fashion (Fig. 40.5). Sometimes this is still done with direct lipectomy using specially designed scissors, defatting the submental region, as has been described historically. Following this, treatment of medial platysmal bands is carried out under direct vision. Approximation of diastasis is done with interrupted sutures, plicating down to the level of the hyoid bone.

Undermining of the facial flaps is extended over the zygomatic prominence to free the retaining ligaments of the cheek. Dissection of the deeper elements of the face has evolved over the past 20 years. Almost no treatment was advocated before the publications that first described the superficial musculo-aponeurotic system (SMAS). The approach to this structure has been a topic of much discussion. Currently, we determine whether to dissect or simply plicate the SMAS only after subcutaneous dissection has been completed. Pulling of the SMAS is done, noting the effects on the skin (Fig. 40.6).

Fig. 40.3. The classic incision, as described for the round-lifting, curves around the anatomical landmarks, and finishes in a sinuous italic S in the cervical scalp

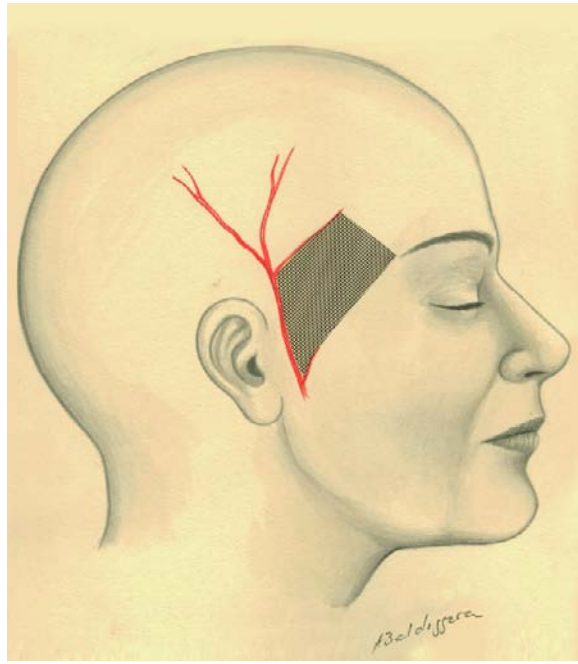


Fig. 40.4. The variation in the anatomical distribution of the frontal branch of the facial nerve determines an area termed by the author as "no man's land," where this nerve is particularly vulnerable to lesion by electrocoagulation

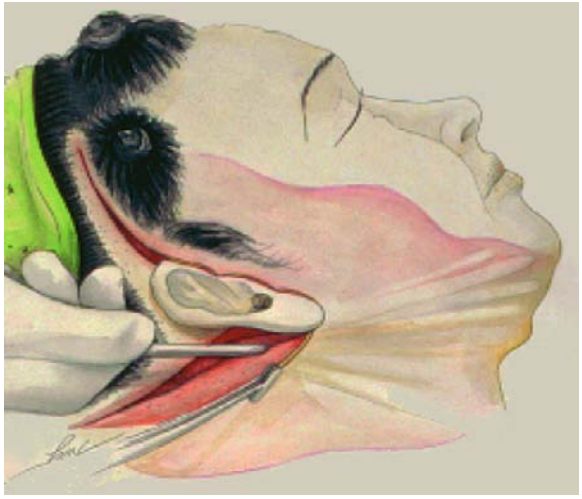


Fig. 40.5. Liposuction has been useful to complement a facelift, and permits the removal of fatty tissue from the cervical region. This maneuver should be done in a crisscross fashion to assure an even plane of subcutaneous tissue

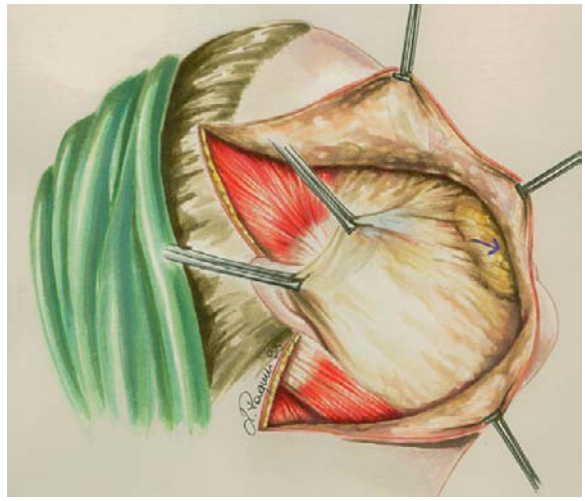


Fig. 40.6. After appropriate dissection is complete, the superficial musculo-aponeurotic system (*SMAS*) is pulled superiorly to check the effect of pulling on this structure

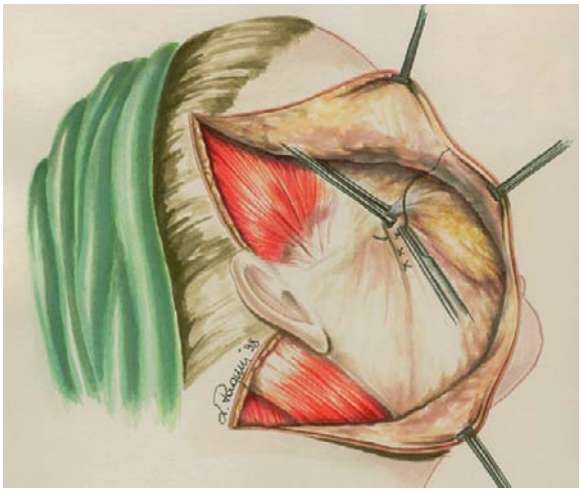


Fig. 40.7. Plication of the SMAS and repositioning of the malar pad is done after subcutaneous dissection has been completed

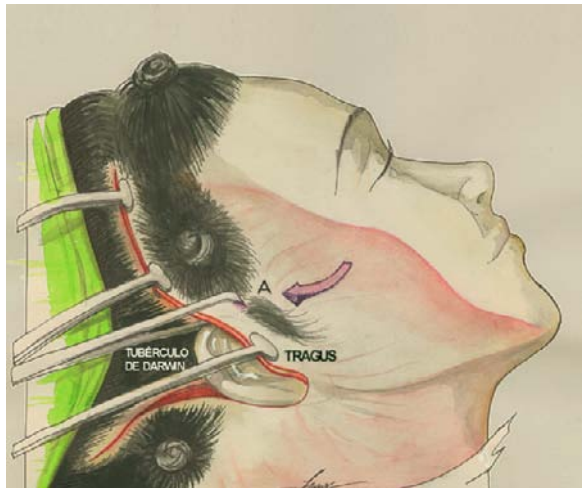


Fig. 40.8. The round-lifting technique describes the direction of traction of the anterior or facial flap, which follows a vector that connects the tragus to Darwin's tubercle. Excess tissue is marked with a Pitanguy flap demarcator

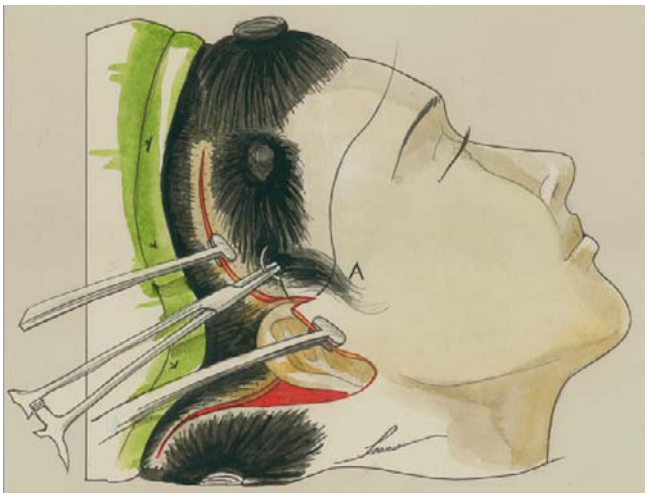


Fig. 40.9. A key suture is placed at point *A* to maintain the facial flap

Although extensive undermining of the SMAS was performed in an earlier period, it has been noted that plication of this structure in the same direction as the skin flaps, with repositioning of the malar fat pad, has given satisfactory and natural results (Fig. 40.7). The durability of this maneuver is relative to the individual aging process. Tension on the musculo-aponeurotic system allows support of the subcutaneous layers, corrects the sagging cheek and reduces tension on the skin flap.

Techniques that treat the pronounced nasolabial fold include traction of skin flaps, the SMAS, or the fascial fatty layer, with variable results. Filling with different substances may also be done at the end of surgery, either with fat grafting or other material. Direct excision of the nasolabial fold is reserved for the older male patient. In very selected cases this technique gives a definite solution to the nasolabial fold, with a barely noticeable scar that mimics the nasolabial fold itself.

The direction of traction of the skin flaps is a fundamental aspect of the round-lifting technique. In this manner, the undermined flaps are rotated rather than simply pulled, acting in a direction opposite to that of aging, and assuring a repositioning of tissues with preservation of anatomical landmarks. A second advantage in establishing a precise vector of rotation is that the opposite side is repositioned in the exact manner.

This vector of traction connects the tragus to Darwin's tubercle for the facial – or anterior – flap. A Pitanguy flap demarcator is placed at the root of the

Fig. 40.10. The posterior flap has been rotated and fixed at point *B*, assuring continuation of the cervical hairline

Fig. 40.11. Excess facial skin is demarcated with no tension on the flap

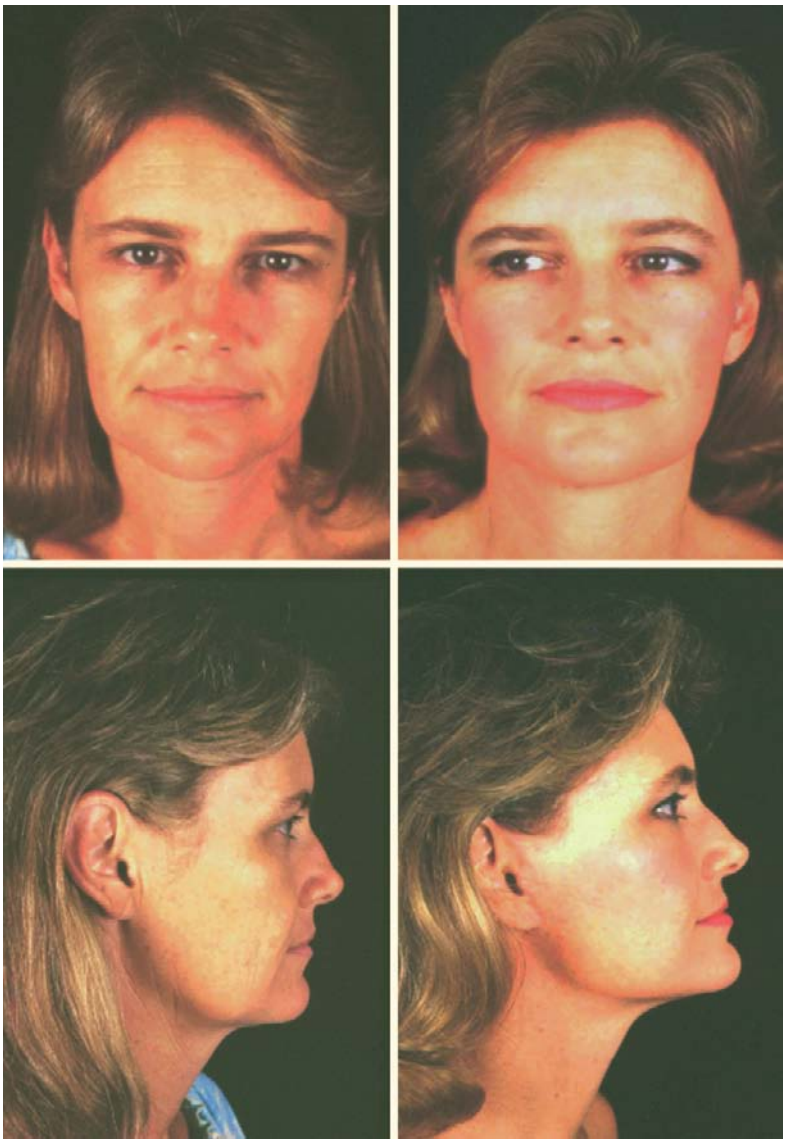
helix to mark point A on the skin flap (Fig. 40.8). The edge of the flap is then incised along a curved line crossing the supra-auricular hairline so that bald skin, not pilose, is resected. A key suture is located here (Fig. 40.9).

Likewise, the cervical flap should also be pulled in an equally precise manner, in a superior and slightly anterior vector of traction, to avoid a step-off of the hairline. Key stitches are placed to anchor the flap along the pilose scalp at point B so that there is no tension on the thin skin at the peak of the retro-auricular incision (Fig. 40.10).[1)]

Only when the temporary sutures have been placed will excess facial skin be resected. Skin is accommodated and demarcated along the natural curves of the ear, with no tension whatsoever (Fig. 40.11). Final scars are thus not displaced or widened. The tragus is preserved in its anatomical position, and the skin of the flap is trimmed so as to perfectly match the fine skin of this region.

When performing a brow-lift, placing these key sutures at points A and B is mandatory before any traction is applied to the forehead flap, essentially "blocking" the facial flaps (Clinical Cases 40.1–40.3).

1) The effects of the round-lifting technique have been studied by analyzing the mechanical forces applied and the displacements produced. The method of finite elements was employed and, by means of computers, the relevant equations were defined. Human skin was modeled as a pseudo-elastic, isotropic, noncompressible and homogeneous membrane, and a computational study of the fields of displacement and the forces applied to the flaps during a rhytidoplasty demonstrated that the direction of traction creates areas of tension that can be either negative or positive. These forces ultimately result in the correction of signs of aging. Interestingly, the vectors described in the round-lifting technique address both the main features that suffer distortion with aging as well as maintenance of anatomical parameters. Although there were limits owing to the variety of factors involved because of the complexities of human skin (basic properties and individual variations), the study holds a close parallel to a real surgical procedure.



Clinical Case 40.1. A round-lifting procedure was performed in this 41-year-old woman, with a simple plication of the superficial musculo-aponeurotic system. *Left*: The patient is seen preoperatively. *Right*: The patient is seen at 18 months follow-up

Clinical Case 40.2. Submental lipectomy was a primary concern in this 58-year-old patient. This was done by ample liposuction, together with a round-lifting technique to reposition facial and cervical tissues. *Left*: The patient is seen preoperatively. *Right*: The patient is seen at 2 years follow-up

Clinical Case 40.3. Male patients are seen more frequently in the office of the plastic surgeon, and many seek rejuvenation procedures. This 63-year-old man was submitted to a face-lift with blepharoplasty, with special attention given to correction of platysmal bands. *Left*: The patient is seen preoperatively. *Right:* The patient is seen at 2 years follow-up

40.3 Forehead Lifting

Aging in the upper face becomes evident with a descent in the level of the eyebrow and the appearance of wrinkles and furrows, sometimes from an early age. These are a direct consequence of muscle dynamics, responsible for the multitude of expressions so characteristic of man, and also due to loss of skin tone. The use of botulinum toxoid has been a valuable adjunct to temporarily correct these lines of expression and has been widely indicated as a nonsurgical application, either by itself or as a complement to surgery.

Elements of the upper face that must be considered preoperatively for any procedure are the length of the forehead and the elasticity of the skin; muscle force and wrinkles; the position of the anterior hairline and the quality and quantity of hair.

An important decision to be made regarding a brow-lift is the placement of incisions. There are basically two classic approaches: the *bicoronal incision* and the *limited pre-pilose or juxta-pilose incision*. The first allows for treatment of all elements that determine the aging forehead while hiding the final scar within the hairline. Certain situations, however, rule out this incision. Patients with a very long forehead or those that have already been submitted to previous surgery should not be considered for this incision, because they will have an excessively recessed hairline if the forehead is further pulled back. The final aspect will be displeasing, giving the patient a permanent look of surprise.

If the surgeon chooses to perform a bicoronal incision, a tri-plane approach is the preferred method:

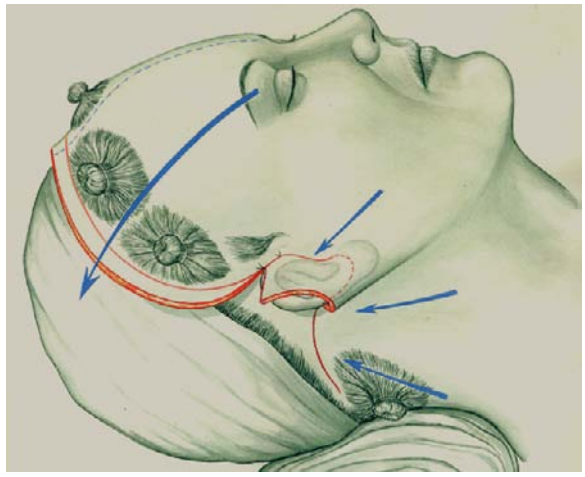


Fig. 40.12. Positioning of the forehead flap is only done after the facial flaps have been rotated and "blocked." This avoids excessive elevation of the facial tissues, and alteration of the hairline

subgaleal down to the orbital rim, then subperiosteal, and subcutaneous over the glabella and all the way down to the nasal tip.

Having "blocked" the facial flaps at points A and B, as described before, we may pull the forehead in any direction, either straight backwards, or more laterally (Fig. 40.12). The amount of scalp flap to be resected is determined by the length of the forehead and the effect that traction causes on the level of the eyebrow. The midline is positioned, demarcated, incised and blocked with a temporary suture. Sometimes no traction is necessary and no scalp is removed in the midline. Two symmetrical flaps are created, and lat-

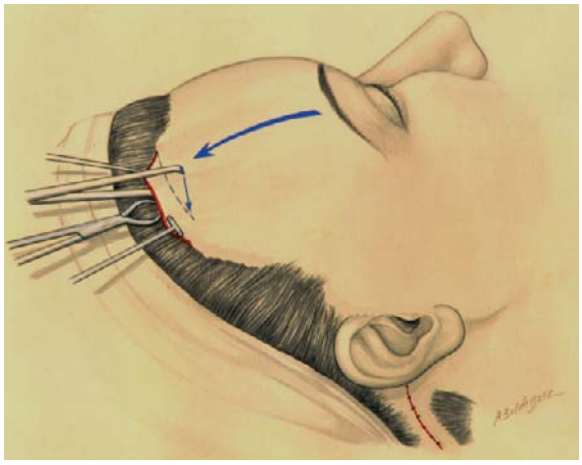


Fig. 40.13. Correction of the level of the brow to a more elevated position may be done by the juxta-pilose incision, with a subperiosteal blunt dissection

eral resection can now be performed allowing the eyebrow to be raised as necessary.

The second approach is the juxta-pilose incision, performed when the patient presents with ptosis of the lateral eyebrow and scant lines of expression of the forehead. The short distance required to reach the eyebrow region is easily performed by subperiosteal blunt dissection (Fig. 40.13).

Endoscopic instrumentation has permitted treatment of the brow through minimal access, and has proved useful in selected cases (Clinical Cases 40.4, 40.5).

Complications in rhytidoplasty are infrequent, yet can bring great distress to the patient and to the surgeon. It is essential to eliminate patients who continue to smoke, as the risk for skin slough is greatly increased. Smoking must be stopped completely at least 2 weeks in advance. In the immediate postoperative period, blood pressure must be constantly monitored

Clinical Case 40.4. Forehead lifting by the coronal incision may still be indicated, in selected cases. This 56-year-old woman presented with marked furrows over the forehead. A face-lift was associated with an open brow-lift. *Left*: The patient is seen preoperatively. *Right*: The patient is seen at 2 years follow-up. Notice that the height of the forehead has not increased

Clinical Case 40.5. Correction of the aging face was done together with elevation of the lateral third of the eyebrow, through a juxta-pilose incision. This 65-year-old patient is seen before and 1 year following the surgical procedure. *Left*: Preoperative view. *Right*: Postoperatively

by the nursing staff, to prevent hypertension and consequently hematoma formation. If an expansive hematoma is diagnosed, the surgeon may initially attempt to drain the collection at the bedside. Early identification and treatment of large hematomas is essential to prevent sequelae. Nerve injuries, dehiscence and other complications are infrequent and should be treated conservatively.

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41 The Vertical Sub-SMAS Periorbital and Midface Rhytidectomy

Ulrich T. Hinderer

41.1 Historical Background

At present we are approaching the first century of surgical attempts to achieve a rejuvenation of the face. Eugen Holländer [24], professor in Berlin, described in 1912 that he "succumbed to a patient's art of persuasion, to remove segments of skin at the hairline and at the natural folds with the purpose to refresh the wrinkles of aging and ptotic cheeks, to the pleasure of the bearer". According to Holländer, the surgery was performed in 1901 on a Polish aristocrat.

In the following decades many French and German plastic surgeons, namely Passot [36], Lexer [30], Joseph [26, 27] and Noël [35], improved the technique by removing skin after dissection, either at the hairline or also in front of the ear and in the neck. The results of this subcutaneous rhytidectomy progres-

Fig. 41.1. The vertical rhytidectomy by means of a short scar preperiostal and pretemporal lateral forehead dissection with elevation of the lateral two thirds of the brow and infrabrow segment in continuity with a subcutaneous midface dissection down to the naso-labial fold. As the purpose was mainly to improve the result of a blepharoplasty by correction of the frame of the eyelids and midface, it was called "extended blepharoplasty" [10, 11]

sively improved by extending the dissection and by meticulous technique trying to hide the incisions.

Hector Marino [34] suggested in 1963 that the result of a forehead lift could possibly be improved by deep dissection and upward displacement of the soft temporal tissues lateral to the orbit, which he called the "meso temporalis" owing to its content of vessels and nerves.

In 1969 I published a short scar temporal incision technique, which I had described in 1966 as "extended blepharoplasty", as the main purpose was to improve the result of a blepharoplasty by correction of the frame of the eyelids and midface. Through a preperiostal and pretemporal dissection, the lateral two thirds of the brow and infrabrow segment were elevated in continuity with the vertical subcutaneous midface dissection down to the naso-labial fold (Fig. 41.1).

However, it was Tord Skoog [40] who first used a deep-plane technique with a lateral approach to displace and stabilize the buccal fascia and also the platysma for improvement of the lower face and neck, independent of the skin plane displacement.

This was followed by Paul Tessier's technique [42] in 1979 based on his outstanding craniofacial experience. Tessier performed a deep-plane subperiostal lifting from a coronal incision downward and also through a small vestibular approach upward, the "mask lift". He wanted to bring the whole soft tissue "mask" upward together with the periosteum, a technique which was a great step forward and had many followers.

In 1983 I thought that the soft tissues should be elevated preperiosteally, instead of lifting them through the periosteum, developing the sub-superficial musculo-aponeurotic system (SMAS) modification of my vertical periocular and midface rhytidectomy of 1969. The technique was first published in the transactions of the ISAPS congress in Madrid in 1985, and extensively in 1987 in the *Annals of Plastic Surgery*, with the denomination "blepharo-periorbitoplasty" [17, 23].

41.2 *Primum non Nocere* Demands Knowledge of the Related Anatomy

The technique first required carrying out anatomical dissections to determine both the pathway and also the depth of the branches of the temporal division of the facial nerve and specifically of the frontal ramus (which according to Baker and Conley [2] is a terminal branch in 85% of cases) to prevent its damage. The other branches (two to the upper orbicularis muscle; the upper zygomatic branch to the lower orbicularis muscle; the lower zygomatic branch, which reaches the major zygomatic muscle from its deep surface and proceeds to the levator labii superioris, buccinator and levator anguli oris [6]) as well as the usually two buccal branches, which cross the masseter muscle beneath its fascia, present, according to our dissections, frequent anastomosis with the neighbouring branches before reaching their respective muscles. The buccal branches also communicate with the homonymous of the mandibular division. Freilinger et al. [6], who quoted four anatomosis of each branch, proved that the facial muscles are situated in four planes of depth, of which the zygomatic major muscle is situated on the second plane beneath the more superficial level of the orbicularis oculi muscle.

According to our dissections, performed in the Departments of Anatomy at the universities of Madrid and Cordoba (Ramon Ribes), in Barcelona (Alfonso Rodríguez Baeza), as well as with Rodrigo Vildósola (Mexico), and at the ISAPS anatomy courses in Nice in 1986 and the ISAPS/LSNA meeting in San Diego, 1991, the branches of the temporal division leave the protection of the parotis, depending on its size, at approximately 1.5 cm in front of the tragus. The frontal branch then crosses an area of approximately 0.8 cm^2 around the midpoint between the lateral canthus and the facial helix implantation and is always located below the anterior branch of the superficial temporal artery. Subdivisions occur after this point and are spread fanlike between 1 and 5 cm above the vertical level of the lateral canthus.

Concerning the depth, when leaving the protection of the parotis, the frontal ramus as well as the branches to the orbicularis muscle including the upper zygomatic branch ascend and are embedded in the deep fibro-fatty tissue of the SMAS to reach the respective muscles at an angle of approximately 90° angle (Fig. 41.2).

Fig. 41.2. *Left*: Dissection of the main branches of the facial nerve [23], when emerging from the protection of the parotis: *From top downward*: the frontal ramus; the branches to the upper orbicularis muscle; the superior and inferior zygomatic branches; the buccal branches of the temporal division and of the inferior division running beneath the masseter fascia; the mandibular branch with a proximal and distal division. *Right*: The terminal frontal branch has been dissected from the deep fibro-fatty tissue of the superficial musculo-aponeurotic system (*SMAS*) (the latter held by two forceps). The *black point* corresponds to the midpoint between the lateral canthus and the facial helix implantation. Close to the forceps is the anterior branch of the superficial temporal artery running on the surface of the SMAS. Beneath the proximal part of the frontal ramus are the next branches of the temporal division of the facial nerve

41.3 Risk Areas: Markings for Prevention of Damage to the Branches of the Facial Nerve

For deep-plane dissection the risk area is situated anteriorly to the parotis up to the area of incorporation of the branches into the fibro-fatty tissue of the SMAS. As the frontal ramus is the most endangered branch I always mark its pathway from 1.5 cm in front of the tragus to the 0.8 cm^2 area around the midpoint between the lateral canthus and the facial helix implantation. I do not perform a deep dissection in-between these markings, or closer than 0.5 cm when dissecting from above [22].

The sub-SMAS dissection of the mobile anterior face is performed at the lateral third of the forehead, the two thirds of the brow and infrabrow segment from the periosteum or temporal fascia, at the lateral canthal and maxillo-malar regions to the nasolabial fold and lateral lip corner. This is safe whenever the tip of the curved scissors is sliding in close contact to the temporal fascia or periosteum (Fig. 41.3).

The main ligaments of the upper two thirds of the anterior face are transected: the malar ligament, described in 1987 by Bossé and Papillon [4], the orbicular ligament of fibres which join the dermis and periosteum along the inferior border of the orbicularis muscle [23], which probably is similar to the malar septum [37]; and also the "orbital ligament" which, at the crista frontalis lateralis, joins the fascia temporoparietalis with the temporal fascia [18, 19, 29]. At this level I described that a few veins and an artery trespass the temporal muscle and fascia and anastomose with the superficial vessels of the anterior branch of the superficial temporal artery, which run on the surface of the temporo-parietalis fascia. The main vein was denominated in 1991 "the sentinel vessel" by de la Plaza and Arroyo [38].

The lateral two thirds of the preseptal and orbital orbicularis muscle are undermined, however, without dissection of the zygomatic muscles. Contrary to the opinion of Ramirez and Santamarina [39], no damage occurs to the ramus of the upper zygomatic branch to the lower orbicularis muscle, as it is located more superficially, incorporated in the fibro-fatty tissue of the SMAS, while the zygomatic muscles are located on a deeper level (Fig. 41.4).

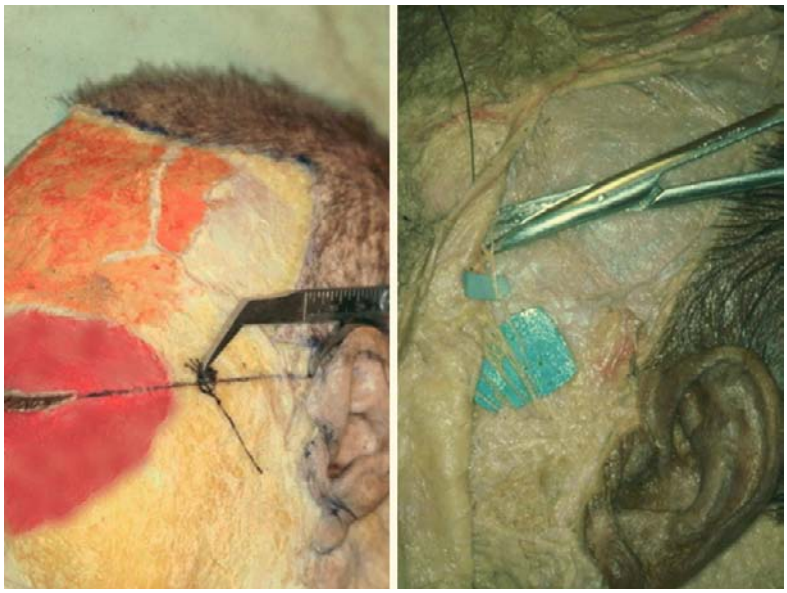

Fig. 41.3. *Left*: The pathway of the frontal ramus, which crosses an area of 0.8 cm^2 at the centre between the lateral canthus and the facial implantation of the radix helicis. *Right*: Dissection corresponding to the cadaver in Fig. 41.2; the SMAS has been turned forward to show the dissected frontal ramus and subdivisions from the SMAS deep fibro-fatty tissue. The tip of blunt scissors, inserted in close contact with the temporalis fascia, is located beneath the area of the frontal ramus and its first divisions, dissected from the fibro-fatty tissue of the SMAS. The deep dissection is safe anterior to the marking, and also from above at 0.5 cm from the pathway of the frontal branch between both branches. Any deep dissection along the pathway and below may endanger the temporal division of the facial nerve when leaving the protection of the parotis to ascend into the SMAS tissue in which it proceeds to the respective muscles

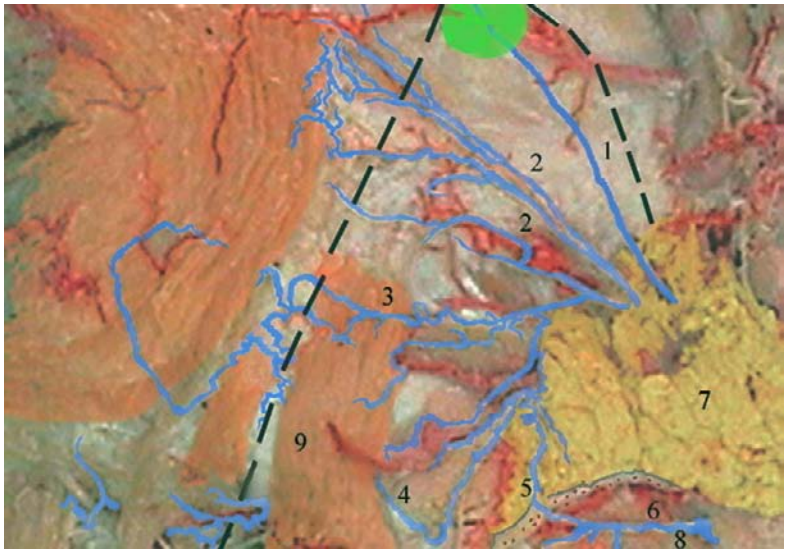

Fig. 41.4. Dissection of the temporal division of the facial nerve (in *blue*) performed with Alfonso Rodríguez Baeza (University of Barcelona). *1* The terminal frontal branch. *2* Two branches to the upper orbicularis muscle. *3* The upper zygomatic branch running within the deep fibro-fatty tissue of the SMAS towards the inferior orbicularis muscle is located in a superficial plane compared with the deeper plane of the zygomatic muscle. *4* The lower zygomatic branch running deep to the zygomatic muscle. **(***9***)**. *5* Anastomotic buccal branch joining the homonymous branches. *6* The inferior division of the facial nerve crossing the masseter muscle. **(***8***)** beneath its fascia. The lower part of the parotis **(***7***)** has been removed (*dots* indicate the cutting surface of the border) to show a buccal branch and the masseter. In *green* the midpoint between the lateral canthus and the facial helix implantation. The *interrupted line* shows the lateral limit of dissection of the mobile anterior segment of the face and also the limit of the deep downward posterior dissection

41.4 The Blepharoplasty and Vertical Preperiosteal Sub-SMAS Lifting of the Periocular Frame and Midface

41.4.1 Blepharoplasty

Almost always surgery begins with the blepharoplasty of the upper eyelids [13]. The marking of the excision is performed with a lower incision at a distance of 8–9 mm from the rim. The upper incision is marked looking straight ahead and taking into account the elevation of the brow and infrabrow segment to be achieved through the lifting. After excision of the skin, the raphe is dissected as is the inferior lateral preseptal and orbital orbicularis muscle. The raphe is laterally elevated and suspended with two 5-0 polyester sutures to the periosteum of the lateral orbital border somewhat above the level of the lateral canthus for stabilization [16]. For achievement of a lateral upward slant of the palpebral fissure, a lateral canthoplasty [14, 15], Jelks's inferior retinacular lateral canthoplasty modification [25] or a canthopexy [5] is used.

In the case of constitutional eyelid bags, the corresponding fat removal of the lower eyelid compartments is performed through a conjunctival approach [3], or a fat displacement according to Loeb [32, 33] or Hamra [8] is used.

A lower blepharoplasty is seldom required, as the lifting will elevate the lower eyelid. A trichloracetic acid peeling (around 30%) of the lower eyelid may improve superficial wrinkles [21].

41.4.2 The Vertical Periocular and Midface Rhytidectomy

The frontal branch of the facial nerve is marked from a point 1.5 cm in front of the centre of the tragus towards a 0.8 cm^2 area around the midpoint between the radix helicis and the lateral canthus. The 3.5 cm temporal incision is marked from a point 3.5 cm vertically above the radix helicis, adding cranially a 2–3 cm anterior extension and caudally, above the ear, a 2 cm posterior extension.

The scalp incision is performed and includes the fascia temporo-parietalis and subgaleal fascia, which covers the fascia temporalis. The lateral two thirds of the forehead, brow and infrabrow segment is undermined with Castañares scissors (Fig. 41.5).

With downward-curved blunt scissors sliding on the fascia temporalis and the maxillo-malar periosteum downward, the SMAS of the anterior midface in front of the upper marking is dissected towards the naso-labial fold with finger protection of the infra-orbital bundle (Fig. 41.6). The author's double-angulated scissors (Padgett) may be useful. A fingertip revision of the complete dissection towards the eyebrow, the midface and the naso-labial fold as well as posteriorly in front of the upper ear down to 0.5 cm from the marking of the frontal branch is also performed, with the purpose of detaching any residual adhesions. Also the raphe is liberated at the lateral canthus.

The complete undermining with transection of the three ligaments (malar, orbital and inferior orbicularis), permits us to vertically upwardly rotate the midface and the lateral periocular frame. It demands, however, that we stabilize the deep plane apart from the scalp fixation. The stabilization is performed with two or three 2-0 polyester Ti-Cron sutures, which immobilizes the temporo-parietalis fascia to the temporalis fascia (Fig. 41.7). While the anterior temporal flap is forcefully pulled upwards with forceps, the posterior scalp is displaced downward. With the help of d'Assumpcão forceps a possible anterior scalp excess of a few millimetres is marked and excised and the first staples are placed. Also the upper anterior and lower posterior extensions are determined, excised and stapled and a suction drain towards the naso-labial fold is inserted.

Steri-strips are applied to the forehead, eyelids and midface for the first 3 days to prevent skin distension due to the postoperative oedema. The suction drain is removed the next morning (Figs. 41.8–41.10).

Fig. 41.5. *Top*: The marking of the pathway of the frontal ramus and of the scalp incision. *Bottom*: Dissection with Castañares and curved blunt scissors along the temporalis fascia down to the infrabrow segment, leaving the subgaleal fascia attached to the temporo-parietalis fascia. Dissection of the brow and infrabrow segment with protection of the supraorbital bundle

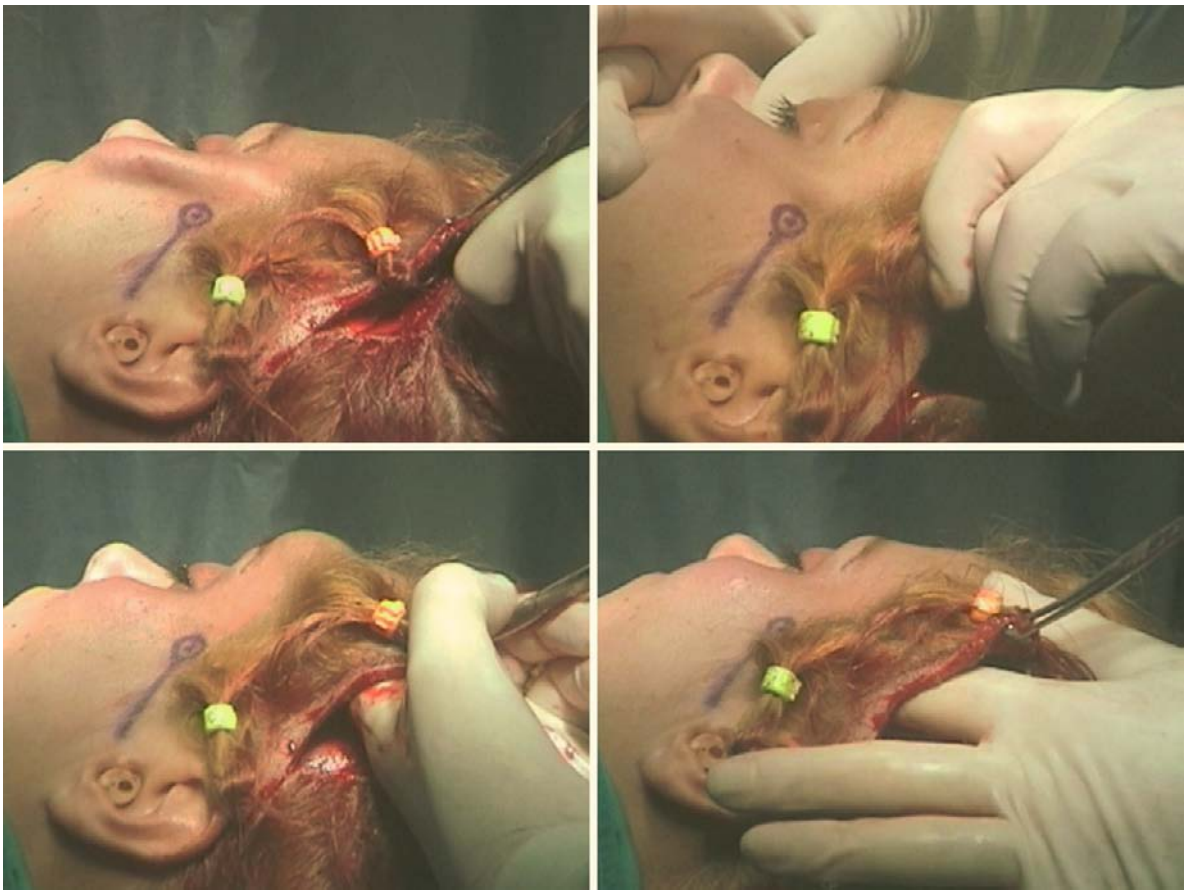

Fig. 41.6. *Top*: With protection of the infraorbital bundle, the anterior face is dissected down to the naso-labial fold. *Bottom*: The complete undermining is verified, dislodging any residual adhesions by fingertip dissection

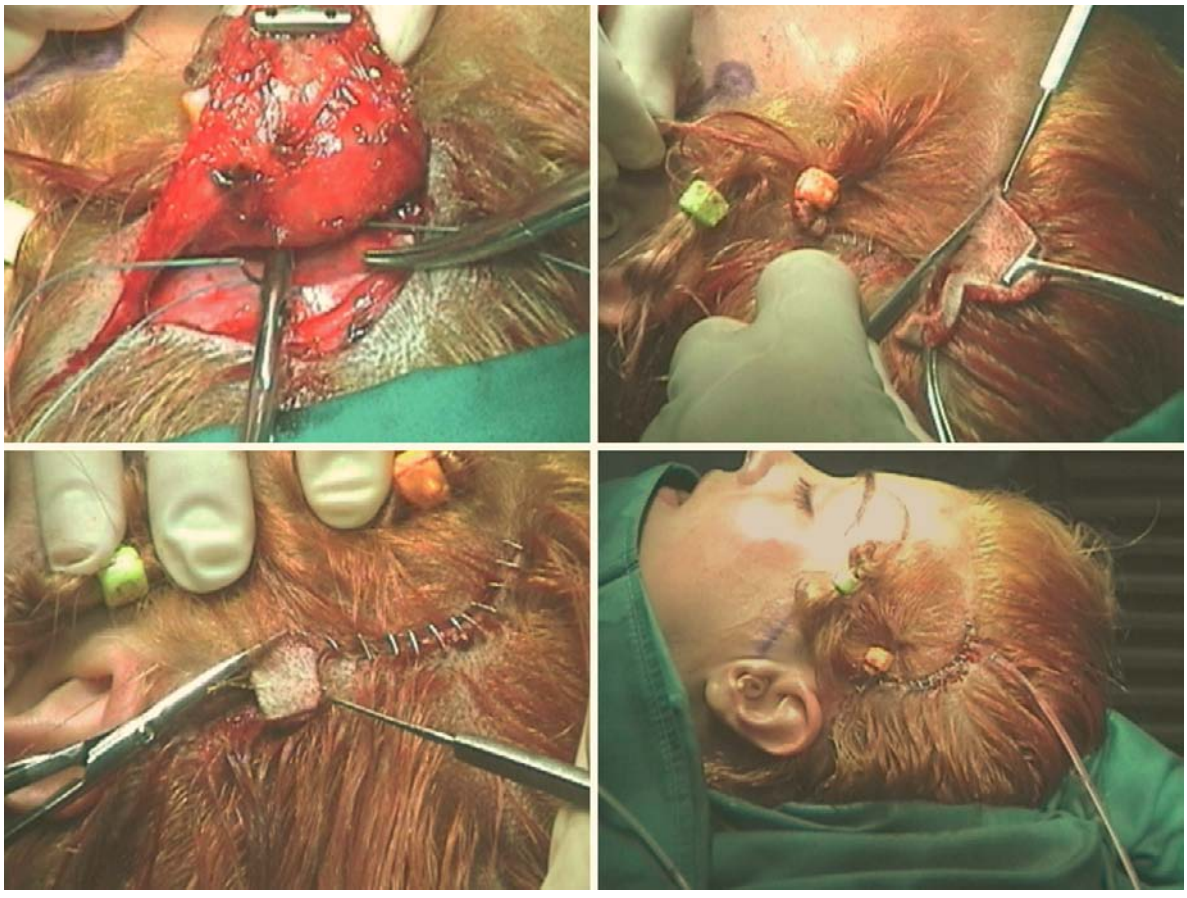

Fig. 41.7. The stabilization of the upwardly displaced anterior scalp is performed by two or three 2-0 Ti-Cron sutures to join the temporo-parietalis fascia to the temporalis fascia. While the posterior scalp is displaced downward and the anterior flap strongly upward, a strip of the anterior scalp is removed if necessary and the borders are stapled, followed by excision of the anterior and posterior extensions and closure. A suction drain is inserted towards the naso-labial sulcus

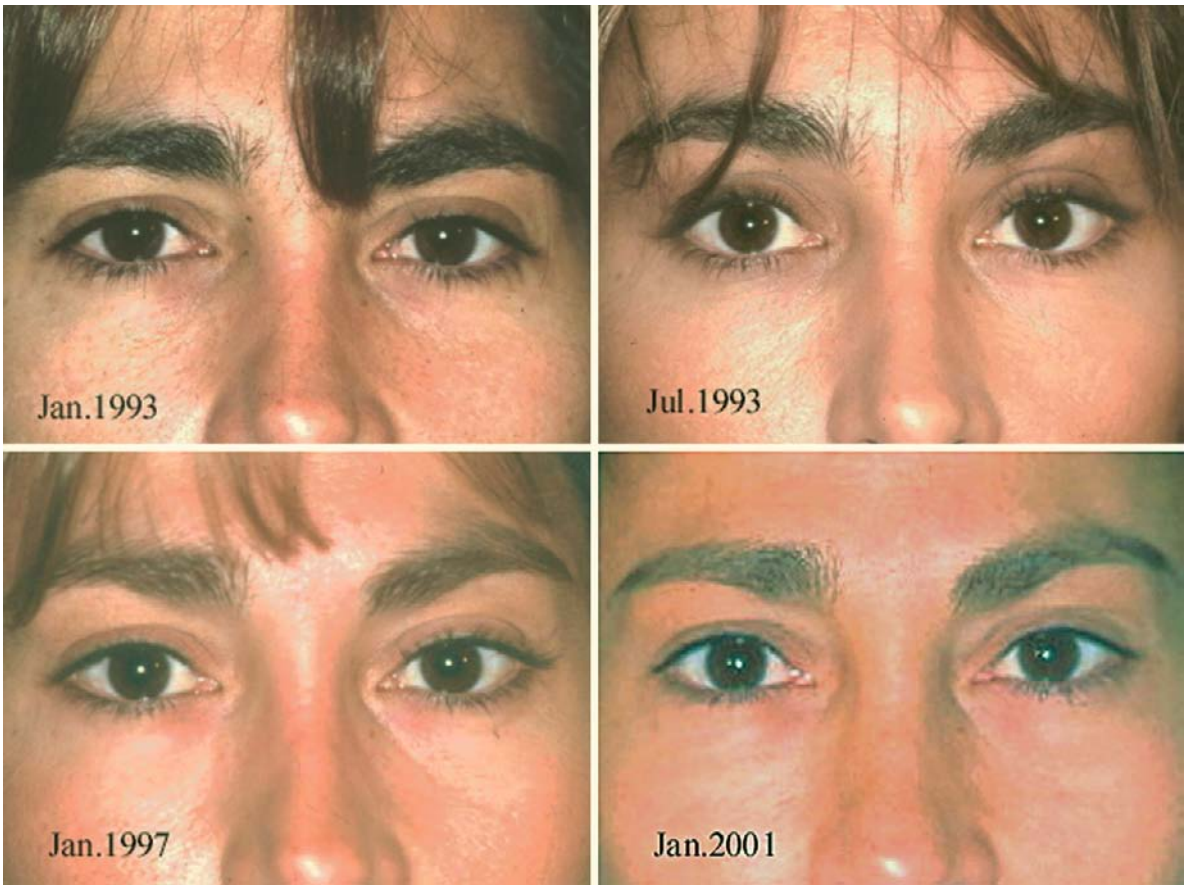

Fig. 41.8. Preoperative and postoperative result of the vertical rhytidectomy and at 4 and 8 years

Fig. 41.9. Preoperative and 1 year postoperative result after vertical rhytidectomy, rhinoplasty, malar augmentation and lower cervico-facial rhytidectomy with submandibular fat removal

Fig. 41.10. Result after vertical rhytidectomy with prehairline forehead correction and cervico-facial correction by minimal access cranial suspension (*MACS*) lift and malar augmentation. One-year postoperative result

41.5 Additional Corrections

41.5.1 Elevation of the Mid-forehead

Through a 2.5 cm transverse midforehead scalp excision, the downward preperiosteal dissection can be extended down to the nose and also to join the lateral undermining. The corrugator and procerus muscles may be excised if indicated. Deep glabellar frowns can be improved by insertion of subgaleal grafts.

41.5.2 Correction of High Foreheads or Temporal Recessions

With obliquely downward incisions at the hairline so that some hair may grow through the scar, the short scar temporal approach may be prolonged into a prehairline temporal or a coronal rhytidectomy.

41.5.3 Profileplasty

If the patient agrees, a profileplasty of a nose or chin is added, as the improvement of facial harmony increases the rejuvenation achieved by the rhytidectomy. Malar augmentation [9, 12] is only added if there is a real bony hypoplasia and not if it is secondary to the ptosis of the malar–submalar fat, to be corrected by the tissue elevation achieved with the vertical lifting.

41.5.4 Correction of the Aging Lip

In the middle-aged patient, an elongated upper lip with loss of concavity, reduced vermilion, descent of the corner of the mouth and deep vertical wrinkles (code bars) show the real chronological age. The correction is performed by means of a complete skin undermining to the vermilion through a skin excision at the naso-labial junction and nostril base [20]. A trapezoidal graft of temporal subgaleal fascia is sutured at both naso-labial folds to cover the orbicularis oris muscle. An extra strip may be used to increase the thickness of the vermilion. The result is satisfactory and the incision, except for hypertrophic scarring, which is very rare, is unnoticeable after a few weeks (Figs. 41.11, 41.12). For correction of the descended corners of the mouth, which gives a “bitter” appearance, an additional suture catching the orbicularis at the corner and the base of the alae has also been effective.

Fig. 41.11. *Top*: Trapezoidal graft of the subgaleal fascia and placement between the skin and the orbicularis oris muscle stabilized with two stitches at both naso-labial folds. *Bottom*: The postoperative aspect shows increase of the vermilion, decrease of the flat upper lip, which becomes more concave, and correction of the deep wrinkles (codebars)

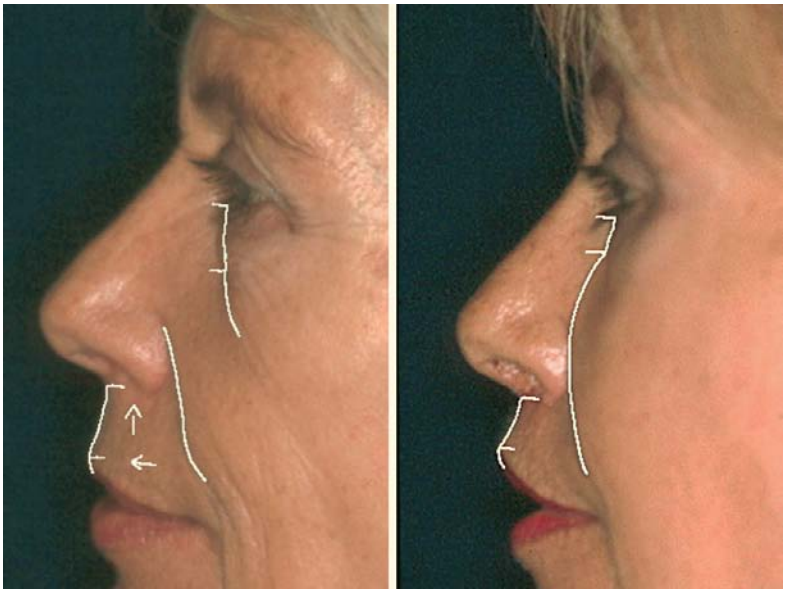

Fig. 41.12. The vertical periocular and midface rhytidectomy with correction of the aging lip 1 year after surgery. The lateral view shows the decrease of the height of the lower eyelid, the elevation of the ptotic midface and correction of the contour flattening, to recover the fullness of the midface contour of youth by elevation of the ptotic tissues to their location decades before. The flat and long upper lip recovers its concavity with increase of the vermilion and decrease of height

41.5.5 Ptosis of the Lower Face and Neck

In the middle-aged patient a correction of the lower face and neck is required in addition to the vertical periocular and midface lifting. I prefer to add a separate incision at the lower hairline of the sideburn followed by a double-curved Castañares incision in front of the ear and around the lobule, which may be prolonged behind the ear above the sulcus. Also for correction of the lower face and neck the vector is predominantly vertical. A SMAS plication and suture of the posterior border of the platysma to the Furnas [7] "auricular ligament", as recommended by Fogli (2004), or a Jost–Levet flap [28], have been utilized with a satisfactory result, also Tonnard and Verpaele's minimal access cranial suspension (MACS) lift [43, 44], or Sulamanidze's "aptos" sutures [41], the latter for additional support at the jowls.

41.6 Evaluation

To be included in the group of advanced techniques, it must accomplish several aspects:

- It must be safe, reliable and reproducible
- It should fulfil the goals of facial rejuvenation
- It must stand up to comparison with other advanced techniques
- It should provide a satisfactory long-term result
- The scar should not be detectable

41.6.1 Safety

The question of safety concerning the facial nerve has been personally discussed and is a fundamental condition.

Concerning the vascular supply, the deep plane downward dissection is carried out in a practically avascular plane above the periosteum and beneath the SMAS, which carries on its surface the main blood vessels, most from lateral. However, some blood vessels accompany the ligaments, for example the malar ligament, which was known as the McGregor patch, to be ligated. The same occurs to the orbital ligament I described in 1987.

In over 750 deep vertical facelifts there has been no permanent damage of the branches of the facial nerve. In about 3% of cases, a paresia occurred, lasting up to 6 weeks postoperatively, owing to distension caused by the fingertip dissection toward the naso-labial fold. No skin flap necrosis occurred. The technique is therefore reliable and recommendable.

41.6.2 Does the Technique Achieve the Set Goals?

Virenque [45] mentioned in 1925 that there is an anterior mobile area of facial expression and a posterior more stable parotid–masticatory region and recommended oblique supero-lateral sutures for stabilization of the anterior region. In 1959 Aufricht [1] used a plication of the subcutaneous tissues. In my opinion the vector should be a deep plane vertical upward rotation; however, with only a minor posterior displacement at the skin level. It should be a vertical lifting and not a major posterior "pull", which produces a "high-speed look".

The vertical lifting elevates and stabilizes the anterior mobile area of facial expression, i.e. the lateral two thirds of the brow and infrabrow segment, the lateral canthal region and lateral two thirds of the orbicularis muscle, which are laterally rotated upward around the fixed point of insertion of the lateral canthal ligament at Whitnall's tuberculum.

Thus, the patient regains the looks of his/her youth by displacing the ptotic tissues to where they were located. The distance from the eyelid rim to lateral brow increases by lifting the brow, thus giving the eye a "clearer" appearance. The height of the lower eyelid decreases as does the depth of the naso-palpebro-malar sulcus. The aspect of the lateral canthal region substantially improves by a moderate elevation with correction of crow's-feet. However, an additional canthoplasty or canthopexy is required whenever the slant of the palpebral fissure should be considerably improved. Lower eyelid bags, and a "skeletonized" appearance [8], are corrected. The oblique malar or "social" profile, as also seen in a frontal view, improve by the increased soft tissue malar volume, without the need of a malar implant, as long as there is not a real bony hipoplasia. The ptotic cheeks are elevated so that the flat midface contour becomes full and round in a lateral or oblique projection with the increased volume of youth (Little's "ogee curve" [31]).

This volumetric goal is achieved without changing the volume by plication but only by elevating the ptotic tissues to the location they had in youth (Figs. 41.13, 41.14). The naso-labial fold is decreased owing to the fact that there is no overhanging of ptotic midface fat tissue.

Fig. 41.13. Result 2 months after vertical periocular and midface as well as cervico-facial rhytidectomy, blepharoplasty and rhinoplasty. Notice the improvement of the upper eyelid, partially covered by the ptosis of the brow and infrabrow segment; the decrease in height of the lower eyelid; the recovery of midface fullness, achieved by elevation of the ptotic midface tissues

Fig. 41.14. The lateral profile before and 8 years after surgery: the vertical height of the lower eyelid is still improved, as is the fullness of the midface, characteristic of youth

41.6.3 Is the Technique Easy to Reproduce?

The technique is simple as the downward undermining is continuous in the natural preperiosteal–sub-SMAS avascular plane, so it is also easily reproducible.

41.6.4 Is the Scar a Tell-Tale Sign of Lifting?

The scar on the upper eyelid is usually unnoticeable and that placed within the scalp is not visible.

41.6.5 Is the Result Long-Lasting?

The result has proven to be long lasting for a minimum of 7 years and usually for more than 10 years as compared with the preoperative appearance (Figs. 41.15–41.17).

Fig. 41.15. Seven years after vertical rhytidectomy of the periocular frame of the eyelids and midface, the oblique view shows improvement of the eyelids and of the oblique facial contour achieved by elevation of the soft tissues filling the submalar hollow contour and malar volume without the need of malar implants. The deep naso-palpebro-malar sulcus is still substantially improved

Fig. 41.16. Preoperative oblique view and result of a vertical rhytidectomy of the periocular frame of the eyelids, blepharoplasty and midface as well as neck lift and nasal tip correction. Result 9 years postoperatively. Notice the improvement of the midface fullness of youth. The patient had lip enlargement elsewhere. The improved oblique malar profile was only due to the displacement of the submalar fat and not to a subperiostal malar implant

Fig. 41.17. Eleven years after vertical rhytidectomy of the periocular region and midface, with blepharoplasty, necklift, tip rhinoplasty and chin reduction. Note the improvement of the deep naso-labial folds and long-lasting result

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42 Composite Facelift

Sam T. Hamra, Ramsey J. Choucair

42.1 Introduction

Facelift surgery has always been a significant part of the practice of plastic surgery from the early part of the twentieth century. In spite of the dramatic advances that have been made in the last 20 years with body contouring and rhinoplasty, much of the basic principles of facelift surgery have remained the same since the introduction of facelift techniques.

Two factors strongly influenced the changes in plastic surgery techniques. First is the demand for surgery by the general population. With the younger and more affluent population more preoccupied with fitness and health, body contouring has continued to evolve significantly owing to the expectations of patients. The second factor that allows development of better techniques is the disappointment from results obtained with traditional techniques. The most obvious example would be rhinoplasty surgery where newer techniques have advantages over the shortcomings of older techniques that left patients with suboptimal results. However, in spite of the recognition of poor results that have driven improvements in body contouring and rhinoplasty, plastic surgeons' frequent fear of using of newer facelift techniques has prevented widespread use of more complicated and advanced facelift procedures.

The advantage of simpler techniques in facelift surgery has continued to be based on the acceptable results seen in the early postoperative period when patients have some degree of edema helping an early reentry into normal lifestyle. Unfortunately these results may fade early as the unwanted appearances of patients who once had facelifts become obvious to their friends and the public at large as a very unattractive result. Up to recently, these results have been very difficult to correct.

The composite facelift has evolved over a 30 year period, by gradually adding and developing various techniques which influence separate parts of the face. Evolution that began with a simple subcutaneous lift has become a comprehensive or global procedure that influences essentially every deep structure of the aging face whose character influences the topography of the face. While facelifts in general appear to be similar to the public and even to aesthetic surgeons who are not actively involved in a facelift practice, there are very definite and clear differences between conventional facelifts and composite facelifts.

42.2 Differences in Technique

Because of the confusion in various words in the facelift literature, both patients and surgeons may not have a clear understanding of the potential result of various techniques since descriptions have overlapping meanings. Historically, one thinks of the traditional facelift as a subcutaneous dissection where the skin is lifted off the deep structures of the face and redraped in a superior lateral vector. In the mid-1970s the tension was directed to the platysma muscle of the lower face in the manner of Skoog [1]. Skoog is clearly the first surgeon who developed the technique where the deep structure was moved as well as the skin. In the Skoog technique the skin of the lower face remains attached to the platysma of the lower face, which he called superficial fascia. Lemmon and Hamra [2] presented the only large series of Skoog facelifts which was done between 1973 and 1978. Following the basic principles of the Skoog technique, Tessier coined the expression superficial musculo-aponeurotic system (SMAS) and Mitz and Peyronie [3], working under the direction of Tessier published the paper on SMAS techniques.

Following the emphasis on neck procedures in the early 1970s the second step in the development of composite rhytidectomy was the triplane facelift technique [4] published in 1982. In this technique, the Skoog flap of the face is separated from a preplatysma neck dissection . The maintenance of the meso-mandibularis mesentery separated the face from the neck dissections since the neck dissection was preplatysmal and the face dissection was subplatysmal. This mesentery was a structure that included the rami-mandibularis but allowed movement of the neck and

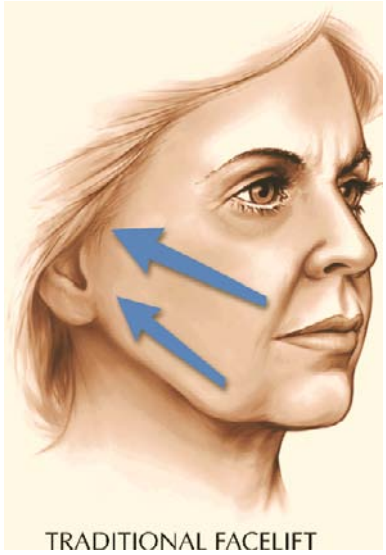

Fig. 42.1. Traditional facelift. The direction of lift in the traditional facelift is singular and lateral toward the ear. This is the only direction of pull. (Courtesy of S. Hamra, Dallas)

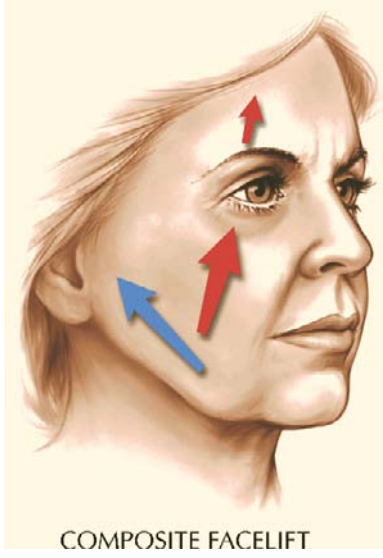

Fig. 42.2. Composite facelift. The composite facelift direction of lift is multidirectional and oblique toward the eye and ear rather than just toward the ear. The movement of the cheek returns the aging eyelid muscle and cheek fat to their original positions, preventing the pull toward the ear. The forehead also is lifted up. (Courtesy of S. Hamra, Dallas)

face tissues without inhibition owing to the principle of mesentery movement. In 1985, the third structure in composite rhytidectomy was included, which was the fat overlying the zygomaticus major and minor muscles. It was clear that the safety of elevation of the fat overlying the muscles allowed inclusion of the cheek fat or "malar fat" in the deep subcutaneous plane facelift flap which now included the fat of the naso-labial fold and the platysma muscle and the skin. This technique, which was called a deep plane facelift [5] was published in 1990 and ushered in an era of "malar fat" procedures championed by many authors and surgeons [6–10]. Thus, when one mentions conventional facelifts they may be subcutaneous lifts, SMAS lifts or deep plane facelifts. It should be noted that these are all lateral vector facelifts and in spite of various names and acronyms all basically accomplish the same correction of the face from the bottom portion of the soft tissue orbit to the jawline. Thus, when one uses the term "conventional facelifts" the reference will include either subcutaneous facelifts, or deep plane (malar fat) facelifts or SMAS lifts, as seen in Fig. 42.1.

It was at this point in 1990 that the continuation of the evolution of the composite facelift took a major turn away from the conventional technique. In 1992 the composite [11, 12] facelift was published which incorporated the orbicularis oculi muscle with the facelift flap so that the orbicularis, malar fat, and platysma muscle would all be left with the skin and the repositioning of all three deep anatomical parts of the aging face could be accomplished while maintaining their intimate relationship with one another. One should remember that when the surgeon or the patient simulates a facelift by putting pressure with their hands on the face in an upward direction, they are essentially doing a composite movement of the underlying tissues rather than just a movement of skin lift or a deep plane facelift. When one thinks in terms of a composite facelift, the vectors are dramatically different from the vectors of a conventional facelift since there is a strong superior medial vector of the upper face (Fig. 42.2) and an obligatory medial vector of the forehead lift as opposed to the superior lateral vector of the face with conventional facelifts or conventional forehead lifts.

Even though the orbicularis muscle became the fourth part of the composite facelift there was still a suboptimal lower eyelid created by conventional blepharoplasties whether transconjuncital or transcutaneous, since conventional lower blepharoplasties have always called for removal of some of the lower-eyelid fat. (Fig. 42.3) In 1995 the lower eyelid fat was preserved with a technique called the arcus marginalis release [13] that advocated repositioning the lower-eyelid fat over the orbital rim. (Fig. 42.4). In this way the junction of the lower eyelid and cheek could be totally camouflaged, achieving a much more youthful contour of the upper face. As the composite facelift continued to be developed, the zygomaticus musculature was included with the orbicularis movement with development of a zygomaticus–orbicularis flap

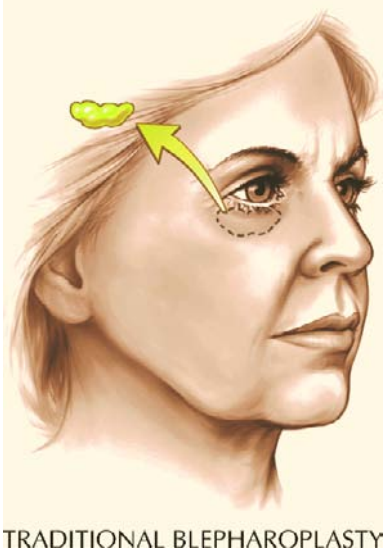

Fig. 42.3. Traditional blepharoplasty. In traditional facelifts, the lower-eyelid lift, or lower blepharoplasty, is optional. Typically, in a lower-eyelid procedure, the fat pads that cause puffines are removed without regard to the possible long-term effects. Over time, this wholesale removal of fat can create a hollow or concave appearance of the eye. (Courtesy of S. Hamra, Dallas)

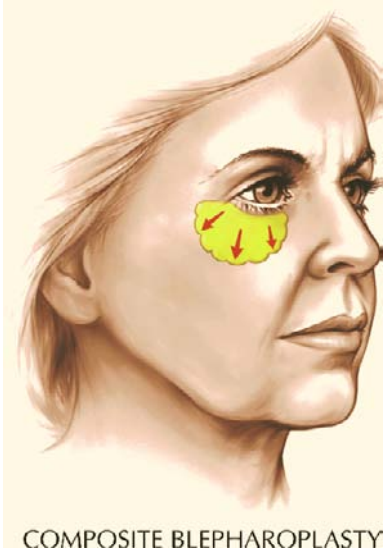

Fig. 42.4. Composite blepharoplasty. The lower blepharoplasty is an integral part of the composite facelift. To create a natural transition between the soft under-eye tissue and the cheekbone, the composite facelift incorporates a special technique in which the fat under the eye is preserved and repositioned over the orbital bone. This method creates a smooth youthful contour. (Courtesy of S. Hamra, Dallas)

called "a zygorbicular flap" [14]. This created a second mesentery with a facelift called a meso-zygomaticus. In addition, the lower-eyelid fat was kept attached to the septum orbitale so that a septum orbitale reset could be accomplished following the arcus marginalis release.

It is this final maneuver which has created the present state of the art for composite facelifting.

42.3 Harmonious Facial Rejuvenation

An aging face is more than just separate parts of the face. As humans age, every part of the face undergoes changes almost simultaneously. Whereas eyelid changes may start in the third decade, by the mid-40s the average person usually has a uniform and harmonious appearance of normal aging. When we analyze the patient in the standing position, the vectors of aging are well known because the forehead, cheek, and jowl areas descend downward in a predictable manner (Fig. 42.5a). Loss of contour of the youthful neck has long been understood as have recognizable changes in the naso-labial fold and jowl area. While lower facial aging has been reversed with conventional facelifts for many decades, the peri-orbital area was an area that was poorly understood and frequently ignored except for removal of lower-eyelid fat with traditional blepharoplasty techniques. The removal of this lower-eyelid fat did little to give true peri-orbital rejuvenation. As the peri-orbital area ages, the changes are inevitable because of normal skeletonization that occurs as the patient enters the fourth decade. (Fig. 42.6a).

From the front view, the peri-orbital diameter becomes wider because the youthful eye usually shows no signs of bony anatomy and becomes wider with aging. The youthful eyelid shows no signs of the underlying bony anatomy. The peri-orbital diameter is very narrow with a very convex appearing lower youthful eyelid. As one ages the appearance is of a deeper and concave lower eyelid compared with the convexity seen in the lower eye. Just for that reason, the arcus marginalis release with preservation of the lower-eyelid fat is obligatory in composite rhytidectomy in order to create a more youthful appearing lower eyelid (Fig. 42.6b).

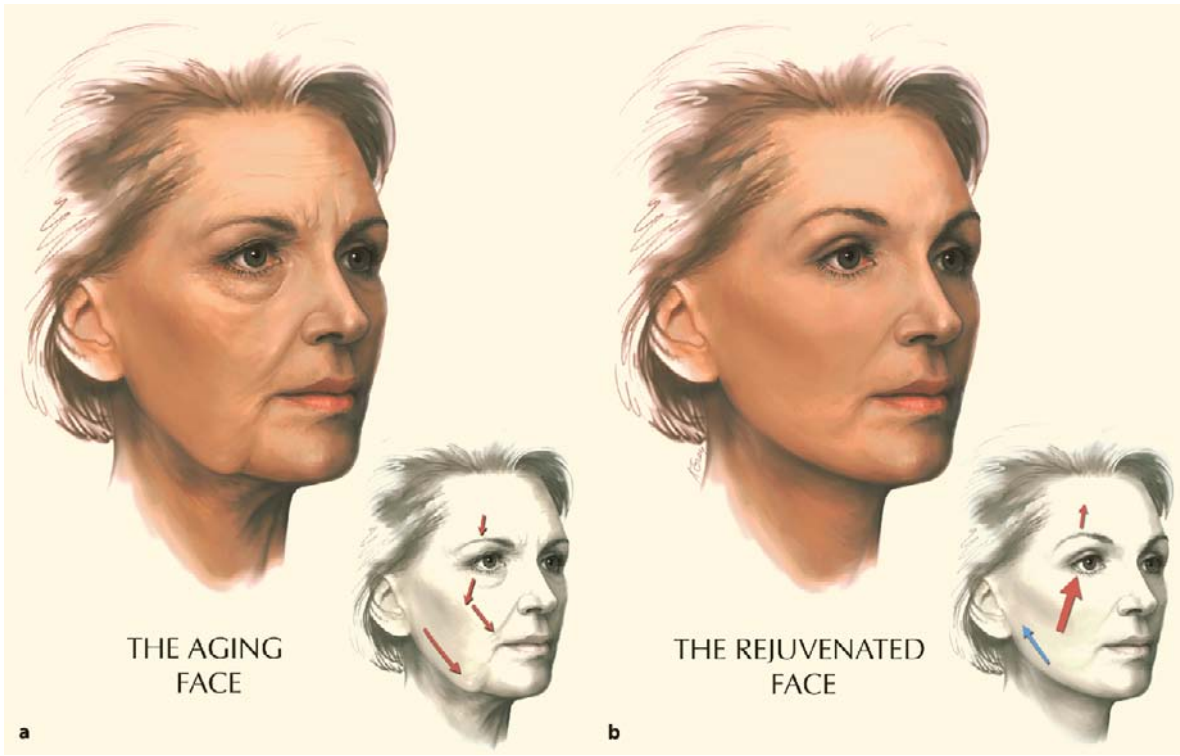

Fig. 42.5. **a** The aging face. *Arrows* demonstrate the normal gravitational direction of aging. **b** The rejuvenated face. The normal direction of aging must be reversed to achieve optimal results. The *arrows* demonstrate the two-direction lift of the composite facelift (Courtesy of S. Hamra, Dallas)

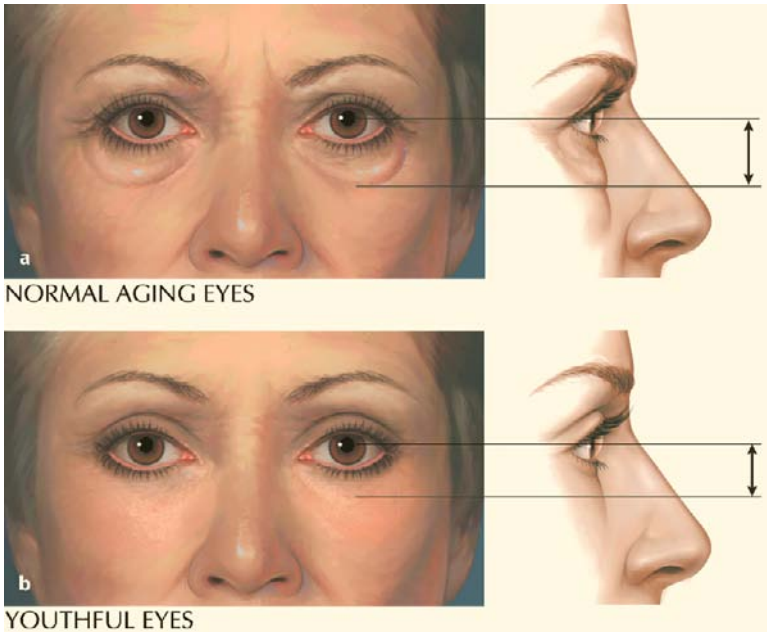

Fig. 42.6. **a** Normal aging eyes. Contours have become wider and deeper. **b** Youthful eyes. Narrow, shallow, youthful contours are restored with a composite blepharoplasty. (Courtesy of S. Hamra, Dallas)

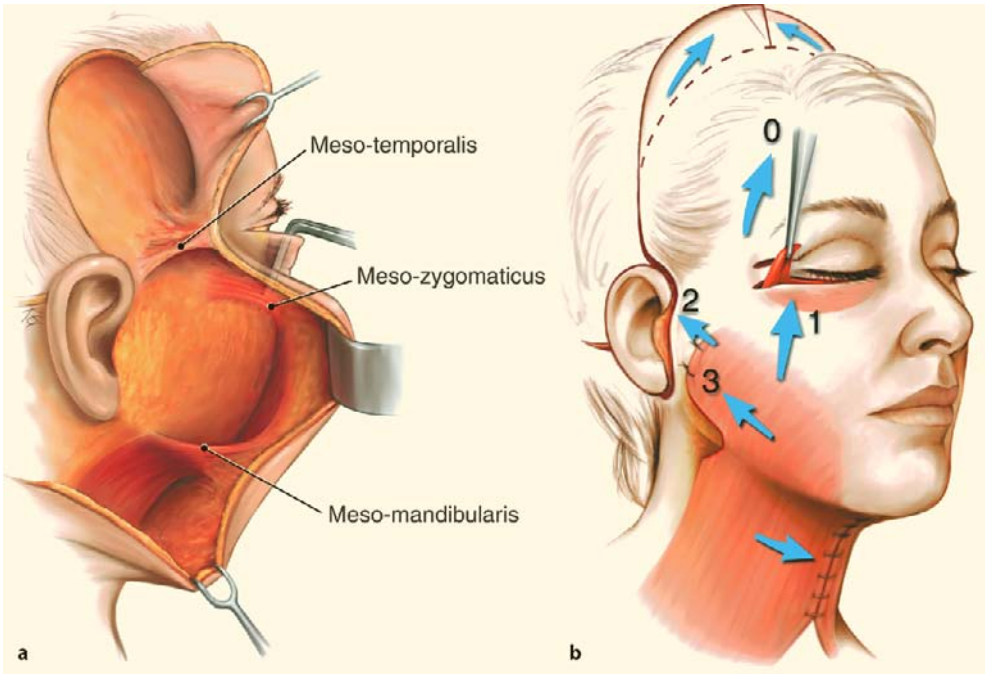

Fig. 42.7. **a** The three mesenteries are created during the composite facelift dissection. The meso-temporalis contains the branches of the frontal nerve. The meso-zygomaticus contains the nerve branches to the zygomaticus musculature and the meso-mandiublaris contains the rami-mandibularis. **b** The mesenteries permit superiomedial movement of the face and forehead without restriction. The tension on point *1* must be stronger than the tension on points *2* and *3* to prevent a lateral sweep. (Courtsey of S. Hamra, Dallas)

42.4 Composite Repositioning

In conventional rhytidectomy one utilizes a lateral vector, which allows a surgeon to do a facelift without a blepharoplasty since the skin can be redraped toward the temple or helix of the ear. This is impossible in composite rhytidectomy since the strong superior medial movement of the upper face dictates a superior movement of the forehead. As discussed earlier, there are three distinct mesenteries (Fig. 42.7) created that contain the facial nerves. Because of the theory of mesentery movement, the surgeon can effectively move the tissues of the face in an uninhibited fashion (Fig 42.7b) which is done in a superior medial direction rather than in a vertical or superior-lateral direction. The meso-temporalis mesentery has long been recognized and is it contains the frontal branch of the facial nerve. The meso-zygomaticus and meso-mandibularis are unique to the composite facelift. As opposed to the composite movement of the SMAS, malar fat, and orbicularis muscle, the neck continues to be done much like the original triplane facelift procedure except that much more vertical movement can be accomplished in the lower face area at the junction of the face and neck. Since the dissection is in a preplatysmal plane the amount of fact that is present can be evaluated after elevation of the flap and then defatting can be done with a scissor technique. Following defatting and reapproximation of the anterior bands, the neck skin is redraped in a posterior direction, while the skin and muscle of the jowl and lower face are moved in a more superior direction. The platysma of the neck is moved in a medial direction toward the midline. One should remember that the evaluation of the aging neck is done when the patient is in a standing position and it is the gravitational force of aging that creates the midline looseness of the neck which one can correct with excision of extra muscle and fat and approximation of the platysma bands.

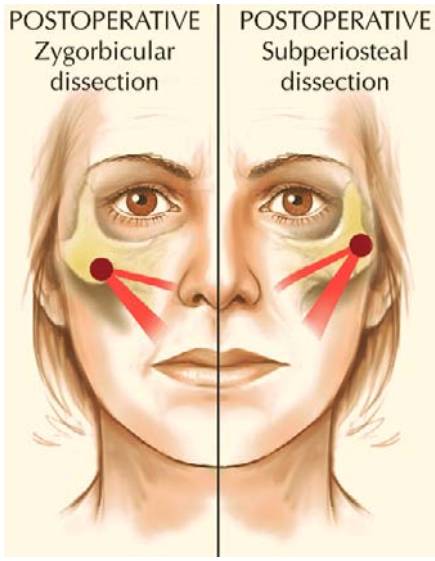

Fig. 42.8. The origin of the zygomaticus muscle does not change following a composite facelift. The origin does change following subperiosteal cheeklift or facelift by widening the soft tissue intermalar distance, which thereby changes the patient's appearance. (Courtesy of S. Hamra, Dallas)

The more impressive and predictable results with composite facelifts have been accomplished since 1996 after development of the zygorbicular dissection of the midface. Subperiosteal facelifts may create the appearance of a more widened inframalar distance owing to repositioning of the origin of the zygomaticus major and minor (Fig. 42.8). This will not occur with composite rhytidectomy. In composite rhytidectomy, the origin of the zygomaticus musculature is not disturbed as the zygorbicular flap dissection extends both medial and lateral to the osseous origin of the zygomaticus major and minor. As the muscle origin stays intact, the meso-mandibularis and meso-zygomaticus allow composite movement of the orbital area in a superior medial direction.

While subperiosteal dissections are of great benefit in secondary facelifts requiring reconstruction of the lower eyelid, they are not routinely practiced in composite facelift since the tissues of the face appear to reveal more aging of the skin down to fat and muscle rather than the periosteum. While the periosteum does furnish a strong platform for movement of the cheek, the stretch of the soft tissues of the zygorbicular flap create a normal and softer appearance of the upper cheek and lower eyelid.

The rejuvenation of the face following composite facelifts can produce a very harmonious appearance (Fig. 42.9) [2] The best way to assay the effects of rejuvenative facelift surgery is with a half-and-half photograph showing the preoperative hemiface juxtaposed with the postoperative same-side hemiface photograph as shown in Fig. 42.9. Up to this point there has been no quantitative procedure to evaluate facelift results. Because of the harmonious appearance of the youthful orbit as seen in the frontal views, a very definite difference can be now understood between conventional rhytidectomy and composite rhyitdectomy. Following conventional rhytidectomy, there will be no changes in the vertical height of the soft tissue orbit. If malar fat procedures or a SMAS procedure is utilized with a conventional blepharoplasty, one cannot achieve a shortened vertical height of the lower eyelid. Moreover, if lower eyelid fat is removed it is quite possible that a normal concave lower eyelid will appear more hollow, which will never be the case with preservation of the lower-eyelid fat in composite rhytidectomy (Fig. 42.10).

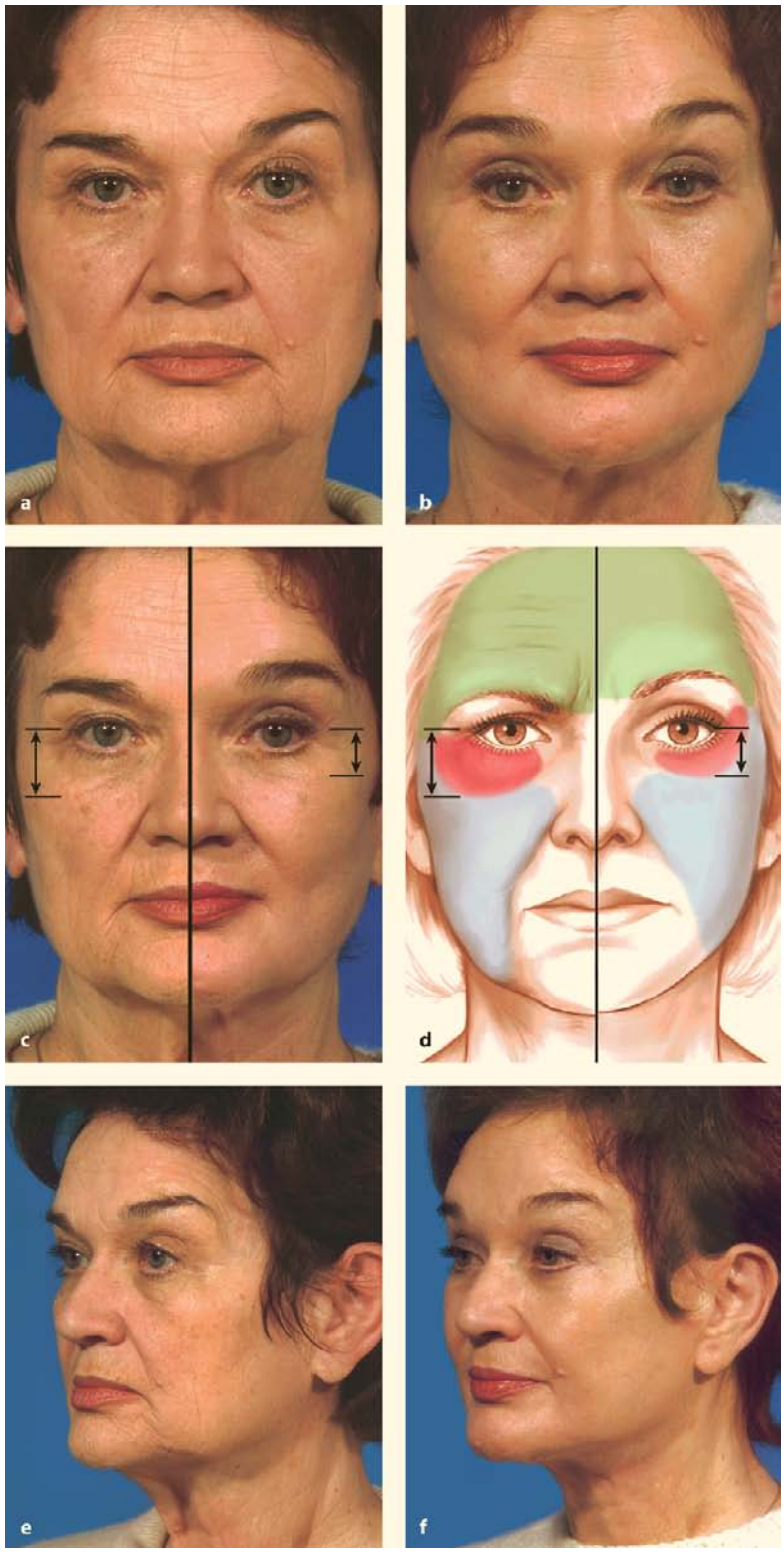

Fig. 42.9. **a** Preoperative patient with a negative lower-eyelid vector with typical signs of aging. **b** Postoperative primary composite facelift, browlift and blepharoplasty with arcus marginalis release. All orbital fat was preserved. **c** Preoperative right hemiface compared with postoperative right hemiface. **d** The hemiface comparisons prove that all three zones have been rejuvenated significantly for facial harmony. (Courtesy of S. Hamra, Dallas).

Fig. 42.10. A preoperative view of a 44-year-old with normal signs of aging. One-year post-operative views showing no signs of underlying orbital anatomy following arcus release and septal reset in composite facelift. Hairline forehead lift narrowed the hairline 2 cm.

42.5 Utilization of Composite Rhytidectomy to Correct the Unfavorable Outcomes Following Facelift Surgery

If one examines the typical surgical appearance of patients who have had facelifts, it becomes easy to analyze the problems and why they result. The best way would be to understand the long-term changes of the vectors of conventional facelifts as shown in Fig. 42.11.

If one judges the vectors of aging of patients in the standing position, they are the same for all humans and are predictable for every person after a certain age (Fig. 42.11a). Without question the conventional facelift can create an excellent jawline but in most cases the tension on the SMAS flap is a shorter, more vertical vector and tension on the upper portion of the conventional flap including the malar fat procedure is less vertical and more superior lateral in spite of claims of vertical "malar fat repositioning." While malar fat techniques and deep plane facelifts have been an improvement over the subcutaneous procedures, the basic problem is still giving an unpredictable result to any patient undergoing conventional techniques. By omitting the surgery of the lower eyelid, the surgeon clearly can promise the patient an early return to social activity often within days. One must remember that a facelift cannot be judged over the first few months since the final results may develop over many months or even several years. With the vectors of the conventional facelift (Fig. 42.11b) there is unopposed tension of the lower face vector. The long upper face vector, however, is more horizontal and is too long to be maintained over the course of time as normal aging proceeds. Thus, the potential progressive relaxation of the orbicularis oculi muscle and cheek and malar fat tends to descend downward in time, creating the "lateral sweep" typically seen with a facelifted person (Fig. 42.11c). If a forehead lift is not done with a conventional rhytidectomy, the forehead also becomes more ptotic in time, creating further disharmony since the patient may eventually have a straight jawline with a very ptotic forehead and looseness of the upper face tissues.

Many patients have a normal crescentric anatomical pattern on the upper cheek area called a malar crescent (Fig. 42.12). The problem with this excessive orbicularis muscle that may become a malar mound or festoon is that it is made even worse with a simple superior lateral facelift, since it is not changed and is in fact made more obvious. While it appears quite normal on a normal unoperated aging face, it becomes a distinct stigma of previous surgery. Of greater significance is the potential for a deeper concavity of the lower eyelid created by orbital indiscriminate lower-eyelid fat (Fig. 42.13). The triad of an unoperated forehead, hollow lower eyelid, and a lateral sweep is pathogenomoic of previous facelift surgery [15]. Frequently, a second facelift is done to correct this stigma of the facelifted appearance but the same lateral vector technique may enforce the undesirable appearance. The effective tightening of the SMAS, which has more longevity than the operated upper facelift tissues in facelift surgery, can create the "pull" of the lower face. Thus, many patients who have undergone two or three facelifts look progressively more distorted in spite of the best attempts by the surgeon to correct the earlier problems. It is for this reason that a composite facelift can be utilized as the best way to reverse the stigmata of previous facelift surgery [16]. While examining a patient with a "facelifted" appearance, superior-medial tension on the patients face with the examiner's fingers will correct this appearance (Fig. 42.11d). This strong tension will counter the tension of the lower face but the flap must include the orbicularis and malar fat to be effective. Because of the need for strong superior medial movement of the face on secondary-facelift patients, the forehead lift must be done otherwise there would be bunching of the tissue in the temporal area after movement of the orbicularis oculi muscle.

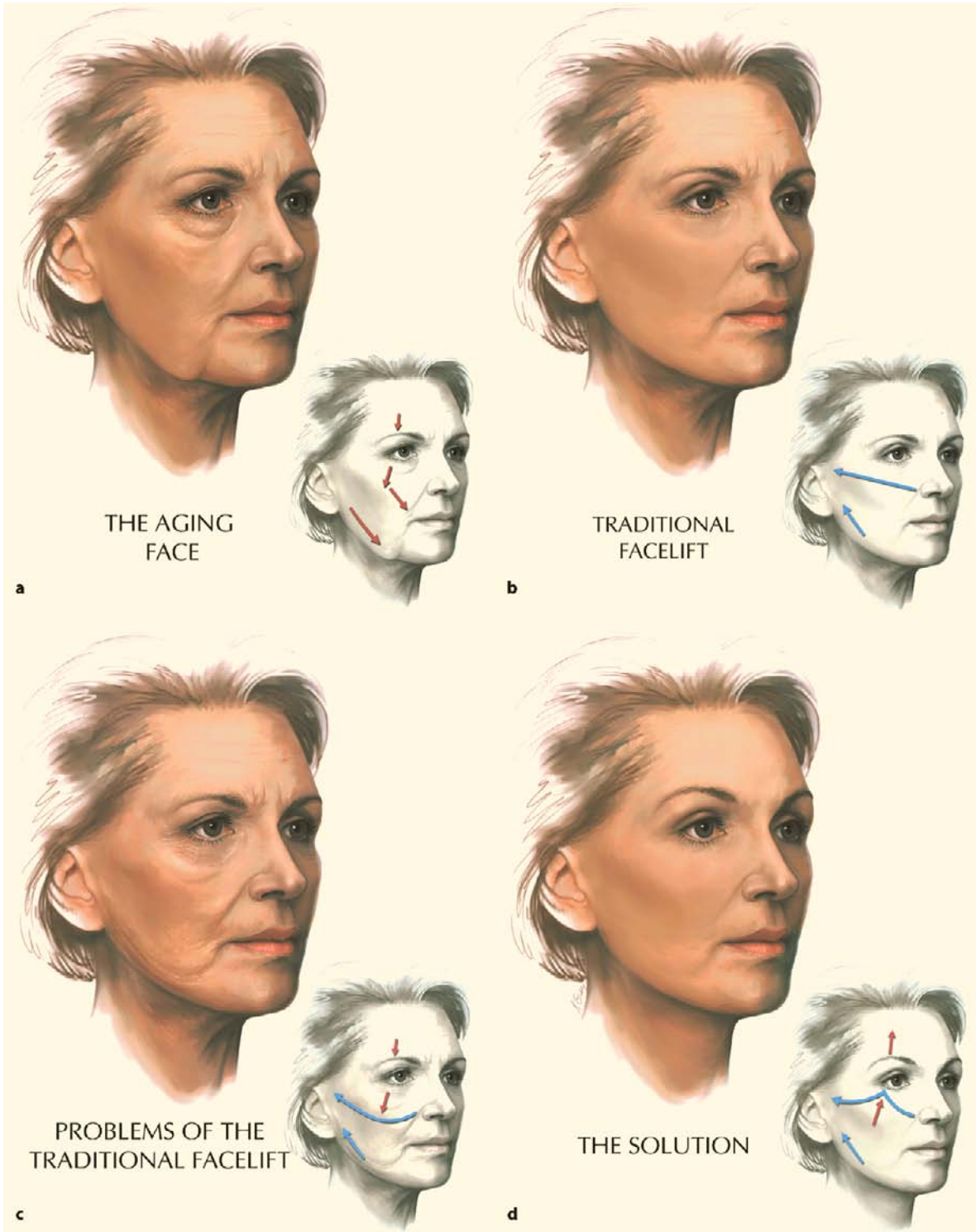

Fig. 42.11. **a** The aging face. *Arrows* demonstrate the normal gravitational direction of aging. **b** Traditional facelift. *Arrows* show the single direction of lift, toward the ear, of the traditional facelift. **c** Problems of the traditional facelift. Over time, the results of the traditional facelift begin to show signs of tension and pull. The lower pull (*short blue arrow*) stays tight, while the upper cheek (*long blue arrow*), which had only a horizontal lift, continues to fall. Areas typically not addressed by a traditional facelift (*red arrows*) continue to descend. **d** The solution. The composite facelift can correct unwanted results by lifting the muscle and fat of the cheek (*red arrows*) in the correct direction, toward the eye rather than toward the ear, which is the natural youthful position. (Courtesy S. Hamra, Dallas)

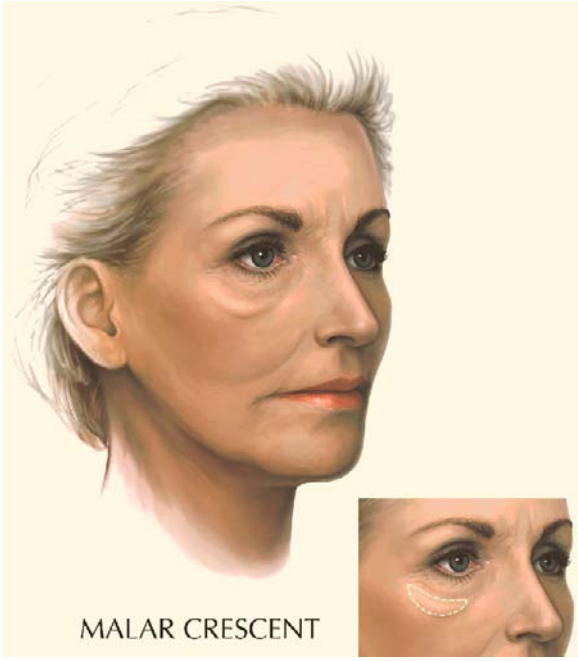

Fig. 42.12. Malar crescent. This crescent-shaped fullness corresponds to the lower eyelid muscle (orbicularis muscle) and occurs along the upper cheek area. Because the orbicularis muscle is not addressed in a traditional facelift, it appears more pronounced next to the hollowness created by the traditional lower-eyelid lift and the pull of the traditional facelift. (Courtesy of S. Hamra, Dallas)

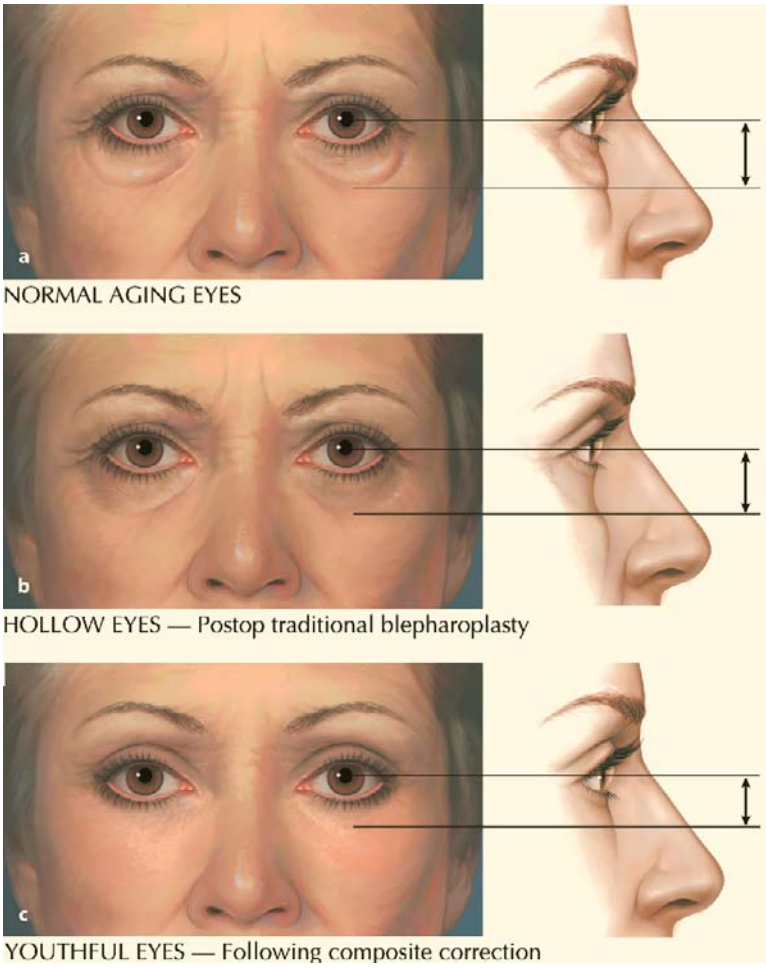

Fig. 42.13. **a** Normal aging eyes. Contours have become wider and deeper. **b** Hollow eyes. The area beneath the eye appears more concave or hollow than before. The soft-tissue diameter of the peri-orbit remains the same. **c** Youthful eyes. Narrow, shallow, youthful contours are restored with a compsite blepharoplasty. The diameter is narrowed. (Courtesy of S. Hamra, Dallas)

42.6 Stigmata of Previous Facelifts

42.6.1 The Lateral Sweep

The lateral sweep (Figs. 42.11c, 42.16) continues to be a postfacelift deformity which is most recognized by the lay public. This is an appearance seen frequently at affluent social gatherings since it is the affluent population of the USA that has undergone most facelift procedures. It is an appearance most often recognized by people and seen frequently by celebrities and is usually called the "pulled" look. It is an appearance that seems more obvious in patients with sun-damaged skin or excessive rhytids or in the direction of the rhytids and clearly delineates the lateral sweep deformity.

42.6.2 Malar Crescent

The malar crescent (Fig. 42.12) is an obvious topographical landmark that cannot be corrected without repositioning the total orbicularis oculi muscle. The malar crescent is the inferior portion of the orbicularis oculi muscle which is never moved in conventional facelift techniques. If it preexists, it will become more obvious after facelifts. Strong vectors created by malar fat procedures can create what appears to be a crescent that was not present prior to surgery. This deformity can be totally corrected by repositioning the orbicularis oculi muscle with the zygomaticus muscle.

42.6.3 Unoperated Forehead

In most facelift surgeries today, the forehead lift is not a consistent part of facial rejuvenation. Since many surgeons and many patients omit this procedure for various reasons, while a patient may undergo a subcutaneous facelift with minimal changes in their early 40s, it would be illogical to assume that the changes are long-lasting. If they are long-lasting then one would agree that the unoperated forehead will become more ptotic, thereby creating a disharmonious appearance in time. On the other hand, if the facelift is considered a "light" procedure with a short longevity, then the patient normally becomes disenchanted with the results which accomplish little of what was expected. Unfortunately, many patients have had an excessive amount of skin removed from the upper eyelid, making a forehead lift often impossible since eye closure would be a problem.

42.6.4 The Pulled Mouth

The pulled mouth appears frequently and is one of the most recognizable signs of surgery to the lay public. With continuing tension on the SMAS, the looser upper cheek tissues seem redundant compared with the very tight tension on the modiolus. Frequently one must release this tight SMAS when doing a secondary facelift.

42.6.5 Hollow Eyes

Because blepharoplasty is done frequently without facelifts and orbital fat is usually removed in standard conventional blepharoplasty, a more concave or hollow-appearing lower eyelid is commonly seen. If one examines typical photographs of pre-and postoperative patients who have undergone a blepharoplasty, either conjunctival or transcutaneous, there is never a postoperative difference in the vertical height of the lower eyelid compared with the preoperative diameter (Fig. 42.13). Laser blepharoplasty, which has become a highly marketed procedure in the last few years, has been promoted as a scarless procedure for peri-orbital rejuvenation; however, many problems are now seen owing to the indiscriminate removal of lower-eyelid fat and the inability to move the cheek in an upward position. The removal of the lower-eyelid fat creates a more concave appearance than before as the skin drops into this concavity and wrinkling may occur. It is for this that the surgeon uses laser techniques to remove the excessive wrinkling that was created by the transconjunctival fat removal. The surgeon then advocates a canthopexy to prevent the "round eye" appearance. If one examines the eyes of the patient when she/he was younger there is usually a convex lower eyelid with a very short vertical height of the lower eyelid. The idea of the surgery is to make youthful contours. It is easy to see why standard blepharoplasties may fail in rejuvenation and may in fact create an unfavorable result since the youthful lower eyelid is not only convex but has a shortened vertical height. One can apply the composite principles to create this. The proof that an arcus marginalis release and zygorbicular advancement is ideal for the primary patient can be seen when approaching the secondary hollow lower eyelid. In many cases the hollow lower eyelid from previous conventional bleparoplasty can be made or totally corrected and the unfavorable appearance can be totally negated by a secondary procedure. (Figs. 42.14–42.16) If the hollow lower eyelid can be corrected, one can only assume that this procedure as a primary procedure will prevent that patient from the ill effects that are possible with conventional blepahroplasty surgery. This repositioning

Fig. 42.14. This 52-year-old had a conventional blepharoplasty 4 years prior to correction with composite facelift and arcus release. Adequate fat was recruited from the subseptal area, to correct the hollow lower eyelid

Fig. 42.15. Correction of the hollow eyes created by a conventional blepharoplasty by composite rhytidectomy, coronal browlift and chin implant

Fig. 42.16. Correction of lateral sweep and hollow lower eyelids in this 62-year-old who had undergone conventional facelift, blepharoplasty and coronal browlift 6 years previous

of the fat and the septum is a permanent change and will give the patient a lifetime without any negative or unattractive appearance that was acquired after cosmetic surgery.

42.7 Summary

Because of the great demand in the last several years for aesthetic surgery and because of the impact of managed care in medicine in the USA, there have been many unforeseen changes. Managed care with its long-reaching problems has encouraged surgeons and doctors from other specialties to perform cosmetic procedures without adequate training. In addition, the need for marketing has sold the public on the advantage of short and simple procedures in facelifting that may allow only a few days of convalescence. With more public awareness of poor results, there appears to be less enthusiasm for facelift surgery as there has been a progressive drop in the number of facelifts in the USA for the past 50 years as compared with the increased popularity of breast implants, liposuction and other nonfacial techniques. Unfortunately the steeper learning curves for more sophisticated techniques make widespread use of these techniques impractical. However, surgeons with adequate facelift practices and experience can learn composite facelifting, which is a simple application of the principles of soft tissue surgery that most well-trained surgeons can easily perform. Suboptimal results following body contouring or breast surgery do exist but are usually guarded as a personal problem with no public awareness. The ability to create a harmonious and attractive result with composite facelifts may well be the ideal marketing tool since these unique results are obvious to the patient and others as well. A surgeon who learns composite facelifting will be served well by performing primary and secondary procedures since the composite facelift appears to be the only documented and published procedure that can correct problems created by conventional techniques. While facelift deformities are not the fault of the surgeon but are unintentional sequelae of older techniques, it is therefore the techniques which must be examined and changed. Composite rhytidectomy as a primary procedure will create a harmonious facial rejuvenation which will disallow the appearance of unwanted deformities.

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43 Double Ogee Facial Rejuvenation

Oscar M. Ramirez, Charles R. Volpe

43.1 Introduction

The subperiosteal techniques described by Tessier for the treatment of congenital craniofacial abnormalities revolutionized the treatment of the aging face. Close to a decade after suggesting that rejuvenation of the cheek and forehead could be accomplished in a subperiosteal plane, Tessier [1, 2] published his landmark paper, *Lifting facial sous-perioste*. Tessier advocated the subperiosteal approach as a method to treat early signs of aging in young and middle-aged patients. Psillakis [3] adopted the subperiosteal approach and refined the technique further. Subsequently, Ramirez [4] described a safer and more effective method of subperiosteal lifting. The latter two authors demonstrated that the subperisosteal facelift technique could be applied across the full spectrum of facial aging.

Despite the success of the subperiosteal approach, opponents of the technique voiced concern over the high rate of nerve injury and the protracted facial edema associated with this approach. The introduction of the endoscope in the treatment of facial rejuvenation ushered in a new era in aesthetic surgery. Treatment of the forehead could now be performed without the need for a bicoronal incision. The subperiosteal midface dissection with the endoscope resulted in reduced postoperative facial edema, minimal injury to the facial nerve branches, and improved aesthetic correction of the sagging cheek structures [5, 6]. Today, endoscopically assisted subperiosteal undermining of the upper, middle, and lower face can provide a means for repositioning the sagging facial soft tissues in addition to augmentation of the craniofacial skeleton. This approach, refined over the past decade [7–9], has come to be known as the "double ogee" rhytidectomy technique.

43.2 The Double Ogee

The youthful face, when viewed at an oblique angle, maintains a characteristic volume distribution of its soft tissues, previously described in the midface by an architectural ogee or single S-shaped curve [10]; however, on more precise examination, the entire contour the youthful face generates follows a double ogee or double sigma when analyzed in a three-quarter view. To view this reciprocal multicurvilinear line of beauty, the face must be viewed in an oblique position that allows visualization of both medial canthi. In this position, the youthful face demonstrates a characteristic convexity of the tail of the brow that flows into a concavity of the lateral orbital wall (the upper ogee). This is joined by the convexity of the upper midface that flows into the concavity of the lower midface (the lower ogee) (Fig. 43.1).

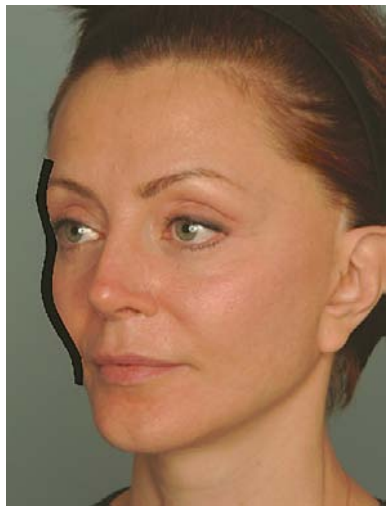

Fig. 43.1. The oblique position (three-quarter view) allows visualization of the "double ogee" outlined on this beautiful face. Note the convexity–concavity–convexity–concavity generated by the profile. Volumetric or three-dimensional facial rejuvenation can restore and accentuate this multicurvilinear line of beauty

The aging face characterized by (1) the development of rhytids secondary to collagen damage, (2) downward, gravitational migration of the soft tissues, and (3) atrophy of the facial fat and bony skeleton allows this youthful double ogee line to become distorted or lost. Rejuvenation of the aging face should address each of these characteristic features in an effort to restore volume and to recreate the reciprocal multicurvilinear line of beauty (the double ogee).

43.3 Indications for Double Ogee Facial Rejuvenation

Patients with considerable aging and ptosis of the central facial structures can benefit most from our endoscopic approach. The eyebrows, eyelid commissures, nasoglabellar soft tissues, nose, nasolabial folds, cheeks, angle of the mouth, and jowls are effectively treated with this approach. Tear trough deformities as well as deep infraorbital hollows can be corrected with the endoscopic techniques. The endoscopic forehead and midface procedures allow recreation of the double ogee that is associated with a youthful appearance.

Additionally, the endoscopic approach is quite effective for patients undergoing secondary or tertiary facelift procedures, for those patients requiring immediate skin resurfacing (e.g., deep chemical peel or carbon dioxide laser [11]), and for patients requiring soft-tissue augmentation via fat grafting. Patients who demonstrate skeletal and soft-tissue disproportion can benefit from endoscopic lifting techniques. The exposed bony structures can be augmented or reduced as needed. The authors recommend this approach in patients with alloplastic facial implants that require removal or exchange.

43.4 Double Ogee Facial Rejuvenation – a Volumetric Approach

Traditional rhytidectomy techniques provide rejuvenation of the aging face through oblique and lateral lifting or through vertical and superolateral lifting maneuvers. These standard techniques address rhytid formation and skin laxity but fail to address the volumetric "deflation" that is characteristic of facial aging. In addition, these two-dimensional or dual-vector techniques often give patients an exaggerated "windswept" or "operated" appearance. By contrast, our approach addresses the volumetric deficiencies associated with facial aging in addition to rhytid formation and skin laxity to provide a more natural three-dimensional rejuvenation of the face. This is accomplished by the addition of techniques developed to enhance the face in an anterior–posterior direction. Methods used to create this three-dimensional or volumetric rejuvenation include augmentation of the subcutaneous fatty layers, imbrication of facial soft tissues, repositioning of fat pockets as pedicle flaps, and/or augmentation of the skeletal framework with alloplastic implants (Fig. 43.2). The authors' approach to three-dimensional rejuvenation utilizes these methods individually or in combination. Proper

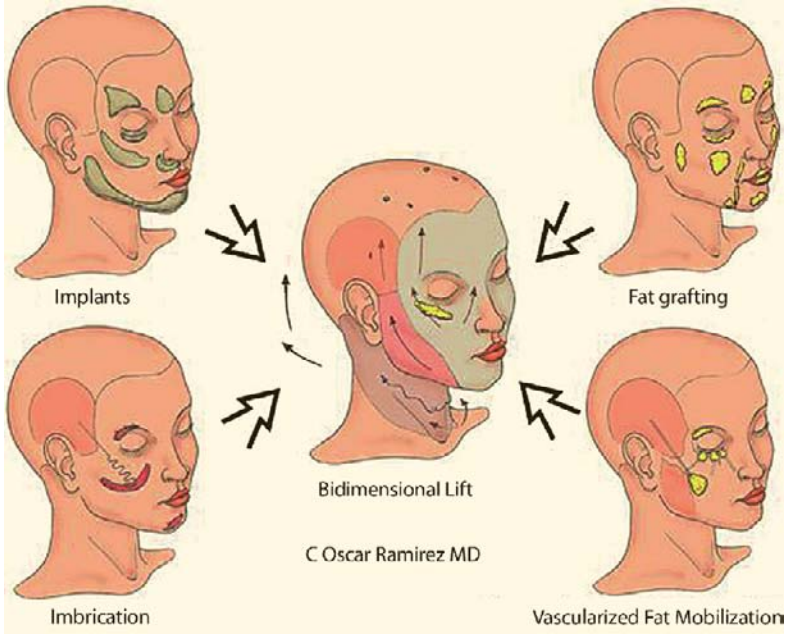

Fig. 43.2. The double ogee facial rejuvenation approach incorporates the selective use of soft-tissue imbrication techniques, vascularized fat pad mobilization, fat grafting techniques, and placement of alloplastic implants to the foundation of endoscopically based two-dimensional lifting techniques. This provides a true three-dimensional or volumetric facial rejuvenation. (From Ramirez [17], used with permission from Springer-Verlag, Berlin Heidelberg New York)

preoperative diagnosis of the aesthetic deficiencies, whether skeletal and/or soft tissue, will determine the most effective plan to achieve excellent results. Common sense dictates that restoration of deficient structures with similar tissues will provide the most natural and long-lasting result.

43.5 The Endoscopic Double Ogee Facelift – Surgical Technique

43.5.1 Endoforehead Procedure

The endoscopic forehead procedure involves the placement of four incisions in the scalp (Fig. 43.3). The first two incisions are located approximately 2.0 cm on either side of the midline, 1.0–2.0 cm posterior to the hairline. For patients with excessively long foreheads (more than 8 cm), these paramedian incisions are placed directly at the hairline. It is important to keep the forehead incisions as anterior as possible. Otherwise, visualization and dissection in the glabellar region will be compromised. The next set of incisions is located in the temple region, bilaterally, 2.0 cm posterior to the hairline. The incisions should be directed parallel to the hair follicles to prevent unnecessary alopecia, postoperatively. Each incision should measure 1.5 cm in length.

Prior to surgical dissection, local anesthesia using 50 ml of 0.5% lidocaine with 1:200,000 epinehphrine is diffusely distributed in both a subcutaneous and a subperiosteal fashion. Early administration of the anesthetic will provide maximal hemostasis required during endoscopic visualization.

To better understand the operative procedure, the forehead is divided into four zones (Fig. 43.4). Zones 2 and 3 can be safely dissected in a "blind" fashion without the use of the endoscope. Owing to the vital neurovascular structures located in zones 1 and 4, dissection in these zones requires the use of the endoscope at all times.

The endoscopic procedure begins through the incision in the temporal area, designated zone 1. A 1 cm incision is made through the skin and subcutaneous tissue, deep to the superficial temporal fascia. Dissection continues inferiorly, remaining above the intermediate temporal fascia. The initial dissection can be performed blindly in a circumferential fashion for approximately 1–2 cm. With the tissues elevated, a silastic port protector is inserted and the remainder of the dissection is performed under endoscopic control.

An elevator is used to dissect to the temporal line of fusion superiorly. The elevator is then used to score and elevate the periosteum 1.0 cm medial to the temporal line of fusion. This is continued superiorly through zones 2, 3, and 4 respectively. This dissection will aid in the connection of the temporal and frontal

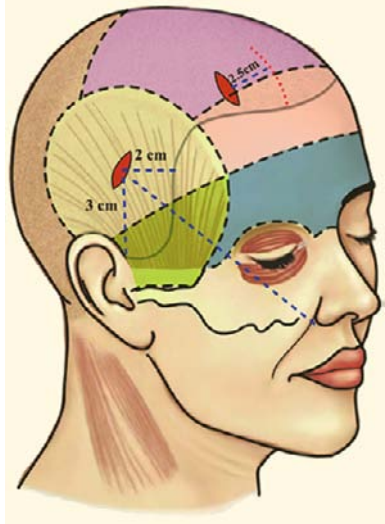

Fig. 43.3. Proper location of the endoscopic incisions. The forehead incisions should be located 1–2 cm away from the hairline (*gray line*), approximately 2.5 cm off the midline, bilaterally. The temporal incisions are situated 2 cm posterior to the hairline and 3 cm cephalad to the root of the helix (ear). Proper positioning of the temporal incision will fall along an imaginary line directed from the lateral nasal ala through the lateral canthus as shown

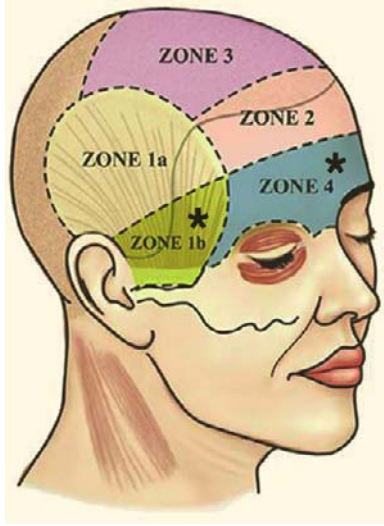

Fig. 43.4. The proposed zones of dissection encountered during the endoscopic forehead and midface procedures. Zones *1a* and *1b* are dissected during the endoscopic midface procedure. Zones *2*, *3*, and *4* are dissected during the endoscopic forehead procedure. The *asterisks* signify zones where strict endoscopic visualization is mandatory

pockets, later in the procedure. Dissection continues from the temporal incision in an inferior and medial direction around the lateral orbital rim. During the course of this dissection, several temporal veins will come into view. Temporal vein no. 1, situated in the region of the zygomaticofrontal suture, is usually sacrificed. Temporal vein no. 2 is encountered while dissecting toward the zygomatic arch. Branches of the zygomaticotemporal nerve may be identified during this dissection. Both temporal vein no. 2 and the branches of the zygomaticotemporal nerve should be preserved when possible. Preservation of these structures is facilitated with a rounded, blunt-tip elevator. As the procedure progresses inferiorly, the dissection plane moves from the temporal fascia proper to the intermediate temporal fascia. The intermediate temporal fat pad will be visualized through the thin intermediate temporal fascia. Dissection along the lateral orbital wall progresses inferiorly to the level of the lateral canthus. This completes the lateral dissection of the endoforehead procedure.

The paramedian incisions are then made as previously described and are carried down through the periosteum. Dissection in zones 2 and 3 can be performed with a blind sweeping technique, as long as the dissection remains in a subperiosteal plane. The endoscope is inserted during dissection in zone 4. In general, zone 4 begins about 3 cm cephalad to the superior orbital rims. Endoscopically assisted dissection should always be performed in zone 4. The initial dissection proceeds toward the lateral aspect of the superior orbital rim. Further dissection laterally toward the temporal line of fusion will allow connection of zones 1 and 4. The dissection then proceeds in a medial direction along the superior orbital rim. Cautious dissection in this area is mandatory given that the authors have noted considerable variation in the supraorbital nerve anatomy.

Occasionally, an accessory branch of the supraorbital nerve can be identified as far as 3.0 cm superior and lateral to the supraorbital nerve proper. Every effort should be made to preserve any accessory nerve branch. After identification of the supraorbital nerve, dissection continues medially, exposing the origins of the corrugator muscles. The supratrochlear nerve travels in the substance of the corrugator muscles, so careful elevation of the corrugators is required. Typically, three fascicles of the supratrochlear nerve are identified and preserved. Prior to resection of the corrugator muscle, the periosteum of the superior orbital rim is released with a curved elevator. The periosteum should be released from the zygomaticofrontal suture line laterally moving medially toward the glabella. In patients with heavy tissues, especially men, the periosteum is released by cutting it with endoscopic scissors. With the periosteum cut medially, the supratrochlear nerve and corrugator muscles are clearly delineated.

The corrugator muscle is extensively resected from its point of origin to just beyond the supraorbital nerve. We prefer to resect approximately 80% of the corrugator muscle to assure that glabellar frown lines are eliminated. Once the corrugator has been removed, the depressor supercilii muscle can occasionally be identified. Resection of the depressor supercilii muscle is indicated if medial brow ptosis is present. An endoscopic scissor then is used to divide the periosteum deep to the procerus muscle. The procerus muscle is resected after being thoroughly exposed. Resection of the procerus muscle should proceed down to the level of the nasoglabellar angle. Occasionally, bleeding will occur during procerus resection. Given the superficial location of the dissection, care must be taken when using cautery in this area. Overzealous cauterization in this location can lead to disastrous consequences (i.e., burning of the skin). When the muscle resection is complete, the area is packed with epinephrine-soaked pledgets. Attention is then directed back to the temporal region where the endoscopic midface lift is started at this point.

Completion of the endoscopic forehead procedure with drain placement, incision closure, and elevation and fixation of the brow proceeds after completion of the endoscopic midface suspension. Briefly, two suction drains are placed through separate stab incisions in the scalp, adjacent to the paramedian access ports. An endoscopic biter is used to direct the tips of the drains to the level of the glabella and the anterior forehead. Each drain is secured with a heavy drain stitch. The paramedian incisions are closed in two layers. A blunt traction hook is then used to elevate the scalp and to position the brow. When proper brow position is obtained, a small stab incision is made in the scalp, with a no. 11 scalpel. A 1.1 mm drill bit with a 4 mm stop is inserted through the stab incision and a unicortical hole is drilled in the calvarium. A 1.5 mm titanium post (Synthes, Paoli, PA, USA) is then placed in the drill hole. In most cases, two paramedian posts (one on each side) are sufficient to maintain the proper brow position. Proper location of the posts will have a significant impact on brow position. Under most circumstances, post placement corresponds to a superomedial axis from the lateral brow. This will provide maximal elevation of the lateral brow. More central post placement is chosen for patients requiring greater elevation of the central and medial brow. Excessive elevation and asymmetric elevation of the brows should be avoided at all costs. The surprised and inquisitive appearances, respectively, that result are poorly tolerated and cosmetically unacceptable.

43.5.2
Endoscopic Midface Procedure

The endoscopic midface procedure begins with the temporal dissection in zone 1, as outlined in the previous section. Temporal vein no. 2 (sentinel vein), temporal vein no. 3, and, the zygomaticotemporal nerves are preserved when possible. The dissection continues in an anterior and inferior direction, remaining above the intermediate temporal fascia. This continues down to the level of the zygomatic arch. The zygomatic arch is entered immediately at the superior border of the arch. The endoscopic visualization allows precise identification of the intermediate temporal fascia, thus exposing the periosteum of the zygomatic arch. The authors prefer elevation of the anterior two thirds of the zygomatic arch periosteum because it enables greater lifting and redistribution of the midface soft tissues. The periosteum of the entire zygomatic arch is elevated when soft tissues lateral to the cheek need to be elevated. Surgeon comfort with the dissection over the zygomatic arch is associated with a significant learning curve. We have found that communication of the midface and temporal dissections is accelerated with pre-elevation of the zygomatic arch, or at least the superior border of the arch.

The midface dissection at this point continues through an intraoral (upper buccal sulcus) incision. The authors' preferred incision is perpendicular to the alveolar ridge (vertical) at the level of the first premolar. We find that the vertically oriented incision preserves the mucosal integrity at the alveolar ridge, allowing a rapid, watertight closure that is associated with fewer complications. Under direct visualization, the initial subperiosteal dissection of the maxilla and malar area is performed. The endoscope is used for the upper malar dissection. The use of the endoscope minimizes trauma to the midface structures caused by excessive traction. The endoscope is most useful during periosteal elevation along the lateral half of the zygoma body, its extension underneath the fascia of the masseter muscle, and the anterior two thirds of the zygomatic arch. The upper (medial) portion of the masseter tendon is also elevated from the zygoma. Endoscopic visualization assists in the preservation of the zygomaticofacial nerve.

Dissection continues along the inferior and lateral orbital rim and continues toward the superior border of the zygomatic arch. Skeletonization of the infraorbital nerve is not necessary under most circumstances.

With the initial midface dissection now complete, the endoscope is returned to the temporal area. An assistant elevates the soft tissue of the midface, thus allowing the surgeon to safely connect the temporal and midface dissection pockets under endoscopic control. Gentle elevation during this step protects the frontal branch of the facial nerve from injury. With wide communication of the temporal and midface pockets, the endoscope is returned through the upper buccal sulcus incision.

The inferior orbital rim is dissected further by elevating the inferior arcus marginalis. A 4-0 PDS suture (Ethicon, USA), introduced endoscopically, is used to imbricate the medial suborbicularis oculi fat (SOOF) to the lateral aspect of the inferior arcus marginalis. It is important to check eye globe mobility at this point with a forced duction test because improper placement of this imbricating suture can trap or place traction upon the inferior oblique muscle.

The lateral aspect of the SOOF is then grasped with a 3-0 PDS suture, providing the first of three suspension sutures (Fig. 43.5). Both ends of this suture are then passed through the temporal incision, under endoscopic guidance. We find it helpful to tag the suture ends with a labeled needle driver. This allows

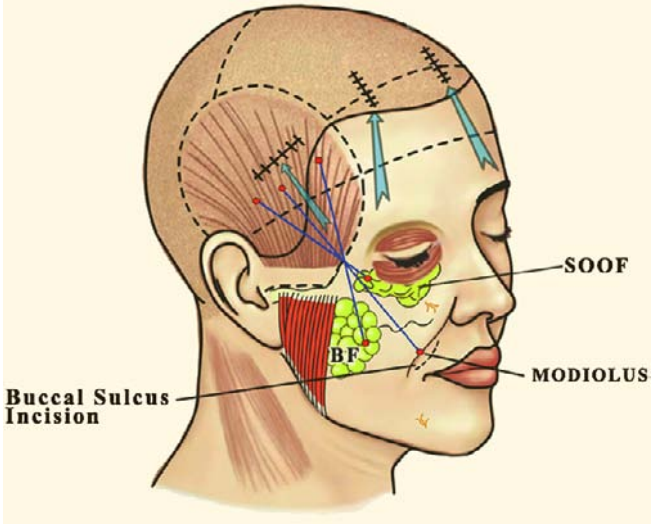

Fig. 43.5. The suspension suture locations and vectors of pull generated with the endoscopic midface technique. Note that the three suspension sutures are initially placed transorally through a gingival buccal sulcus incision and are directed individually to the temporal dissection pocket under endoscopic guidance. *BF* Bichat's fat pad, *SOOF* suborbicularis oculi fat pad

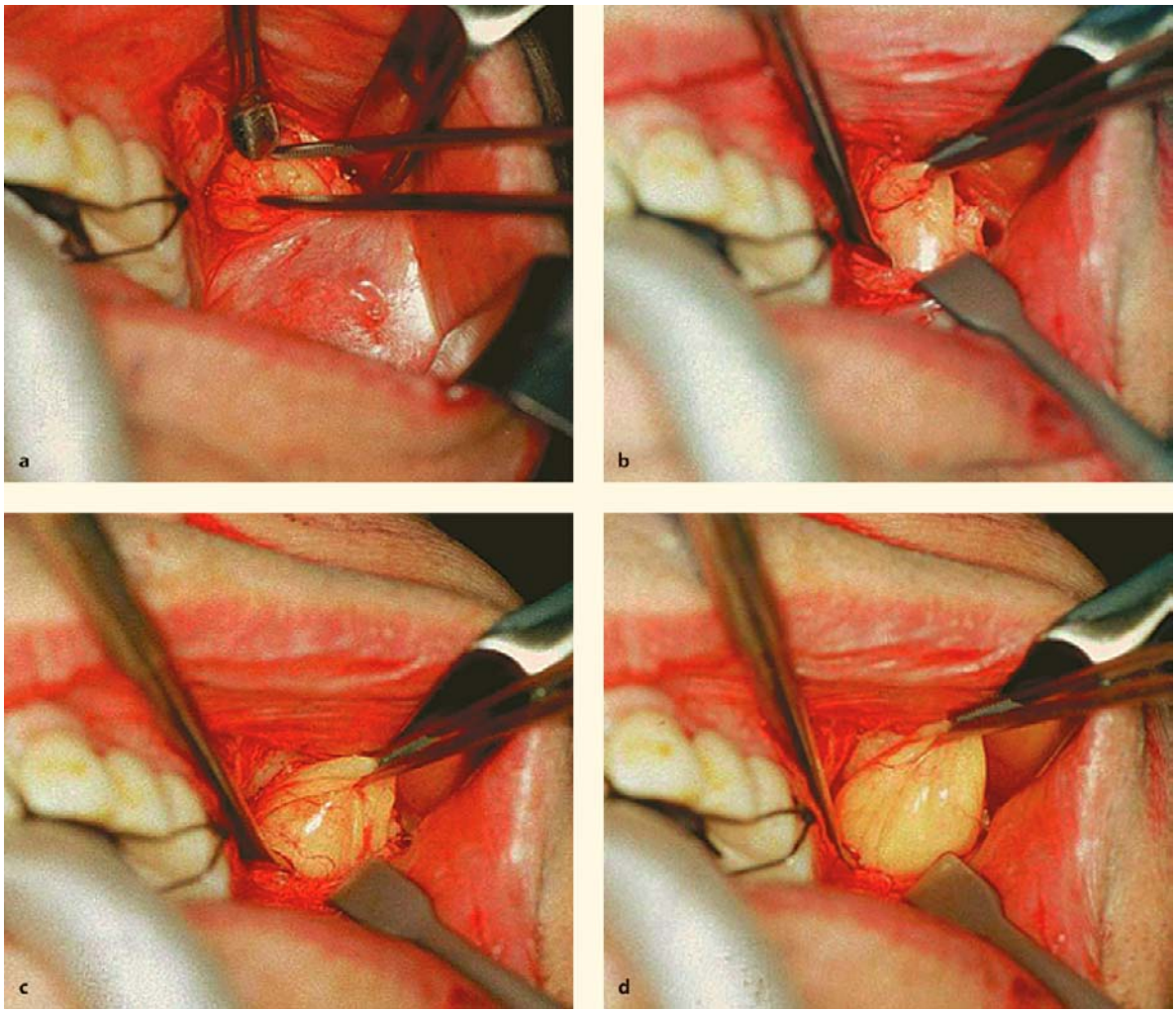

Fig. 43.6. Delivery of Bichat's fat pad. **a** The fat pad herniates through the spread periosteum and buccinator muscle. **b** Gentle dissection with a blunt dissector mobilizes the fat pad. **c** The fat pad is then gently teased from the buccal space with forceps. **d** Continued gentle traction and concomitant blunt dissection will assist the full delivery of the fat pad

the surgeon to keep track of each suspension suture. The second suspension suture is the cheek imbrication, or "modiolus" suture. This suture is placed into the tenuous fascia and fat of the inferior maxillary soft tissue near the upper buccal sulcus incision. Both ends of this suture are then directed through the temporal incision and tagged, as previously described.

Exposure of Bichat's fat pad follows the placement of the last suspension suture. Bichat's fat pad is approached through the superomedial wall of the buccal space. The periosteum and buccinator muscle are spread with the use of a blunt dissector. This allows Bichat's fat pad to herniate through maintaining an intact capsular fascia (Fig. 43.6). The fat pad should be carefully dissected free from the wall of the buccal space. Bichat's fat pad should be easily movable for repositioning as a pedicle flap. A 4-0 PDS suture is then woven into the fat pad and the suture ends are delivered to the temporal area, similar to the previous suspension sutures. The endoscope should be used to visualize the delivery of the pedicled fat flap over the malar bone. The endoscope can also assess the trajectory of the suspensions sutures. It is important to avoid crisscrossing the suspension sutures as they are passed to the temporal area.

Each of the suspension sutures is then secured to the temporal fascia proper, in ordered fashion. The sutures should be placed in the temporal fascia proper, below the level of the temporal incision. The first suture, the Bichat's pad fat suspension, should be placed most medially. The inferior malar fascia and fat or modiolus suture is placed next, in a more lateral location of the temporal fascia proper. The most lateral suture, the suborbicularis oculi suture, is the last

Fig. 43.7. Preoperative (*left*) and postoperative (*right*) views of a 46-year-old female patient exhibiting signs of early facial aging. The preoperative image demonstrates evidence of frontalis muscle hyperfunction in conjunction with "normal" brow position and upper eyelid pseudoptosis. The patient was treated with a full endoscopic forehead and midface double ogee facial rejuvenation, along with bilateral lower lid blepharoplasty. Note the relaxed forehead and improved upper-lid position that results from correction of the true brow ptosis

Fig. 43.8. Preoperative (*left*) and postoperative (*right*) oblique or three-quarter views of the 46-year-old patient shown in Fig. 43.7. The preoperative view clearly shows the flattened midface associated with facial aging. Restoration of midfacial volume gives the patient a youthful, rejuvenated appearance. The double ogee is clearly defined in the postoperative result

Fig. 43.9. A youthful photograph of the patient from Fig. 43.7 and 43.88 taken during her early 20s. Compare this view with her postoperative results. Considerable rejuvenation can be achieved with the double ogee technique

Fig. 43.10. Preoperative (*left*) and postoperative (*right*) views of a 42-year-old female patient who underwent endoscopic forehead and midface rejuvenation in conjunction with bilateral upper and lower blepharoplasties. The preoperative view demonstrates subtle flattening of the brows, glabellar frown lines, and moderate midface soft-tissue decent. The postoperative result shows improved brow shape, smoothing of the glabellar rhytids, and improved midface soft-tissue volume

Fig. 43.11. Preoperative (*left*) and postoperative (*right*) three-quarter views of the 42-year-old patient shown in Fig. 43.10. Moderate brow ptosis with lateral hooding can be seen in this oblique view. Improved brow and cheek soft-tissue position accentuate the double ogee in the postoperative view

to be anchored to the temporal fascia proper. This completes the suspension of the midface.

Butterfly drains are placed bilaterally through separate stab incisions in the temporal scalp. Each drain is carefully directed into the midface and secured to the temporal scalp with a suture. The superficial temporal fascia is then anchored to the temporal fascia proper with two 4-0 PDS sutures, while an assistant provides superomedial traction to the advanced scalp. The intraoral incisions are then closed with interrupted 4-0 chromic catgut sutures. The butterfly drains are placed to gentle suction at the completion of the operative procedure. The drains are typically maintained for 48–72 h postoperatively. Figures 43.7–43.11 provide several patient examples demonstrating the rejuvenative capacity of the volumetric double ogee rhytidectomy technique.

43.5.3 Bichat's Fat Pad Excision

There are a subset of patients who present for facial rejuvenation that demonstrate chubby cheeks, significant bulk, and pseudoherniation of Bichat's fat pad, and good malar bone support. These patients benefit from excision of Bichat's fat pad rather than suspension. Dissection of the fat pad proceeds as previously outlined; however, care must be taken during resection of the fat pad. Undue traction of the fat pad can result in injury to neurovascular structures and/or Stensen's duct. Meticulous hemostasis should be obtained and can be facilitated by the use of bipolar cautery during Bichat's fat pad excision.

43.5.4 Fat Grafting

Structural fat grafting provides an excellent means for treating residual facial asymmetries or contour irregularities [12]. Deep residual creases, such as exaggerated nasolabial folds and marionette lines, can be effectively treated with the subcutaneous placement of harvested fat grafts. The fat grafts are typically obtained from the lower abdomen through a small midline, infraumbilical incision following administration of a standardized tumescent solution. Specialized harvesting cannulas have been developed to allow easy collection of graft material. If the abdomen demonstrates a paucity of fat, grafts should be harvested from alternative locations. Alternative locations for graft harvest include the hips, medial thighs, or posteromedial knee region. Because fat grafts are placed in a subcutaneous plane, the grafts can be safely placed in patients undergoing concomitant subperiosteal or double ogee rhytidectomy. We find this approach advantageous toward the final aesthetic outcome.

43.5.5 Alloplastic Implants

Occasionally, the desired multicurvilinear line of beauty (double ogee) cannot be achieved solely with the volume-enhancing soft-tissue techniques described earlier in the chapter. Under these circumstances, alloplastic augmentation of the craniofacial skeleton should be considered. A variety of alloplastic facial implants are currently available that allow correction of residual volume deficiencies. Rubber polysiloxane (silicone) and high-density porous polyethylene implants are currently the most common alloplastic materials available for facial augmentation procedures.

Solid silicone implants are manufactured in a wide variety of shapes and sizes. The implants are soft and pliable and can be inserted with ease. However, the smooth surface of silicone implants does not permit vascular or soft-tissue in-growth. Fibrous tissue encapsulation is characteristic of solid silicone implants. Morbidity related to silicone implants includes infection, extrusion, and displacement, as well as bone erosion by the implants [13]. The process of encapsulation makes removal of silicone implants technically less challenging when necessary.

High-density porous polyethylene implants such as Medpor (Porex Surgical, Newnan, GA, USA) are also manufactured in a variety of shapes and sizes. (Fig. 43.12). In contrast to silicone, the porous nature of these implants allows in-growth of both soft tissue and bone [14]. The morbidity related to porous polyethylene implants includes infection, extrusion, and seroma formation. The incorporation of the polyethylene implant into native tissue accounts for a significantly lower risk of infection and extrusion compared with the risks with silicone implants [15]. However, morbidity can be significantly increased when removal of porous polyethylene implants is necessary. Bone and fibrous tissue in-growth can make implant removal a formidable task. Patients must be informed of these characteristics when considering alloplastic facial augmentation with porous polyethylene im-

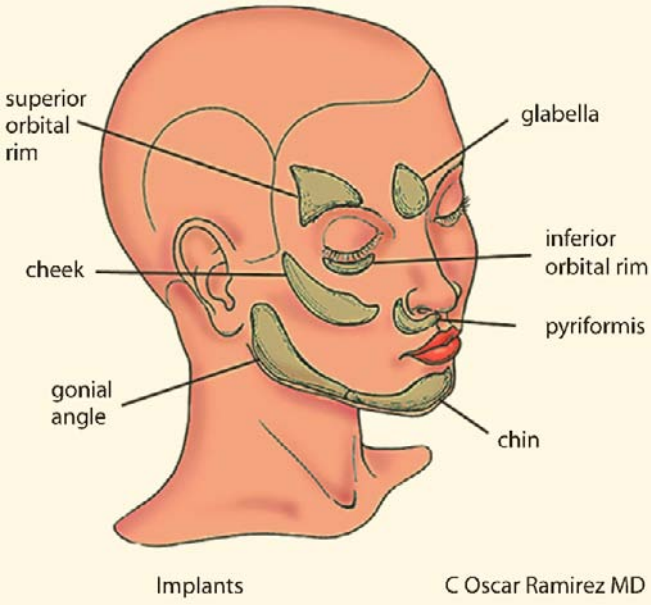

Fig. 43.12. Alloplastic implants have been developed in a variety of anatomic shapes that can be placed to enhance the facial contour. In patients with deficient skeletal features, superior orbital rim and cheek implants can be used to recreate the multicurvilinear line of beauty

plants. We prefer to use porous polyethylene implants based on the aforementioned characteristics in addition to the fact that the implants can be easily shaped (by scalpel) to fit anatomic skeletal variations. We have used preformed porous polyethylene implants along the superolateral orbital rim and/or the malar area to create the optimal convexities of the double ogee when soft-tissue augmentation alone is insufficient. (Fig. 43.13). Placement of mandibular angle and chin implants is also considered, selectively, to maintain an aesthetic balance between the upper two thirds and the lower third of the face. Use of the superolateral orbital rim implant is demonstrated in the patient example shown in Figs. 43.14 and 43.15.

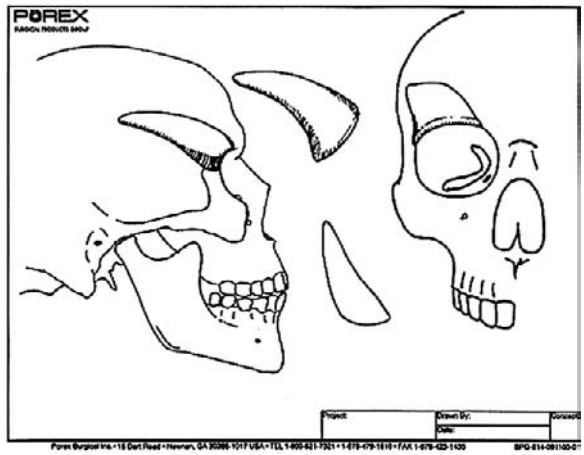

Fig. 43.13. The porous polyethylene superior orbital rim implant designed by Porex Surgical (Newnan, GA, USA). The implant can be placed and secured through a standard upper blepharoplasty incision

Fig. 43.14. The 50-year-old patient shown here demonstrates bitemporal narrowing of the forehead and superior orbital rim deficiency resulting in an aged, emaciated appearance. Preoperative view shown at *top*. The *lower* (postoperative) image was taken 3 months after endoscopic forehead procedure, upper and lower blepharoplasty, and placement of bilateral MedPor superolateral orbital rim implants. The implants were placed through the upper blepharoplasty incisions. Note the improved contour of the lateral forehead. Improved brow position and smoothing of glabellar frown lines are also evident

Fig. 43.15. Oblique or three-quarter views of the 50-year-old patient shown in Fig. 43.14. Preoperative view (*upper*) and postoperative view (*lower*) are shown. Again, the brow position and shape are improved with the endoscopic forehead procedure and the contour of the lateral brow and forehead is improved

43.6 Complications

Complications related to the endoscopic subperiosteal facelift procedures include nerve injury, hematoma, and infection. Nerve injury is typically seen with excessive traction during endoscopic manipulation. Among our patients, neuropraxia of the frontal branch of the facial nerve occurred in 0.4% of patients. Neuropraxia of the zygomaticus branch of the facial nerve and the infraorbital nerve occurred in 0.2 and 0.4% of patients, respectively [16]. No permanent injury to motor nerves has been seen to date.

Hematoma and infection can be minimized with meticulous operative technique and adequate irrigation of the subperiosteal pockets with antibiotic solution prior to closure. Hematoma has been seen in a single patient, on postoperative day 4. This late presentation occurred secondary to an acute hypertensive episode. The hematoma was drained and the patient recovered uneventfully. Infection has been seen in one patient undergoing an endoscopic facelift procedure. The patient complained of severe pain in the cheek, 10 days postoperatively. Fluctuance of the cheek mound and tenderness was noted. Incision and drainage of the collection resulted in resolution of the infection without further sequelae.

43.7 Soft-Tissue Response to Suture Suspension in the Midface

The structural foundation of the double ogee facial rejuvenation technique is formed by the series of suspension sutures placed in the midfacial soft tissues during the endoscopic midface procedure. These suspension sutures can provide elevation, imbrication, and increased volume (anterior–posterior projection) to the midfacial soft tissue, and/or obliteration of the tear trough deformity. The graded effect that each suspension suture provides to the midface is summarized in Table 43.1. The modiolus suspension suture primarily provides imbrication of the cheek soft tissues and secondarily contributes to elevation and volumetric enhancement of the midface. Bichat's fat pad repositioning (suture) primarily provides volumetric enhancement with secondary elevation of the cheek mass. The medial SOOF suspension suture functions to obliterate the tear trough deformity and exerts a secondary effect on cheek elevation and volumetric enhancement. The upper lateral SOOF suture allows significant elevation, imbrication, and volumetric increase in the cheek soft-tissue mass. It also functions to obliterate the tear trough deformity. The lower SOOF suture provides primary imbrication of the cheek mass with concomitant elevation and volume increase. The lower SOOF suture exerts little to no effect on tear trough obliteration.

43.8 Summary

The endoscope now allows extensive subperiosteal undermining of facial soft tissue through minimal-access incisions. Improved understanding of facial anatomy and the facial aging process now allow surgeons to reposition and remodel the soft-tissue envelope with excellent aesthetic results. Restoration of facial volume following the multicurvilinear line of beauty or double ogee line can be achieved with the endoscopic subperiosteal techniques described in this chapter. Further aesthetic refinement with Bichat's fat

EFFECT	MODIOLUS	BICHAT'S	MEDIAL SOOF	UPPER LATERAL SOOF	LOWER SOOF
ELEVATION	++	++	++	+++	+++
IMBRICATION	+++	o	o	+++	++++
VOLUMETRIC	++	++++	++	+++	+++
TEAR TROUGH	o	o	++++	++	o / +

Table 43.1. Midface soft-tissue manipulation (*SOOF* suborbicularis oculi fat)

pad excision, fat grafting, or the use of alloplastic implants can be achieved in select patients. Overall, the double ogee facial rejuvenation technique can be applied to the full spectrum of patients with lasting results.

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44 The SACS, ESP and Prehairline-Terrace Lifting

Christoph Wolfensberger

44.1 Introduction

The author's concept and strategy in facial rejuvenation can be summarized as follows. Facial contouring means an even distribution of volume. Tightening has been replaced by repositioning, distributing, balancing, reducing and/or replacing volumes according to the requirements of each facial area. The direction of repositioning is mainly vertical:

1. Endoforehead to raise the brows and the upper third of the face.
2. Vertical subperiosteal midface advancement to elevate the cheek mound.
3. Balancing the volumes of the lower face, jawline and neck by undermining in the deep subcutaneous (supra-superficial musculo-aponeurotic system, supra-SMAS) level, flap advancement in a vertical direction through the prehairline periauricular incision (the postauricular flap is a rotation flap), liposuction in the submental and submandibular area to mold the cervicomental angle and reduce the jowls, and fatgrafting for replacing volumes perioral and nasolabial.

Flap undermining of the SMAS layer is avoided in favor of plications or SMAS-ectomies.

The difficult neck with prominent platysma bands can be approached by the Feldman platysmaplasty with a corsetlike suturing in the midline [7].

All these procedures can be combined and will interact to reestablish facial harmony in contours, volumes and skin surface. Ancillary procedures such as laser skin resurfacing, dermabrasion and chemical peels will contribute to improve the skin texture.

The primary purpose of a classic face–neck contouring is to reestablish a clean jawline with repositioning of sagging volumes. Jowling is the main concern of most patients. To get rid of the *Hamsterbacken* – the German expression for "jowls" – and the sunken skin of the neck and below the chin, with a natural result without looking tight or pulled, is the most frequent motivation for undergoing a facelift procedure. The numerous methods described in the past 20 years are focussed on the following requirements of a facelift procedure (Table 44.1):

Table 44.1. Operative techniques of cervicofacial rhytidectomies rebalancing volumes

Reduction:	
Submandibular	Liposuction
Submental	
Jowls (partially)	
Reposition:	
Malar	"ESP"/SACS lifting
Midcheek	Subperiostal vertical
Jowls (partially)	midface advancement
Augmentation:	
Perioral	Lipostructure
Lips	Fatgrafting
Nasolabial (fold)	
Chin ("marionette fold")	
Infraorbital ("tear trough")	

ESP extended supraplatysmal plane, *SACS* superficial adipocutaneous system

- Volume displacement of skin and underlying structures by gravitation should be reversed by repositioning, redraping and evenly redistributing sagging tissues without ending up with a tight-looking face.
- The nasolabial fold should be flattened, the jowls should disappear in favor of a clean jawline and a regular cervicomental angle.
- The sunken malar fat pad should be repositioned higher up.
- The neck should be rejuvenated, no submental lipomas (double chin) and no platysma bands should be visible any more.
- The result should be natural-looking, stigmata of the so-called facelifted or surgical look should be avoided:
- No displacement or recession of the temporal hairline, no tight look with diagonal tension on the cheeks and no distortion of the earlobes or flattening of the tragus should occur.

Beauty does not mean tightness but even distribution of facial contours and volumes; therefore the surgeon has to correct the anatomical structures responsible for that even surface: the skin and the underlying fat, the subcutaneous tissue and the various fat pads of the face.

Gently mobilizing and redraping these anatomical structures instead of pulling on the skin became the concept of modern volumetric rhytidectomy techniques. Reconstructing facial harmony by repositioning and redistribution of volumes is the main challenge of today's facial rejuvenation surgery.

What does "volume" mean in facial anatomy? Its primary aspect is the bony support, namely, the malar eminence, the mandibular arch and the chin.

Volume of the overlaying soft tissues is provided by the fatty tissue, the subcutaneous fat layer distributed all over the face and neck area, and the different "concentrations" of fat, namely, the malar fat pad, the midfacial fat with the nasolabial pouch and the buccal (Bichat's) fat. Laxity, downwards sliding and dysbalance of distribution with aging leads to jowling, thickening above the nasolabial fold and double-chin formation.

In addition to that, facial harmony is disturbed by loss of volume in the perioral and periorbital region.

Faces look unattractive, tired and negative not primarily because of wrinkles – that is a widespread error – but because of losing the balance of facial volumes.

44.2 Volumetric Maneuvers Below the Jawline: Fine Tunneling and Superficial Liposuction

In the late 30s or early 40s with the beginning of the early stage of jowling, a wide soft-tissue undermining is not yet required. A detachment in the deep subcutaneous layer limited to the midcheeck and the lateral third of the neck combined with a submandibular and submental superficial liposuction [9] will provide a regular clean jawline with flattening down of the jowls (Figs. 44.1).

The surgery is performed under general anesthesia with intravenous Propofol, the headrest allowing a smooth turning of the head to the left and the right side. The tumescence is performed with the following liquid: 250 ml Ringer's lactate, 10 ml 1% Xylocaine, 0.5 mg adrenaline, 60–80 ml each side infiltrated to the cheek/submandibular/submental area before liposuction (Fig. 44.2).

The periauricular incision and partial undermining and infiltration of the cheek–neck area proceeds with the introduction of a 2 mm liposuction cannula for in the submental and submandibular region (Fig. 44.3). The fine tunneling of the neck below the jawline and of the submental area has a contouring effect in addition to the required reduction of volume (Fig. 44.4).

Fig. 44.1. A 42-year-old patient with unpleasant lower face jowling compared with a juvenile upper face. Result 3 weeks after face–neck contouring from a periauricular access up to the midcheek and the lateral third of the neck with undermining in the subcutaneous layer combined with a superficial liposuction of the submandibular and submental area. A perioral microfat-grafting including the nasolabial, upper lip, angle of the mouth and vermilion area has completed the facial rejuvenation

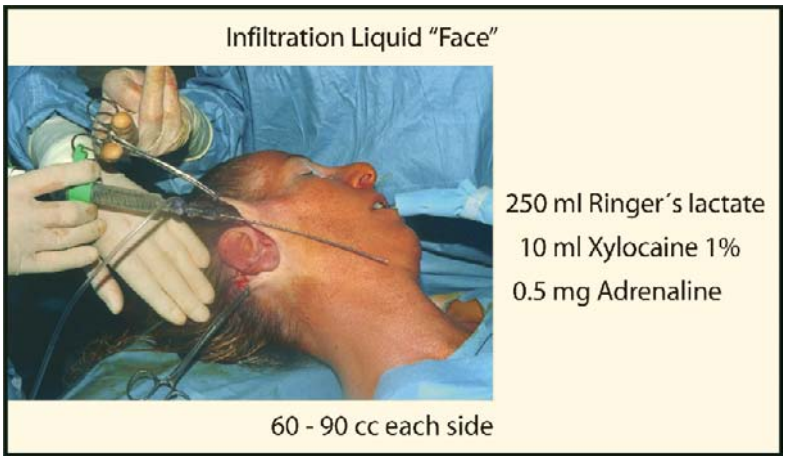

Fig. 44.2. Infiltration solution for facial liposuction

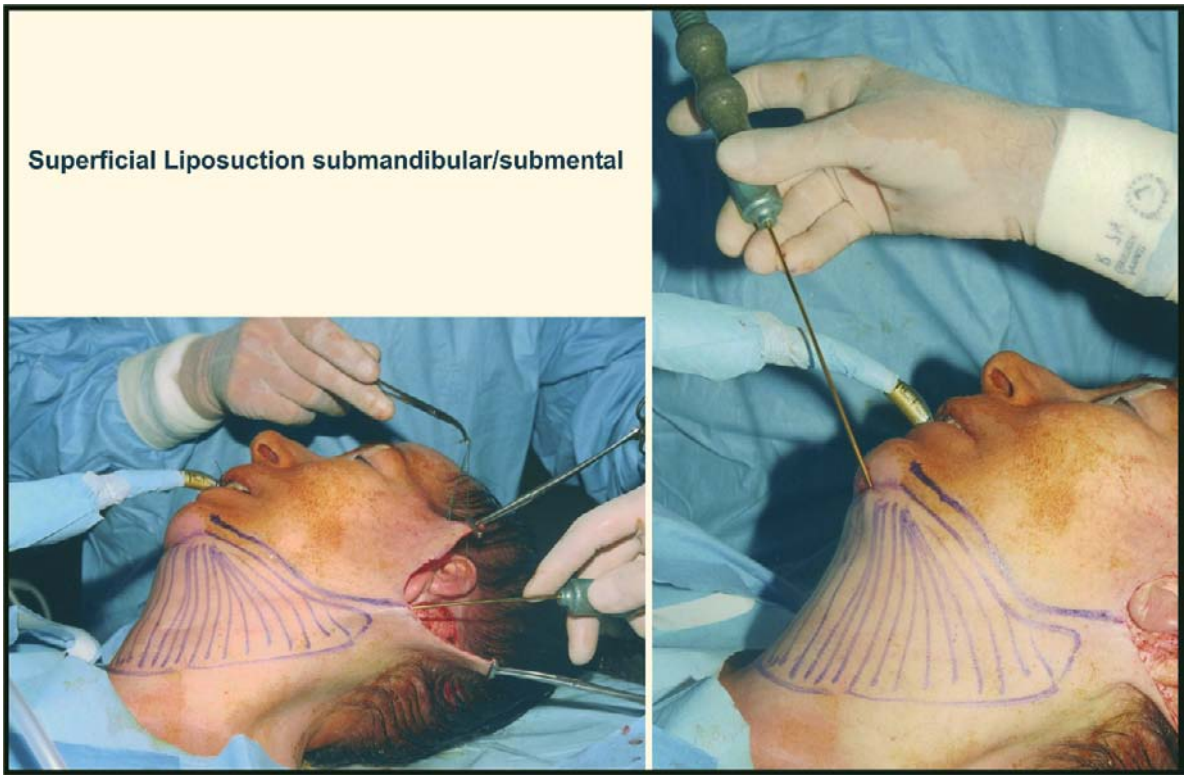

Fig. 44.3. The periauricular incision and partial undermining and infiltration of the cheek–neck area proceeds with the introduction of a 2 mm cannula for liposuction in the submental and submandibular region

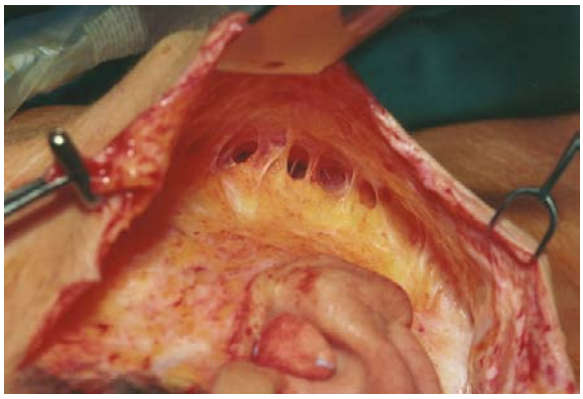

Fig. 44.4. The fine tunneling of the neck below the jawline and of the submental area has a contouring effect in addition to the required reduction of volume

44.3 Volumetric Maneuvers in the More Advanced Stage of Midfacial Aging: Superficial Adipo-cutaneous System, Extended Supraplatysmal Plane Liftings

In the more advanced stage of aging, a more extended undermining is necessary for repositioning sagging skin and volumes. A deeper plane of detachment avoiding vascular damage compromising the blood circulation of the flap is advisable.

There have been many discussions about which is the anatomically correct plane in the past.

Hamra, a pioneer of the deep plane facelifting, has brought fundamental inspiration to anatomical thinking and reflection about facial rejuvenation.

In Hamra's deep plane rhytidectomy [10] the plane of undermining is on top of the orbicularis and the zygomaticus major and minor muscles. In the "composite rhytidectomy" [11] the author additionally includes the orbicularis oculi muscle and the SMAS/platysma layer of the cheek above the jawline (sub-SMAS) into the underminded flap. The concept of this technique is the belief that there is a similar amount of aging in all soft-tissue layers of the face, including fibromuscular tissues, the fat pads, the subcutaneous fat and the skin. therefore, all these layers have to be elevated en bloc with the composite flap.

Hamra's analysis of aging in relation to facial anatomy says that "the ptotic cheek fat becomes the nasolabial fold …. and the ptotic platysma muscle of the face becomes the broken jawline or jowling of the lower face" [11].

A different standpoint is taken by Trepsat [16], who says that the main reason for facial aging is a progressive ptosis of the skin and the subcutaneous fat layer including the facial fat pads, and the thickening/accumulation of submental and submandibular fat layer, much more than alterations of the fibromuscular tissue. Jowls belong to the earliest signs of aging owing to a sagging and accumulation of subcutaneous fat in the lower cheek area on both sides of the chin, lateral to the osteocutaneous mandibular ligaments. In the majority of faces there is an important difference in laxity between the skin fat layer and the fibromuscular tissue (SMAS/platysma).

These planes have to be separated from each other, says Trepsat, to provide the possibility of more extensive repositioning the superficial plane (mainly responsible for aging) compared with the SMAS/platysma system.

Analysis of the aging process proves that sliding downwards and laxity of the skin fat layer cause the signs of aging much more than alterations of the fibromuscular tissue [12, 16].

Therefore, the correct level of undermining is the deep subcutaneous plane just on top of the SMAS, leaving all the fat on the flap.

This type of facelift is called lifting of the superficial adipo-cutaneous system (SACS lifting). This level of undermining gives direct access to the subcutaneous fat and its accumulations as well as the pads (malar, buccal, jowls) for contouring – it is a true volumetric access to the midfacial and jawline structures.

Corresponding to that concept ,the following experience is described by Ellenbogen [6]:

> It has been our observation that facial aging is primarily caused by the loss of facial fat volume and the descent of upper facial fat below the mandibular border. Many techniques have attempted to address this issue by lifting or repositioning the SMAS and other layers to restore volume to the face. However, in our experience, this often produces insufficient volume correction and a pulled look, which may only be correctible by subsequent fat restoration.

Therefore, procedures for restoring, repositioning and – in some areas – replacing volumes instead of tightening will provide the most "physiological" therapy of facial aging.

Hoefflin [12] with his name extended supraplatysmal plane (ESP) facelift takes a similar standpoint saying that "the ptosis of the subcutaneous fat and

skin is the predominant cause of facial aging" and that "the nasolabial fold is due to progressive thickening and ptosis of the lower portion of the cheek fat and skin, but not to appreciable changes in the muscle plane (SMAS)." Therefore, he prefers a dissection plane above and not below the platysma aponeurosis/SMAS, to get more efficiency in correcting signs of aging, namely, the ptosis of skin and fatty tissue. The supraplatysmal plane is a dissection that leads immediately on top of the platysma muscle/SMAS layer with all facial fat superficial to the platysma and the SMAS kept on the skin flap, where it can be mobilized and contoured.

The extent to the corner of the mouth includes a more complete ligamentous release.

44.3.1 Operative Technique

The cheek undermining is performed superficial to the parotid gland above the parotid fascia and the SMAS layer. The dissection is continued above the orbicularis oculi muscle after visualization of the edge of the orbicularis oculi and the undermining goes over the zygomaticus major and minor muscle. The front dissection is carried on to the level of the nasolabial fold, to the modiolus and under the jowl, where the mandibular ligament is released

The plane of dissection is under the adipocutaneous layer but above the SMAS layer, leaving all fat on the flap, providing good access to all fat that has to be repositioned, molded and recontoured from inside.

The postauricular undermining leads to the anterior border of the sternocleidomastoid muscle. After the platysma muscle has been identified, the dissection can extend across the neck. Special attention has to be paid to the greater auricular nerve.

The cervicofacial soft tissue is dissected in the subadipose layer over the SMAS. The platysma fibers on the cheek are identified and the dissection is continued on to the buccal commissure and down to the release of the mandibular ligament. In the zygomaticomalar area is not necessary to change planes. The detachment is still subadipose and in the direction of the nasolabial pouch the fat layer, always remaining on the flap, thickens. The zygomatic muscles stay below the dissection plane. The total liberation of the adipocutaneous layer from the fibromuscular plane and its repositioning will provide 80% of the result.

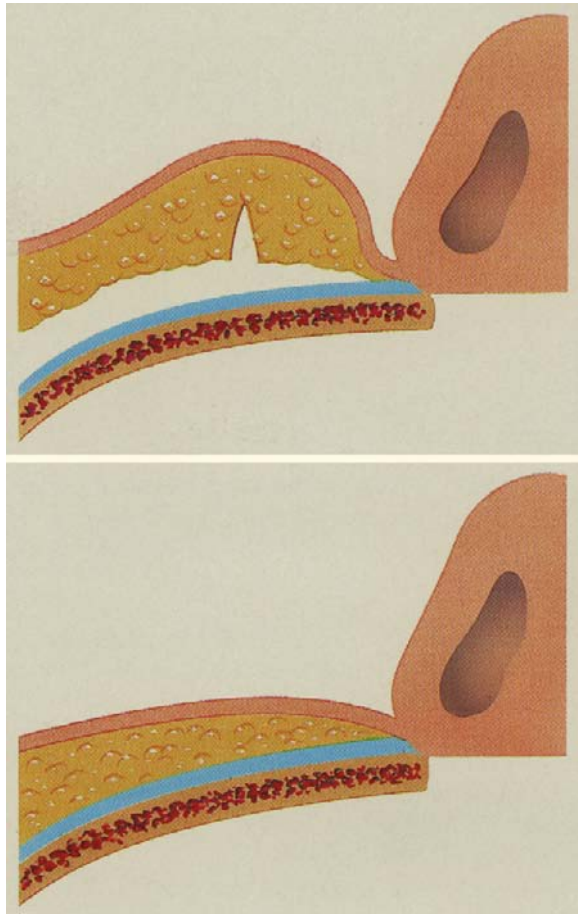

Fig. 44.5. Spreading of the nasolabial pouch perpendicular to its long axis

The efficiency of eventual actions on the deep layers has to be checked and carried out as plications or SMAS-ectomies according to the requirements in each individual case.

From this access the platysma can be put under tension laterally or, in cases of prominent platysmal bands, a Feldman corset platysmaplasty [6] can be carried out with plication of the platysma in the midline; therefore, a submental incision is necessary.

If the nasolabial pouch is very dense and very thick, it is advisable to incise it parallel to the nasolabial fold and to spread the opened pouch perpendicular to its long axis (Fig. 44.5).

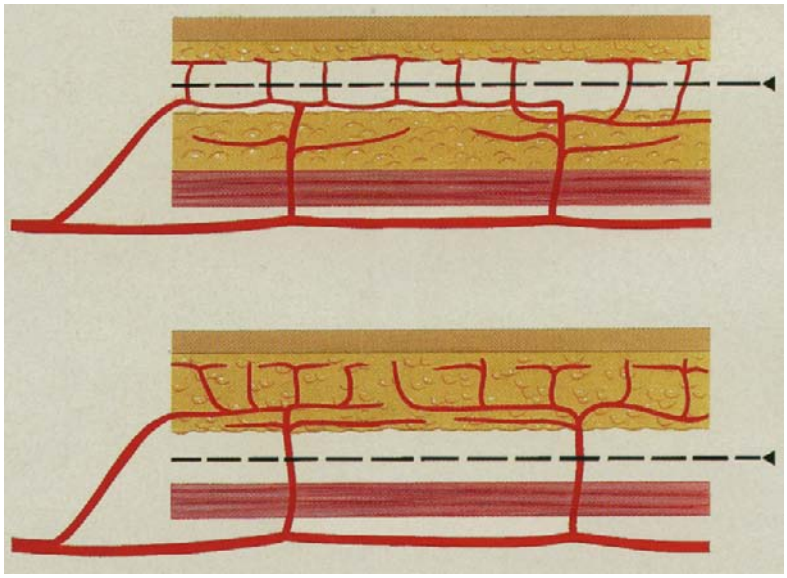

Fig. 44.6. A subcutaneous dissection would injure a large number of perforating vessels and lymphatics. A subadipose dissection encounters far fewer vascular elements, and separates the two anatomical leaflets, without injuring either of them

44.3.2 Anatomy

The superficial plane just under the skin with a thin layer on facial fat of the skin flap does not correspond to a proper anatomical plane. Too many vessels especially of the subdermal plexus are divided.

Anatomically the subadipose dissection encounters and damages far fewer of the important vascular elements and separates the two anatomical leaflets without injuring either of them (Fig. 44.6).

A Trepsat dissector in different sizes (Fig. 44.7a, b) may be helpful to perform a wide undermining with spreading movements, blunt-tipped scissors allowing atraumatic separation of the various anatomical layers. The deep plane undermining is extended to the nasolabial fold, the modiolus and the mandibular osteocutaneous attachments (Fig. 447c, d). All the fat remains on the flap (Fig. 44.7e).

The deepening of the nasolabial fold with aging is due to progressive thickening and ptosis of the lower portion of the cheek fat and skin but not to any remarkable change in the fibromuscular plane (SMAS) [12, 16].

Attention must be paid to a localized thickening of the following areas of fat pads: submental, buccal, nasolabial (midcheek) and malar. The deep subcutaneous undermining over the SMAS/platysma layer allows the surgeon the directly address these fat collections for contouring. In addition to that, the deep subcutaneous approach (supra-SMAS) provides a complete release of the osteocutaneous ligaments described by Furnas [8] for better mobilization and even distribution of tissues: malar (McGregor's patch), parotid, masseteric, infra-inferior-distal-zygomatic, mandibular (Fig. 44.8).

The advantages of the plane of dissection described (SACS, ESP) are:

1. Direct access to the fatty tissue and its accumulations (jowls, malar fat pad, nasolabial pouch) for mobilizing and contouring.
2. Safe wide undermining in a relatively avascular plane with no damage to the skin blood supply.
3. Even distribution of volumes by release of the osteocutaneous ligaments.
4. The SMAS/platysma plane can be addressed separately.

The more advanced the situation of jowling and sagging of the facial skin and fat, the more extended epifascial undermining is necessary to provide access to all zones of drooping, accumulated fat and the release of osteocutaneous ligaments (Figs. 44.9, 44.10).

Fig. 44.7. **a**, **b** Trepsat dissecting instrument for spreading movements. **c**, **d** Wide undermining in the deep plane between fat and fibromuscular tissue (superficial adipo-cutaneous system, *SACS*, lifting). **e**, **f** All the fat is kept on the flap

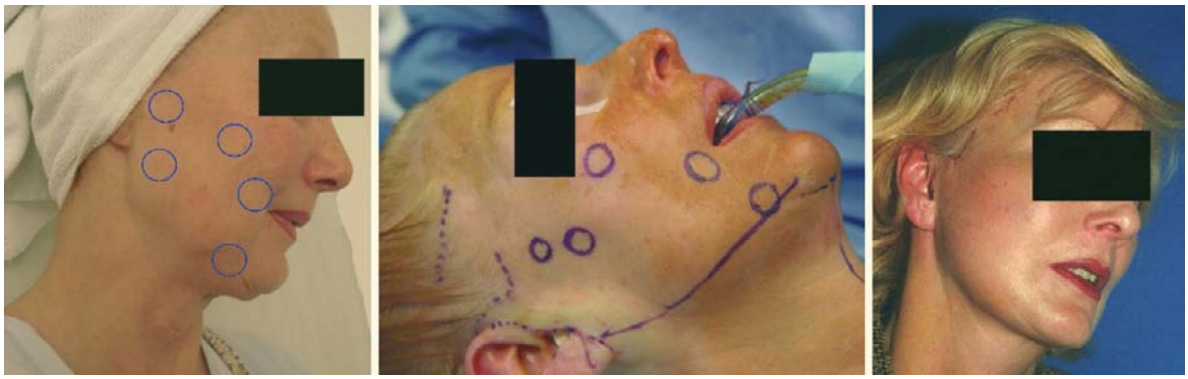

Fig. 44.8. The osteocutaneous ligaments of the face: malar, parotid, masseteric, infra-inferior-distal zygomatic, mandibular, and their release (visible in the result on the *right*)

Fig. 44.9. **a** A 62-year-old female patient with very prominent jowls, sagging of the cheeks and thickening of the fat pad above the nasolabial fold, "rectangular" face in the front view. **b** To reestablish a clean oval jawline a supra-superficial musculo-aponeurotic system cervico-facial rhytidectomy with contouring of the subcutaneous fat, namely, in the jowl area, was performed with a wide undermining of the lateral cheek and jawline zone, releasing the osteocutaneous ligaments

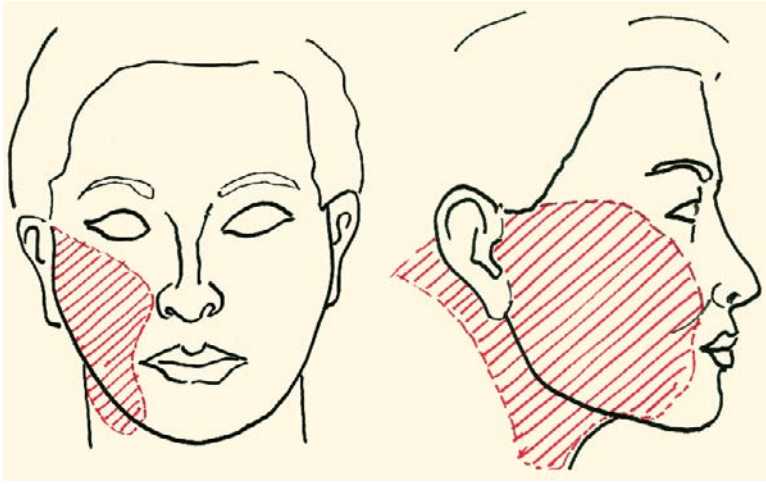

Fig. 44.10. The extent of undermining

44.4 Skin Incisions: the Prehairline Terrace Lifting (Avoiding Hairloss and Hairline Displacement)

44.4.1 Plane of Undermining and Incision Lines

When Performing a face–neck rhytidectomy, the first question will be which is the best plane to operate with the purpose of redistributing the various volumes and which will be the incision lines to get access to the tissues responsible for the volume displacement and alteration.

Avoiding hairline distortion is a must in modern facial rejuvenation surgery. A facial aesthetic surgery creating a juvenile contour of the jawline but leaving a zone of baldness in the temporal hair is conterproductive!

Cervicofacial rhytidectomy with a wide undermining and mobilizing the midfacial and cervical skin/fat layer creates a significant amount of skin to be resected. There is a direct coherence between laxity (or skin excess) and the necessity of skin excision [3]. The periauricular incision lines – and the scars – should be kept as short as possible [1, 15] but must have an extent allowing sufficient skin removal in advanced stages of facial aging [3, 17].

Wide mobilization with osteocutaneous ligament release and the good vascularity of the flap in ESP or SACS lifting techniques allows a large advancement with significant skin excess to be removed. therefore, the skin incision lines have to be placed in front of the temporal sideburn, if hairline recession is to be avoided. This is of further importance in secondary rhytidectomy procedures with a high incidence of hairloss from a primary facelift 10 or 20 years ago.

The hairline should be respected as an aesthetic unit of the face. Fullness of the hairline is a sign of youth (Fig. 44.11); a receding hairline with baldness of the sideburn area–as pointed out by Connell [5] – is a sign of aging and should not be "produced" by using

Fig. 44.11. The fronto-temporo-cervical hairline is describing a curved line in the shape of a "triple S"

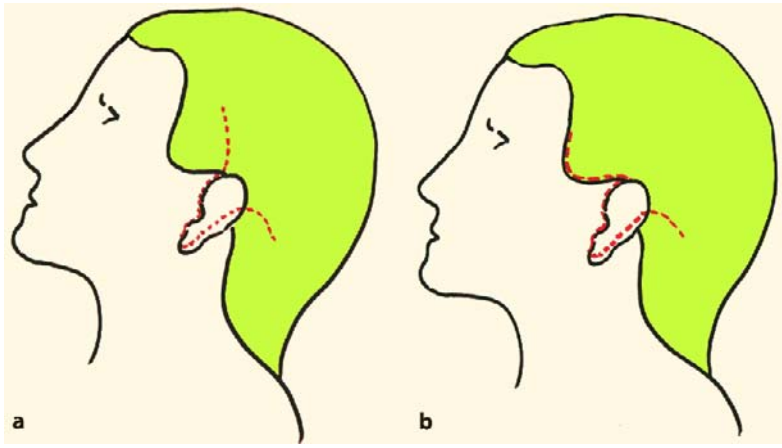

Fig. 44.12. **a** Temporal traditional incision inside the temporal hair always leads to posterosuperior displacement of the sideburn. **b** Hairline distortion and hairloss inside the temporal hair-bearing skin can be avoided with a prehairline incision

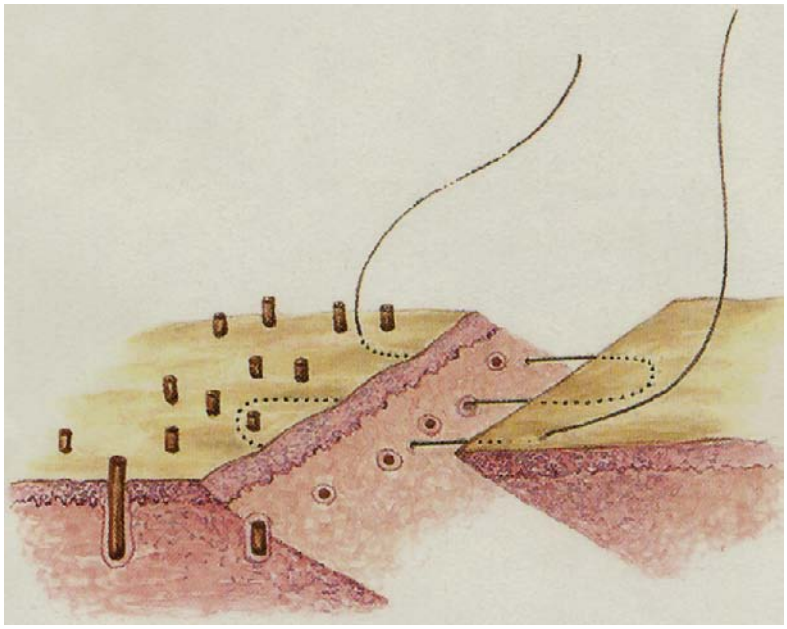

Fig. 44.13. Beveling the incision provides regrowth of hair through the prehairline scar in a later stage of healing

the traditional incisions inside of the temporal hair removing hair-bearing skin! (Fig. 44.12). The incision is performed with a beveled blade 2–3 mm inside the hairline in a way that through the transected hair follicles a small zone of new hair can grow through the scar in a later stage of the healing process (Fig. 44.13).

The line of cutting describes a pattern of multiple waves, while the excision line is simply curved to end up with a congruence of the sutured edges (Fig. 44.14). The prehairline incision is situated on a transition zone of skin pigmentation, comparable to the periareolar incision in breast surgery (Fig. 44.15a).

The healing process in that area is extremely good if a correct suture technique is applied. After 1 year the incision lines will be hardly visible (Fig. 44.15b).

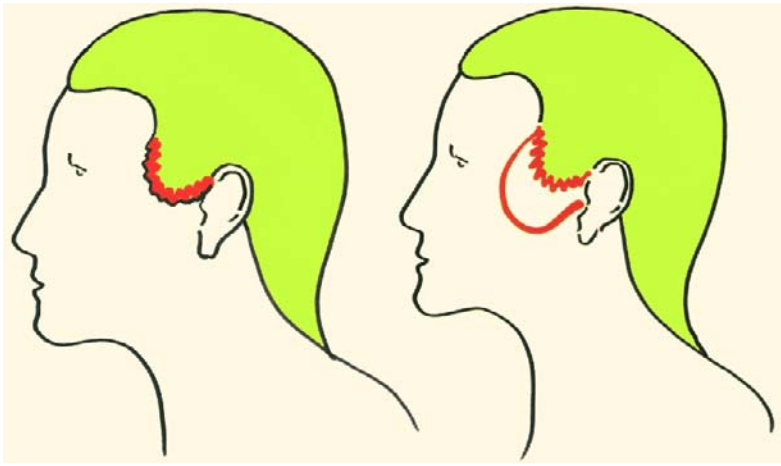

Fig. 44.14. The incision line is waved; the skin excision line is simply curved

Fig. 44.15. **a** The prehairline incision is situated on a transition zone of skin pigmentation, comparable to the periareolar incision in breast surgery. **b** Prehairline incision after 1 year

44.4.2 Operative Technique

The periauricular incision is before the hairline in front of the ear; the postauricular incision is never before the hairline but extends into the hair-bearing zone dorsal to the mastoid.

After a soft-tissue undermining in the cheek and neck area and hemostases (the anesthetist raises the blood pressure to about 110 mmHg during that period) and application of the two-component fibrin seal (Tissucol), the key stapler clamps in front and behind the ear are positioned, followed by stepwise resection of the redundant skin. The hairline behind the ear is readapted through a third stapler clamp. A drain is applied over the mastoid. The prehairline requires meticulous suture technique. An intradermal running suture with 5.0 Vicryl rapid is recommended.

The excised skin in the prehairline cervicofacial rhytidectomy is not hair-bearing except for a small triangle of the posterior hairline over the mastoid (Fig. 44.16).

With the mainly vertical orientation of vectors and the significant amounts of advanced skin to be resected, especially from the cheek, a dramatic elevation and postero-superior displacement of temporal hair would occur with the traditional incision inside the hairline.

Short scar and minimal incision techniques [1, 15] are without doubt highly appreciated but seen from another perspective – the necessity of skin reduction – it is the author's experience that patient satisfaction depends more on the quality and position of the scars than only on their length. Especially for good access to the neck/platysma, a postauricular incision is unavoidable. Good-quality prehairline and periauricu-

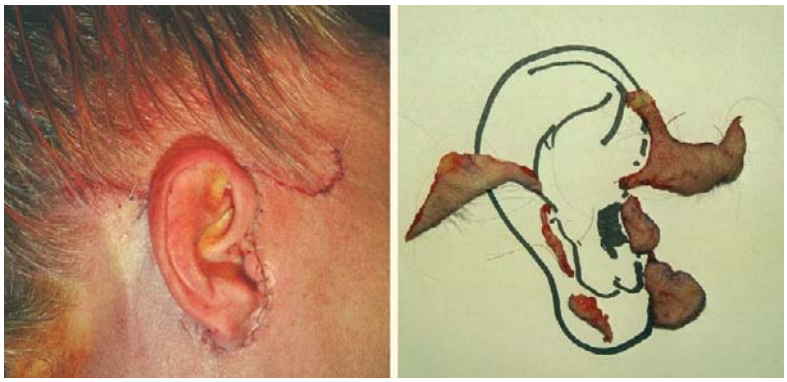

Fig. 44.16. The excised skin in the prehairline cervicofacial rhytidectomy is not hair-bearing except for a small triangle of the posterior hairline over the mastoid

lar scars can be obtained by avoiding traction of the skin edges.

The only moment when a tension is applied is the positioning of the pre- and postauricular key stapler clamps before skin excision. Choosing the right tension in that maneuver will determine the quality of the result. Every following redraping of the mobilized skin flap is done without tension. The sutures have to be applied with meticulous precision, respecting every single hair follicle!

44.4.3 The Terrace-Like Cranial Extension of the Temporal Prehairline Incision!

If there is a bunching up of skin in the temporal area, the prehairline technique can be extended cranially by a stepwise superposition of fusiform skin excisions in the temporal zone and the lateral forehead [13, 17].

These complementary incisions are done without any skin undermining just to flatten down the skin cranial to the point where the prehairline sideburn incision ends, to redrape bunching-up skin higher up.

To strictly avoid visible scars, it is of special importance that these additional skin excisions are placed horizontally or slightly curved, never vertically (Figs. 44.17, 44.18), so that they are covered by the overlaying hair.

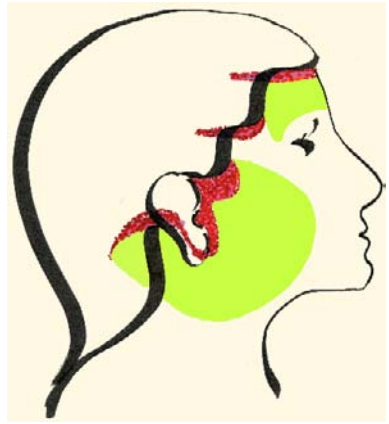

Fig. 44.17. The stepwise terrace-like cranial extension of prehairline incisions

A combination of cervicofacial rhytidectomy with a browlift is the most complete facial rejuvenation!

In a high forehead, it is advisable to perform this as endoscopically controlled prehairline biplanar forehead advancement [14]. The incision lines are not coherent, but the sideburn prehairline incision at the level of the upper pole of the helix and the forehead incision are performed as separate incisions horizontally. The prehairline incision at the frontal hairline "feathers" into the lateral hair-bearing zone on each side.

Fig. 44.18. Patient of 49 years of age, **a** before, **b** 1 week after and **c** 3 months after SACS rhytidectomy and terrace lifting. Note the inconspicuous scars positioned in the same "geometry" as the overlaying hair is directed

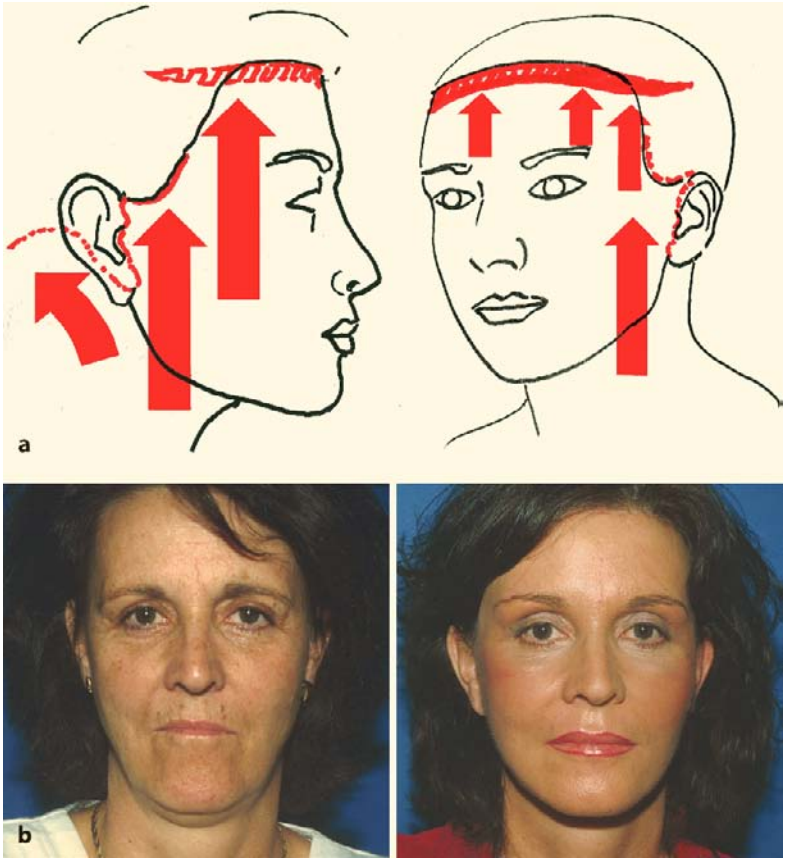

Fig. 44.19. **a** Preopertive and **b** postoperative pictures: prehairline cervicofacial rythidectomy combined with endoscopically controlled biplanar prehairline forehead advancement and a perioral and lip microfatgrafting [4] for complete facial rejuvenation

44.5 Author's Experience

In a period of 6.5 years between October 1998 and March 2005, the supra-SMAS plane of dissection according to the principles of SACS [12] and ESP [16] lifting techniques combined with the prehairline incision were applied by the author in 389 cases of cervicofacial rhytidectomy.

The patients' degree of satisfaction with the result was high. No complaints have been reported regarding prehairline scars except in six cases (scar revision).

The following complications occurred:

Hematomas (mastoid/cheek)	
return to the operating room	7
Suture dehiscence prehairline on one side	2
Hypertrophic scars (scar revision)	4
Early recurrence of jowling fat	8
Skin slough	2
Seromas	4

In the author's experience, it is a highly appreciated if hairloss or hairline distortion can be avoided. The criteria of a modern facial contouring are fulfilled by the SCAS or ESP techniques because they provide an even distribution of volumes in cervicofacial rhytidectomies, a fully restored regular jawline and cervicomental remodeling, and flattening of the nasolabial fold and the jowls, without ending up with a "pulled" or tight "facelifted" aspect.

44.6 Summary

The SACS and ESP-liftings are truly volumetric techniques of cervicofacial rhytidectomy. The plane of undermining provides direct access to the subcutaneous fat, the fat pads to be contoured, repositioned and modified, and the plane of the fibromuscular tissue (SMAS/platysma) to be addressed separately as well as to osteocutaneous release. It is an anatomically correct plane of dissection without vascular damage to the skin. The prehairline incision with terracelike extension to the temporal zones and lateral forehead, and removal of excess skin, secures the maintenance of the temporo-frontal hairline without distortion or hairloss on the sideburns.

Restoring facial harmony and naturally looking long-lasting results of facial contouring achieved by replacing volumes of the perioral, nasolabial and infraorbital regions using fatgrafting will fulfill today's patients' requirements in facial rejuvenation surgery.

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45 The Vertical Facelift

Bernard Cornette de Saint-Cyr, Claude Aharoni, Nicolas Mutaftschiev

45.1 Introduction

The new vertical description of the face's topographical anatomy, as opposed to the former horizontal one, explains the evolutional anatomy of the aging process [1–3].

The midface ("mesoface") progressively slides downwards between two fixed points: the ear and the nose (Fig. 45.1). A progressive skeletonization of the orbital region appears. The sagging malar cheek loses its natural curve. The nasogenial sulcus becomes more marked, thus giving an aging aspect to the patient. Later, the senile mesofacial flow spreads on the mandibular area, breaking the mandibular arch and leading to a heavy cheek, increased by the osteocutaneaous fixed point of Furnas.

The understanding of this senile mesoface ptosis leads to the introduction of new rejuvenation vertical vectors, for a more appropriate midfacial repositioning.

In our experience, we have evolved in three surgical stages since 1989:

1. The subperiosteal mask lift was first described by Tessier [26–27] in 1988. He first introduced the idea of a total facial deep subperiosteal detachment associated with canthopexy and onlay bone grafts. This principle was further developed by Krastinova [14].
   In 1989, our European group (Gaston Maillard, Bernard Cornette de Saint Cyr), together with the Israeli Michael Schefflan, and Oscar Ramirez simultaneously published a series of numerous extensive open subperiosteal face lifts with a strong deep suspension of the face: the deep musculoaponeurotic system (DMAS) without canthoplasty. Endoscopy later brought certain improvements in lessening the length of scars [10–12, 16, 21–24]. The procedure was efficient and its effect long-lasting, but the surgical repercussion was longer [4, 5, 17].
2. The oblique superficial musculo-aponeurotic system (SMAS) flap procedure described by Lelouarn and Cornette de Saint-Cyr [16], following Skoog and Hamra, was the main procedure that we performed between 1992 and 2003. Though suspension issues were not completely solved, this second surgical procedure gave us great satisfaction. We introduced an oblique tension vector with an oblique SMAS flap below the parotida. We successfully corrected heavy cheeks, nasogenial sulcus and repositioned the malar cheeks. The lower-eyelid fat bags were treated with the traditional procedure.
   Despite a satisfying outcome, we made a critical analysis of our experience and compared our results with the beauty and youthfulness described in magazines. We noticed that the skeletonization of the orbital region and the periorbital senile shade remained. We understood that we had to improve the orientation of our vectors, in order to give a more appropriate answer to the senile ptosis.
   Today, when no periorbital skeletonization is observed, we still perform an isolated oblique SMAS flap.
3. In 2002, Besins introduced a new "package" with the suspension of the cheek and orbicularis oculi muscle and improved the fixation problems with a temporal hanging. It appeared as a turning point in facial rejuvenation and embellishment surgery: the reverse and repositioning effect (RARE) procedure [2].

We have been using this vertical midface lift since 2003 and have observed dramatic improvements in our clinical results.

45.2 Anatomical Considerations

The jugomalar adipose tissues are divided into two planes by the orbicularis oculi and the zygomaticus major muscles. The superficial plane is represented by the superficial malar adipose tissue. It is limited medially by the nasolabial fold and laterally by the fixed point of the zygomatic arch [7]. The deep malar adipose tissue is the zygomatic extension of the buccal fat

pad and a fusion of the superficial malar muscles. Both planes are intimately adherent to the orbicularis oculi muscle, as described by Mendelson [18]. The nasolabial fold is a passive element and its position is determined by the arrangement of subcutaneous tissue on either side of this fold.

45.2.1 The Fixed Points of the Face

There are four fixed osteocutaneous points of the face: the zygomatic (McGregor), mandibular (Furnas) [9], orbital (Psillakis) [20] and masseteric points. They play an antigravitational and functional role in the facial expression and act as pulleys for the superficial muscles.

45.2.2 The Facial Nerve

In its intraparotidal segment, the facial nerve has five branches [10]. Dissections show a number nervous anastomosis creating a true supply plexus. Only the highest and lowest branches, temporal and mandibular, are particularly vulnerable during facelift surgery [8].

The ramus temporalis has numerous terminal branches for the corrugator supercilii, the procerus and the frontalis. It flattens against the zygomatic arch between the upper continuation of the SMAS superficially, and the layers of Libersa and Laude (deep layer) below. This layer protects the nerve when the dissection stays in the temporal fascia plane and the zygomatic arch subperiosteal plane.

For Pitanguy [19], the landmark of the temporalis ramus follows a line going from a point situated 0.5 cm below the tragus to a point situated 1.5 cm above the lateral extremity of the eyebrow.

45.2.3 The Infraorbital Nerve

The distance between the infraorbital rim and the nerve is roughly 6–10 mm, centred on the medial line of the pupil. This nerve carries the sensibility of the lower eyelid, the ala nasi and the upper lip

45.3 Pre-operative Consultation

The first consultation appreciates the rejuvenation potential of the face and should propose a surgical strategy.

The face should be analysed as a whole. Volumes are observed and palpated; the overall facial fat melting is appreciated. The eye expression is described (osseous eye expression, fatty bags, round eyes, hollow eyes). Previous history of lower-eyelid surgery is investigated and the clinical examination of the lower eyelid searches for a high laxity, which is a risk factor in this procedure (eyelid eversion).

The mouth is observed (fatty melting, alveolar lysis and muscular atrophy with lip eversion). The neck ptosis is evaluated to decide whether additional neck surgery is needed.

This analysis should be compared with former pictures at different ages to understand the effects of aging and produce an adequate surgical answer for the patient's case. This answer should never be standardized. Instead, it should be adapted to each individual case.

With a deep plane approach, smoking does not appear as unfavourable.

45.4 Surgical Procedure

The midfacial facelift is a minimal scar procedure using two short surgical approaches which leads to a correction of the periorbital skeletonization and the malar cheek ptosis.

The principles of the procedure are based on midfacial area suspension (malar cheek and heavy cheeks), orbicular stretching and lower-eyelid skin excess resection.

45.4.1 Preoperative Planning and Drawings

The "M" point ("M" for malar cheek) is located at the crossing point between a vertical line drawn across the lateral canthus and a horizontal line passing through the inferior border of the nostril (ala nasi) (Fig. 45.5). To understand the significance of the "M" point, we should observe the facial modifications associated with a forced smile. When smiling, the shortening of the comical expression muscles between their attachment points projects all tissues in front of the malar bone. It produces a youthful unbroken roundness from the nasogenial sulcus to the zygomatic arch and masks the orbital border. This position is associated with a natural shortening of the lower eyelid. The "M" point will be used to insert the percutaneous suspension of the malar cheek.

The subciliary approach is drawn as the classic lower-eyelid approach with an external extension in an oblique wrinkle at the outer corner of the eye. This extension must not be longer than 1 cm for discretion purposes. It will be used to resorb the lower-eyelid skin excess after *orbicular stretching and malar cheek*

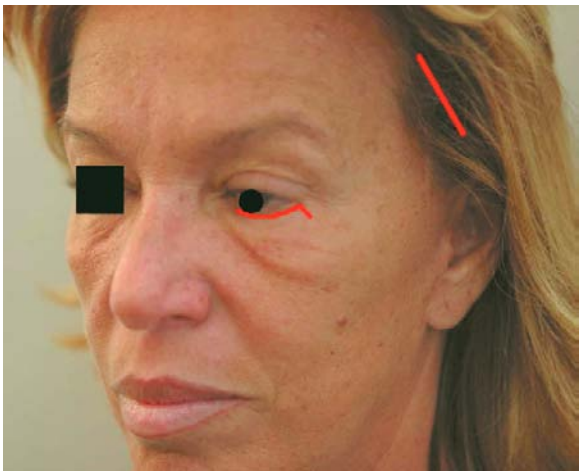

Fig. 45.1. Subciliary and temporal incisions

elevation. The deep approach can also be performed through the outer aspect of the upper-eyelid incision.

The temporal approach is performed through a 3 cm horizontal line drawn 3 cm behind the temporal hairline implantation (Fig. 45.1).

45.4.2 Orbitomalar and Zygomatic Subperiosteal Detachment

The procedure begins with the subciliary approach. The lower-eyelid skin is undermined to approximately 1 cm to expose the orbicular muscle. On its lateral aspect, the orbicular muscle is opened to reach the orbital rim.

The deep subperiosteal plane is reached and the arcus marginalis must always be respected. Tessier's periosteal elevator is introduced deeply to detach the totality of the orbital rim, the orbitomalar and the zygomatic areas. Special care must be taken to respect the infraorbital nerve and the temporal ramus of the facial nerve on the midthird of the zygomatic arch. The dissection reaches the nasal bone on the infraorbital rim, under the medial canthus. The piriform foramen and the vestibule are also dissected. The elevator must be seen intraorally, through the vestibular mucosa. This mucosa should not be opened to avoid infectious risks. The zygomatic minor and the levator of the upper lip are detached from their upper insertions. The periosteum becomes very thin medially and the dissection must be carefully performed to avoid any muscle injuries, particularly the levator of the upper lip. All facial tissues are detached from the bone (Fig. 45.2).

Fig. 45.2. Malar subperiosteal detachment through the lower-eyelid approach

45.4.3 Temporal Stage Detachment

We perform a deep temporal incision parallel to the hairline, as previously described, leading straight to the white temporal fascia (Fig. 45.3). Medially, the entire temporal crest is released and the frontal subperiosteal dissection includes the upper orbital rim with a restriction area under the eyebrow medial third to prevent any supraorbital nerve injury. The whole procedure is nonendoscopic, as described for the open mask lift procedure. The subgaleal posterior detachment must be extensive in order to absorb all the tissue excess resulting from the suspensions, without any intracapillary resection.

The lower dissection of the temporal area is more delicate and we advise, in order to avoid nerve injuries, reaching the lateral orbital rim first and following the temporal crest forward, always keeping a bony contact. Then, a posterior movement with the elevator allows a safe deep temporal fascia detachment and facilitates its junction with the previously performed orbitomalar subperiosteal detachment (Fig. 45.4).

Fig. 45.3. The temporal incision

Fig. 45.4. Temporal deep fascia and subperiosteal orbitomalar detachment junction

Fig. 45.5. The "M" point

45.4.4 Malar Cheek and Orbicular Suspensions

We first begin with the malar cheek suspension and we use a kind of Hagedorn needle specially described by Besins for this procedure. The "M" point (Fig. 45.5) is used to insert the percutaneous suspension of the malar cheek (Fig. 45.6). The needle is inserted straight into the bone pinching the ptotic malar fat pad toward the outer corner of the eye incision, where the 2 Vicryl or Dexon threads are introduced. A roundtrip movement allows a thick grip without any dimples. The thread is carried to the temporal incision under the temporal skin (Fig. 45.7).

The orbicular stretching is made with a 1 Vicryl thread, introduced into the lower malar orbicular muscle under the lateral canthus. A vertical testing tension on the thread must correct any scleral show without any lateral detachment of the lower-eyelid rim. A more superficial 3/0 Vicryl thread is sometimes passed on the orbicular muscle flap to secure the grip. The threads are carried under the temporal incision. We perform a double or triple suspension.

All threads are sutured to the temporal fascia with high tension (Fig. 45.8). Sometimes, threads can be fixed to the frontal bone using tunnels sunk through the external cortical bone or Endotine fixation devices.

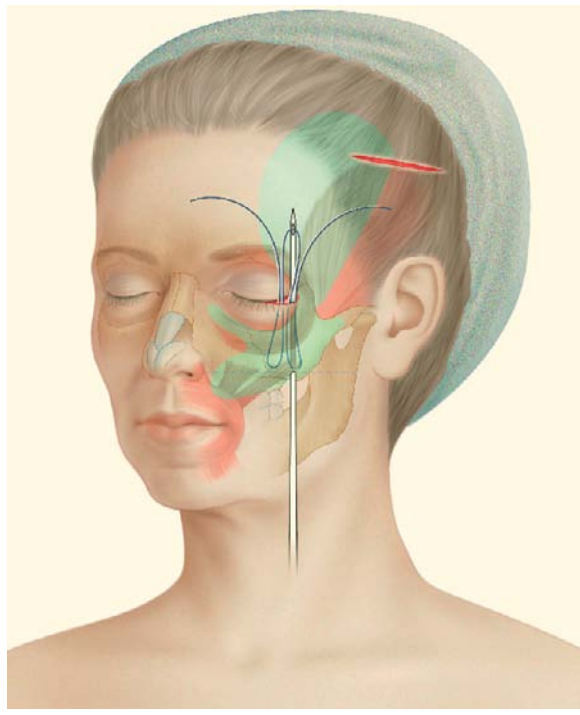

Fig. 45.6. Malar cheek percutaneous suspension

Fig. 45.7. The thread is carried to the temporal incision under the temporal skin

Fig. 45.8. Result after complete unilateral suspension. Note the lower-eyelid skin excess

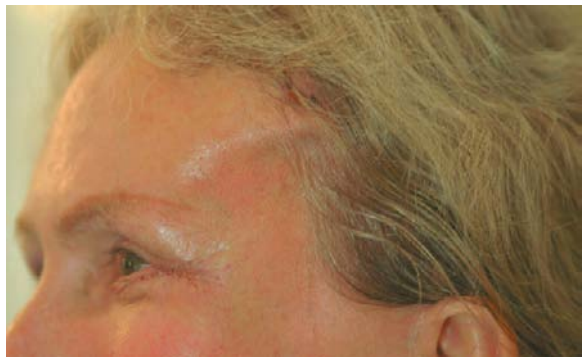

Fig. 45.9. Early result. Provisional temporal wave

45.4.5 Lower-Eyelid Skin Excess Resection

The skin excess is drawn on both sides. We cautiously remove around 50% of the amount of the apparent skin excess, to avoid ectropion complications. Closure is realized with 6/0 fast-resorption Vicryl.

45.4.6 Temporal Lift

In order to achieve the vertical translation of the mesoface, we perform a deep temporal lift to absorb all the tissue excess at the outer corner of the eye resulting from the suspensions [13]. Three or four 2/0 PDS or Vicryl threads fasten the raised galea to the temporal fascia. We do not make any intracapillary resection. The resulting wave will disappear within a few weeks (Fig. 45.9). Skin closure is achieved with 4/0 fast-resorption Vicryl.

At the end of all these stages, the symmetry is verified and an additional face filling using Coleman's procedure can be realized in order to soften the slope and emphasize cheek volume.

Additional procedures may be performed, such as neck lifting, following Labbe's procedure [15].

45.4.7 Neck Lift

The posterior bordure of the platysma muscle is fixed by a subcutaneous retroauricular approach to the fascia of Lore. After the suspension, the residual cervical detachment remains minor with a low risk of haematoma.

The neck is repositioned following a horizontal vector, thus tightening the mandibular line. In short, we create a vertical vector on the face and a horizontal vector on the neck. Both sides are performed symmetrically.

Fig. 45.10. A 40-year-old woman. Before (*left*) and 1 year postoperatively (*right*)

Fig. 45.11. A 52-year-old woman. Severe tear trough and malar bags corrected by a vertical midface lift

45.5 Results

45.5.1 Global Results

The mean age of the patients was 55 years old (31–88). All patients underwent the same procedure (94 women and six men) (Figs. 45.10–45.14). An associated necklift was performed in 55 patients. This procedure was the first facelift in 84 patients.

Patients were checked up the day after surgery, at 2 weeks to remove residual threads and at 3, 6 and 9 months. At 1 year, they were clinically evaluated. Patients with unfavourable evolution were seen every week until total satisfaction was achieved.

The recovery period was evaluated by the patient between 3 and 4 weeks as being able to be socially reintroduced with a subnormal or normal appearance without sunglasses.

Fig. 45.12. A 54-year-old woman given back her own original beauty

Fig. 45.13. A 49-year-old woman. No preauricular scar. No one in her family circle noticed the facelift . She was congratulated for her freshness

Fig. 45.14. A 52-year-old woman. Heavy cheeks and hollow eyes preoperatively (*left*). Postoperative result (*right*)

45.5.2 Complications

45.5.2.1 Haematoma

The deep subperiosteal plane is an exsanguine plane and drains have never been used. Haematomas do not seem to be a common complication of this facelift procedure.

45.5.2.2 Infection

One case of infection has been observed, concerning the temporal incision with a favourable evolution. Its low incidence is explained by the fact that we avoided the intraoral approach and by the short duration of the procedure (less than 1 h).

45.5.2.3 Skin Necrosis

Skin necrosis does not appear to be a complication of this facelift procedure. Deep facelifts, by sparing the blood supply of most anatomical planes, allow the perfectly safe creation of an extensive skin flap. It is very interesting in smokers.

45.5.2.4 Eyelid Eversion

Eyelid eversion occurred in seven cases. The incidence fell from 12% in the first 50 cases to 2% in the following 50 cases (and to zero in the next 50), thus showing the importance of the learning curve at the onset of this complication [6]. The eyelid eversion always appears early, within 3 weeks (seven cases). Two kinds of eyelid eversion are commonly described: ectropial evolution by excess skin excision and ectropial evolution by orbital septum retraction with a worse prognosis. In the first 50 cases, four patients underwent an upper-eyelid or retroauricular total skin graft and two patients underwent a Khunt–Szymanowsky procedure [25]. In all these patients, the previous history found a lower-eyelid surgery which appears as a risk factor and leads to caution for lower-eyelid skin excision (in these cases, we now approach through an outer upper-eyelid incision).

The lower-eyelid skin graft is well hidden by the make-up and rapidly well integrated within 3 months (Fig. 45.15). We improved our results by introducing a third thread to secure the orbicular grip and by resecting less skin despite the residual excess. Today, we do not resect more than half of the apparent skin excess. Another very important point is to always respect the arcus marginalis during the dissection to avoid any orbital septum retraction [1].Now we approach though the upper eyelid and lift the cheeks with endotine midface without opening the lower-eyelid muscle or the lower-eyelid skin unless at the end we need a small eyelid skin excision respecting the muscle – zero eversion.

Fig. 45.15. Right lower-eyelid early eversion. Skin graft day 1. Results at day 45

45.5.2.5 Nerve Injuries

Neurapraxy of the V Nerve

Neurapraxy of the V nerve is frequently observed in our patients (25%), giving a dysesthesia of the upper lip for 2–6 weeks. The difference between the two groups (the first 50 cases and the following 50 cases) is not significant, showing that despite all the attention paid, it did not depend on the training. The nerve sideration is the result of the tissue distension all around the infraorbital foramen during the subperiosteal dissection. Evolution is always favourable within 4 weeks.

Neurapraxy of the VII Nerve

The temporal ramus was injured in one case of unwise temporal fascia dissection. The evolution was spontaneously favourable within 3 months. During this period, the controlateral symmetry was obtained with botulism toxin. As previously mentioned, we stress the fact that in order to avoid any nerve injuries, the lateral orbital rim should be reached first and the temporal crest should be followed forward with a constant bony contact. Then, a posterior movement with the rasp allows a safe deep fascia detachment.

45.5.2.6 Muscle Injuries

Muscle injuries occurred in three cases in the first 50 cases. The injured muscle was the levator of the ala nasi and labii superioris. This can be explained by the fact that the periosteum becomes very thin medially, leading to planes error and muscle injuries. Dissection must be carefully performed in this area. The evolution is spontaneously favourable within 4 weeks.

45.6 Discussion

We present a new facelift philosophy with a rejuvenation effect and no altering of the patient's identity. Patients rediscover themselves as they were many years before.

The advantages are numerous. We do not perform any canthoplasty and the eye expression is always respected. The correction of the orbital fat hernia by the orbicular stretching avoids a senile enophtalmia (fatty hernia) evolution. We obtain a simple volumetric effect on the malar cheek and Coleman lipostructure is not always required. The correction of the wrinkles at the outer corners of the eyes is obtained with an intracapillary temporal lift during the temporal stage. We do not perform any preauricular incision on rather young patients with minimal heavy cheek, when an associated lower facelift is needed.

The main drawback of this procedure is the risk of ectropial evolution of the lower eyelid. We have introduced new devices to eliminate this complication. The two others drawbacks are the surgical repercussion, which is longer than for a simple blepharoplasty, and the necessary surgical experience in the subperiosteal facelift [4]. No definitive neurological complications have been observed (infraorbital nerve, facial temporal ramus). The indications are the skeletonization of the orbital region and the malar cheek ptosis.

The isolated vertical lift appears to be an excellent procedure for young patients with an embellishment request around the 40s. It can replace the isolated inferior blepharoplasty most of the time.

45.7 Conclusion

The vertical midface lift is a turning point in the field of rejuvenation procedures. It appears as an appropriate, safe and stable surgical answer to the malar cheek ptosis and the orbital rejuvenation request, without altering the patient's expression (*la mirada* in Spanish, *le regard* in French).

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46 How to Minimize Inherent Contradiction in Facelift Operation Focusing on a Combined Method with Facial Bone Reduction

Kiyotaka Watanabe

46.1 Introduction

For a long time, the author has doubted the effects of various facelift operations currently performed for rejuvenation: The existing standard facelift operations result in larger facial surfaces owing to pulled skin although wrinkles and drooping are eliminated.

Since it is widely believed across the world that the contour of a young face is sharp and small, to create an enlarged facial surface is, in some sense, to create an aged face, thus decreasing the rejuvenative effects expected in facelift.

46.2 Young Female Face and Its Changes with Aging

A young woman has a small, full face with a round or oval contour, and there are no wrinkles or drooping. This can be recognized in various paintings across the world, and it is also true for Noh masks or traditional Japanese paintings, making it a universal recognition (Fig. 46.1).

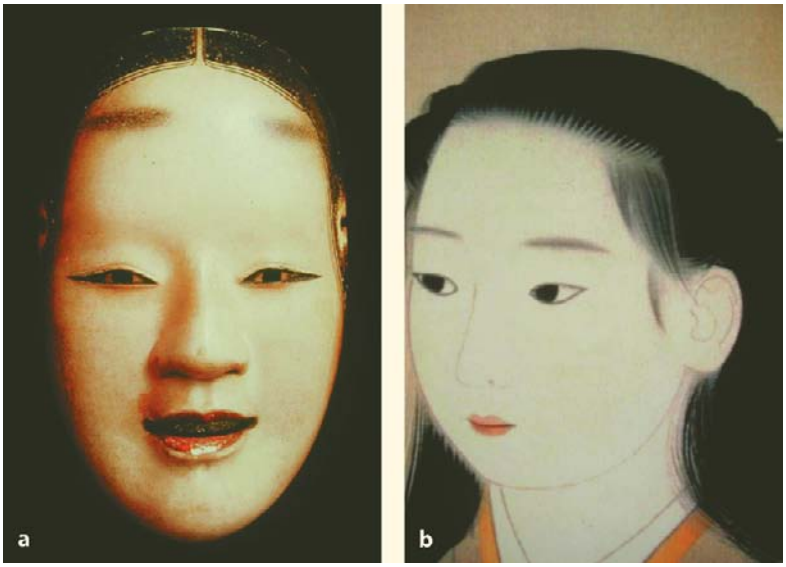

Fig. 46.1. **a** A Noh mask of a young woman. **b** A Japanese painting of a young woman's face

Fig. 46.2. **a** A facial contour and a facial surface of a young woman. **b** A facial contour and a facial surface of an old woman

46.2.1 Changes of Facial Contour with Aging

Owing to degeneration of soft tissue, including skin, fascia and muscles, elasticity is lost. At the same time, changes of accumulated areas of subcutaneous fat make the middle part of cheeks indented and the lower part of cheeks bulky and ptotic. Ptotic cheeks make a contour of the lower third of a face squared. These changes make a facial contour larger and angular with aging.

46.2.2 Changes of Facial Surface

Decreased elasticity owing to degenerated muscles of facial expression, fascia and skin creates fine wrinkles and drooping on a facial surface, and irregularities of a surface become conspicuous. Specifically, changes caused by aging first appear around eyelid areas because skin at eyelids is thinnest in a face.

At the same time, large grooves such as infraeyelid, and nasojugar and nasolabial folds become deep. Furthermore, a retreated hairline at the frontal and lateral sides help produce an impression that facial surface is wider. These features are the specific characteristics of an aged face (Fig. 46.2).

46.3 Inherent Contradiction in Facelift Operation

Usually, in a facelift operation performed for rejuvenation, drooping cheeks are eliminated by pulling drooping soft tissue back and upward. In this method, a contour is corrected into a round shape to a certain degree, and wrinkles and irregularities on a facial surface are decreased. But by pulling soft tissue backward, the hairline of a forehead in a front view is not only retreated, but sideburns in a profile view are also retreated; thus, an enlarged facial surface unavoidably results (Fig. 46.3).

This result inherently contradicts our common understanding that a small face is a young face, and this phenomenon reduces rejuvenative effects expected in facelift.

Fig. 46.3. **a** Preoperative and **b** postoperative conditions. Changing of a facial contour and facial surface by facelift operation in frontal views. **c** Preoperative condition and **d** postoperative condition. Changing of a facial contour and facial surface by facelift operation in profile view. In both views, drooping and wrinkles are eliminated but an enlarged facial surface can be recognized

46.4 Ancillary Procedure to Solve Inherent Contradiction

Some ancillary procedures, as mentioned in the following, have been attempted to solve an enlarged facial surface, an inherent contradiction in facelift:

1. Hairline incision
2. Liposuction
3. Micro hair graft
4. Reconstruction of sideburns using rotation of a local flap

Now, I will focus on facial bone reduction as the fifth procedure, which has never been combined with facelift to solve inherent contradiction.

46.5 Facial Bone Reduction Combined with Facelift

Since Orientals belong to the brachycephalic group, the face is wider than that of Westerners, who belong to the dolichocephalic group: thus, Orientals often have protruded malar and mandibular angles, and this is the cause for a flat and large-looking face in a front view. Retreated sideburns after facelift will emphasize these characteristics, and protruding facial bone and mandibular angles may disturb easy lifting of soft tissue.

For these patients, the author tried to decrease protrusion on a facial surface not only to make it smooth but also to make an entire facial contour smaller than

the preoperative one. For this purpose, with the simultaneously combined malar and mandibular angle reduction, it is possible to obtain far better rejuvenative effects using the same incision as for facelift to avoid enlargement of a facial surface after facelift procedure.

An additional favorable side effect is that partial undermining of periosteum makes displacement of soft tissue easier.

The facial bone reduction is done under direct vision, so it is very likely to prevent facial nerve injury.

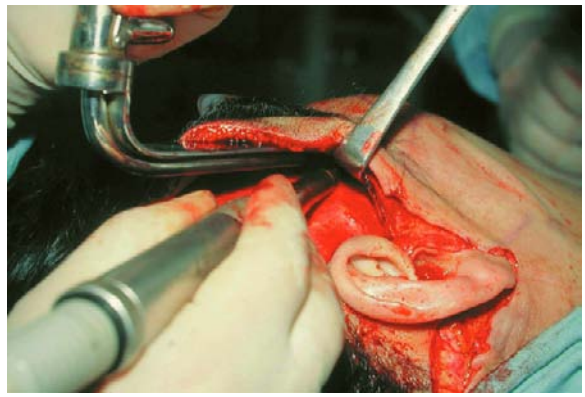

Fig. 46.4. The procedure of malar bone reduction performed along with facelift. The malar body was shaved down with a round burr

46.6 Malar Bone Reduction

In a case where malar bone protrusions are noted, radiographs should be taken preoperatively in the arch positions and water positions. On the basis of the condition of the malar bodies and arches, it is necessary to plan how much and where to shave off the bone. First the malar body is exposed and shaved down thoroughly with a round burr, and the region just before the synthetic line of the body and arch is cut completely with a reciprocating saw, and at 1–2 cm of the upper edge of the zygomatic body it is not cut completely.

Next, the tubercular region of the arch is bluntly exposed and obliquely cut completely. Then, a greenstick fracture is made to get movability of the arch. The cutting edges of the upper and lower sides of the arches are bluntly displaced, and the middle part of the arch is indented and fixed. Wiring or a miniplate

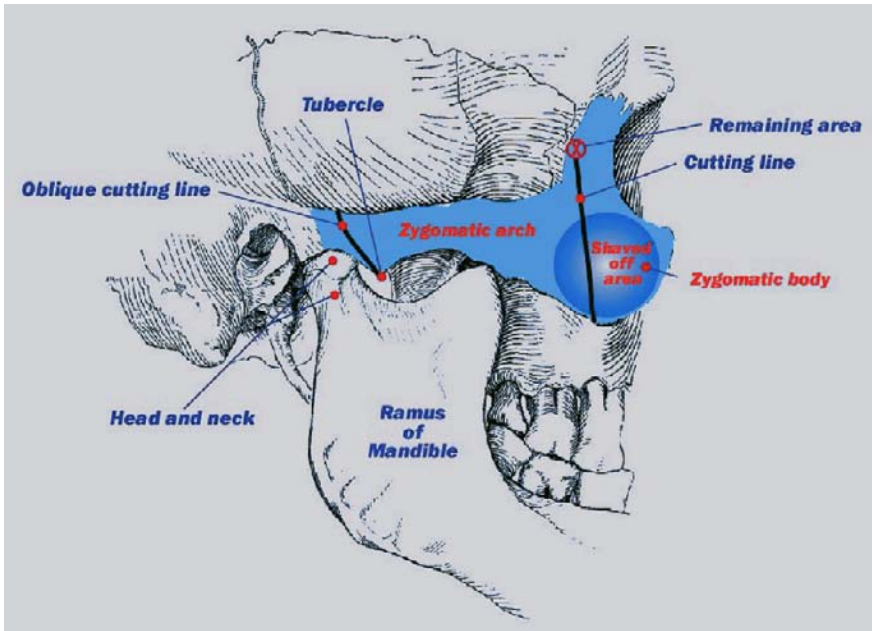

Fig. 46.5. Shaving area and place at which malar bone is cut

Fig. 46.6. A 48-year-old woman with malar bone protrusion. Note the width of the face in the frontal view became narrow in the postoperative condition. **a** Preoperative condition and **b** postoperative condition

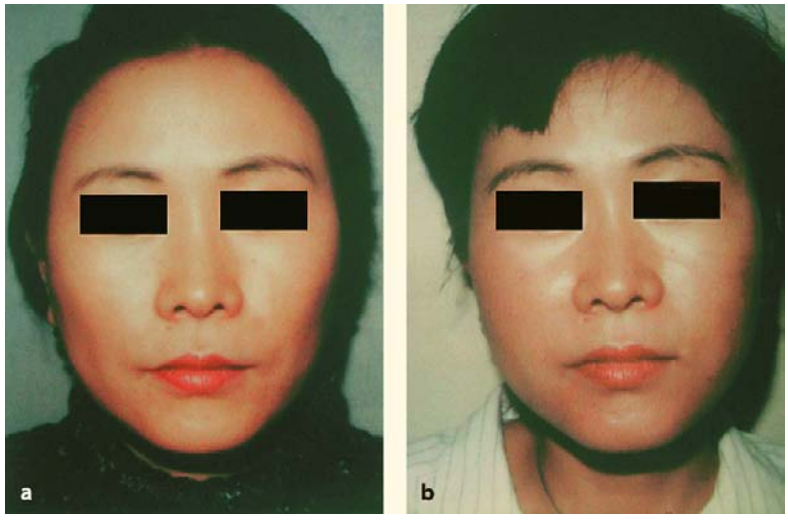

Fig. 46.7. A 45-year-old woman showing the condition of malar bone protrusion. **a** Preoperative condition and **b** postoperative condition

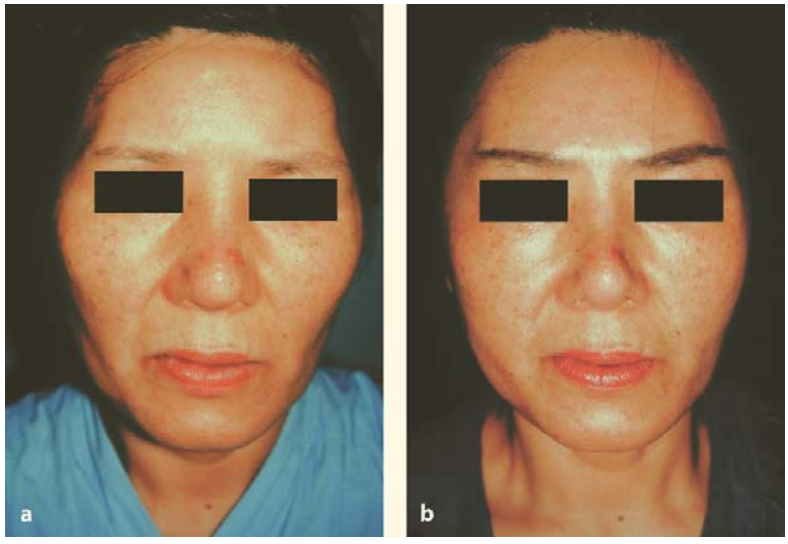

Fig. 46.8. A 63-year-old woman showing the condition of malar bone protrusion. **a** Preoperative condition and **b** postoperative condition

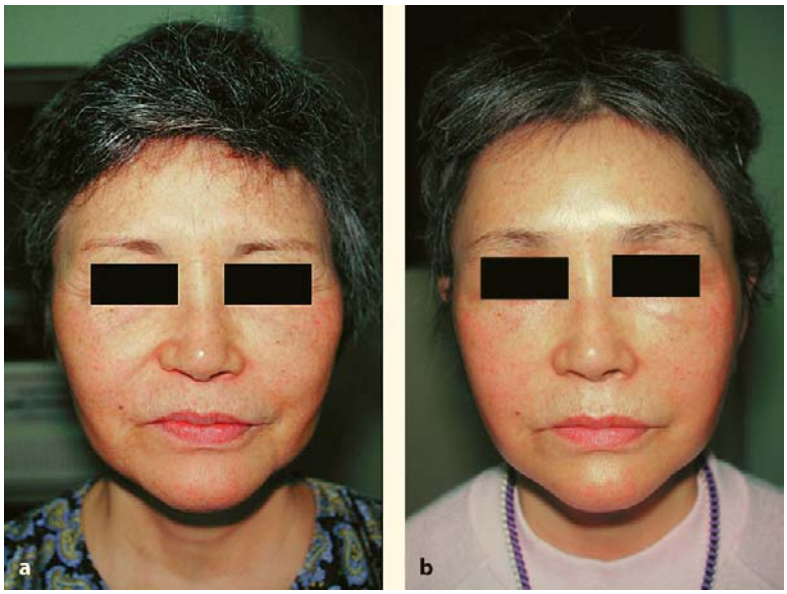

Fig. 46.9. Preoperative and postoperative conditions of malar bone reduction performed along with facelift

is used if necessary (Figs. 46.4, 46.5). Several cases are illustrated in Figs. 46.6–46.9.

46.7 Mandibular Angle Reduction

Frontal cepharograms should be taken before operation to check for the degree of flaring, and mandibular panoramagraphs for the degree of angle protrusions. On the basis of the condition, it is important to make a preoperative plan concerning where and how much to eliminate. Superficial musculo-aponeurotic system (SMAS) undermining near to the angles performed at the time of facelift could provide relatively easy vision of mandibular branches of facial nerves. With great care not to damage these branches, the origin of the masseter muscle is excised a little bit for a full subperiosteal exposure of the angles to be excised, and bone is excised in a full thickness with an oscillating or a reciprocating saw. Direct vision allows a surgeon to eliminate residues completely, avoid a resultant linear contour, and make natural mandibular plane angles. In principle, the masseter muscle is not excised except when it is too thick (Figs. 46.10, 46.11). Some cases are illustrated in Figs. 42.12 and 46.13.

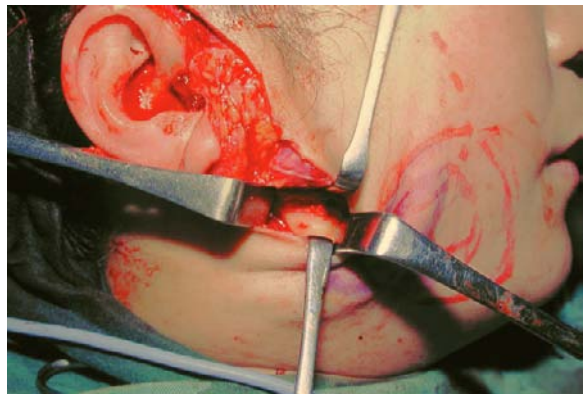

Fig. 46.10. The procedure of angle reduction performed along with facelift. The protruded angle is exposed under direct vision

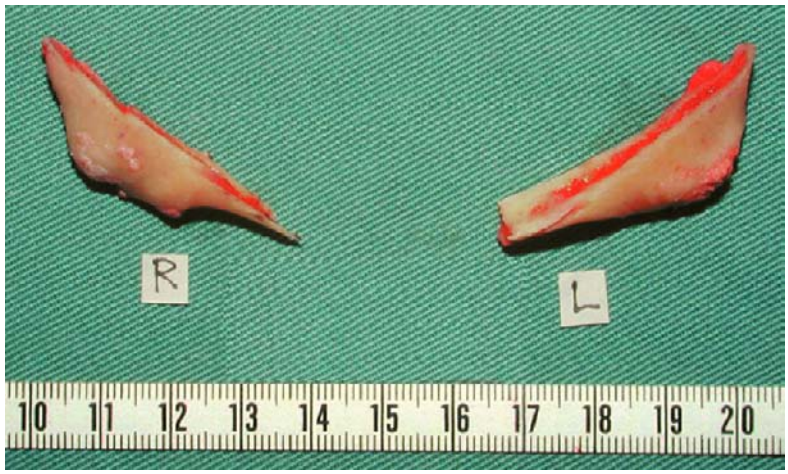

Fig. 46.11. The resected bone of both angles

Fig. 46.12. A 45-year-old woman who has protruded mandibular angles. **a**, **b** Pre- and postoperative conditions in frontal view. **c**, **d** Pre- and postoperative conditions in profile view. You can note that the postoperative facial contour is smaller than the preoperative one

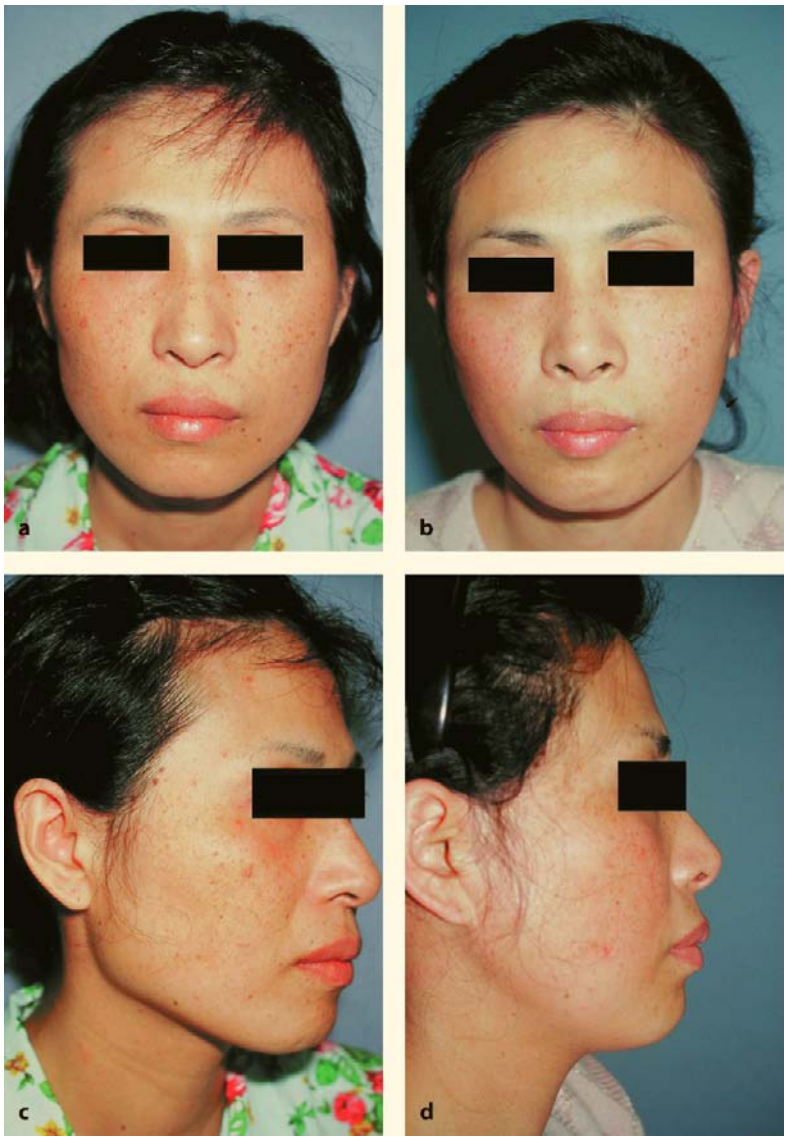

Fig. 46.13. A 47-year-old woman who has extremely protruded mandibular angles. **a**, **b** Pre- and postoperative conditions in frontal view. **c**, **d** Pre- and postoperative conditions in profile view. In the postoperative condition shown in the profile view, you can note the mandible became smooth and natural

46.8 Advantages and Disadvantages

The advantages are as follows:

1. It is possible to perform additional procedures helpful to make a facial contour smoother and smaller and to avoid having a larger facial surface. In this way, we can minimize the inherent contradiction in facelift and get more effective rejuvenative results in facelift.
2. Effective rejuvenative effects can be expected in making a small and smooth facial contour without extensive undermining; thus, less undermining of soft tissue is required, and less damage is caused to patients who are already in the degeneration stage, and acceleration of degenerative change of soft tissue is avoided.
3. Facial bone reduction can be safely performed under direct vision.
4. The facial bone reduction procedure does not require creation of additional scars.

The disadvantages are as follows:

1. The operation time is somewhat prolonged, but a moderate undermining may set off this disadvantage compared with extensive undermining.
2. When combined with facial bone reduction, general anesthesia may be required.

46.9 Discussion

The main objective of facelift has been to effectively eliminate wrinkles and drooping of a face; however, a resultant enlarged facial surface that possibly creates a larger-looking face has been neglected for a long time, and no discussion has been held so far.

Also, a hairline incision to avoid hairline retreat is not adequate for Orientals, who easily have invisible scars. Various rotation flaps have been used to avoid an unnatural look that may be caused by disappeared sideburns. Hinderer and some others have introduced various methods useful for making new sideburns.

In my view, these ideas put emphasis on maintaining the facial balance and conditions as naturally as possible, but not on lessening a facial surface for a small-looking face.

The drooping lower third of a facial contour becomes smaller, and the facial surface becomes smooth to a certain degree by facelift. Liposuction, when used for patients with highly accumulated subcutaneous fat at cheeks and submandibular regions, is effective as an additional method, and is now frequently combined with facelift.

For Orientals, who belong to the brachycephalics, many of them have malar and mandibular angle protrusions, and facial bone reduction has been performed for the aesthetic purpose.

Onizuka and I performed a malar reduction for aesthetic purposes in 1983 for the first time in the world. Since then, many surgeons have attempted and reported various malar reduction techniques for aesthetic purposes [1–7].

In contrast, in the case of Westerners, who belong to the dolichocephalics, malar augmentation is frequently used for the aesthetic purposes. Gonzalez Ulloa [8] reported in 1974 that he performed malar augmentation with facelift. Hinderer [9] and other surgeons also reported malar augmentation using prostheses for the aesthetic purpose.

Also, many surgeons, including Yang [10], Baek [11] and Deguchi [12], reported various techniques or mandibular angle reduction for the purpose of treating square-looking mandibular angle protrusions and obtaining a smaller facial contour too.

However, no report was found concerning facelift combined with mandibular angle reduction to avoid the inherent contradiction of an enlarged facial surface. Nagase et al.]13] recommended SMAS lift for elderly people following angle reduction in order to correct redundant skin around the mandibular region, but they did not perform facial bone reduction simultaneously with facelift to prevent enlargement of a facial surface.

As I mentioned earlier, Orientals, who belong to the brachycephalics, usually have flat faces, and malar and mandibualr angle protrusions. For these patients, displacing soft tissue is difficult and a resultant enlarged facial surface may sometimes emphasize bony protrusions. I would like to point out that with my method, displacing soft tissue becomes easier although an extensive undermining is not required, and a resultant small and smooth facial contour could enhance rejuvenative effects of facelift.

46.10 Conclusions

In the traditional facelift, too much emphasis seems to be placed on how to undermine soft tissue and effectively pull it in order to decrease wrinkles and drooping. Although wrinkles and drooping are improved by pulling skin, and a contour of the lower third of a face becomes somewhat smaller in front views, a retreated hairline results in a larger surface. There is a risk of a face becoming larger in both front and profile views.

This contradicts with our common and traditional understanding that a young face is small, thereby reducing the effects of rejuvenation, the objective of facelift.

Under such circumstances, the author tried not only removing wrinkles and drooping, but also minimizing the contradiction by undermining moderately, and creating a face as small as possible.

My idea will minimize the inherent contradiction of facelift, and produce better rejuvenative effects than the standard facelift.

I believe this will be one of the important ideas. The objectives of rejuvenative surgery are not only to decrease wrinkles and drooping of a face with minimal damage to soft tissue but also to try to make a face smaller and smoother.

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47 Face Lifts with Vertical Hidden Incisions

Daniel Marchac

47.1 Introduction

Maintaining a natural appearance and limiting the sequelae of a face lift have always been major goals for us. Limitation of scar visibility and avoidance of hairline displacement are fundamental, especially for younger patients and when multiple procedures are performed. To avoid the elevation of the preauricular hair, downward rotation flaps at the temporal level have given satisfactory results [1, 2]. Sometimes, when elevation in the temporal area is limited, a subtemporal incision associated with an upper temporal scalp incision can be used.

Previously, in the retroauricular area, a transversal flap with back cut was used to realign the hairline [1, 2]. Subsequently, a pedicled high flap was used [3]. Since April 2000, a vertical incision technique has been developed, eliminating any visible retroauricular scar [4]. The joined temporal vertical incision and the retroauricular incision create the shape of a vertical U. The preauricular area is managed with a retrotragal incision and careful placement of the lobule.

General anesthesia with intubation is rarely employed (except in cases of agitated men with high blood pressure). The majority of patients are operated on under sedation with propofol, which is administered by an anesthesiologist who is present during the entire procedure. Lidocaine with epinephrine (120 ml of 0.5 % lidocaine and 0.6 mg of epinephrine per side) is injected in all the areas that will be operated on after the drawings have been made.

Fig. 47.1. The vertical U incision. Vertical in the temporal area above the ear, and vertical as well in the retroauricular sulcus, continuing in the scalp, parallel to the temporal incision, 2 cm further back. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

47.2 Skin Incision and Dissection in Primary Cases

The preauricular portion of the U incision is marked from the edge of the tragus upward along the root of the helix and then vertically into the hair-bearing area for approximately 5 cm along the axis of the tragus. The incision is designed with a gentle curve to become horizontal, stopping at 1 cm from the frontal hairline (Fig. 47.1).

From the tragus, the incision descends with a step in front of the lobule. The preauricular incision is continued around the lobule and into the retroauricular sulcus, with the pinna retracted anteriorly. The incision is made at the level of the sulcus without climbing the posterior conchal wall. When the sulcus turns anteriorly, the incision is continued in a strictly vertical dissection across the superior aspect of the hairless zone into the hairline. The length of the incision within the hairline is about 3 cm vertically and 2 cm behind and parallel to the vertical branch of the temporal incision (Fig. 47.2).

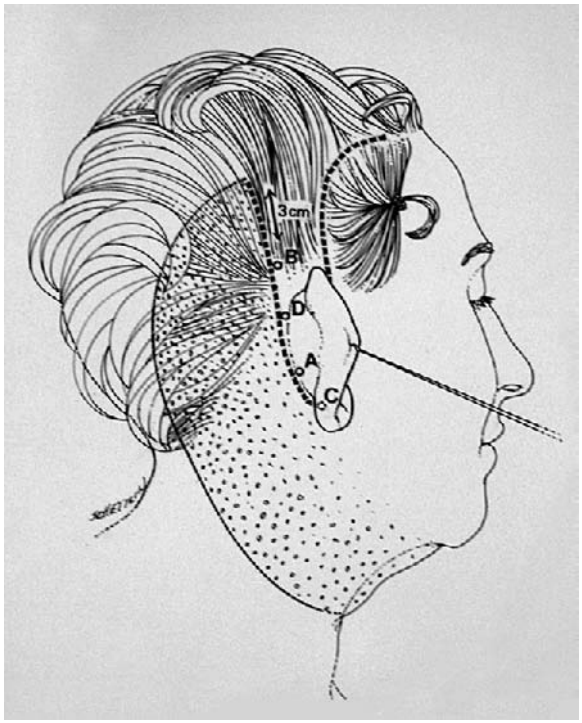

Fig. 47.2. The retroauricular incision starts in the sulcus, and from there continues vertically at *D*, where the sulcus turns anteriorly. The scalp is entered at *B* and is incised vertically for 3 cm. An extensive superficial subcutaneous dissection is made behind the ear, connecting anteriorly with the usual superficial neck dissection. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

The subcutaneous dissection is then performed at the temporal level above the fascia in the hair-bearing area and anteriorly toward the lateral canthus, exposing the orbicularis oculi. After a limited preauricular subcutaneous undermining, the retroauricular skin and scalp elevation is performed. The dissection is started along the incision with a scalpel for about 1 cm and is continued with scissors. One should find the right plane of dissection, which is above the aponeurosis of the muscle. Adhesions are often tight at the scalp, and one should avoid cutting into the muscle, remaining at the subcutaneous level. A generous preoperative infiltration with a mixture of lidocaine and epinephrine (0.5% lidocaine) helps for this dissection.

This subcutaneous undermining is extended to 6 cm from the retroauricular sulcus (Fig. 47.2) and connected anteriorly with the mastoidal and neck dissection. On the face, our superficial dissection varies in its extent, but at the neck level, we do extensive undermining, getting close to the midline. When there is an excess of fat, we start with a medial liposuction. It is preformed though a 1 cm incision done in the submental fold, and after undermining of the medial submental area with scissors, always preserving a thin layer of fat under the skin, the liposuction is performed with a no. 8 transparent gynecological cannula. The lateral dissection is then connected widely with the medial one. We think that when a midline liposuction has been done, a wide neck undermining should be performed to flatten the neck.

The extent of the lower dissection goes to about the level of the cricoid cartilage. It is especially important to dissect low enough at the level of the sternocleidomastoidal muscle to allow the redraping of the neck skin. We usually stop our skin dissection 5–6 cm from the retroauricular sulcus.

47.2.1 Deep Layer

The deep layer work is then performed as needed. When there is deep layer sagging, we perform a full superficial musculoaponeurotic system (SMAS) dissection involving the cheek and neck.

After an infiltration of lidocaine with epinephrine under the area of the SMAS dissection, we incise it along a line that goes in front of the ear, curves up along the zygomatic arch and goes higher, nearly horizontal, across the orbicular ring. At the neck level we continue vertically for about 3 cm below the mandible, and then go horizontally across the platysma for about 5 cm in cases of moderate sagging and up to the midline in cases of more severe sagging and platysma bands. The SMAS is elevated as far as necessary to get the desired elevation of the jugal and temporal area, the SMAS rotating upward thanks to the platysma section.

The main suspension of the SMAS is done in the temporal area, at the level of the upper border of the ear, to the temporal aponeurosis accessed by short discision, spreading the scissors. At this level, suspension under strong tension is made by a 3.0 nonabsorbable stitch. The posterior border of the platysma is defatted and solidly suspended to the strong fascia located under and behind the lobule of the ear by a nonabsorbable loop of 2/0 Prolene.

Then interrupted and running 3/0 absorbable stitches reinforce and smooth out the SMAS flap. This flap is superposed in the temporal area. It can be thinned by liposuction if thick, but when one wants to avoid a too wide temporal area, the flap either can be resected in the overlapping area or its upper part can be folded upon itself, building up the malar area.

When there are no significant signs of sagging at the deep layers of the cheek and neck, we enlarge our area of dissection at the cheek level and do a vertical plication of the SMAS from the malar area to the neck

but we perform nearly always a pulling on the neck platysma, without undermining, hooking it to the cervical fascia by two strong sutures.

When the SMAS – or the plication – has been done, the neck is reevaluated, and if necessary, a liposuction under the mandible level is performed.

47.2.2 Vertical Retroauricular Closure

The skin repositioning allowing closure of the vertical retroauricular incision is then performed (Fig. 47.3). The retroauricular key stitch A is the same as in classic face lifts, in the middle of the retroauricular sulcus at the level of the Frankfurt line. In fact, we initially pull both at the preauricular temporal level and on the retroauricular skin to determine the relationship of the upwardly displaced skin to the retroauricular sulcus. In many cases, a resection of a few millimeters of skin seems appropriate to align with the retroauricular sulcus. This incision is lengthened anteriorly for 1 or 2 cm but must stay well behind the lobule of the ear. The retroauricular key stitch A (Fig. 47.3) is placed, and the posterior displacement is measured. It is usually around 5 cm in primary cases. To measure precisely the displacement of the flap, we scratched the skin at two points: preauricular, below the inferior crus 1 cm above the tragus, and behind the ear, across the incision, at the level of the middle of the concha.

The aim is now first to realign the retroauricular hairline, to put the neck under tension, and to obtain a smooth and flat retroauricular area. To realign the hair one uses a d'Assumpçao clamp whose upper part is stuck to the periostium at level B of the incision. The lower flap is then pulled with moderate tension up until the hairline is realigned. One needs to excise usually a very small amount of hairless skin, 3–8 mm (Fig. 47.4).

The 3/0 absorbable stitch placed there should pick up the periostium and the scalp at the upper part (B) at the limit of the hairline, to be sure not to pull down the scalp. The lower part is grasped at the hairline limit and after tying of the knot, the hairline is restored.

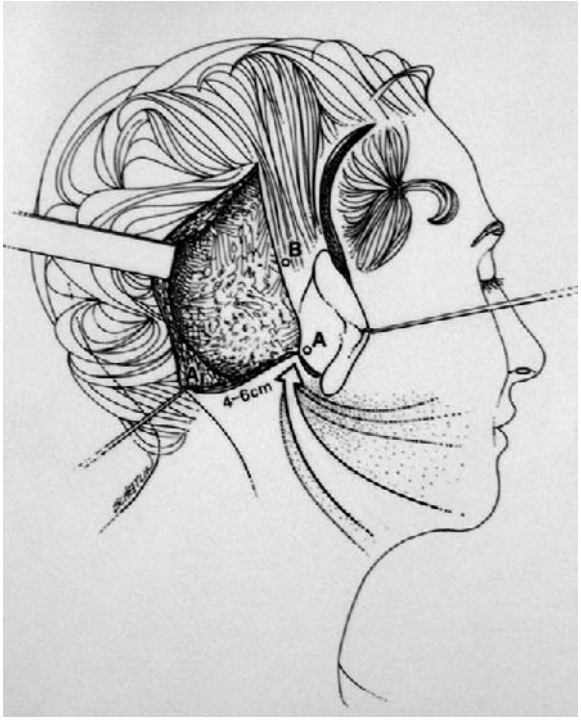

Fig. 47.3. After completion of the deep layer work, a strong retroauricular pull is exerted to drape the neck. A key stitch is placed at *A*, at midear and the Frankfurt line. The backward displacement is about 5 cm. There is a significant discrepancy between the anterior and posterior edges of the wound. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

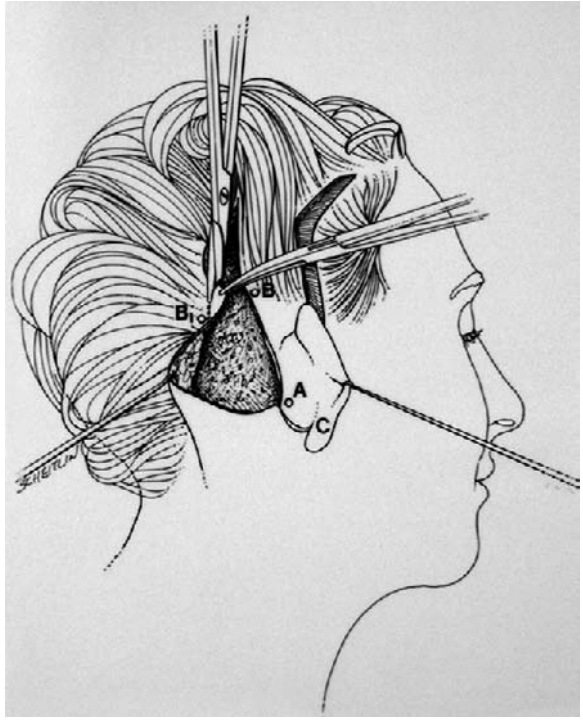

Fig. 47.4. The hairline is readjusted at *B*. A few millimeters of skin is resected along the posterior edge of the hairline to favor a superior displacement of the scalp (usually 3–8 mm). (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

This maneuver creates a discrepancy between the lower (long) and upper (short) edges of the scalp incision, like 3 cm at the upper edge and 4–6 cm at the lower edge. The suture between these edges of different lengths is easily made with the principle of "small bite–big bite." We use 3/0 Vicryl Rapide (Ethicon), but staples can be used. Sometimes a vertical fold of the scalp can be palpated below the lower edge, but it flattens out in a few weeks. One understand easily that to perform this elevation and realignment of the hairline, the retroauricular undermining of the scalp should be sufficient posteriorly and inferiorly to allow easy displacement, and that the more important is the posterior displacement, the longer should be the vertical scalp incision (from 3 to 5 cm). This hairline realignment (B) has taken care of 1.5–2 cm of the retroauricular skin discrepancy.

The temporal elevation is then adjusted. To determine its (Fig. 47.5) position, a d'Assumpçao clamp is placed 1 cm above the tragus of the ear, pushed in to hold the deeper structures and not to displace the ear. The cheek flap is then pulled up in an upper oblique direction, with the proper tension to smooth out the cheek. The clamp marks a point which is usually 2 cm below and 2 cm forward on the cheek flap. An incision is made to this point and a 4/0 resorbable stitch placed (Fig. 47.7) in front of the crus of the helix. The excess skin at the tragal and perilobular area is removed conservatively, and a deep stitch is placed at the level of the lobule (C).

We then place a cervical drainage, like a Blake drain, introduced through the scalp at the posterior end of the undermining and placed along the neck, finishing at the anterior part of the cervical undermining (Fig. 47.6). One has then to deal with the skin discrepancy existing between points A and B. The lower skin flap is pulled up and flattened upward, and a moderate resection of 0.5–1.5 cm of skin is performed. A series of inverted knots of 4/0 resorbable stitches will allow the difference of the length between the upper and lower edges to be resorbed, even if this difference is sometimes significant with 3 cm at the upper edge and 6 cm at the lower. An intradermal suture of 4/0 resorbable Monocril finishes the retroauricular suture. There are a few vertical skin folds. They disappear after a few weeks.

Fig. 47.5. After suturing the hairline at *B*, the scalp closure easily redistributes the discrepancy between the anterior and posterior edges of the hair-bearing scalp. One must then push the retroauricular skin excess upward, taking care to flatten the lower part. A key stitch *D* is placed at the upper part of the sulcus incision. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

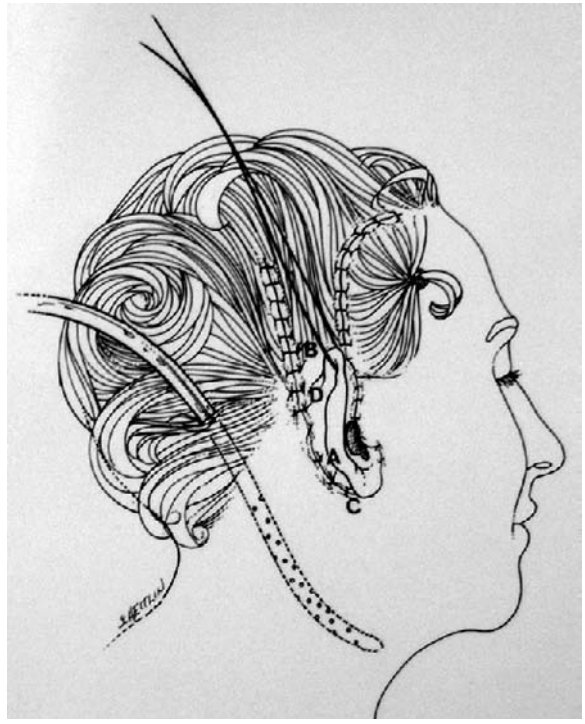

Fig. 47.6. The vertical retroauricular closure is completed after minimal skin resection. A suction drain is placed in the neck. A downward temporal flap is used anteriorly to maintain the temporal hair in normal position. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

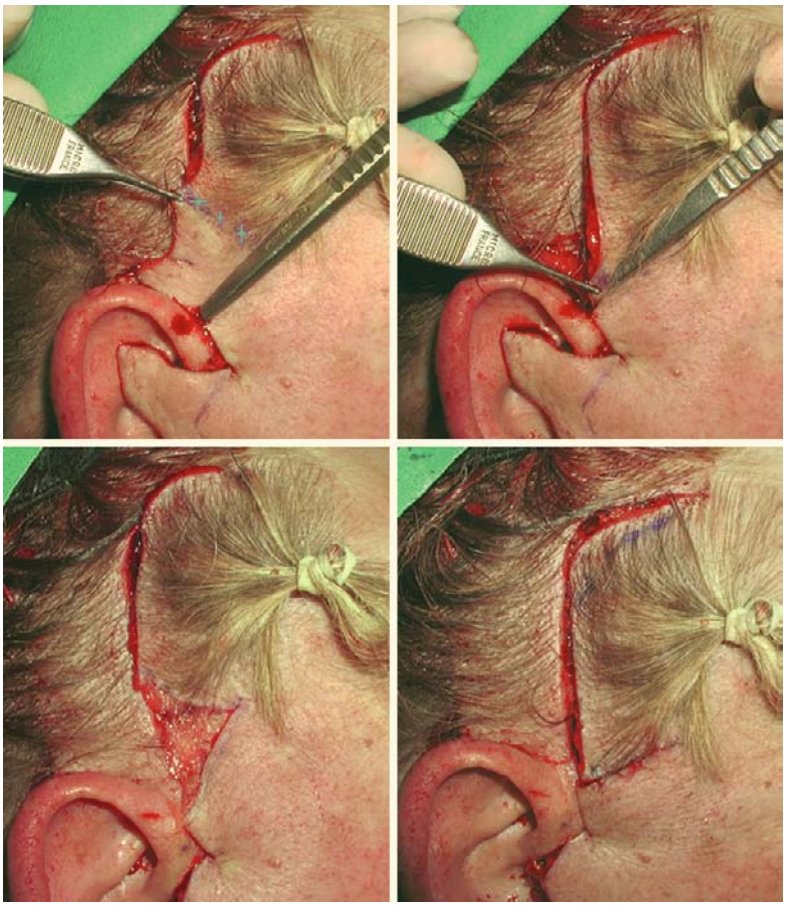

Fig. 47.7. Temporal downward flap. *Top left*: Once the preauricular key stitch has been placed, spreading the temporal flap would elevate the hairline. The posterior edge is grasped and the flap is folded over a thin instrument. *Top right*: One sees where the hairline can descend. *Bottom left*: The triangle thus delineated is deepithialized. *Bottom right*: After suturing of the triangle, there is very little to excise at the upper part, because of the downward movement. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

47.2.3 Downward Temporal Flap

At the temporal level, the skin flap is fixed under moderate tension by the placement of the key suture in front of the crus of the helix. There is usually a significant elevation of the temporal hairline. To avoid this hairline elevation, we perform a downward rotation (Fig. 47.7). The inferior temporal hairline is outlined, grasped at its posterior end, and the skin below it is folded onto itself. This delineates a triangle of resection below the horizontal temporal hairline. Instead of a full resection, we only perform a deepithelialization: first, to preserve the blood supply to the hair-bearing triangle and, second, to avoid a late-appearing depression at this level. After deepithelialization of this triangle, the two edges are sutured together with intradermal 4/0 Vicryl Rapide.

The temporal area must be smooth and even. At the time of the undermining, we elevated the skin close the lateral canthus and elevated if necessary the lateral frontal skin, to avoid any folds after elevation of the deep layers by the SMAS or suspension and skin elevation. This dissection is safe if one stays superficial, under the skin.

To be sure to flatten the temporal area, a deep suspension is performed between the temporal flap and the temporal fascia with a 4/0 resorbable stitch, 2 cm in front of the temporal incision. The upper edge of the temporal flap is then adjusted. The amount of hair-bearing skin removed is minimal – 2–4 mm, and sometimes none – because of the lowering of the upper edge of the temporal flap (the downward movement).

47.3 Secondary Cases

In secondary cases, the same technique can be applied. In the temporal area, the same flap is elevated with the same downward shift; minimal or no resection of the scalp at the upper part is necessary. In the retroauricular area, when the primary transversal retroauricular scar is of good quality, one can ignore the old scar and perform a vertical incision as if it were a primary case. Apart from occasional adhesions

Fig. 47.8. Secondary cases. *Left*: When the old transversal scar is of good quality (*arrow*) it is ignored, and the vertical incision is performed. *Right*: The old scar migrates higher and is no longer visible. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

at the scar level, the entire retroauricular area is easily elevated. At the end of the procedure, the old transversal scar has been raised significantly and made less conspicuous (Fig. 47.8).

47.3.1 Temporal Separate Incisions

The temporal incision allows an easy undermining of the crow's-feet area, a meticulous hemostasis, and the downward flap permits the hairline to be maintained in the in proper position. But sometimes, especially in smokers, there is a partial transient alopecia in front of the incision, or even a skin slough.

Therefore, in smokers or when the expected elevation of the skin cheek flap is moderate, one can avoid putting the temporal area at risk by using two separate incisions:

1. At the level of the temporal hairline, a horizontal incision
2. At the upper part of the temporal area, located at the same level as the horizontal part of the usual temporal incision, a 4–5 cm opening

The undermining is on the fascia and then subcutaneous and connects with the cheek incision. A lighted retractor is useful to check the dissection and the hemostasis.

47.3.2 Gluing

For many years, we used to spray fibrin glue under the elevated flap, with stay sutures kept for a long time, and the assistant tied the suture while the surgeon maintained the skin in the desired position [5, 6].

The silicone cervical drain seeming so effective, we have reevaluated the efficacy of the glue and found that the benefit in terms of diminution of ecchymosis and edema is not obvious. We have therefore decided to discontinue its use on a routine basis [7].We now use fibrin glue only in special cases of unusual bleeding or an agitated and hypertensive patient, and we then use at least 5 ml (2.5 ml for each side).

In any case, the suture is made with 3/0 Vicryl Rapide in the scalp portion; the deep interrupted stitches are made with 4/0 resorbable stitches; behind the ear, a 4/0 intradermal resorbable stitch, and in front of the ear, intradermal 5/0 Prolene and interrupted Prolene 6/0. In the case of a submental incision, it is closed with intradermal 5/0 Prolene, in one layer, with Steri-Strips.

No dressings are applied. The patient's head rests on a sterile absorbable towel. The patient is instructed to stay as quiet as possible, to avoid flexing and rotating the neck. One dose of antibiotics was given during the anesthesia and no more afterwards.

47.4 Evaluation of 100 Cases

The vertical approach has been used since April 2000. The first 100 cases [4], from April 2000 to July 2001, were carefully evaluated and the results are as follows.

The 100 consecutive patients, ranging in age from 44 to 80 years, were operated on either for primary or secondary face lifts. The subjects included 94 women and six men. Total excision of excess cervical skin ranged from 6 to 14 cm, with an average of 8.4 cm (i.e., 4.2 cm on each side). The distance between the retroauricular sulcus and the hairline was measured at the Frankfurt line level in ten patients before and after surgery. The backward displacement ranged between 0 and 3 mm. In these ten patients, the mean displacement between the ear and the hairline was therefore only 1.5 mm (Fig. 47.9). The early complications were limited.

Among our 100 patients, two partial retroauricular skin sloughs occurred, one in a heavy smoker (two packs a day) and one in a nonsmoker patient who developed sloughs in all undermined areas, temporal

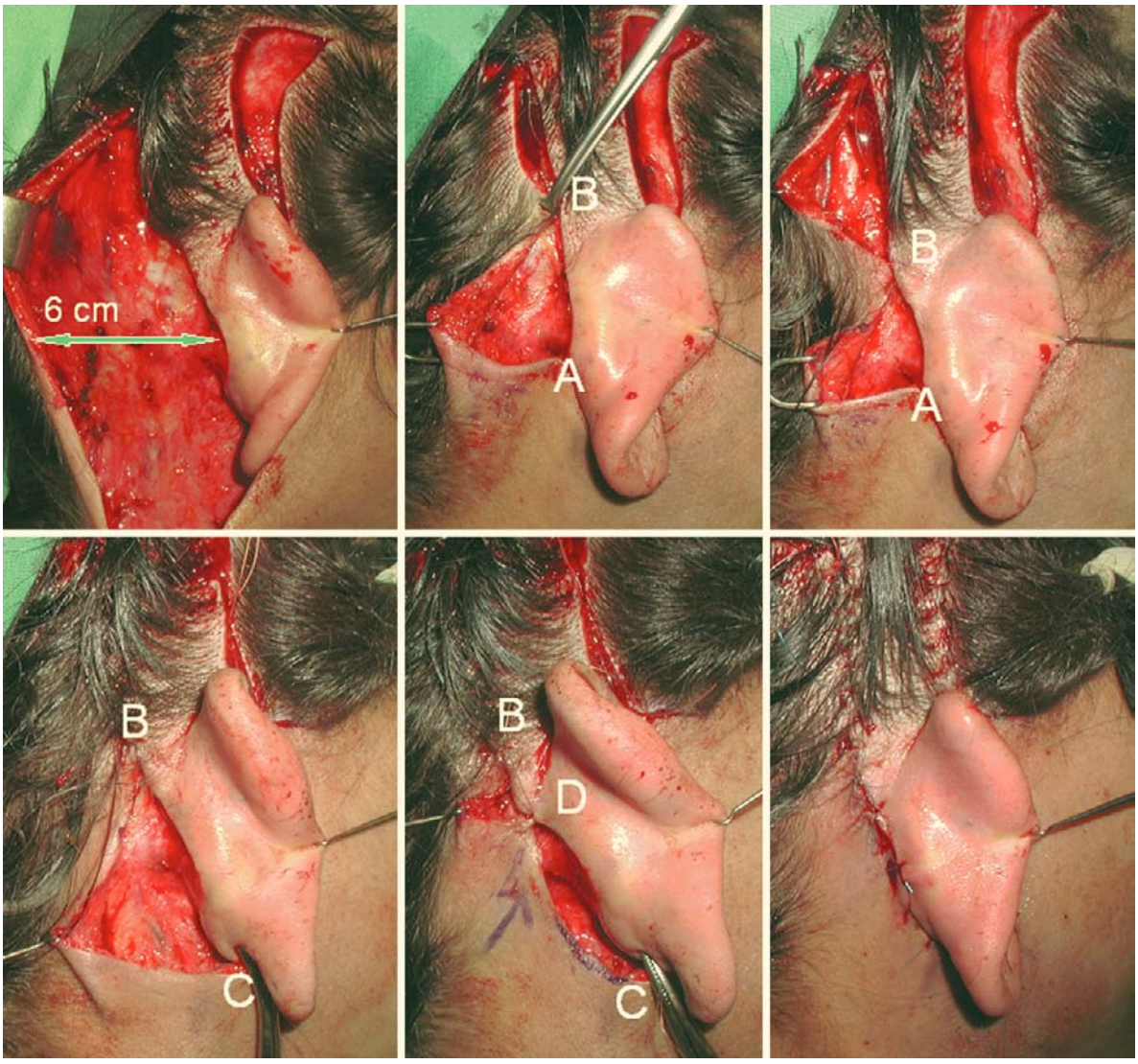

Fig. 47.9. Clinical example of vertical retroauricular closure. *Top left*: Extensive superficial undermining to 6 cm from the sulcus. *Top center*: Hairline is realigned at *B*, with a moderate pull and upward displacement of the posterior scalp flap. *Top right*: Above *B*, there is a discrepancy between the anterior scalp edge (3 cm) and the posterior edge (4–5 cm). *Bottom left*: The posterior flap will be pushed upward. *Bottom center*: After pushing upward behind the ear, a key point stitch is placed at *D*. The skin discrepancy is now mostly between *B* and *D*. *Bottom right*: The thin retroauricular skin adjusts well after multilayered closure. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

Fig. 47.10. Early folds in thick skin. *Left*: Eight days after a U-incision face lift with 5.5 cm retroauricular displacement in a 54-year-old male patient. *Center*: Two months later, the skin folds have disappeared. *Right*: Six months later, the retroauricular scar is not visible. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

and retroauricular, with no known disease or coagulopathic symptoms. The first patient developed a hidden retroauricular hypertrophic scar, and the second had some visible scars below the ear lobe. Two hematomas requiring evacuation occurred, but only two patients required aspiration of fluid in the cervical area. One postoperative cervical infection on the ninth day was observed on one side. The retroauricular incision was opened by a general surgeon for evacuation of the abscess, drainage, and irrigation; it healed uneventfully.

The scar remained well-hidden, being restricted to the retroauricular area. In five patients, retroauricular skin folds were observed, especially at the beginning of our experience. These gradually improved, and only one required revision (Fig. 47.10). There was no hair loss in the undermined retroauricular scalp area, whereas some temporary hair loss was observed in the temporal area in about 10% of patients. Two hypertrophic scars were observed, creating a few folds. No patient complained of pain or sensitivity problems in the retroauricular area.

Thirty-five patients were reviewed for follow-up at 6 months. The scars were of extremely good quality in the retroauricular sulcus. The vertical component between the sulcus and the hairline was well-hidden by the ear in all cases, and it was necessary to pull the ear outwards and lift the hair to see it. The scalp portion was also of good quality. There were no cases of enlarged or distended scars (Figs. 47.11, 47.12).

In most patients, the retroauricular area was flat, with a linear scar. In five patients, there were a few posterior folds. They were all well-hidden behind the ear, and only one patient requested revision, which was easily done by elevating the posterior edge and resecting the extra skin.

The overall result of the face and neck lift was good, equivalent at the neck level to the previous approach with a transversal incision (Figs. 47.13, 47.14). The patients expressed their satisfaction at having no visible retroauricular scars. This was true not only for the primary cases (26 out of the 35 cases reviewed) but also for the nine secondary cases.

Fig. 47.11. *Left*: Five days after vertical incision in a 60-year-old female patient; 5 cm retroauricular displacement. *Right*: Six months later, the scar is linear and the retroauricular area is smooth. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

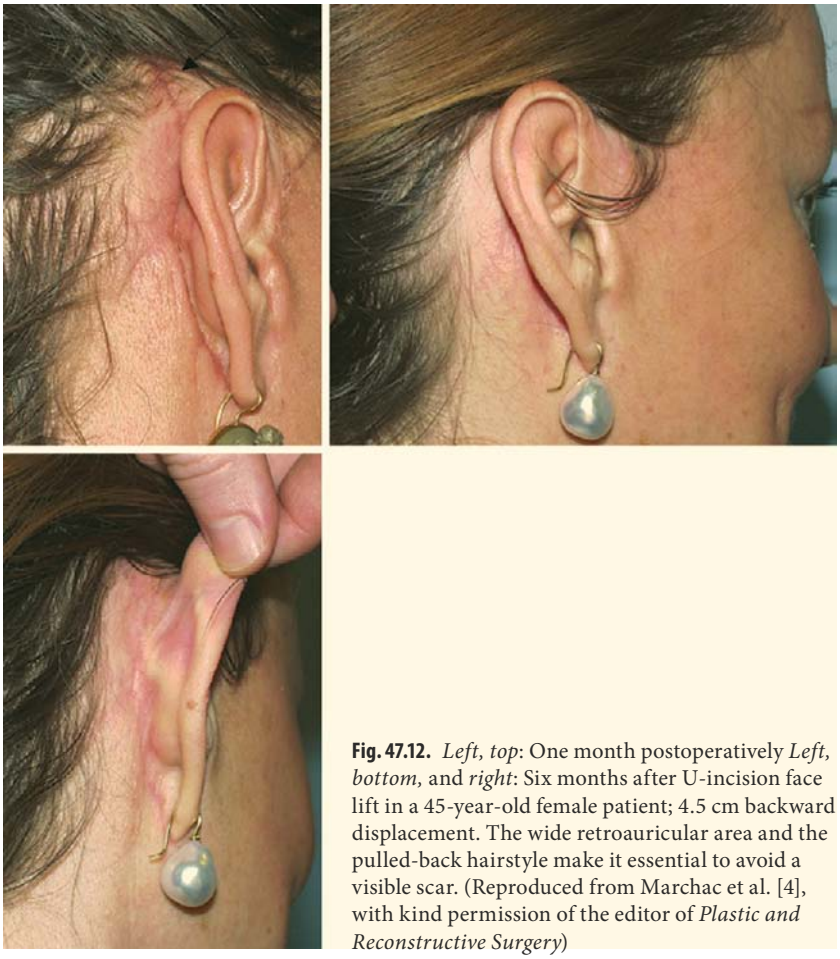

Fig. 47.12. *Left, top*: One month postoperatively *Left, bottom,* and *right*: Six months after U-incision face lift in a 45-year-old female patient; 4.5 cm backward displacement. The wide retroauricular area and the pulled-back hairstyle make it essential to avoid a visible scar. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

Fig. 47.13. *Left*: A 58-year-old female patient. *Right*: Six months after U-incision face lift with a vertical retroauricular scar and temporal downward triangle. The temporal horizontal scar is not visible, hidden by the downward movement of the hair. *Center*: The ear must be retracted forward to see the vertical scar. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

47.5 Discussion

In both the temporal and the retroauricular areas, we favor a technique of wide undermining and repositioning of tissues with very limited skin and scalp resection. It is more a redistribution than a resection. In the temporal area, the backward displacement of the hairline is no longer acceptable. The precapillary incision is the old way to avoid compromising the hairline. Studies by Connell [8], Camirand [9], and Camirand and Doucet [10], have shown that a precise technique can produce excellent results. We use it sometimes, especially in secondary cases in which the temporal area has already been altered, but it is still unpredictable in our hands, and we prefer an incision within the hair-bearing area.

The incision of Guyuron [11], which is below the hairline in the horizontal position and then enters the hair-bearing portion vertically, is interesting. Its drawback is for secondary face lifts because a new elevation creates a step at the anterior portion. Another way to maintain the temporal hairline at its horizontal level is to resect the extra skin below the horizontal portion. This technique is advocated by Little [12]. One must then add a pull at the upper part of the temporal area to be able to pull on the skin of the malar area. We prefer to elevate a temporal flap that will allow redistribution of the skin area located between the lateral canthus and the hairline. In secondary face lifts, Rees [13] has described the resection of a triangle below the temporal hairline when there is considerable skin excess; however, his technique pulls and lifts the temporal scalp area upward. We prefer the contrary, namely, a downward movement of the temporal

Fig. 47.14. *Left*: A 60-year-old nonoperated patient. *Top center*: Three months after a U-incision face lift with endobrow lift and upper blepharoplasty. *Bottom center*: The vertical retroauricular scar; 4.5 cm backward displacement. *Right*: One year after surgery. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

flap that maintains the hair at its original level and avoids significant resection of the scalp (Fig. 47.7). The lowering of the temporal flap recruits most or all of the excess scalp at the upper edge. In secondary cases, when the temporal hairline has been elevated and is often already too high, the downward temporal rotation flap will avoid further elevation and result in a lower temporal hairline.

In the retroauricular area, many attempts have been made to eliminate the visible retroauricular scar, ranging from a high transversal incision to the high retroauricular flap by the senior author [3] to techniques by innovative precursors like Claoué [14] (Fig. 47.15). The vertical incision relies on a different approach, using mostly redistribution and skin retraction after extensive subcutaneous undermining. Our previous approach with a horizontal scalp incision and vertical back cut [1] was already creating a significant skin discrepancy between the realigned hairline and the retroauricular sulcus, but we observed that the posterior excess of the thin retroauricular skin was easily addressed and rapidly flattened.

The description of Eanes et al. [15] of an endoscopic neck lift with transfer of excess scalp skin has shown that posterior shifting of the elevated scalp is possible. When Little [12] described his omega approach, we were very interested and developed our method with several of his ideas, but also with some radical changes. His incision is omega, that is, oblique posteriorly in the scalp, whereas ours is strictly vertical. The level

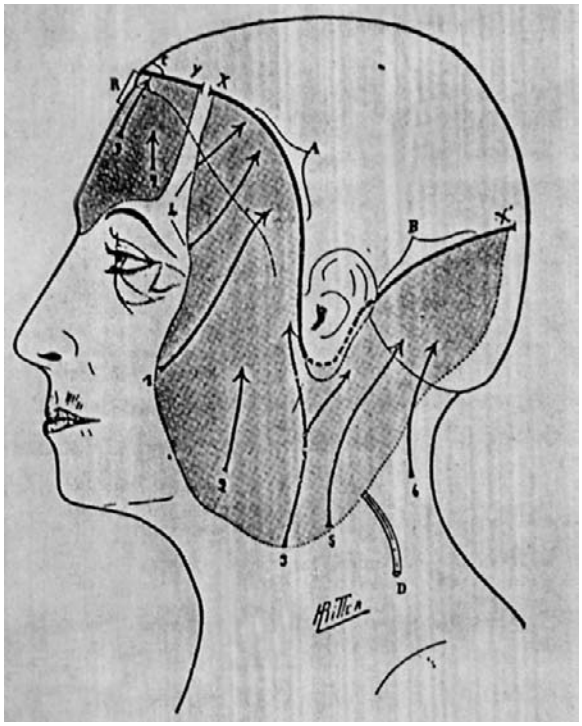

Fig. 47.15. An old idea: the proposal of Claude Claoué in 1933. (Reproduced from Marchac et al. [4], with kind permission of the editor of *Plastic and Reconstructive Surgery*)

of undermining under the scalp is different. He uses a deep dissection downward, under the muscle, close to the periosteum, whereas our dissection is superficial and subcutaneous. Little exerts a significant pull on the lower edge of the scalp and excises 1–3 cm, whereas we exert no tension and there is minimal resection (a few millimeters) at the scalp level. The redistribution of retroauricular skin is equivalent, but we excise much less skin. Little [12] warns about the danger of this extensive dissection, particularly the risk of damaging the posterior branch of the lesser occipital nerve and the greater occipital neurovascular bundle. We stop the undermining under the scalp at 5 or 6 cm from the retroauricular sulcus, and we have neither seen nor damaged these nerves.

The ease with which dissection in the retroauricular area is done varies greatly from one patient to another. Infiltration with lidocaine and epinephrine followed by progressive, gentle dissection above the aponeurosis are the ways to maintain a continuous layer without damaging the deep structures, such as muscles and nerve branches. According to Little [12], his technique requires an additional hour of work, whereas our approach lengthens the operating time by 20 min.

All our primary cases are now treated this way because we do not see any contraindication. An additional significant advantage of the vertical scar is the increased viability of the retroauricular flap. It is one large advancement flap with a good blood supply, and we no longer experience the occasional limited retroauricular slough at the tip of the triangular classic flap. We had only two problems in 100 patients, as discussed before.

We also use this technique in secondary face lifts when the existing transverse retroauricular scar is of good or acceptable quality (Fig. 47.8). In these cases, we simply ignore the old scar and perform the vertical approach. In the 22 patients treated – with an average of 8 years between the primary and secondary face lifts – we have not observed any slough or healing problems above the previous scar. When the old scar is of poor quality (i.e., wide or conspicuous), we then prefer to excise it and reproduce the original approach.

Objections to this well-hidden and vertical scar might be insufficient cervical pull and hairline displacement. It is true that the cervical pull is exerted only in the retroauricular area and not lower in the posterior aspect of our neck skin under tension. It is according to the teaching of Millard et al. [16], who advocated pulling the main vector behind the ear, along the Frankfurt line.

Some think it is necessary to pull lower and perform a low precapillary incision. For these clinicians, the vertical approach will not obtain their approval because it does not create a transversal tension in the lower part of the neck. We strongly think that this lower tension is not necessary and that many of the precapillary incisions widen conspicuously.

When the platysma muscles are sagging, a strong pull on the deep layer, cervical platysma mobilization with sutures under tension to the sternocleidomastoid aponeurosis, defatting of the neck, and a reasonable retroauricular skin pull are, in our experience, the best way to produce a good result in the neck.

There is mostly a redistribution of retroauricular skin with this technique, occasionally accompanied by a moderate recession of the retroauricular hairline (about 2–4 mm). This is of no consequence in the majority of patients whose hairline is rather close to the ear. When the hairless retroauricular area is wide, it can be objectionable to enlarge it further. On the other hand, it is with these patients that the classic transverse retroauricular scar will be most conspicuous and, thus, these patients derive greater benefit from the vertical approach, even at the cost of this very moderate hairline displacement.

Recently, Baker [17] proposed a short face lift incision with a very limited retroauricular incision at the inferior aspect of the posterior sulcus. He elevates an-

teriorly and preauricularly to correct the ptosis of the cheek and neck. He states that there is frequently a skin fold under the lobule because of the absence of retroauricular pull; this is demonstrated in the cases he has presented. His main goal in presenting this short-scar face lift is to avoid a visible transversal retroauricular scar. If we understand it correctly, he does not object to the length of the retroauricular scar, but to its visibility. The vertical retroauricular scar eliminates the visibility and achieves a satisfactory retroauricular pull with better skin distribution. It also allows correction of considerable skin excess with a hidden scar, whereas Baker does not recommend his short-scar technique in cases in which the skin excess is significant.

When a patient presents with very heavy cheeks, we perform a suspension as proposed by Tonnard [18]. Two or three loops of 2/0 Prolene are passed on the cheek and fixed to the periostium of the zygomatic arch or the temporal aponeurosis. Irregularities or lumps are smoothed out with 4/0 resorbable stitches.

In the temporal area, the downward rotation flap both maintains the lower hairline at about the same level and places the malar and crow's-feet areas under tension. The downward movement enables one to perform a limited scalp resection at the upper part of the flap (or sometimes even to avoid resection entirely). The horizontal temporal hairline scar is usually of very good quality, hidden by the hair that grows downward at this level. Despite a careful dissection and the absence of tension on the temporal flap, we have observed 10% of patients presenting with significant loss of temporal hair, usually in front of the scar. Complete regrowth is usually obtained within 2–3 months, but that is why we sometimes perform two incisions, one below the hairline, one in the temporal area.

47.6 Conclusions

We believe that the vertical U incision addresses the problem of visible posterior scars in face lifts. This technique relies on redistribution of skin and scalp rather than on the traditional backward pull. The SMAS is elevated according to the level of sagging tissues. The hairline is not displaced, and the hidden scars are of excellent quality. This is now our operation of choice for both primary and secondary face lifts.

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Mini Facelift as Prophylactic Preservation of Youth 48

Dimitrije E. Panfilov

When we have situation where the neck skin is not very affected and the face could require some support, then we take into account only preauricular access for a so-called minilift. The deep layer, however, should be done well. For decades the majority of plastic surgery patients were older; there is now an increasing number of younger patients in their mid-40s, sometimes even in their early 30s.

The question occurs whether facelifting at such an early age is at all reasonable? If we conduct facelift surgery on a 60-year-old or on a 70-year-old, the surgery can cause a rejuvenation effect of 15–20 years. The younger our patients are, the smaller the effect of rejuvenation will be. There are not many traces of age to be modified on a 30-year-old. Yet her/his features can be beautified and harmonized.

There is another advantage of facelifting at an early age: traces of age will take effect later in life. This is due to the fact that the deep level of the superficial musculo-aponeurotic system (SMAS) is lifted well and fixated with lasting effect. That is why this procedure could be considered as prophylactic preservation of youth or prevention of an ageing look.

The media often causes speculation about how long the effect of a certain method of plastic surgery will last: 3, 5, 10, 12, 15 years…? Robert Flowers from Hawaii had luck when he found two female twin sisters in the USA: one of them had undergone facelifting, the other – because of health, family, and financial reasons – had not. Flowers organized a meeting between the two sisters, placed them on the couch, and took photographs: 10, 20, and even 30 years after

Fig. 48.1. **a** Our youngest patient, 28 years of age. **b** One week after surgery she does not look much younger, but harmonized and beautified

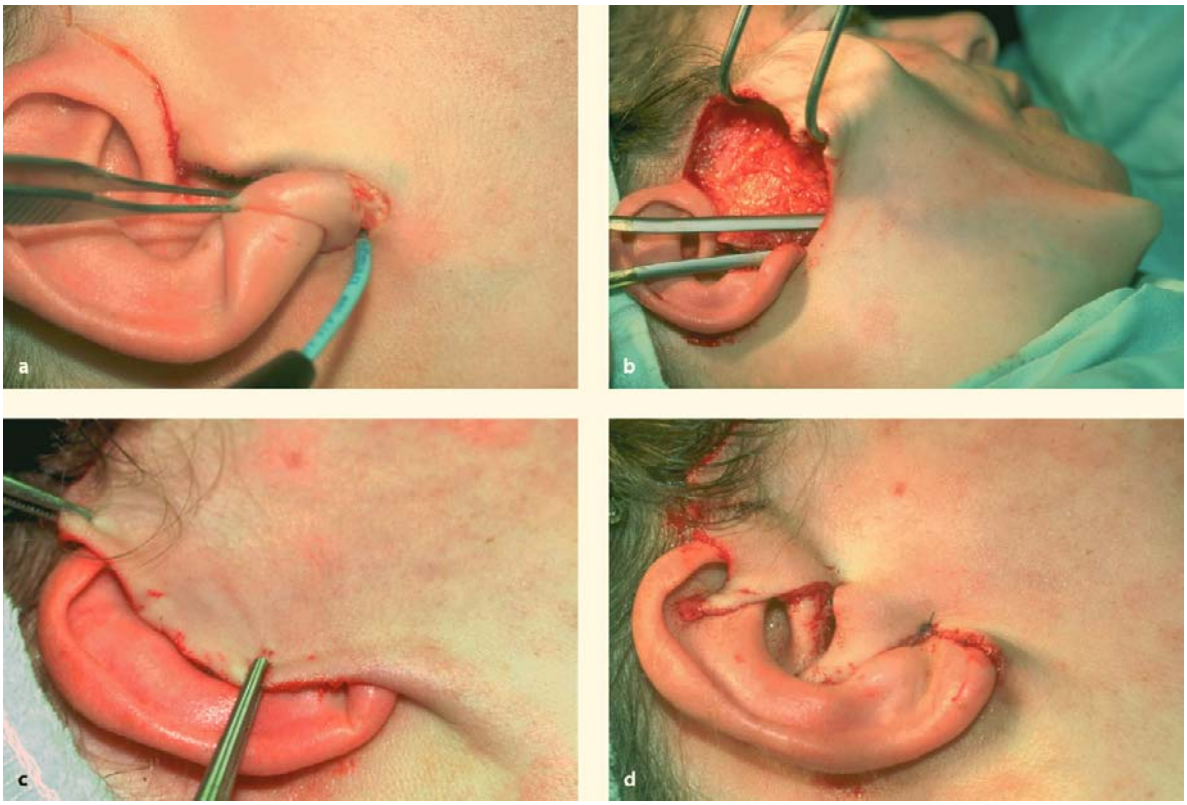

Fig. 48.2. **a** Preauricular, retrotragal incision with radiosurgery. **b** Skin flap preparation till the midline of the neck. **c** After the superficial musculo-aponeurotic system (*SMAS*) layer has been tightened well; skin excess to be removed. **d** To achieve a harmonious result, we avoid too much tension of the skin

plastic surgery the differences between the two sisters were still visible. One could easily tell which one looked younger, which one had undergone plastic surgery.

The effects of facelifting last forever. The skin and SMAS layers, parts of which we remove, do not grow back nor do they regenerate. The time lapse our patient has gained has everlasting effects. Yet we have to warn our patients: we can turn back time on the biological clock but we cannot stop it, it will go on. A 60-year-old woman can be made to look 45 again, but 15 years on she will not look 45 anymore, rather 60. Providing there is sufficient zest for life and health, we can conduct a second facelift surgery, which is a completely new operation, not a correction of the first.

In secondary procedures, we only have to respect the previous scars and, if necessary and possible, to correct them, to make them less obvious.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 48.3. **a** Male patient, 40 of age, with dermographic markings for a minilift. **b** The same patient 1 day postoperatively. Comparison **c** before and **d** after 7 days: intradermal sutures to be removed, hair-wash allowed, he is resocialized

Fig. 48.4. A 33-year-old patient **a** before and **b** 2 weeks after mini facelift and upper and lower blepharoplasty

Fig. 48.5. **a** This 53-year-old patient had a facelift (somewhere else) 9 years ago. **b** Dermographic markings: notice the temporal and frontal visible scars in the prehairline. **c** Six days after mini facelifting, vertical simple snail SMAS flap and augmentation of the lower lip with a strip of the SMAS

Fig. 48.6. **a** A 60-year-old patient had a facelift elsewhere 8 years ago. **b** A mini facelift was enough to refresh her appearance

The MACS Lift – Minimal Access Cranial Suspension Lift

49

Patrick Tonnard, Alex Verpaele

49.1 Introduction

When different surgical techniques in plastic surgery and especially in facial rejuvenation surgery are compared, one is tempted to look only at the end result and not at the global risk–benefit ratio that should be considered with any intervention. Some interventions can lead to superb final results but this at the cost of a possibly high complication rate and a long postoperative recovery period. It is not always the most aggressive and extreme surgery that delivers the happiest patient. There is a delicate subjective balance between the final result and the morbidity of the procedure that will determine the degree of the patient's happiness.

In the last decade of the twentieth century, facial aesthetic surgeons became increasingly convinced of the importance of shifting facial volumes rather than putting traction on the skin. The concept of volumetric rejuvenation gained worldwide acceptance. The restoration of facial volumes is more important than the amount of skin resected and the tension on the skin and superficial musculo-aponeurotic system (SMAS).

All traditional facelift designs have an oblique vector of traction on the SMAS which can be decomposed into a horizontal and a vertical component (Fig. 49.1). The horizontal component of this vector of traction on deep tissues and skin does not really rejuvenate the face. It rather flattens the face and puts it under tension.

In recent years, more emphasis has been put on reorienting this vector in a more vertical direction.

The working hypothesis of minimal access cranial suspension (MACS) lifting is as follows: The only rejuvenating vector applied on the deep tissues as well as on the overlying skin is the *vertical* one.

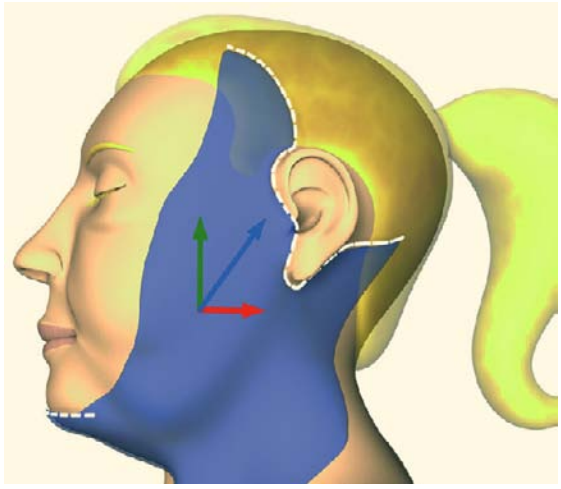

Fig. 49.1. Traditional facelift designs have an oblique vector of traction on the superficial musculo-aponeurotic system (*SMAS*) which can be broken down into a horizontal and a vertical component. In recent years more emphasis has been placed on reorienting this vector in a vertical direction

In the MACS lift the horizontal vector of traction is omitted, making this procedure a pure vertical vector facelift on deep tissues as well as on skin. It is aimed at obtaining an antigravitational volume redistribution in the upper neck and face by suspending the soft tissues of the face, working in the superficial subcutaneous plane without any deeper undermining. The skin excess is redraped in a vertical direction and resected in the temporal region and lower eyelid.

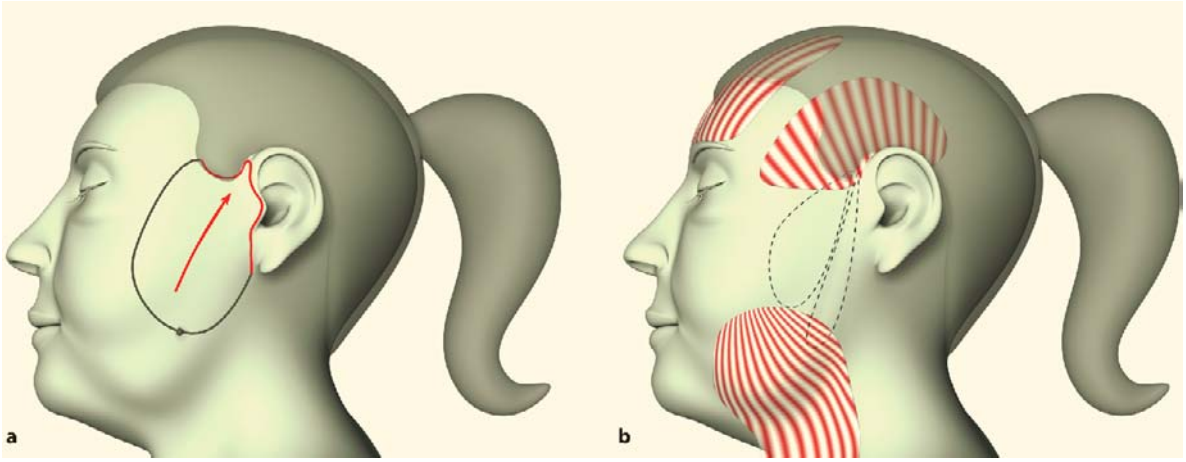

Fig. 49.2. Simple minimal access cranial suspension (*MACS*) lift. **a** The incision starts at the lower limit of the earlobe, runs preauricularly to the temporal hairline following this along the sideburn up to the level of the lateral canthus. The skin is undermined in a subcutaneous level approximately 5 cm in an anterior direction. The mandibular angle is the inferior limit of the undermining. The *arrow* indicates the vector of the traction. **b** Position of the vertical, narrow purse-string suture and the 30° wide purse-string on the nonundermined SMAS with anchoring to the deep temporal fascia

49.2 The Technique: Simple and Extended MACS Lifting

The general principle of the MACS lift is the vertical suspension of sagged facial soft tissues with permanent or slowly resorbable purse-string sutures strongly anchored to deep temporal fascia through a preauricular and temporal prehairline incision.

Two variations of the procedure were designed:

1. *The simple MACS lift(S-MACS*), where two purse-string sutures are placed for correction of the neck and the lower third of the face (cervicomental angle, jowling, marionette grooves).
2. *The extended MACS lift (X-MACS)*, where a supplementary third purse-string suture is placed to suspend the malar fat pad. This suture will have an extra effect on the nasolabial groove, the midface and the lower eyelid.

In the simple MACS lift, two purse-string sutures are used for correction of the neck, the jowls and the marionette grooves. They are both anchored to the deep temporal fascia above the zygomatic arch 1 cm in front of the auricular helix. The first suture runs as a narrow vertical U-shaped purse string to the region of the mandibular angle catching the lateral border of the platysma muscle. Tying this suture under maximal tension produces a strong vertical pull on the lateral part of the platysma muscle, correcting the cervicomental angle of the neck region, which has been liposuctioned previously. The second purse-string suture starts from the same anchoring point above the zygomatic arch and runs obliquely in the direction of the jowls as a wider O-shaped loop. This suture corrects the jowls, the marionette grooves and the downward slanting of the corners of the mouth (Fig. 49.2).

When performing an extended MACS lift, an additional undermining of the skin over the malar region is performed. A point dropped 2 cm below the lateral canthus has been marked with the patient in the standing position. It will be included in the skin undermining and is the inferior limit of the third purse-string suture. This suture originates as well from the deep temporal fascia, but in its anterior part, lateral to the lateral orbital rim. It provides a strong correction of the nasolabial fold, an enhancement of the malar region, a lifting of the midface and a shortening of the vertical height of the lower eyelid (Fig. 49.3) .

In both the simple MACS lift and the extended MACS lift the skin is redraped in a *pure vertical direction* and the excess of skin above the temporal hairline incision is resected. As no lateral traction on the skin is applied, there will be no dog-ear at the level of the earlobe, eliminating the need for a retroauricular dissection (Fig. 49.4).

As a consequence of lifting the malar fat pad in the direction of the lateral orbital rim, a bunching up of skin in the region of the lateral part of the lower eyelid and the paracanthal zone becomes apparent. A skin excision in the subciliary and paracanthal region hence becomes mandatory. This pure skin resection is easy and safe because of the good structural support of the lower eyelid provided by the third purse-string suspension suture. This observation has led to

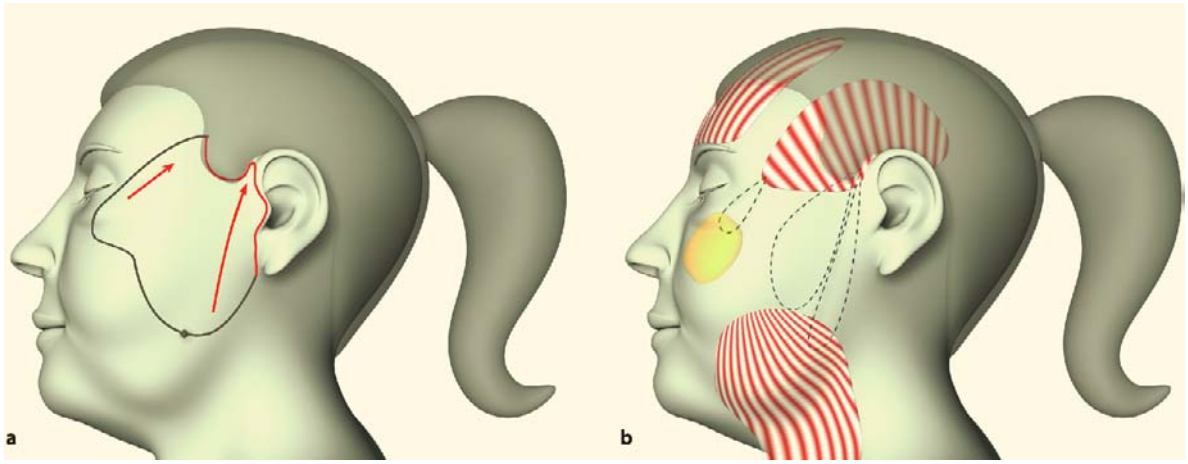

Fig. 49.3. The extended MACS lift. **a** Preoperative marking of the preauricular and infracapillary incision, which is extended along the temporal hairline with supplementary undermining of the malar region and different vectors of traction (*arrows*) on the midface soft tissues. **b** Position of a third narrow purse-string suture, in addition to the two purse-string sutures described in Fig. 49.2, between the anterior part of the deep temporal fascia and the malar fat pad

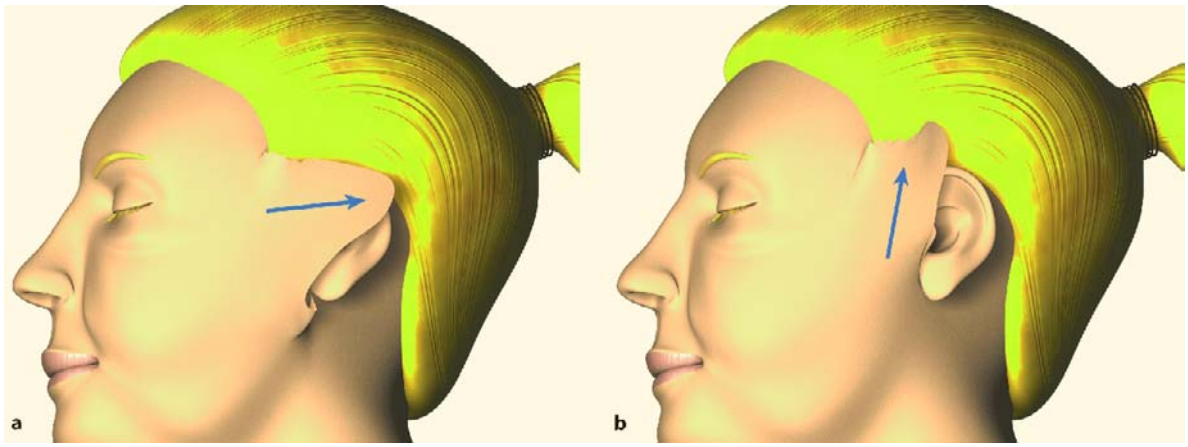

Fig. 49.4. **a** When lateral skin redraping is performed, as in classic facelifts, a dog-ear appears at the earlobe which necessitates redraping by retroauricular flap dissection. **b** Vertical skin redraping, in contrast, will not produce a dog-ear under the earlobe and will avoid the necessity for retroauricular dissection

the development of the principle of *pinch blepharoplasty*: the excess of skin is evaluated by pinching the skin between the teeth of forceps and is excised via a lower-eyelid blepharoplasty incision with paracanthal extension. Four to eight millimetres of skin can easily be resected especially in the paracanthal region without the risk of ectropion or scleral show.

49.3 Indications and Contraindications

The appeal of the MACS lift lies mainly in the fact that it offers a stable and natural facial rejuvenation by a simple and safe procedure of 2–2.5 h which can be performed under local anaesthesia on an outpatient basis. In comparison with a classic facelift, the MACS lift has a quicker recovery and a lower morbidity. Last but not least the final scar is significantly shorter.

The MACS lift provides a powerful correction of submental and upper-neck laxity, correction of a blunted submental angle, restoration of a well-defined jaw line by correction of the jowls, restoration of the midfacial volume and correction of the nasolabial fold.

The decision whether to perform a simple or an extended MACS lift is not purely determined by the age of the patient. The main consideration to make is whether the patient needs a correction of the upper

half of the nasolabial fold and the midface. The third suture, suspending the malar fat pad, gives a powerful correction of these features. It also enhances the volumetric restoration of the midface and provides a very strong support of the lower-eyelid skin. This means that the indication for the third suture can be extended to patients with a flattened malar mound and laxity of the lower eyelids. This is not only determined by age, but also by the facial bony anatomy.

In classical teaching smoking is considered an absolute contraindication for facelift surgery. Because of the limited subcutaneous undermining and the absence of multiplanar dissection, we consider smoking more as a relative contraindication.

As a general rule only, patients without a major medical history or cardiovascular risk factors are selected for outpatient office-based surgery. The decision whether to perform the MACS lift under a local or under general anaesthesia depends on the surgeon's and the patient's preference.

49.4 Operative Technique

49.4.1 Submental Infiltration

The sequence of infiltrations follows the sequence of the procedures. This means first the upper eyelids if treated, followed by the submental area, and then followed by one cheek infiltration.(For the anaesthetic solution see Table 49. 1)

For the submental suction lipectomy an average of 30–40 ml is infiltrated in the preplatysmal fat until a moderate degree of tumescence is reached.

49.4.2 Peroperative Marking: Incision

The marking starts at the lower limit of the lobule, going up in the preauricular crease. At the level of the incisura intertragica the marking makes a 90° turn backwards to preserve the integrity of this anatomical landmark. The marking then follows the posterior edge of the tragus, ascending towards the helical root.

Table 49.1. Anaesthetic solution for minimal access cranial suspension lift

100 ml	0.9 % NaCl
20 ml	2% lidocaine
10 ml	10 mg/ml ropivacaine
2 ml	8.4% sodium bicarbonate
0.2 ml	10 mg/ml levorenine
10 mg	triamcinolone

* From Tonnard PL., Verpaele AM. The MACS-lift Short Scar Rhytidectomy. St. Louis: Quality Medical Publishing, 2004.

At the superior limit of the ear the marking follows the small hairless recess between the sideburn and the auricle and then turns downward to follow the inferior implantation of the sideburn. In men the marking descends approximately 1.5 cm before turning anteriorly to cross the sideburn.

The marking runs further forward in a zigzag pattern, 2 mm within the lower and anterior implantation of the sideburn. In this part of the incision, the knife is inclined to an angle almost tangential with the skin so as to cut hair shafts perpendicularly (Fig. 49.5). This manoeuvre will allow hair to grow through the scar. After hair regrowth, the final scar will be hidden a few millimetres within the hairline and become virtually invisible. The purpose of the zigzag pattern is to increase the length of the temporal incision for better congruence with the length of the cheek flap, thereby reducing dog-ear formation.

In the simple MACS lift the incision will extend to the level of the lateral canthus. In an extended MACS lift the incision goes up to the level of the tail of the eyebrow. The total length of the incision will usually not exceed 7–9 cm, depending on the dimensions of the auricle (vertical branch of the incision) and the width of the sideburn (horizontal branch of the incision).

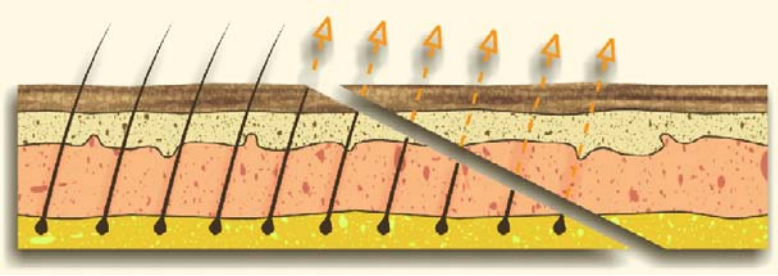

Fig. 49.5. Incision in the skin perpendicular to the hair shafts will allow hair regrowth through the scar and through the skin in front of the scar. This will hide the scar within the hair-bearing skin, making it less conspicuous

49.4.3 Peroperative Marking: Undermining

The mandibular angle is palpated with the index finger and marked as the lowest point of the undermining. The extent of the undermining is marked starting from the lowest point of the incision at the lobule, directed towards the marking of the mandibular angle, and then curving anteriorly to 5–6 cm in front of the ear. In the case of an extended MACS lift, the undermining of the malar eminence is included in the demarcation.

49.4.4 Suction Lipectomy

We prefer to use a 3 mm spatula cannula, with one opening. The opening is never directed towards the skin to avoid dermal damage. Two or three incisions are used to crisscross the marked area optimally. The lipectomy is performed in a preplatysmal plane under tactile guidance of the nondominant hand. A maximal lipectomy is performed, so that in the end the cannula is visible just beneath the skin.

49.4.5 Flap Creation

The skin is undermined blindly with Rees-type facelift scissors. The dissection is performed in a subcutaneous plane. The points of the scissors are directed towards the skin to have visual and palpable control over the thickness of the cheek flap. Most of the dissection is done by spreading manoeuvres with the scissors. Care is taken to create a flap of sufficient thickness to mask small irregularities of the underlying layer.

49.4.6 The First Purse-String Suture: the Vertical Loop

This suture will be fixed to the deep temporalis fascia at a point 1 cm above the zygomatic arch and 1 cm in front of the helical rim. An extra dose of local anaesthetic is injected at the anchor point down to the temporal bone, withdrawing the needle and infiltrating all layers of tissues.

With the iris scissors in the spreading mode a 0.5-cm-diameter window is made in the subcutaneous tissue to visualise the deep temporal fascia. It should be identified as a distinct white shiny layer.

A 2-0 permanent suture on a big V-7 needle is used to perform the suspension of the sagged facial and neck soft tissues. Monofilament polypropylene (Prolene), poly(tetrafluoroethylene) (Gore-Tex) or braided nylon (Mersilene) can be used, as well as a slowly resorbable PDS O suture.

The first bite starts in the window where we visualise the deep temporal fascia and goes down to the temporal bone. The needle is oriented towards the tragus so there is no danger of damaging any facial nerve branch. Firm bites 1–1.5 cm long and 0.5 cm deep are taken in the SMAS tissue, which consists of parotid fascia in the upper two thirds and platysma in the lower third. It is essential to confirm that every bite of the needle takes a substantial part of SMAS tissue, so that the suture will not pull through.

The suturing goes down towards the region of the mandibular angle until the lower limit of the undermining. In this region direct visualisation by means of a head light or a lighted retractor is helpful. After placing 2 or 3 firm bites in the lateral part of the platysma muscle, the suturing is turned upwards and continued towards the starting point. This creates a narrow U-shaped purse-string loop with a width of about 1 cm. Some skin dimples may have to be freed at the borders of the undermining.

49.4.7 The Second Purse-String Suture: the Oblique Loop

The second suture originates from the same location on the deep temporal fascia. This purse-string suture forms a wider loop, directed towards the region of the jowls, at an angle of 30° with the vertical. This loop is more O-shaped instead of the U-shaped vertical loop to prevent linear traction on the subcutaneous tissue, which could be visible through the skin.

The loop follows the borders of the anterior undermining in the lower part of the cheek. Short bites of maximum 1 cm are taken in the parotid fascia and the SMAS tissue.

49.4.8 The Third Purse-String Suture: the Malar Loop

The third suture has a separate anchor point on the deep temporal fascia, just lateral to the lateral orbital rim, which is in front of the course of the frontal branch of the facial nerve. Here a window is made in the orbicularis muscle down to the deep temporal fascia by spreading the iris scissors. This suture should also have a *narrow* U shape to prevent bulging of subcutaneous tissue in the highlighted zygomatic area. It runs to the malar fat pad, which was preoperatively located by a point marked 2 cm below the lateral canthus.

A deep bite is taken anchoring the suture to the deep temporal fascia. The purse-string suture is oriented obliquely downwards and medially. The malar fat pad is recognisable by a more fibrous consistency than the surrounding subcutaneous fat. At the preoperatively marked point, referring to the malar fat pad,

the direction of the suturing is reversed, now in an upward and lateral direction. The loop has a narrow U shape, grabbing firm parts of tissue with every bite of the suture. The suture ends at its starting point in the window made in the orbicularis muscle.

The knot is tied under maximal tension. The window in the orbicularis muscle is closed with 4-0 Vicryl to prevent knot palpability in the lateral orbital region. Again some skin dimples may have to be freed with the scissors at the borders of the malar undermining.

49.4.9 Skin Redraping and Resection

One of the most important features in this short scar facelift is the *vertical* redraping of the skin. As the vector of the SMAS suspension is nearly purely vertical, the redraping and resection of the skin in the same direction will seal the underlying suspension effect. Because the earlobe is pulled upward by the suspension sutures, it will have to be set back in the cheek flap, taking the place of any dog-ears.

In classic face lifting there is always a horizontal component of skin redraping. This causes a skin excess in the earlobe region, necessitating a retroauricular incision for skin redraping.

The skin resection on the cheek flap is carried out in linear fashion and will be sutured to the zigzag border of the temporal hairline incision. The zigzag incision will now open up when coapting with the linear cheek flap, thereby compensating for the incongruence in length of the both borders and reducing possible dog-ears.

Closure with interrupted 4-0 Vicryl buried sutures is started from the superior end of the incision downwards. This is important to avoid dog-ears in this section.

The horizontal limb of the incision is sutured with a running 5-0 nylon horizontal mattress suture, taking bigger bites on the cheek flap side than on the temporal side to compensate for the final incongruence in length between both sides. A small hollow silicon tube is inserted for drainage at the lowest point of the incision. It will drain into the loose retroauricular dressing during the first 24 h, after which it is removed together with all dressings. The rest of the suturing is done with running and separated 6-0 nylon sutures.

49.4.10 The Pinch Lower Blepharoplasty

This is routinely added after performing an extended MACS-lift procedure as the lifting of the malar mound creates a skin excess in the lower-eyelid region (Fig. 49.6).

The concept of the pinch blepharoplasty of the lower eyelid is the safe removal of excess skin in the paracanthal and lateral subciliary region after providing strong structural support of the lower eyelid through suspension of the malar fat pad with the third purse-string suture of the extended MACS-lift procedure.

The skin excess is estimated by a pinching manoeuvre with forceps and marked with methylene blue. The pinch blepharoplasty is performed via a classic lower blepharoplasty incision. The skin is freed from the orbicularis muscle, is vertically redraped without any tension and resected. The skin is closed with a running 5-0 nylon intradermal suture.

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Fig. 49.6. a–c Frontal, three-quarter and profile views of a 56-year-old woman with a general sagging of the midface, marked nasolabial folds, marionette grooves and jowls, and moderate submental skin laxity with visible platysmal bands. **d–f** Results 8 months after an extended MACS lift (three sutures) with liposuction of the submental area, lower-lid pinch blepharoplasty, and upper-lip resurfacing with an erbium laser. Note the general triangularisation of the face in frontal view, the correction of the neck skin laxity with disappearance of the platysmal bands, and adequate correction of jowling with better definition of the mandibular border. There is an improvement of the marionette grooves and nasolabial folds, and an obvious volumetric replenishment of the midface with better transition of the eyelid skin into cheek skin and shortening of the vertical height of the lower eyelid

50 MIDI Facelift

Dimitrije E. Panfilov

50.1 Introduction

Looking tired is reason enough for many 35–45-year-olds to ask a plastic surgeon for prophylactic rejuvenation. They want to achieve good and long-lasting effects with harmonious features, small scars, and – as they are still very active in their professional and private lives – a quick recovery is very important for them. We have developed a modification of the short-scar facelift with solid deep support. We call it the MIDI facelift. MIDI stands for Minimal-Invasive, Deep-Intensive.

The technical details are as follows. Two half Z-plasties are performed at each end of modest skin excision, supraauriculary and retroauriculary, to avoid uneven suture edges. By doing so we achieve very unobtrusive scarring. For solid superficial musculo-aponeurotic system (SMAS) tension, the procedures suggested in Chap. 36 are suggested. Depending on preoperative cheek fullness, we perform SMAS plication, simple SMAS flaps, snail SMAS flap, or tricuspidal SMAS flap.

By applying tumescent local anaesthesia with adrenaline and fibrin glue at the end of the procedure, we can avoid the drainage, so 96% of our patients were outpatients. The satisfaction of our patients was high (88%) and no major complications have occurred. Only three out of 200 patients had to undergo revisionary surgery.

The way that people of about 60 years of age participate in public life has changed radically during the last century. In the past they used to withdraw almost completely from public life. Nowadays they are still fully active, mainly on a private level, but also professionally – consuming the fruits of their life's efforts.

Fig. 50.1. **a** Tired look of a 43-year-old patient prior to surgery and **b** look of same patient 3 months postoperatively

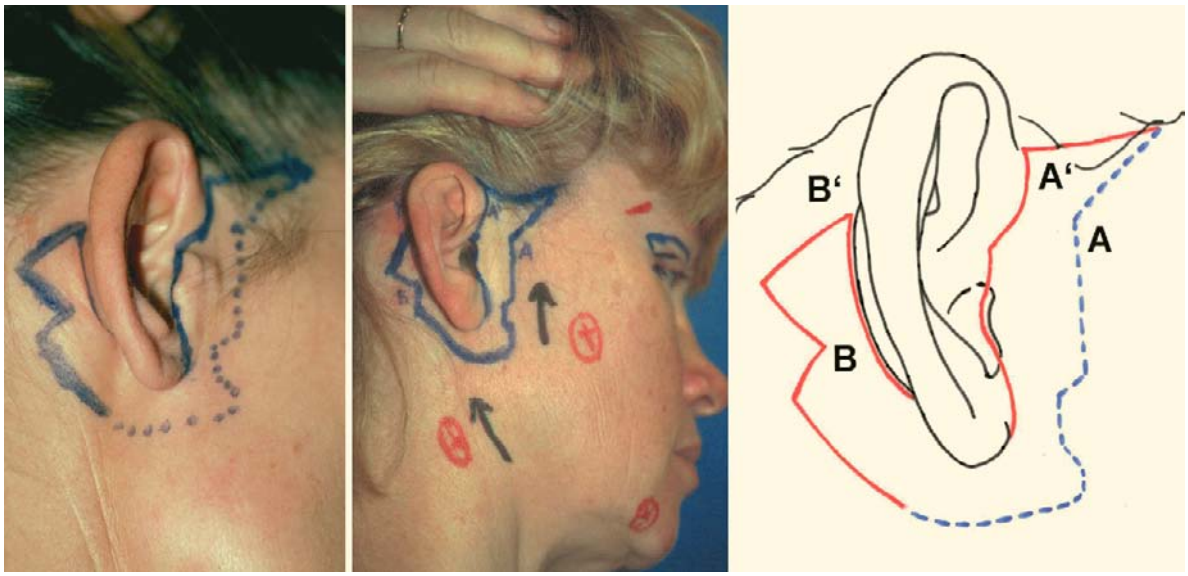

Fig. 50.2. Markings of incisions, presumed excision, vectors of traction, and superficial nerve branches

Rejuvenation not only creates the mythological illusion of eternal life, it has also become a very important factor for the quality of life.

The outcomes of facelifts dramatically improved over the last few decades. Many details of anatomical understanding (four levels of acting, volume preservation and replacement, endoscopy, various traction vectors, restoration of different mimic units) have replaced simple skin traction – with its unpleasant operated look – with harmonious rejuvenation and stable effects.

It is a general observation that more and more younger people are coming to our offices asking for aesthetic surgery. This phenomenon is also occurring in the field of rejuvenation surgery. Our patients say: "Why should I wait until I am old and ugly before I do something? Now when I am fully active in life I want to benefit from my attractive appearance. If I look tired, people will not believe I have enough energy and fun for life."

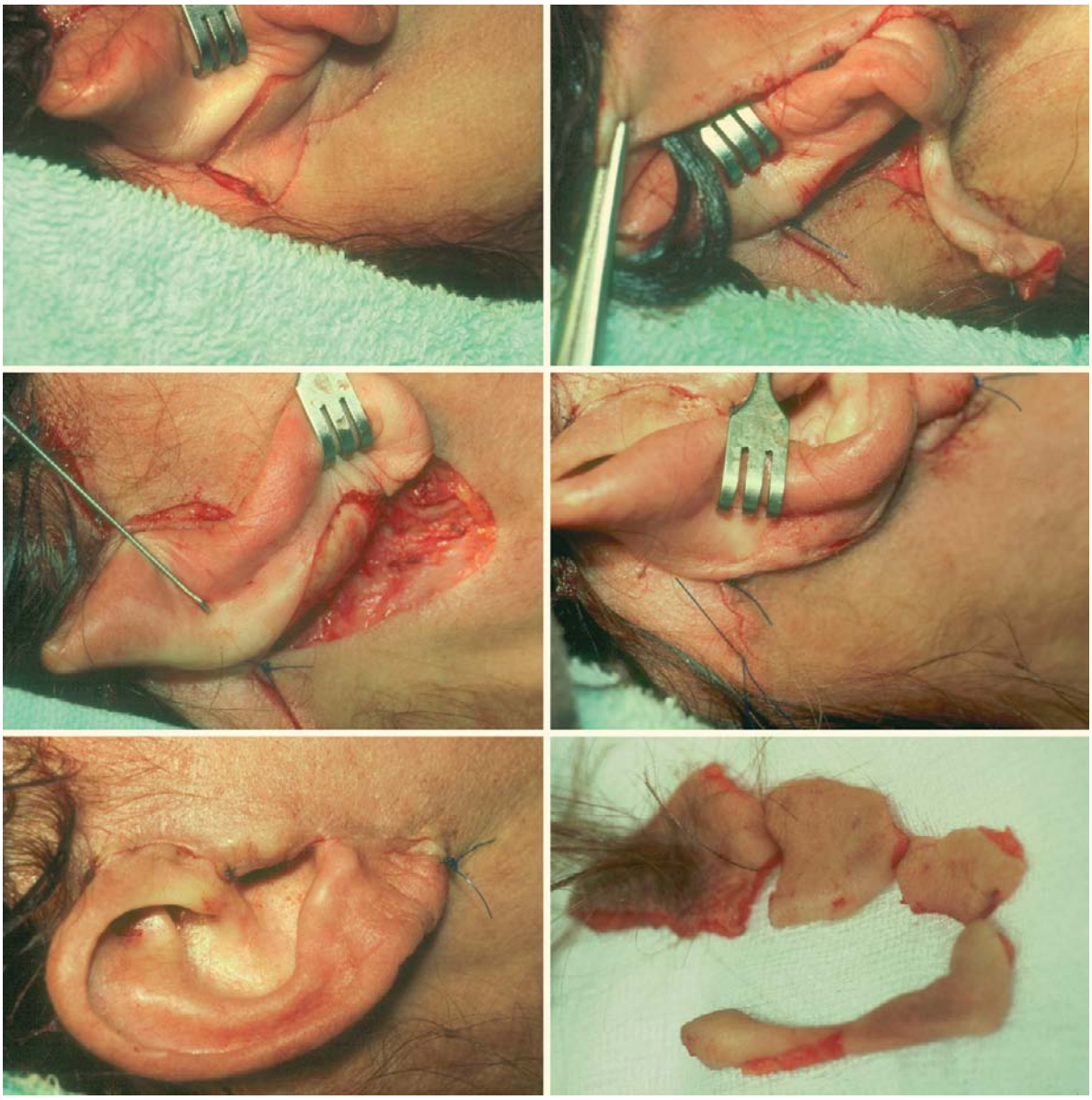

Fig. 50.3. Steps of retroauricular skin advancement and resection

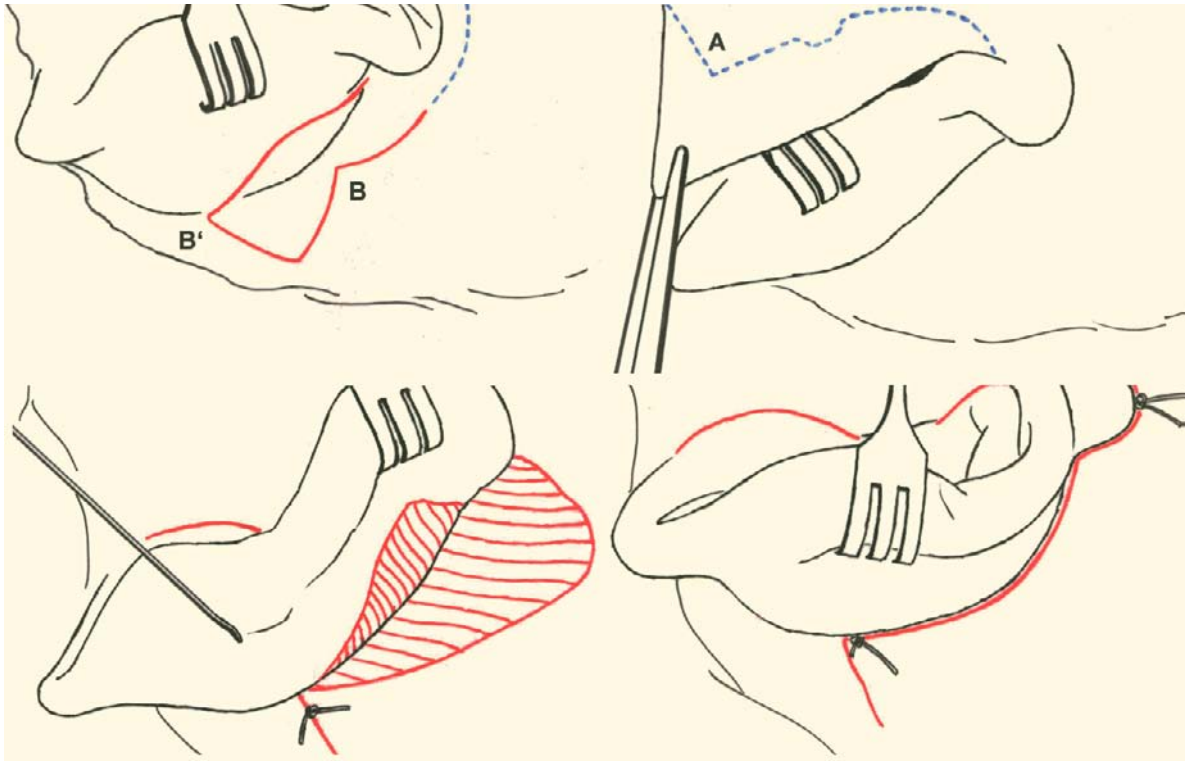

Fig. 50.4. The steps of the minimal-invasive, deep-intensive (*MIDI*) facelift

Fig. 50.5. The youngest patient was 34 years of age. At this age we cannot rejuvenate somebody much, but can beautify and enhance. **a** Before **b** and after MIDI facelift and lip augmentation

Fig. 50.6. A 40-year-old patient **a** before **b** and 1 year later

Fig. 50.7. Our oldest female patient, 51 years of age, **a** before **b** 3 months after MIDI facelift

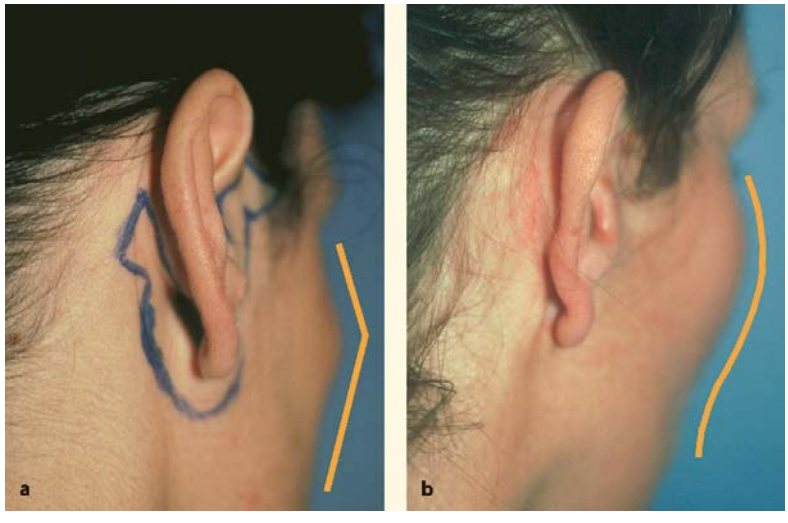

Fig. 50.8. **a** Presumed skin excision and edgy contour of malar region "edgee line". **b** Four weeks after surgery. Note very fine scarring and the harmonious contour of malar region ("ogee line")

50.2 Materials and Methods

For our patients around 40 years old, we are looking for procedures that require less effort and may be performed on an outpatient basis, have fewer complications, smaller scars, shorter recovery, and stable or prolonged effects. The special request of these patients, as they are fully integrated in active lives, is for short recoveries. Another request of our patients is that they remain themselves. They do not want to change their facial expressions, but simply to achieve more freshness, harmony, and youth, and to get rid of features that look tired and pessimistic. The change should not be obvious to everybody.

First, the skin drawings are made. These include incision lines, dotted lines of presumed excision, vectors of traction for the cheeks and neck skin, markings of superficial nerve branches, and midline marking of the throat for symmetry control. All drawings have to be made when the patient is upright.

The skin flap release is by tunnelling with a liposuction cannula but without suction, or with the spreading-scissor technique – closed scissors are advanced blindly under the skin and then opened. Hereby, we stay in the proper layer and we can stretch the nerve branches without cutting them. By dividing the skin flap from the underlying tissue, we release McGregor's malar ligament and other connecting tissue septa up to the front cheek and platysma margin. The perforator vessels should be preserved at this level to keep the skin flap safe.

The incisions have to divide the half Z-plasty markings, beginning in the supraauricular region and ending in the retroauricular region, as shown in Fig. 50.3. Depending on whether a patient has full cheeks or hollow cheeks, we treat the deep SMAS–platysma layer that has to undergo solid traction.

We first used liposuction of the submental area only occasionally and noticed that it improved skin retraction. We eventually decided to do it regularly, even if there is no fat to be removed, and we continue to do so.

It is very important to harmonize the skin and deep layers after we have played with the different vectors at the key point, 2–5 cm lateral of the lip commissures. If we neglect to release this adhesion, we will create a case of the "sofa button" phenomenon, with the unpleasant stigma of an operated look.

To make the skin anchorage sutures, the skin flap is first stretched to its maximum point, then released 2–3 mm. There is the motto in aesthetic surgery: What ever you do, do not overdo.

The supraauricular and retroauricular anchorage sutures are made first. The skin flap is then cut in the direction of the ear lobe. There has to be no tension on the ear lobe. We then size the skin that will be sutured retrotragally and put the third anchorage suture upwards of the tragus.

After the anchorage sutures have been placed, fibrin glue is applied to the skin that is pulled upwards for 3 min. This is good prevention of swelling and bruising, so our facelift patients rarely need drainage anymore. Intradermal sutures complete the wound closure.

We check the midline to test the symmetry. After the right side has been lifted, the midline deviates to the right. When the left side has been completed, it returns into midposition again. The patient wears a head net bandage for 1 day. The patient can be dismissed from the clinic the same evening or late afternoon. The patient can be picked up or driven by taxi but cannot drive or use a bus or train alone. The next day we remove the bandage. After 6 days, the intradermal sutures are removed. The anchorage sutures are removed after 10 days.

50.3 Results

We have treated 200 patients in 4 years with the MIDI facelift method. The satisfaction rate among the patients is promising: high 88%, moderate 11%, low 1%. We could not observe any major complications; nerve lesions 0%, skin necrosis 0%. Only in two cases of consecutive bleeding and one case of a postoperative salivary cyst did a patient have to undergo surgical revision (Table 50.1).

The latter did not have to be done: the revision of salivary cysts is not necessary. Table 50.2 shows the adjuvant procedures performed. Figures 50.9–50.11 show some results.

There are some aging patients who do not want to undergo "real" operation. For them we offer alternatively the following procedures: autologous fat augmentation of facial structures like folds, cheeks, malar prominence, lips, and the possibility of combining it with a handlift.

Seventy-five percent of our patients were between 35 and 45 years of age. If they were older than 50 (women) and platysma bands had already developed, the MIDI facelift was not recommended. Rather, the full facelift, with extended retroauricular skin resection and platysmoraphy, was indicated.

With patients younger than 35, we employed the mini lift that only uses preauricular incisions. In the 19 male patients (9.5% of the total) who underwent MIDI facelifts, we observed that the higher upper age limit was 58 years.

The MIDI facelift is a one-stage operation with short scars, short recovery, and short operative time

Table 50.1. Complications in 200 minimal-invasive, deep-intensive (*MIDI*) facelifts

	Percentage
2 consecutive bleedings unilateral	1.0
1 postoperative salivary cyst	0.5
12 postoperative unilateral swellings	6.0
8 cases of prolonged wound healing	4.0
2 hypertrophic retroauricular scars	1.0

Table 50.2. Among 200 MIDI facelifts, these additional surgeries were done on request

	Percentage
8 endoforehead lifts	4.0
35 blepharoplasties	17.5
9 rhinoplasties	4.5
18 partial peels (forehead or lips)	9.0
23 lip augmentations	11.5
42 double-chin liposuction	21.0
3 chin implants	1.5

Fig. 50.9. A 38-year old actress **a** before and **b** 2 weeks after MIDI facelift and lower blepharoplasty

Fig. 50.10. A 45-year old patient **a** before and **b** 6 months after volumetric MIDI facelift, with cheek and lip enlargement by autologous fat

Fig. 50.11. **a** Before surgery. **b** Dermographic markings and **c** 6 weeks after MIDI facelift, upper and lower blepharoplasty, autologous fat transfer, and reductive rhinoplasty of a 50-year-old patient

(90 min on average), which allows outpatient treatment and combination with other aesthetic procedures.

Modern rejuvenation procedures combine different methods, creating better and longer-lasting results and with less aggressive surgery than the singular methods. Less aggressive surgery has fewer complications, which translates into great safety for both the patient and the surgeon.

The MIDI facelift is easily taught and easily learned (prerequisites are anatomical knowledge and operative skills). It shows no major complications and serves to the satisfaction of the patient. In four words we can say it is easy, simple, effective, safe.

Bibliography

Please see the general bibliography at the end of this book.

51 Skin Resection Rhytidoplasty

Ulrich K. Kesselring

51.1 Introduction

The last 50 years has been a period of intense diversification of facial rejuvenation surgery. Face-lifting procedures have been developed further, becoming more extensive in all dimensions as the mechanisms generating the visible signs of aging became better understood.

Parallel to the trend that favored more invasive and often more traumatizing techniques that promised better and longer-lasting results, there were always tendencies where one would try to achieve with a light, precise and well-aimed surgical gesture a favorable result in a given situation.

If one agrees that in the face and neck unsightly signs of aging are mainly due to skin alteration and associated soft-tissue shifts, there are a series of smaller procedures available if one accepts a fine inconspicuous scar in a visible area.

A good understanding of the vectors implied in repositioning surgery of the face helps to determine the required tissue shift.

51.2 Temporo-canthal Rhitydectomy

After repeated facelift procedures implying vertical soft-tissue repositioning and diagonal skin traction, a more vertical skin shift including the subjacent soft tissue becomes necessary in most cases. Such an upward advancement brings redundant skin to the infrapalpebral area as well as to the malar and temporal area. Incisions at the border of the hair-bearing area can take care of the skin abundance in the latter region. As a lower blepharoplasty will then also be required, it makes sense to use what we call the temporo-canthal incision [1], which starts at the inner canthus and goes all the way to the fossa supratragica (Fig. 51.1). From there, the incision can be carried downwards behind or in front of the tragus, depending on the convictions of the surgeon. We favor the retrotragal incision that does not leave a telltale scar in a prominent area. To avoid an unsightly yawning of the meatus acusticus, the small flap eventually covering the tragus will have to be thoroughly defatted and shaped generously in order to avoid forward traction (Figs 51.2, 51.3).

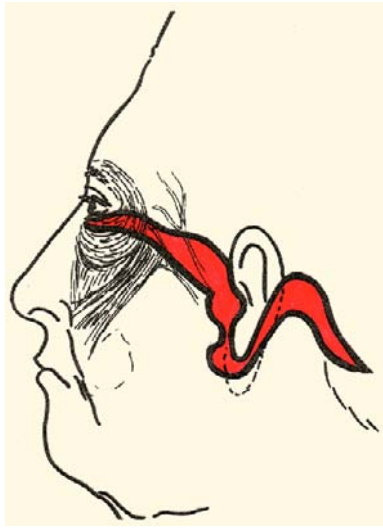

Fig. 51.1. The temporo-canthal incision makes sense since in most cases a lower blepharoplasty has to be performed

Another important point is the design of the horizontal incision. Beyond the orbital rim, the incision should be directed upwards, following one of the upper crow's-feet folds, thus reaching the hair-bearing area in a lazy curve. From there, the incision follows the scalp border to the preauricular area (Fig. 51.4).

Pinching the skin over the zygomatic arch, one can get a rough idea of how much skin can be removed there. Having already drawn the upper incision line, the estimated amount of removable skin can now be marked below this line (Fig. 51.5). The estimated resection line can now be drawn, starting at the inner canthus and delimiting a slender triangle of which the long sides have a similar curved pattern. The maximum width is situated just before the hairline and usually measures between 20 and 30 mm.

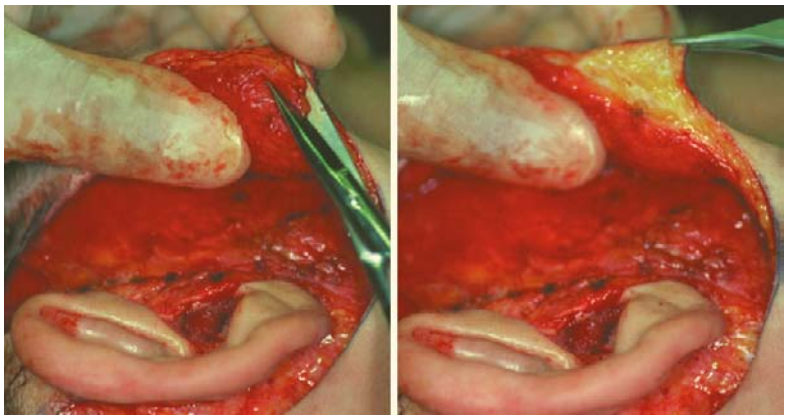

Fig. 51.2. The defattening of the small "peninsula flap" which will cover the tragus is essential. It will allow the skin to smoothly adhere and reproduce the cartilaginous structure

Fig. 51.3. If required, the removed fat can be grafted into the tear troughs or the lips

Fig. 51.4. After following one of the crow's-feet folds, the temporo-canthal incision curves down in front of the hair-bearing area to reach the fossa supratragica

This resection pattern minimizes the risk of creating an ectropion. To be even more on the safe side, the orbicularis oculi muscle can be attached in the lateral canthal region to the orbital rim periosteum with an absorbable 5/0 suture (Fig. 51.6).

Once the initial incisions have been made, the surgeon will decide how to intervene on the subjacent structures. All options are possible and all planes easily accessible (Fig. 51.7).

The advantage of this and other, related incision patterns resides in the fact that the skin shift vector points in the right direction and we can achieve a considerable tissue lifting and tightening effect down to the mandibula-neck angle without displacing the scalp (Fig. 51.8).

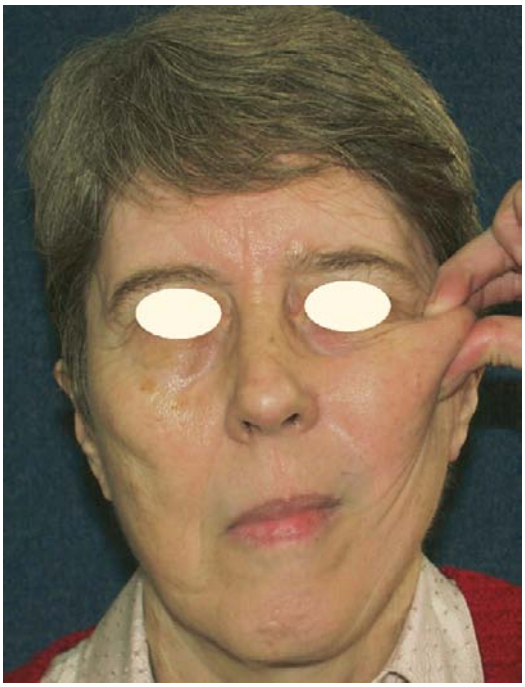

Fig. 51.5. Pinching the skin above the zygomatic arch gives an indication of how much skin can be removed at that level

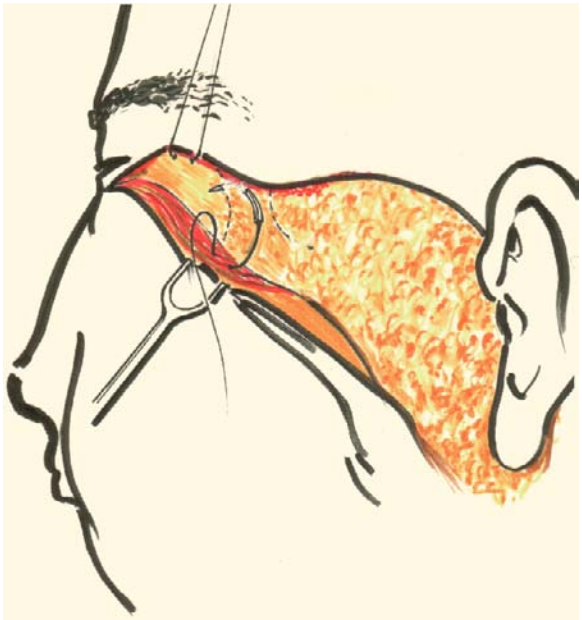

Fig. 51.6. The orbicularis oculi muscle, which is attached to our skin/muscle flap, will be attached to the orbital rim periosteum with one suture

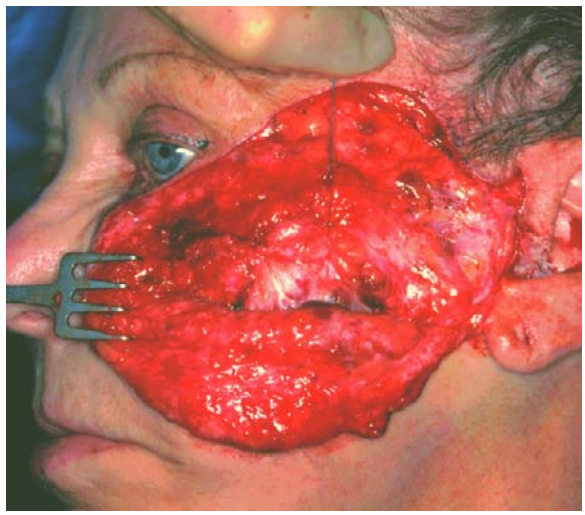

Fig. 51.7. As this incision gives a generous access and view of the deeper layers, any technique can be used at that level

Fig. 51.8. Case: 81 year old lady, secondary face lift, pre-op and 3 months post-op

51.3 The Difficult Neck

A crucial telltale area that can be addressed separately also is the neck area, if there is a significant redundancy of skin and platysma with or without excessive fat tissue.

This symptomatology is usually dealt with during a comprehensive facelift, combined with a minimal incision submental procedure. There are, however, patients who do not wish to undergo such extensive surgery, e.g., the typical male patient who just wants to be able to close his collar button to wear a tie rather than to hide his turkey gobbler neck behind a John Wayne neckerchief.

For these cases we use a midline multiple w skin resection [2], which gives excellent access to the subjacent structures (Fig. 51.9) that can now be surgically modified and rearranged as necessary. It is also a nice approach to do a first-time Connell [3] or a Feldman [4] procedure with an anatomical view of the layers involved. Precise skin approximation and suturing are imperative and make all the difference in the final appearance of the scar (Fig. 51.10). In an aged, atrophic skin, one or two simple Z-plasties instead of a long W-closure may be a valid alternative (Fig. 51.11).

This operation is not suitable for patients with drooping jowls as the forward repositioning of the neck skin can accentuate that problem.

51.4 Drooping Lip Commissures

Downward drawn mouth angles give the face a bitter, disapproving expression. The multifactor etiology includes lower-lip retraction through soft-tissue loss, cheek ptosis and chronic mimic activity.

The problem has been addressed in various ways, surgically, with fillers or with Botox. Austin and Weston [5] reported a simple skin resection above the commissures (Fig. 51.12). We added to this technique the subtotal transection of the m. depressor anguli oris, folding its stump upon itself and keeping this pad in place with a 6/0 absorbable suture (Fig. 51.13). With this procedure we reposition the angles of the mouth cranially, we weaken significantly the active downward pull and we fill the subangular depression with our pad.

The scar, which lies some 10 mm along the upper vermilion border and reaches 10 mm into the adjacent cheek skin, is very inconspicuous and always well accepted by the patients (Fig. 51.14).

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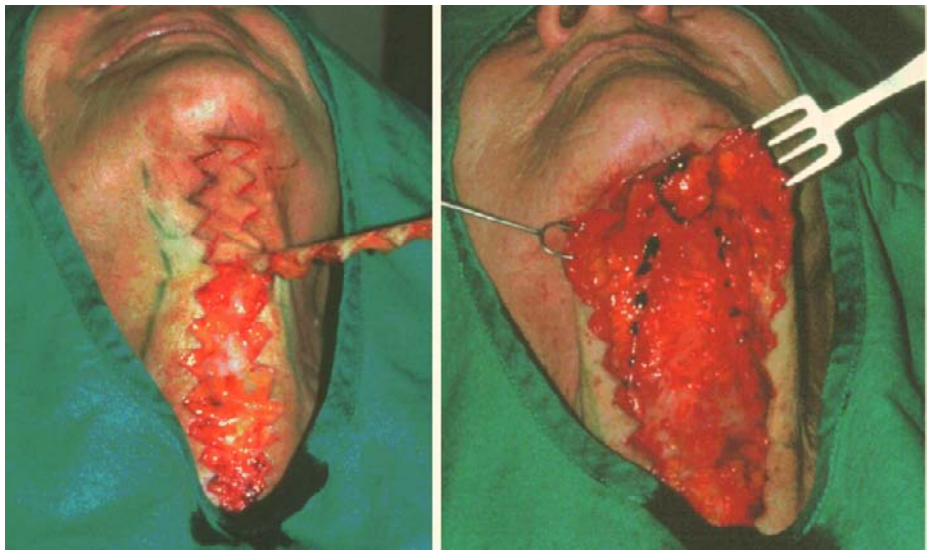

Fig. 51.9. The vertical multiple w skin resection in the neck gives excellent access to the subjacent structures

Fig. 51.10. Precise skin approximation is essential to produce an inconspicuous scar

Fig. 51.11. Case: 59 year old patient, pre-op and 6 months post W-neck plasty

Fig. 51.12. The lozenge skin resection along the upper vermilion border reaches beyond the commissure and gives access to the depressor muscle

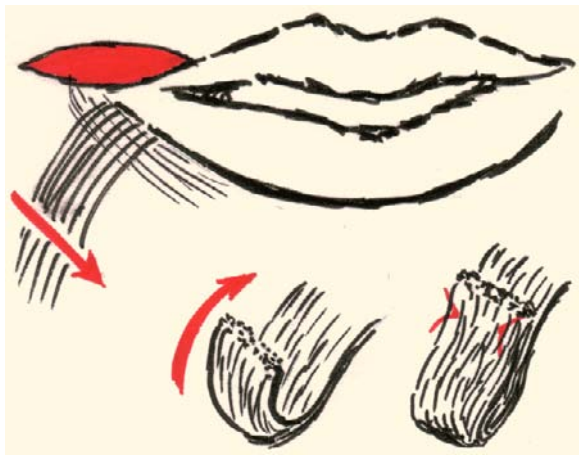

Fig. 51.13. Under direct view the muscle is transected cranially and the stump folded and sutured upon itself. The resulting pad efficiently fills the infraangular "bitterness troughs"

Fig. 51.14. Case: 51.14 67 year old patient, pre-op and 14 months after lip commissure plasty

Facelift in Males

52

Bruce F. Connell

52.1 Introduction

For more than two decades the author's practice has been almost exclusively face and neck rejuvenation. The specialization has enabled concentrated evaluation of both primary and secondary results. The technique described for facial rejuvenation for men has been found to be safe, produces a natural-looking appearance and restores a lost handsome appearance or reveals pleasing masculine contours. The basic technique has been used for several decades and can be modified for each patient and as indicated can be modified for each side of the face according to the specific anatomical problem (Fig. 52.1).

52.2 Male Patient Assessment

A precise diagnosis, appropriate anatomical architectural planning and skillfully executed surgical repair are required for each patient's individual problems. For accurate diagnosis of facial aesthetic problems, it is essential that the surgeon be aware of all aspects of pleasing facial features, as well as the attractiveness of natural facial asymmetry. The best face and neck rejuvenation addresses the entire face, forehead, glabellar area, nose, eyes and hair. Male patients complaining about their neck or jowls may not be aware of their inappropriate and unintentional expression of annoyance, anger, fatigue or sadness [1]. The forehead rejuvenation produces very pleasing results and happy patients (Figs. 52.2, 52.3a, b).

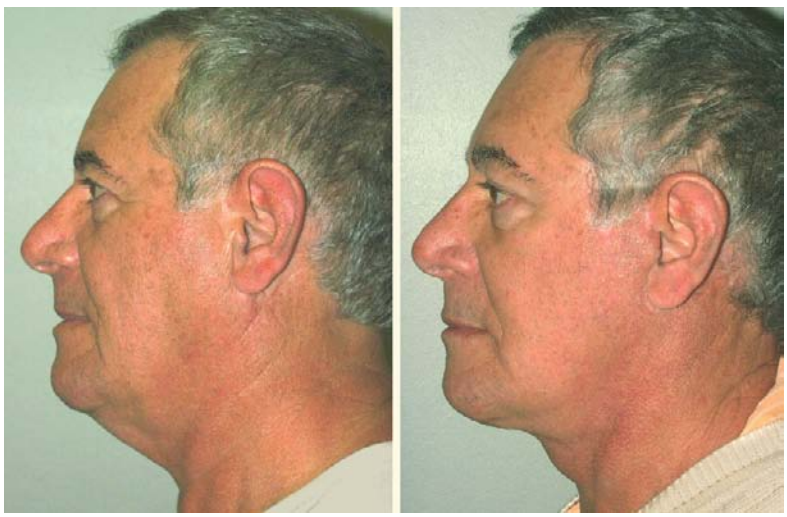

Fig. 52.1. A 63-year-old male patient for facial rejuvenation. After his wife had surgery he felt he looked like her father and this inspired him to have surgery. The distance from the lateral canthus to his temporal hairline was preserved to avoid an aged and unsightly hair shift. The incision along the edge of the helix was a curving incision within the first color change of the junction of cheek to helix. The lower end of the tragus was defined by making a transverse incision at the intended lower edge of the tragus. The hair bulbs, which were shifted over the tragus, were eliminated by folding the skin over the finger and electrocoagulating the bulbs. He had full thickness transection of his platysma muscle at the level of the cricoid to obtain maximum concavity because of his low hyoid

Fig. 52.2. **a** A 46-year-old male patient complaining that he was appearing like a "killer" and he was looking for a wife. For this tall muscular male, the eyebrows were placed in a slightly concerned look, which was approved by him. He has been delighted and is now married with several children. **b** Three months after his facelift. **c** Thirteen years after his facelift

During the initial consultation with a male patient, the wishes and goals are matched with the possibilities for improvement. It is of great help for the surgeon to be able to examine photographs that were taken when the patient was younger and most pleased with his appearance, for the assessment of eyebrow position, angle of the nasojugal groove (tear trough), eyelids, amount of malar prominence, location of angles of the mouth, and the deep and superficial contours. In addition, the texture and amount of excessive skin of the forehead, face and neck is recorded. While looking in the mirror, the skin and deep tissues are placed in an optimal position. The patient then comments as to whether the position of the eyebrows, malar prominence, jaw line, angle of the mouth and the face and neck contours are pleasing to him (Fig. 52.2).

The assessment and documentation of facial asymmetry during animation and rest is noted during a 1 h consultation and is reviewed during the preoperative evaluation. This assessment is for precise diagnosis and planning of the surgery [2, 4]. Discussion of normal asymmetry may eliminate postoperative misinterpretation by the patient who will closely examine the face after the surgery. All persons have a large side of the face, with a larger eyelid, wider half of the lips and larger bone structure. The smaller side of the face appears older and there is more rejuvenation improvement on the smaller side of the face than the larger side of the face. Abnormal fat accumulations, platysma laxity and abnormal contours caused by bulges of the salivary glands and digastric muscles are noted. If the patient smiles and looks much older because of the smile creases (crow's-feet), this problem will be corrected (Fig. 52.4).

The amount of skin excess and the direction of the necessary tissue shift are determined by pinching the excessive skin in five or more sites. Also, the goals to be achieved by shifting the superficial musculoaponeurotic system (SMAS) are recorded. For example, the SMAS can be utilized to eliminate or restore the position of the nasojugal groove as well as to eliminate much of the excessive lower-eyelid skin without making an eyelid skin incision if the restricting attachments between the skin and orbicularis oculi muscles are released. In addition, the vertical shift of the lower-eyelid–cheek junction restores the appearance to a shorter, more youthful appearance. These results are helped by a transection of the SMAS high along the superior border of the zygomatic arch and rarely utilizing a third SMAS flap after the retaining ligaments, which are muscle–skin attachments forming the smile creases (crow's-feet) that have been detached from the muscle–skin attachments. This permits the facelift skin shift to decrease very much the amount of excessive skin in the lower eyelids without making an incision below the eyelashes (Fig. 52.3) [2].

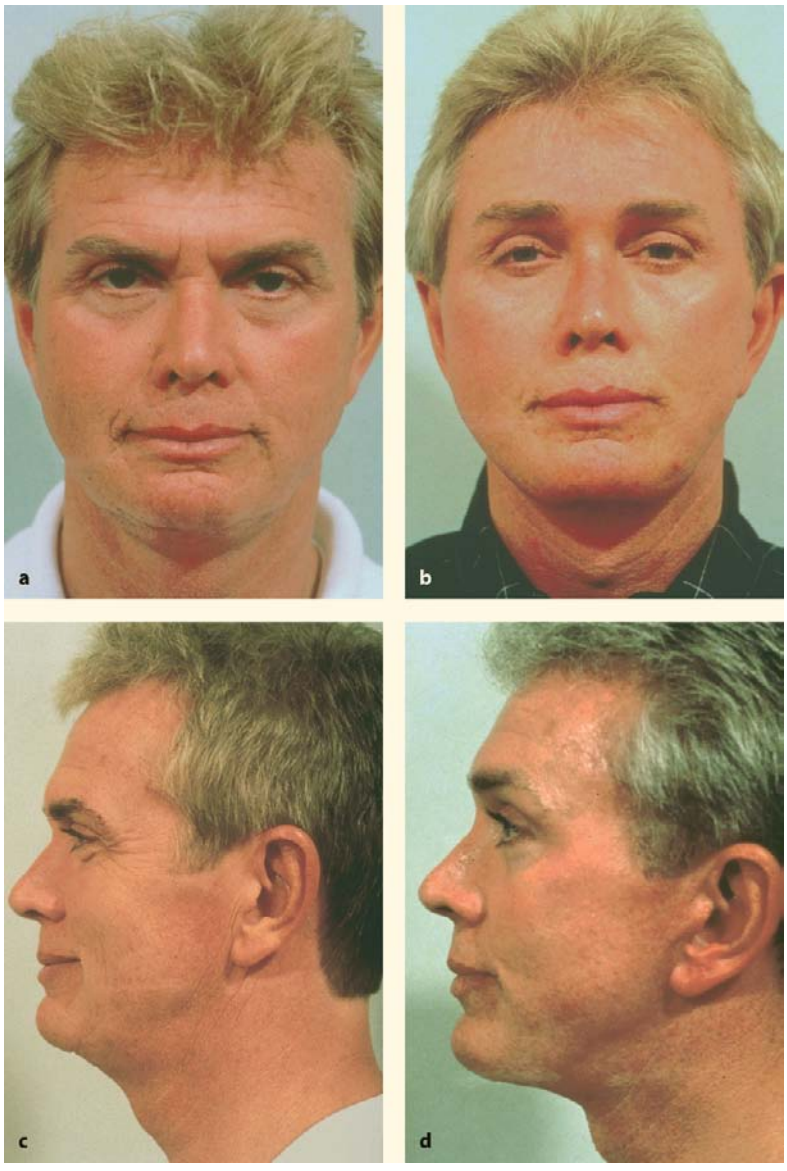

Fig. 52.3. **a**, **b** A 52-year-old male patient who had an inappropriate annoyed and angry appearance at rest. Correction resulted in a pleasing more friendly body language. The lower-eyelid improvement was accomplished by utilizing a high superficial musculoaponeurotic system (*SMAS*) flap and liberation of the smile creases from the orbicularis oculi muscle to permit the facelift skin shift to change the diagonal direction of the nasojugual groove to horizontal, elevate the cheek fat to soften the junction of the eyelid with the cheek and to give a shortened appearance of the eyelid. No incision was made through eyelid skin below the eyelashes. **c**, **d** He had a low hyoid and very large anterior belly of the digastric muscle. Forehead, face and neck lift with transection of the platysma muscle at the level of the cricoid produced results that were very pleasing to the patient. It was possible to avoid a shift of his temporal hair by having the incision go along the hairline

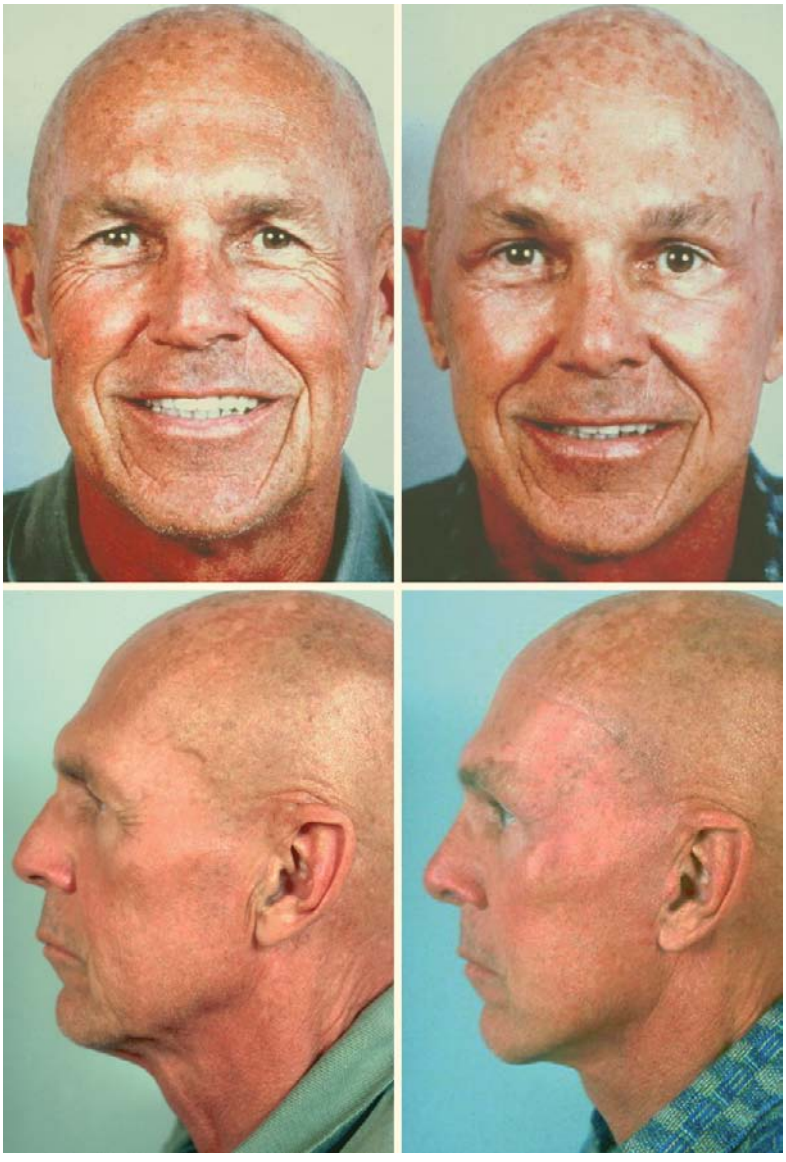

Fig. 52.4. Correction of the frown muscles was made by utilizing the highest forehead crease on the left and making a new crease higher on the right. Dissection was in the subcutaneous plane to excise the medial end of the corrguator superciliaris muscles, and transect the procerus and supercilii muscles. In addition, he had a tip rhinoplasty utilizing ear cartilage to give projection and improve contour of the nasal tip

52.3 Fat Transfer for Males

With the improved results and the very long lasting improvement accomplished by fat transfer there is an increasing need for the use of fat for correction of special facial problems and for restoration to a more youthful appearance. For example, the patient who had elimination of his inappropriate annoyed appearance because of his glabellar frown still looked tense and annoyed because of the loss of volume in his lips (Fig. 52.5). Older persons and those who are taking medications such as medicine for HIV treatment may have subcutaneous wasting of the facial fat. The restoration to correct the facial skeletonization is excellent and long-lasting using autogenous fat.

Fig. 52.5. **a** The patient's thin lips give him a tense and annoyed appearance. **b** Fifteen months after secondary face and neck lift and forehead rejuvenation at the same time by the author. Walton Montegut performed fat transfer from abdominal fat to philtral ridges, white line ridges and lips at the same time

52.4 Consent and Preoperative Evaluation

In addition to the informed consent form, each patient has had a recent annual physical performed by an internist or family physician before surgery. The blood studies include HIV for each patient. A cardiologist, ophthalmologist or other specialist that the patient has seen is asked for recommendations as to the patient's fitness for surgery. The consent for photography is included in the informed operative consent and a separate consent is used for the anesthetist or anesthesiologist.

52.5 Incisions

To achieve nondetectable surgical scars an appreciation of skin color is required. The apparent sizes of the features such as the tragus and the helix of the ears are defined by the skin color changes and not by the size of the underlying cartilage (Fig. 52.6).

Patients may be disfigured by hair shifts and may be annoyed as well as they must restyle the hair to hide the deformities. Some men may have the temporal incision placed behind the hairline [2]. However, if the temporal hairline is moved more than 4 cm away from the lateral canthus, the incision should be placed a few millimeters within the temporal hair (Fig. 52.7c, d). The rare suboptimally healed incision along the temporal hair can be revised, concealed with make-up or hidden with micro hair grafts. A large shift in the temporal hair causes the patient to look older and is very difficult to conceal. The loss of the volume of temporal hair is often regretted. Making incisions parallel to the hair shafts will result in hair growing through most of the incision. Incisions across the scalp placed at the vertex or over the lamboid skull suture of a man who is bald are very kind in healing (Fig. 52.4c, d).

Fig. 52.6. Postoperative photograph of a male ear showing the difficult-to-detect incision at the junction of the helix with cheek skin, along the edge of the tragus and curving to define the lower border of the tragus to give the appropriate size to the tragus. In addition, notice that the earlobe has been set back approximately 15° posterior to the long axis of the ear. There was a cuff of skin left at the junction of the earlobe with the cheek to give a normal transition from earlobe skin to cheek skin

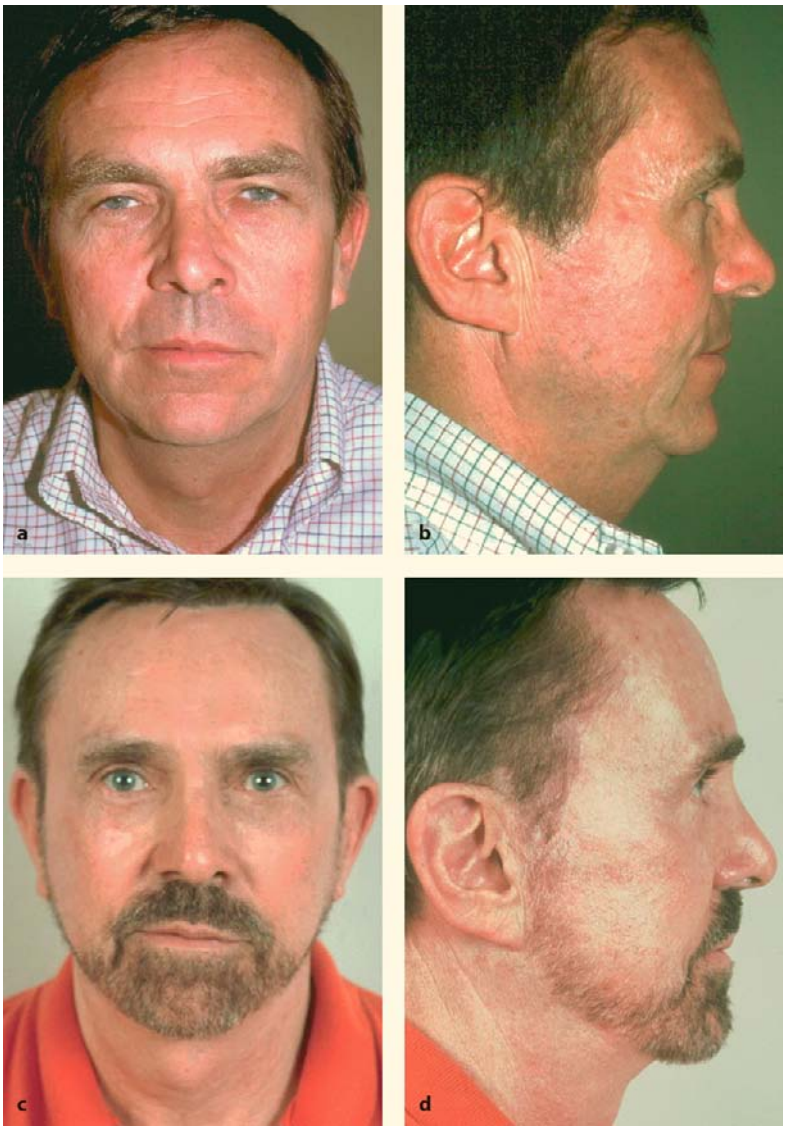

Fig. 52.7. **a**, **c** A 51-year-old patient with the appearance of a short platysma muscle, sagging cheeks, sagging forehead, and wrinkles anterior to the ear. **b**, **d** Eleven years after the primary facelift correction and 20 months after the secondary facelift. The patient has been delighted all of these years with his face and neck rejuvenation

52.5.1 Prehelix Incision

In order for the scar to be nondetectable, the superior portion of the preauricular incision should be curved and placed within the skin color change from cheek to helix. If the incision is placed outside the color change of the helix, the scar will be visible because there will be a color change before the scar, then the scar, then another color change before the helix skin color is reached (Figs. 52.6, 52.8).

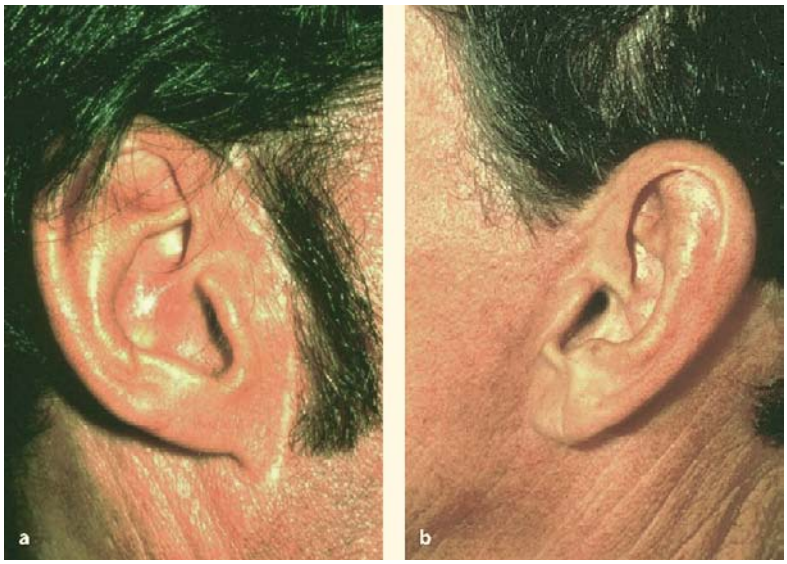

Fig. 52.8. **a** The results of the placement of the incision in the wrong location for persons who have red skin. The scar will remain white and cannot be revised. **b** The patient with red skin where the incision was made within the color change of the helix with the cheek skin and along the edge of the tragus. The height of the tragus was defined by curving the incision anterior at the appropriate height level

52.5.2 Tragal Incision, Peri-earlobe Incisions, Postauricular Incision

Most patients have increasing redness, altered pigmentation or texture changes in the skin proceeding anteriorly toward the nose. A color or texture mismatch may reveal the facelift procedure despite excellent healing with an almost nondetectable scar. Most incisions are placed within the 3-mm-wide edge of the tragus to avoid the risk of a detectable scar. The height of the tragus is produced by a color change. The incision to define the lower edge of the tragus must be perpendicular to the edge of the tragus and then must descend inferiorly just along the junction of the ear with the cheek. If this transverse incision is not made at a 90° angle to the skin, a fold may result and produce an indistinct visual ending to the tragus, which looks very unnatural.

So that no beard hairs are shifted onto the tragus hairless area, beard hair bulbs can be excised and electrocoagulated when the cheek skin is folded over the finger. The hair bulbs are not in the skin but are below the skin and they project very well when the skin is wrapped around a finger (Fig. 52.9). The hair bulbs are either just excised or touched with a needle. Use of a blade may make too much heat and damage the tragal flap.

The earlobe looks as if there has not been a facelift performed if the distance from the long axis of the ear is 12–15° posteriorly. Also, the earlobe's natural transition at the ear–cheek junction should be preserved by placing an incision 2–3 mm below this junction, which also avoids beard growth in an area that is difficult to shave (Figs. 52.6, 52.10).

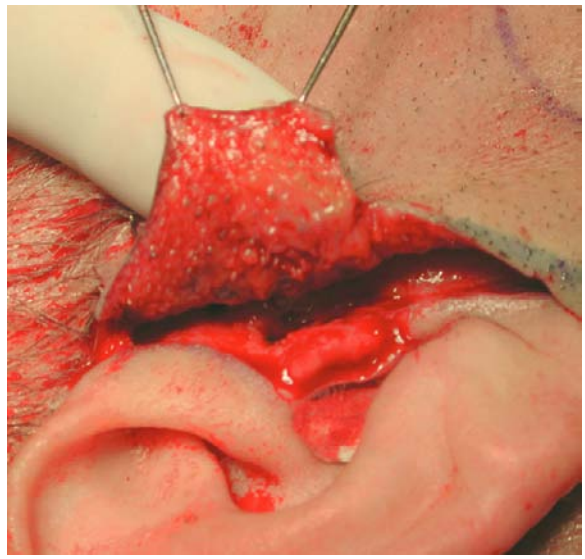

Fig. 52.9. When the shift of the cheek skin will place hairs overlying the tragus, the skin can be turned over the finger and the bulbs that are projecting below the dermis and the underlying fat can be easily trimmed with scissors and touched with the needle point electrocoagulation with more than 98% or close to 100% removal of the hairs without scarring on the anterior skin

Whether or not a postauricular incision is needed is determined by drawing a perpendicular line to the lowest point on the fold of the neck skin when the chin–neck angle is 90° [3]. Some patients do not need to have an occipital incision. The proper flap shift of the neck skin is perpendicular to the vertical skin folds and follows a posterior and slightly superior

Fig. 52.10. The markings made for surgery in a secondary facelift patient. Each of the creases that are formed when the patient smiles is carefully marked and these are released from the connections of the skin to the orbicularis oculi. The *circle* shows the pivot point chosen for rotation of the SMAS, which will give more projection at that one spot than any other place. Note that the incision follows within the color change of the helix along the edge of the tragus and forward where the lower end of the tragus is to be defined. The *markings dotted on the neck* show the location of the platysma muscle incision crossing the midline at the hyoid. The *arrow* shows the anticipated direction of the skin shift for the neck

Fig. 52.11. The scar going along the occipital hair in the same patient as shown in Fig. 52.1. He has no problem in scar detectability with a short haircut

course that often parallels the mandibular border. The proper vector never parallels the sternocleidomastoid. If this skin is shifted more superiorly and excised when the patient is seated and the shoulders are no longer raised by lying on the table, there will be excessive tension in this area. Surgeons can be misled by examining excessive neck skin only while the patient is lying on the operating room table with the shoulders elevated.

52.5.3 Incision Between Occipital Hair and Ear and Occipital Incision

The level of the postauricular incision from the ear to the occipital hair depends on the amount of excessive neck skin [4]. This incision can always be placed higher at the end of the surgery but it cannot be moved lower. If the postauricular incision is placed too high in an attempt to hide the scar, the surgeon must make an anterior superior rotation of the flap to close the resulting defect and this rotation compromises the improvement of the neck and submental areas. In addition, it may make the neck creases misplaced and appear to be folds of drapery when the patient looks downward.

The incision may pass above the occipital hair in rare cases, which requires neck contouring but does not have any excessive skin to be shifted laterally or the amount is less than 1 cm.

Larger skin shifts would result in an unnatural displacement of the occipital hair. With larger amounts of skin to be excised, the incision should curve along the thick occipital hair and where the hair becomes thin should go above to be shifted upward by excising the occipital recipient site (Figs. 52.11, 52.12).

Fig. 52.12. After excision of the skin with no tension while the chin–neck angle is at 90°, closure is made with no sutures crossing the incision line and at the posterior dog-ear portion of the incision a recipient site is excised to receive the hair-bearing neck flap.

52.5.4 Submental Incision

A submental incision is made for releasing the osseocutaneous ligaments, which form an unsightly submental crease when the patient looks downward. This incision is used to release the mandibular ligaments, which form jowls. In addition, a mobile submental incision can be used for decreasing the size of the anterior bellies of the digastric muscle, or partial excision of the submaxillary glands, augmenting chin or transecting the platysma muscles at the cricoid. This incision is never made in the immobile location of the submental crease formed by the osseocutaneous ligaments. The osseocutaneous ligaments never reform if completely released. The submental incision is approximately 2.5 cm in length, located posterior to the submental crease and in the shadow of the chin, which is usually about half way between the chin and the hyoid.

52.6 SMAS Utilization

Almost all patients benefit from a posterior superior rotation of the cheek SMAS about a pivot point situated over the malar eminence. This rotation and posterior cheek SMAS shift will provide a strong immediately visible support to the cheeks, restoration of the jowl fat to the youthful position, flattening of nasolabial folds and even a sling support to the submental area extending across the midline from the hyoid to the chin [5]. If the transverse incision of the SMAS is over the upper part of the zygomatic arch and high onto the malar bone, a very good support to the orbicularis oculi and orbital septum, the upper nasolabial fold and lateral upper lip will be achieved. Also, elevation of the angle of the mouth can change a down-in-the-mouth or "fish mouth" to a more pleasant and content appearance (Fig. 52.13).

If the shifts of the deep layers are not visible at the time of surgery, this means the SMAS liberation and shift was inadequate. Patients with vertically short platysma muscles or tight bands are best treated by some form of localized muscle interruption and release. The improved neck contour is immediate, dramatic and long-lasting. If lateral bands are present or there is lack of mandibular definition owing to short lateral platysma muscles, this transection is brought superolaterally along the approximately 1 cm wide avascular area in front of the anterior border of the sternocleidomastoid muscle and into continuity with the vertical SMAS incision overlying the parotid about 1 cm anterior to the ear. In most cases, anterior submental platysma invagination is planned as well to add support to the submental tissues (Fig. 52.14). Wedge resections and vertical excisions of anterior bands are unnecessary if the aforementioned techniques are used [3].

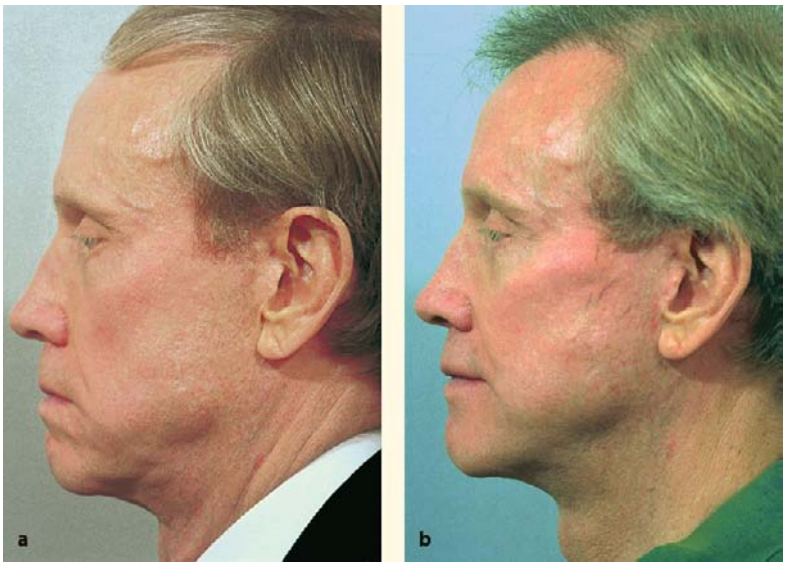

Fig. 52.13. **a** The shift of the SMAS in the proper vector can change the downward angle of the mouth from a disapproving position to a neutral position. **b** Fifteen months after secondary facelift

Fig. 52.14. **a** Patient with a short platysma muscle with large anterior bellies of the digastric muscle. Surgery was performed with a submental incision plus an incision along the occipital hairline extending forward only to the junction of the earlobe with the cheek. **b** Nine months after necklift only

52.7 The Crow's-Feet

Deep periorbital smile creases can make the rejuvenated face appear much older in animation than repose. This creates an upsetting disharmony (Fig. 52.4a, b). Marking all objectionable smile creases preoperatively assists in performing a complete "release." The depth of skin dissection should be determined by transillumination and palpation. When the lateral brow is pulled downward by the orbicularis oculi muscle when smiling, the muscle is then transected in a line ending 15° below the lateral canthal raphae. The transection begins 5 mm anterior to the lateral orbicularis oculi muscle edge to avoid injury to the frontal branch of the facial nerve.

There will remain smile creases that are due to inelastic skin. A patient in whom most of the creases are due to pushing inelastic skin upward would benefit very little from this method of "crow's-feet" correction [6].

52.8 The Neck

A youthful attractive appearance depends very much upon a well-contoured neck without abnormal upper neck bulges [4, 7]. Abnormal bulges may result from subcutaneous or subplatysmal fat, prominent submandibular glands, platysma muscle or large anterior bellies of the digastric muscle with interdigastric muscle fat (Fig. 52.5c, d). Often contour problems

Fig. 52.15. a–d A 37-year-old man concerned about the submental fullness, which made him appear to be overweight and produced a double chin when he looked downward. Correction was by tangential excision of 90% of the anterior bellies of the digastric muscle. The only incision used was the submental incision located approximately 1 cm behind the submental crease. **e, f** An incision was made behind the submental crease approximately 2 cm in length and the platysma muscle was opened with a vertical incision in the midline. The digastric muscle was delivered by passing a hemostat under 90% of the anterior belly and excision by electrocoagulation

caused by a prominent anterior belly of the digastric muscle have not been treated. A vision of the goal is the most important part of rejuvenation. Knowledge of the neck anatomy is essential for the architectural planning and avoidance of complications, including nerve injury, loss of fat or skin necrosis.

The improvement to submental neck contour resulting from tangential resection of bulging, large anterior bellies of the digastric contributes greatly to the formation of a youthful submental area contour (Fig. 52.15).

We have performed tangential resection in 560 digastric muscles with great improvement in cervical contour with no morbidity. Not all patients with double chins have bulging digastric muscles; some have only huge submandibular glands or subplatysmal fat.

During the preoperative examination of the neck, the patient extends the chin and contracts the platys-

ma muscles to reveal the amount of fat external to the platysma muscles. The neck is palpated and the skin, fat, platysma, submandibular gland, muscle, and bony and cartilaginous structures are assessed.

With regard to the anatomical architectural planning, the submental support of the neck is accomplished by utilizing the SMAS tissues. The submental platysma muscles may be used as a sling or hammock, which is formed by the upward SMAS face shift along with invagination of the submental platysma muscle. In addition, a transposed flap of preauricular cheek SMAS to the mastoid fascia provides a third different vector of support at the hyoid without displacing the sternocleidomastoid muscles anteriorly. The transection of the platysma muscles at the level of the cricoid permits a greater upward shift of the SMAS and platysma muscle for those patients who have tight bands or short platysma muscles (Fig. 52.14).

After correction of the excessive subcutaneous and subplatysmal fat, the neck is flexed during surgery to observe persistent objectionable submental bulges. If the anterior bellies of the digastric muscles cause bulges, these muscles should be tangentially decreased. Frequently, 90% of the muscle is removed tangentially from the anterior belly, since complete removal may allow the muscle to slip through the sling through which the intermediate tendon passes. A complete set of neck photographs should include preoperative and postoperative profile views of the patient looking straight ahead and downward.

52.9 Surgical Technique

Rhytidectomy incisions and a 2.8-cm-long submental incision located about half the distance between the hyoid cartilage and the submental crease are used to approach the subcutaneous tissues of the neck [8–16].

If the neck bulges are due to very large submandibular glands, the capsule can be opened centrally or medially and the gland carefully separated from its capsule (Fig. 52.16). Excision is by clamping portions of the submandibular gland and then coagulating with the clamp or the tissues can be removed by a needle electrocoagulation. Following removal of the major portion of the gland, which causes the bulge when the neck is flexed, the capsule does not have to be sutured. As long as the dissection is kept within the capsule injuries to nerves or surrounding structures are not expected. The platysma is invaginated with two rows of inverted 4-0 nylon sutures with buried knots through the submental incision. Subplatysmal round, perforated suction drains are placed by passing a closed long hemostat through each side of the closure line and pulling the drain between the remaining anterior bellies of the digastric muscles and the platysma muscle. Whenever submandibular glands have been decreased in volume or the anterior bellies of the digastric muscle decreased, a drain is passed under the repaired platysma muscle (Fig. 52.17).

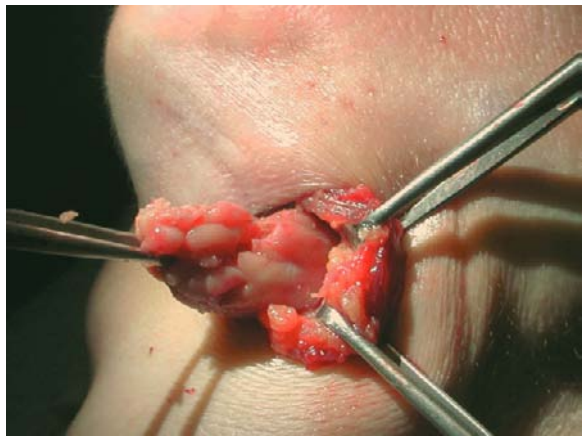

Fig. 52.16. If the neck bulges are due to very large submandibular glands, the capsule can be opened centrally or medially and the gland carefully separated from its capsule

The contour correction of the submental area always gives the appearance of a stronger chin projection and release of the submental osseocutaneous ligament permits great improvement of the ptotic chin. Occasionally, excision of ptotic skin muscle is indicated. Sometimes an alloplastic chin implant or injected fat may improves the vertical height of the chin. The youthful appearance of the neck as well as rejuvenation of the upper third of the face is of great importance for patient satisfaction.

Fig. 52.17. Two men 1 day after surgery showing the average amount of discoloration and swelling. Note that both of them have drains that pass subcutaneously across the midline to the other side of the cheek. In the submental area the drain passes beneath the platysma muscle, if subplatysmal fat has been removed or digastric muscles decreased in size

52.10 Summary

In the past few decades men have increasingly sought facial rejuvenation because the results that surgery can now deliver are worth having. In the past it was questionable whether or not contour improvement at the expense of having unsightly scars would be really worthwhile for most men. The basic deep layer support technique presented can be used for most patients. With accurate diagnosis, appropriately conceived and executed surgical procedures, and meticulous postoperative care, complications are rare and patient satisfaction is very high. The basic deep layer support technique has been used by many surgeons for several decades and the almost problem free technique can be modified for each patient as indicated according to the specific anatomical problem.

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53 Secondary Facelift

Dimitrije E. Panfilov

Even celebrities in our profession – the best plastic surgeons in the world – are not able to stop the biological clock. Very good results after rejuvenative procedures are subject to the ageing process and these faces will lose their freshness and attractiveness as time goes by. In well-performed rhytidoplasties we will have fewer problems from facelift surgery, even after 15 or 20 years. Sometimes it could be sufficient to perform only a mini or a minimal-invasive, deep-intensive (MIDI) facelift in patients of even advanced age, if the first surgery was done well.

If the first surgery was not done in a proper way, there are many reasons for reoperation:

- Insufficient effect of rhytidoplasty with laxity of both deep layer and skin
- Descended facial structures soon after initial surgery with a pessimistic "tired look"
- Irregular jawline
- Improper scars
- Displaced hairline
- Distorted or "amputated" earlobe
- Cervical deformities
- Unnatural pattern of wrinkles – "static facelift stigma"
- Dimpled paraoral K-point (junction of different vectors of traction) with mimetic, dynamic "facelift stigma"
- Permanent nerve damage

It is important to try not to show a difference in our reaction toward the patient if the previous surgery was done by ourselves or by another physician. We should hide any expression of shuddering or feeling of repugnance for a bad result which another physician has caused. Everybody in our profession can have complications. Otherwise, we should try to look at our own suboptimal or incomplete results with the eyes of our colleagues. Would I make an early correction of this patient if he/she came from another surgeon? If yes, then I should perform an early reoperation also of my own patient.

Fig. 53.1. **a** A 54-year-old patient who had a facelift 12 years ago. **b** Dermographic markings. **c** Three weeks after double layer rhytidectomy, crow's-feet sealing, and autologous fat transfer

Fig. 53.2. **a**, **b** Subauricular (instead of retroauricular) scars in a W shape; the initial facelift had been done by a dermatologist! **c** Dermographic planning: secondary facelift correction of eyelids, "lemon wrinkles" of upper lip, "witch's chin" deformity, and platysma bands. **d** Before and **e** 6 weeks after secondary procedure

Fig. 53.3. **a** Male patient with suboptimal result of endoscopic facelift 2 years ago done in another clinic. **b** We have done a classic facelift and forehead lift. **c** Female patient with facelift done in another clinic 3 years ago with irregular jawline and neck skin laxity. **d** Three months after secondary facelift

If 10, 15, or 20 years has passed since the initial facelift and the patient is still healthy and "full of life" we can indicate and perform another procedure but not because the first one had been done badly. Just the time passed has put its traces in the face. The ageing process is different for different individuals, and its speed is different. In general, individuals with thicker skin (like men, Asian race) show later signs of ageing than those with thin skins.

Fig. 53.4. **a** A 62-year-old patient who had undergone a facelift 16 years ago. **b** Three weeks after secondary procedure.

Fig. 53.4. *Continued.* **c** We have planned rhytidoplasty with superficial musculoaponeurotic system (*SMAS*) resection, crow's-feet sealing, and **d** scar correction. Retroauricular scar **e** after first rhytidoplasty and **f** after secondary procedure. Profile of the same patient **g** before the operation and **h** 10 days postoperatively

Fig. 53.5. **a** The previous maxillofacial surgeon put too much tension onto the earlobe, which looks like it has been "amputated". Also there are visible pre- and retroauricular scars. **b** After secondary facelift we could improve scars, including a retrotragal scar; 2 weeks postoperatively. The same patient **c** before and **d** after secondary facelift; notice the volumetric improvement of the semiprofile contour

Taking care of good scars will please all patients, but it can have some unexpected "side effects". It is our experience that some patients got the recommendation from their hairdresser. Certainly, they cannot judge the whole medical work we have done, but they can judge and compare scars of different surgeons. If we make unobtrusive scars, they will recommend us.

When the neck skin is not affected after primary procedure(s) we can do only minimal incisions but tighten the deep layer well. We minimize the effort and maximize the effect.

After primary facelift many new techniques have been developed; we can apply new methods to improve also poor results from earlier decades, for instance volumetric improvement with autologous fat transfer.

If we face patients with facial paralysis caused through previous surgery which has not occurred recently, we have to employ all our skills and experience from reconstructive surgery to help these patients as well as we can.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 53.6. **a** A 60-year-old patient, 8 years after primary facelift. **b** Mini facelift with shortened operative and recovery time (only preauricular scar)

Fig. 53.7. **a** Facelift stigma of "operated look" produced 22 years ago. **b** Slight deep-layer and neck skin correction with SMAS plication and autologous fat transfer; minimal skin resection!

Fig. 53.8. **a** Patient with paralysis of all three branches of the facial nerve, when a bilateral facelift with resection of neurofibromas was performed 30 years ago. **b** Patient after second stage of reconstruction. **c** Dermographic planning. **d** Left preoperative side view of the patient

Fig. 53.8. *Continued*. **e** Left unilateral minimal-invasive, deep-intensive (*MIDI*) facelift with extirpation of neofibromas, cantopexy, and **f** elevation of the left mouth angle. Her mouth **g** before. and **h** after second-stage reconstruction. Her eyes **i** before and **j** after cantopexy and resection of skin and neurofibromas

54 Submental Manoeuvres

Dimitrije E. Panfilov

Mostly we can achieve fairly good definition of the mento-cervical angle by lateral mobilization and fixation of skin and platysma and by liposuction of the submental region. Sometimes, however, it will not be enough to harmonize the entire neck. We can excise a spindle-like part of the submental skin and subcutaneous fat to tighten the skin.

If there are platysma bands with muscle fibres we can mobilize them, cut them, or suture them together.

We can provoke the real platysma bands by asking the patient to tighten his/her neck muscles or to a make disgusting facial expression. Skin excision, "corseting", and "notching" will improve the neck harmony.

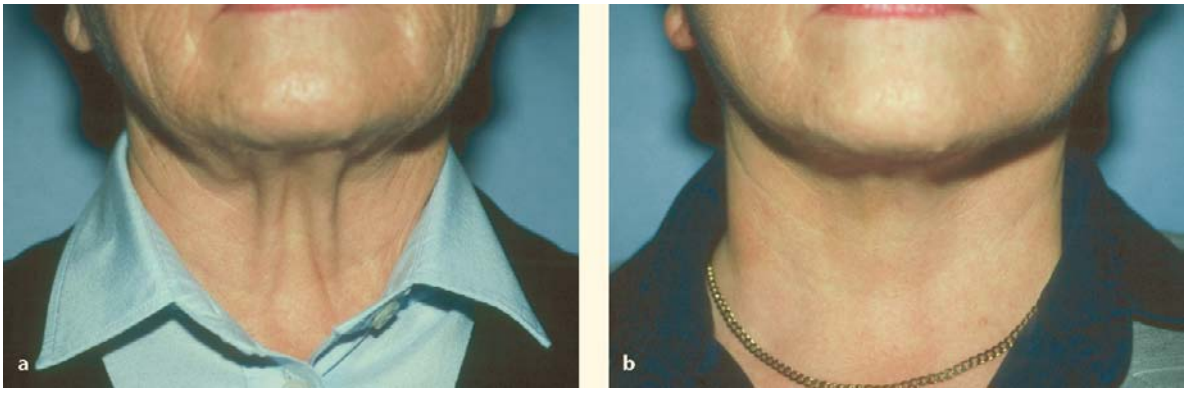

Fig. 54.1. **a** Preoperative look with skin bands – without platysma bands. **b** Classic face-neck-lift and submental skin excision were sufficient to achieve this result

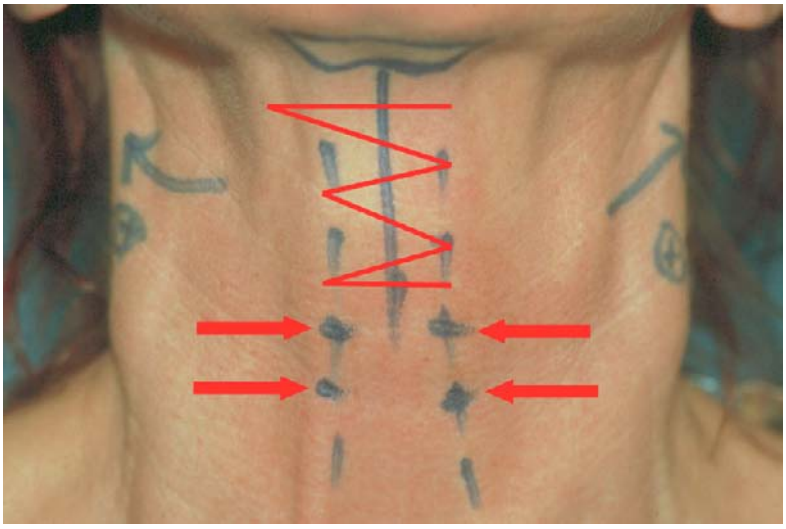

Fig. 54.2. Submental skin excision and "corseting" of platysma bands in the upper part (platysmoraphy) and "notching" in the lower part of the neck

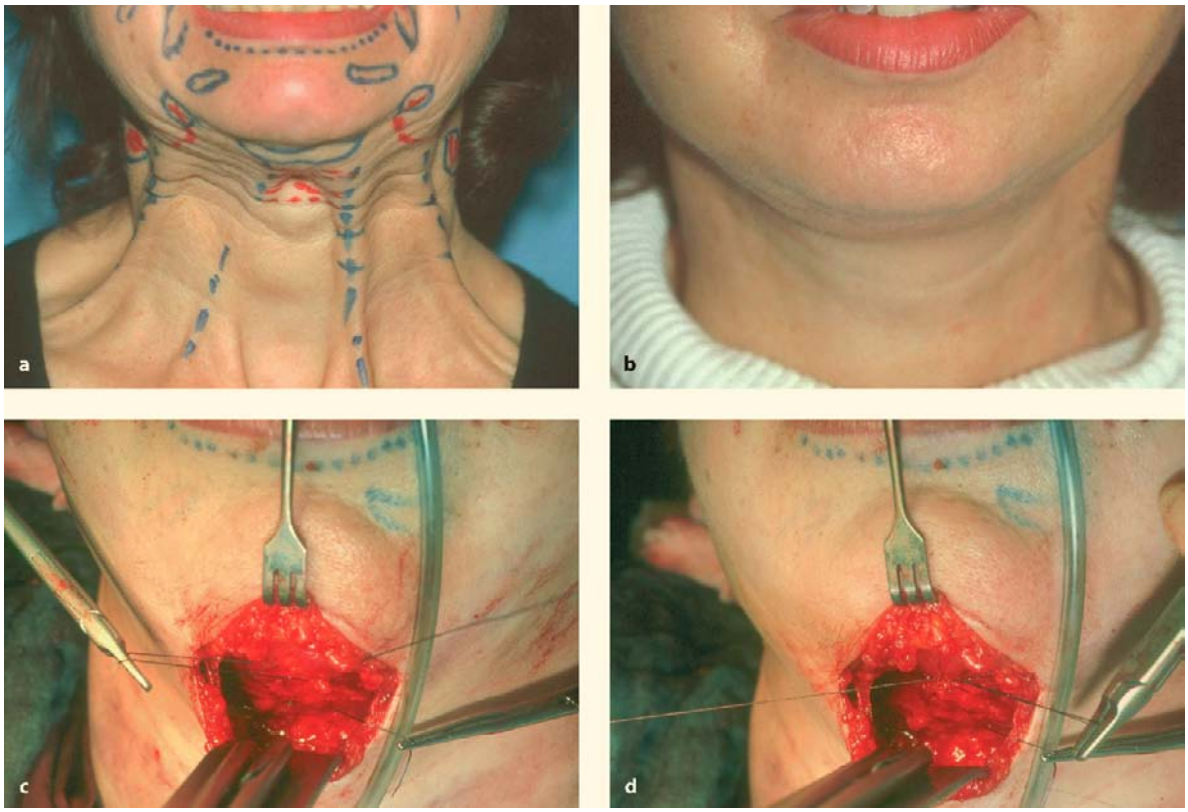

Fig. 54.3. **a** Real platysma bands. **b** Result 2 weeks after platysmoraphy. Corseting suture **c** placed and **d** tightened

Notching is procedure popularized by Ziya Saylan which is very simple. Preoperatively we palpate platysma bands and make markings where horizontal neck wrinkles cross these bands. Intraoperatively we cut the skin superficially over these markings and catch the muscle band with a small Dechemp hook. Now we cut muscle fibres preferably with radiowaves. In such a way we do not cause bleeding.

Fig. 54.4. **a** Real platysma bands, left more than right. **b** Ten days after face-neck-lift and notching of platysma bands. Stretching the skin, we clasp the muscle and divide it into **c** the upper and **d** the lower part of the neck

Sometimes the hypertrophic digastric muscle produces a turkey neck without a mento-cervical angle. In that case we detach the mental attachments of both digastric muscles in the same way as we do in notching.

When we have a "heavy neck" we must sometimes do additionally partial resection of the submandibular gland (see Chap. 55 by Farzad Nahai and Foad Nahai). This is the case in less than 1% of all our facelifts and we perform digastricus detachment in less than 2% of all cases.

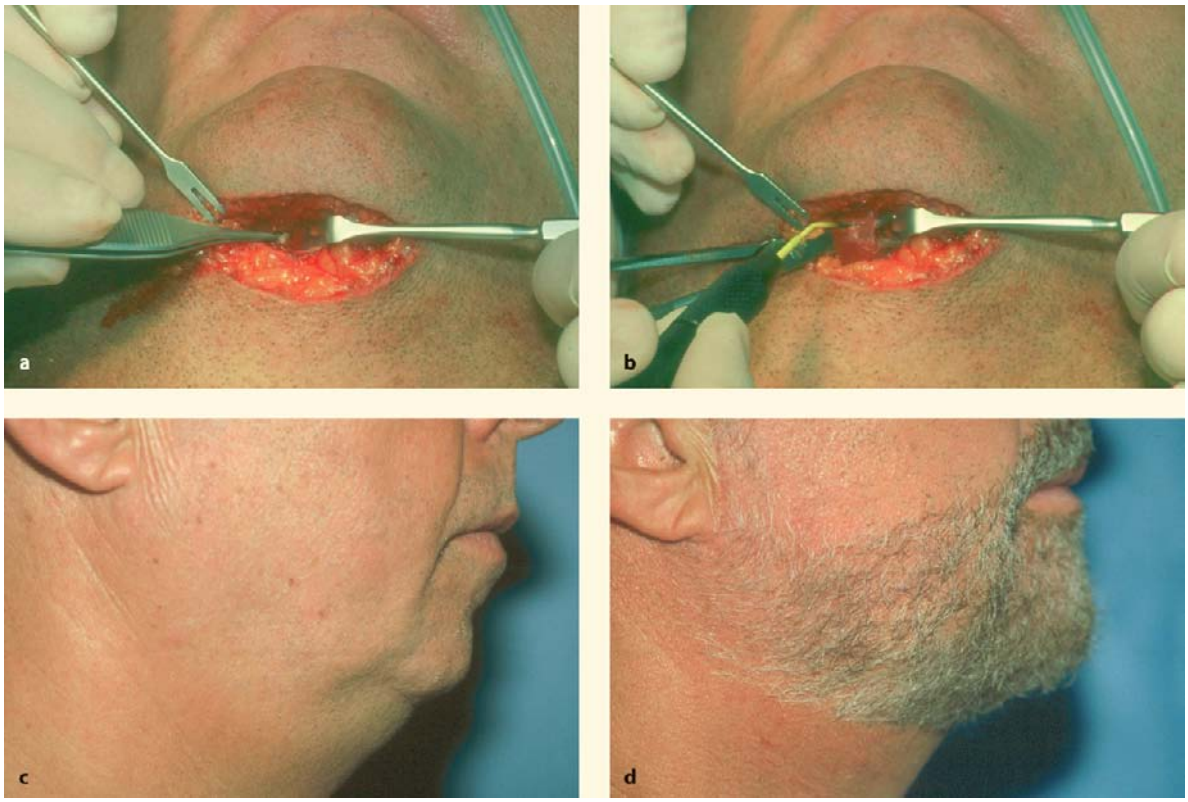

Fig. 54.5. **a** Exposing the mental attachment of the right digastric muscle through the skin and platysma layer and **b** detachment with radiosurgery. Patient **c** before this type of surgery and **d** after face-neck-lift, liposuction of platysmal fat, and bilateral digastricus detachment

Fig. 54.6. **a** "Heavy neck" with platysma bands and visible submandibular glands. **b** Face and neck surgery, liposuction, corseting, and partial resection of the submandibular gland

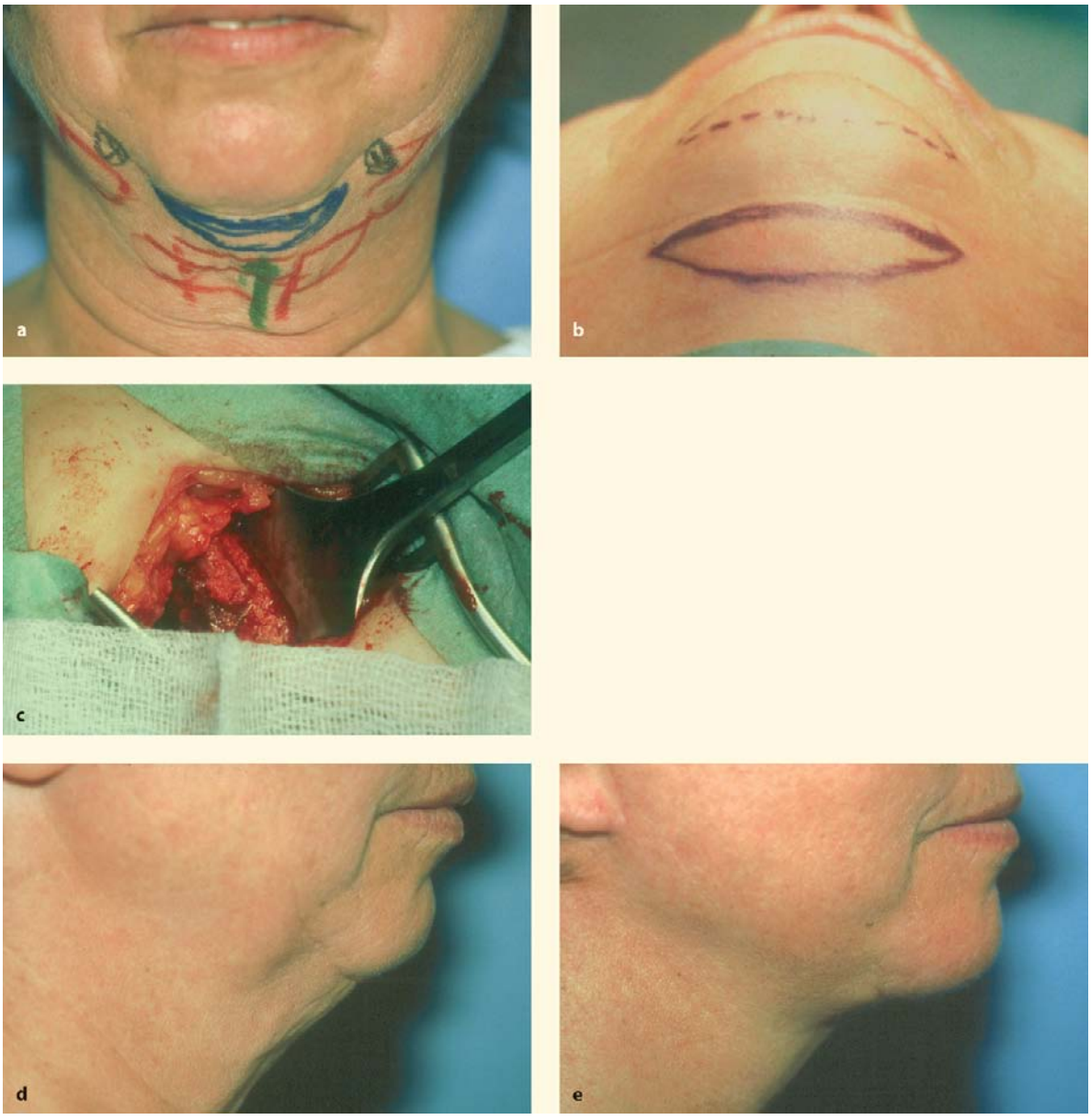

Fig. 54.7. **a** "Turkey neck" and hypognathy; submental excision, corseting, liposuction, and bone graft planned. **b** Preoperative submental view. **c** Bone graft to be taken from the iliac crest. Patient **d** before and **e** 3 months after surgery

If the turkey neck is combined with hypognathy, we should add also chin augmentation. For this purpose we prefer a "horseshoe" silicone chin implant, but patients in Germany sometimes insist on autologous bone graft, which we take from the iliac crest.

There is also a simple method of neck-tightening by "star excision" and zigzag "Zorro scar" in the middle of the neck for those patients who are ready to accept this type of scar. We should check if the patient already has unobtrusive scars somewhere else on the body. It is of some comfort that the older we are, the more cell activity decreases, and the scars we produce are less visible with increasing age.

First we palpate the skin and underlying fat with one hand and we mark an oval or spindle-like vertical picture in the middle of the neck. Then we mark the legs of distant multiple Z-plasty (see Figs. 54.8 and 54.10 and also Chap. 51 by Ulrich Kesselring). Then we cut it preferably with radiosurgery and suture it. Additionally we apply adhesive bandages to reduce the tension on the wound edges.

Fig. 54.8. **a** Preoperative markings. **b** Incisions with radiosurgery – no bleeding! **c** Excision completed. **d** Suture completed

Both patient and surgeon should have patience for the first couple of weeks and months. After the tenth postoperative day, the scar should be hidden with cosmetic camouflage.

We can do this kind of surgery at the same time as facelift surgery, some time later, or isolated, just for neck-tightening.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 54.9 a–e. Patient from Fig. 54.8 *en face* after **a** 1 week, **b** 3 months, and **c** 12 months. Same patient in profile view **d** before surgery and **e** after 12 months

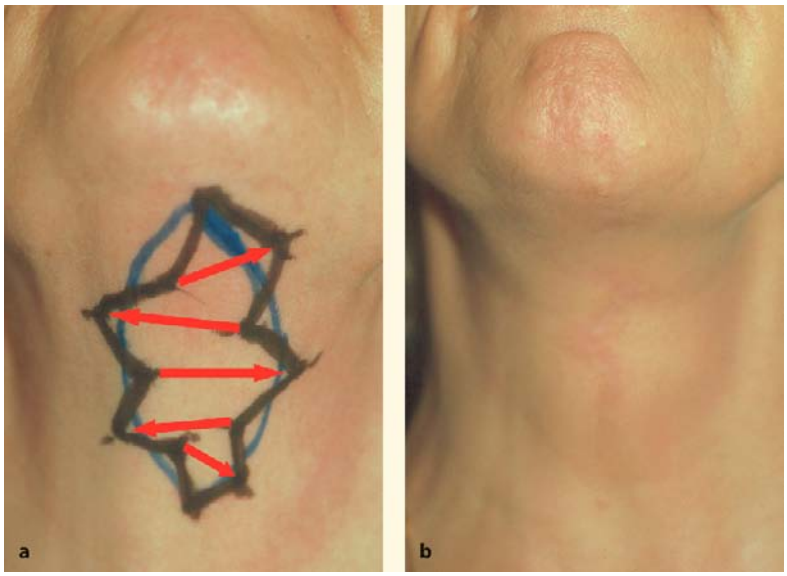

Fig. 54.10. **a** Planning of isolated necklift with "star excision". **b** Patient 6 months after surgery. Profile view of the same patient **c** before and **d** 6 months after surgery

55 Partial Resection of the Submandibular Gland

Farzad R Nahai, Foad Nahai

55.1 Introduction

As our skills at facial rejuvenation have advanced, so has our attention to the submental area in our aesthetic assessment and surgical approach [1, 3]. Despite thorough preparation and the best surgical efforts, the rejuvenating results of a neck lift and platysmaplasty can be marred by ptotic or enlarged submandibular glands. Unnoticed preoperatively, following the effects of skin/muscle tightening and fat resection in the aged neck, previously undetected ptotic or enlarged submandibular glands can appear as a prominent bulge and can be more noticeable, to both the patient and the physician (Figs. 55.1, 55.2).

Partial resection of the submandibular glands is an effective means of improving contours and aesthetic outcomes in neck lifts (Fig. 55.3). Knowledge of neck anatomy and sound surgical technique are critical when considering partial resection of the submandibular glands.

Fig. 55.1. Preoperative lateral view demonstrating an oblique cervicomental angle, fatty neck, redundant and hanging skin, platysmal bands, and a witch's chin

Fig. 55.2. Postoperative lateral view after face and neck lift including submental access for platysmaplasty. The submandibular glands were not addressed. Note their prominence after defatting and tightening of the neck. Their presence detracts from the aesthetic result and demonstrates poor neck contours

Fig. 55.3. Same patient as in Figs. 55.1 and 55.2 after partial resection of the submandibular glands through a submental incision. Note the improvement in neck contour and enhancement of the aesthetic result

55.2 Anatomy

Singer and Sullivan [4] published an excellent anatomical description of the submandibular gland, its blood supply and location relative to critical structures in the neck. The submandibular gland is a bilobed structure located within the digastric triangle of the neck deep to the platysma muscle. It rests on the caudal surface of the mylohyoid muscle, behind the mandible (although it descends beyond its inferior border with age), with its lower border nestled against the tendinous portion of the digastric muscles. The smaller deep lobe rests behind the mylohyoid muscle. The gland is enveloped by its own fascial covering and is one of the multiple glandular structures within the head and neck which produce saliva.

The submandibular gland derives its blood supply from branches of both the superior thyroid and the facial arteries. Two branches enter it medially and a separate deep perforating branch enters from its deep border. While the function of the gland is dictated by its autonomic input, four critical nerves, the lingual, hypoglossal, marginal mandibular, and cervical, course close to it. The hypoglossal nerve is located posterior to the tendinous junction of the digastric deeper within the neck. The lingual nerve is also deep, protected by the medial border of the mandible, and rests cephalad and medial to the deep lobe. The marginal mandibular nerve is located approximately 3–4 cm cephalad to the inferior border of the submandibular gland and travels deep to the platysma, temporarily dipping below the level of the inferior border of the mandible as it courses medially towards the mentum. The cervical branch also runs deep to the platysma and is caudal to the marginal mandibular nerve. From a submental approach to the submandibular glands, the terminal branches of the cervical nerve are not seen.

55.3 Surgical Decision Making and Technique

A preoperative examination of the nonfatty neck can identify enlarged or ptotic submandibular glands. These can then be marked before surgery. Clear knowledge of the anatomy and adequate comfort level operating in this area is a prerequisite for partial resection of the submandibular glands. Typically the submandibular glands are encountered when the decision has been made to perform a platysmaplasty through a submental approach. At the time of mobilizing the platymsa muscles on either side by dissecting and freeing up its undersurface to facilitate midline plication, the submandibular glands may be noted as being ptotic or enlarged. If you see that the glands, if left alone, will create an unwanted bulge in the neck, you have three choices: (1) accept the bulge, (2) suspend the glands, or (3) partially resect them. If the glands are minimally ptotic or enlarged, you have the option of resuspending them using sutures between the mylohyoid muscle and the mandibular periostem. Suspension will be successful if the gland can be repositioned above the level of the lower mandibular border without undue tension. The suspension technique forgoes any further dissection deep to the platysma and minimizes the risks of bleeding and local structure injury.

Suspension sutures under undue tension will tear and can be relied upon for only a certain amount of upward repositioning of the glands; therefore, if the glands are significantly enlarged or ptotic, suspension sutures alone will not be adequate and you must consider resecting the superficial lobe. Paramount to a safe and controlled resection is an intracapsular approach to the superficial lobe. The superficial fascia is incised and peeled back to expose the gland. Using gentle blunt dissection techniques in addition to bipolar cautery forceps, you can excise the superficial lobe of the submandibular gland safely provided you do this in a controlled manner. Remember that two

vessels usually enter its medial surface. It is best to identify these early and cauterize them. Vascular clips can also be helpful here. Staying within the fascial envelope of the gland minimizes the chance of damage to local structures. It is unwise to dissect above the level of the lower mandibular border as bleeding behind the mandible is much more difficult to control. After the superficial lobe has been removed, ensure excellent hemostasis, then close the capsule. If suspension sutures are still needed, they are applied at this time. Bleeding in this area can be copious and difficult to control so it is imperative to dissect in a controlled and judicious manner. Drains are left deep to the platysma whenever a partial submandibular glad resection is performed.

55.4 Thoughts on Our Experience

The question arises as to whether complex procedures in the subplatysmal plane are worth the risk and whether or not there is added morbidity. The commonly practiced alternative of liposuction and or direct lipectomy in the neck, which we employ, is effective in contouring the neck; however, it is not without its own problems. Liposuction can cause streaking, skeletonization, skin adherence to the platysma, and unmask deeper problems, all of which can be difficult to remedy. Indeed resection of the submandibular gland can be risky with the potential for bleeding, nerve injury, dry mouth, and dental problems. In our hands, partial resection of the submandibular gland has been a safe and effective adjunct to contouring the neck [5, 6]. Knowledge of the neck anatomy, an intracapsular approach, and judicious surgical technique are imperative and have made this a technique that we both advocate and employ when indicated.

The key points for the operation are listed in Table 55.1.

Table 55.1. Key points

- Having in-depth anatomical knowledge of the neck when embarking on any procedure that includes neck structures is imperative
- Be aware that in the fatty neck a ptotic or enlarged gland may not be evident during a preoperative evaluation and could potentially mar an otherwise good aesthetic result
- Consider suspending the submandibular gland if possible before resecting it
- Perform an intracapsular dissection/resection of the submandibular gland to avoid injury to surrounding critical structures
- Ligate the medial vessels early during the intracapsular dissection

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Chin Corrections

56

Dimitrije E. Panfilov

There seems to exist a gender-specific ideal of chin shape. Whereas men prefer a prominent, "character chin" as sign of social dominance, women have a tendency to prefer a smaller chin shape. This predicts the influence of oestrogen, which promises better fertility. Consequently, chin augmentation is more frequent in men and chin reduction is more frequent in women.

A "witch's chin" is often a problem in elderly women. It is prominent in a frontal and caudal direction. To reduce it we make a spindle-like skin excision including skin in front and behind the submental skin crease. Then we remove a slice of mental subcutaneous connecting and fat tissue if liposuction alone is not enough to reduce the chin volume sufficiently.

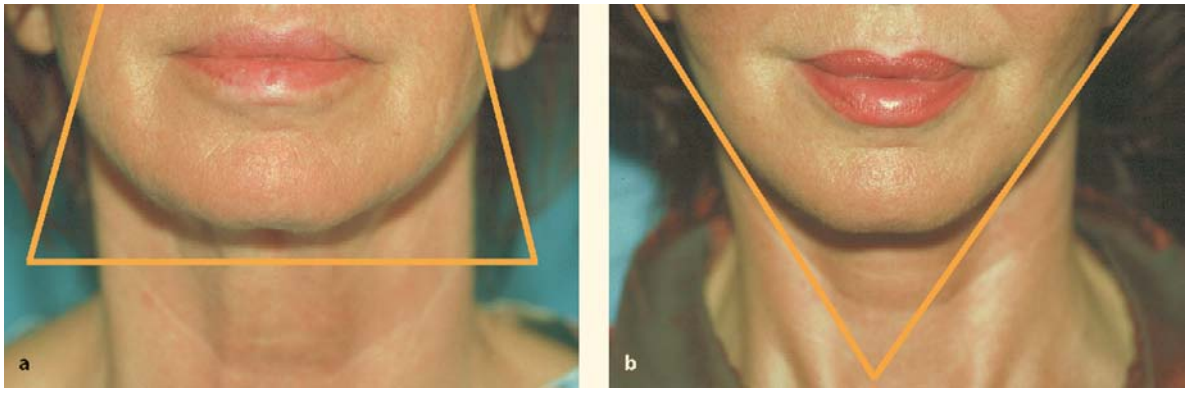

Fig. 56.1. **a** Wide chin turning the "triangle of youth" upside down. **b** Reversion of this triangle makes the appearance more feminine, and more youthful

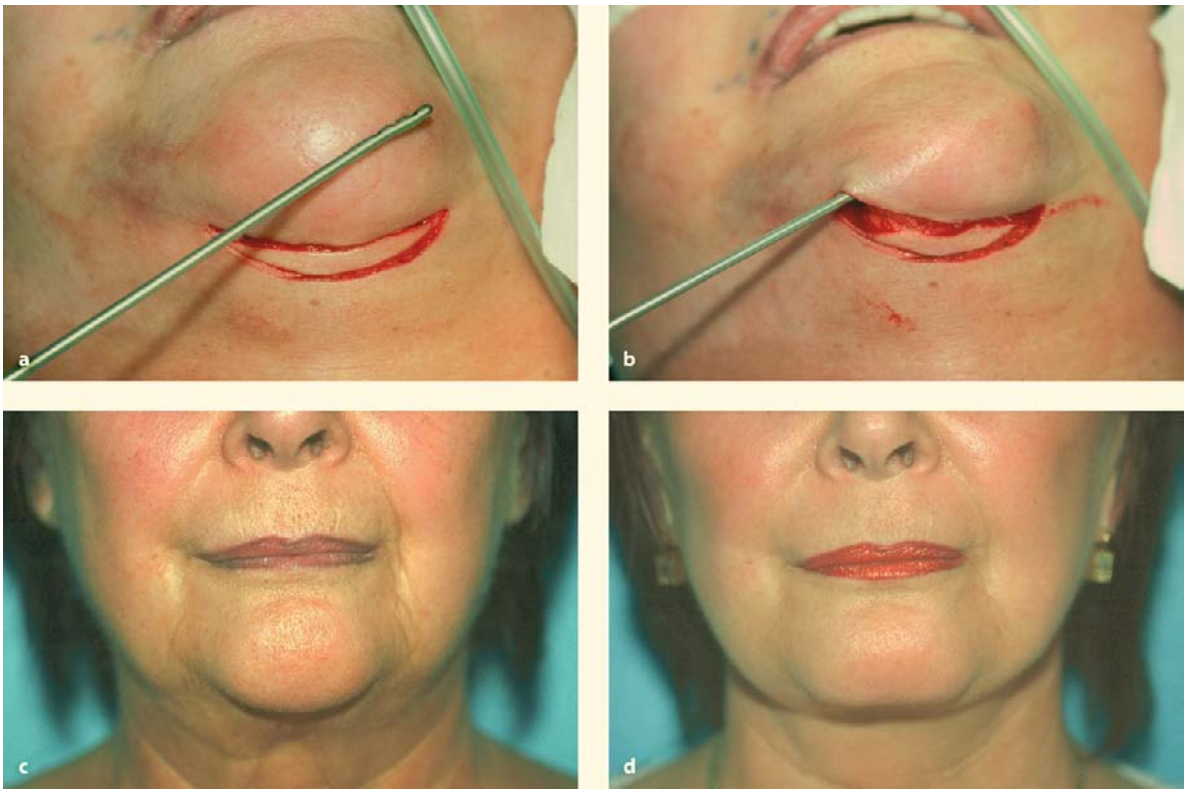

Fig. 56.2. **a** Submental skin excision with simulating cannula for liposuction above the skin. **b** Liposuction performed below the skin. Witch's chin **c** before and **d** after its correction performed together with face-neck-lift

If the submental crease is too deep, we make skin excision. We cut the underlying slice of connecting and fat tissue so that a proximal distal flap can be formed, turned backwards, and sutured below the proximal edge of the skin excision. In this way, the submental depression has been filled up. An intradermal pull-out skin suture finishes the procedure.

The asymmetry could also arise as a problem either through atrophy on one side or as unilateral hypertrophy.

If asymmetry is due to hypertrophy, we can correct it by gentle liposuction.

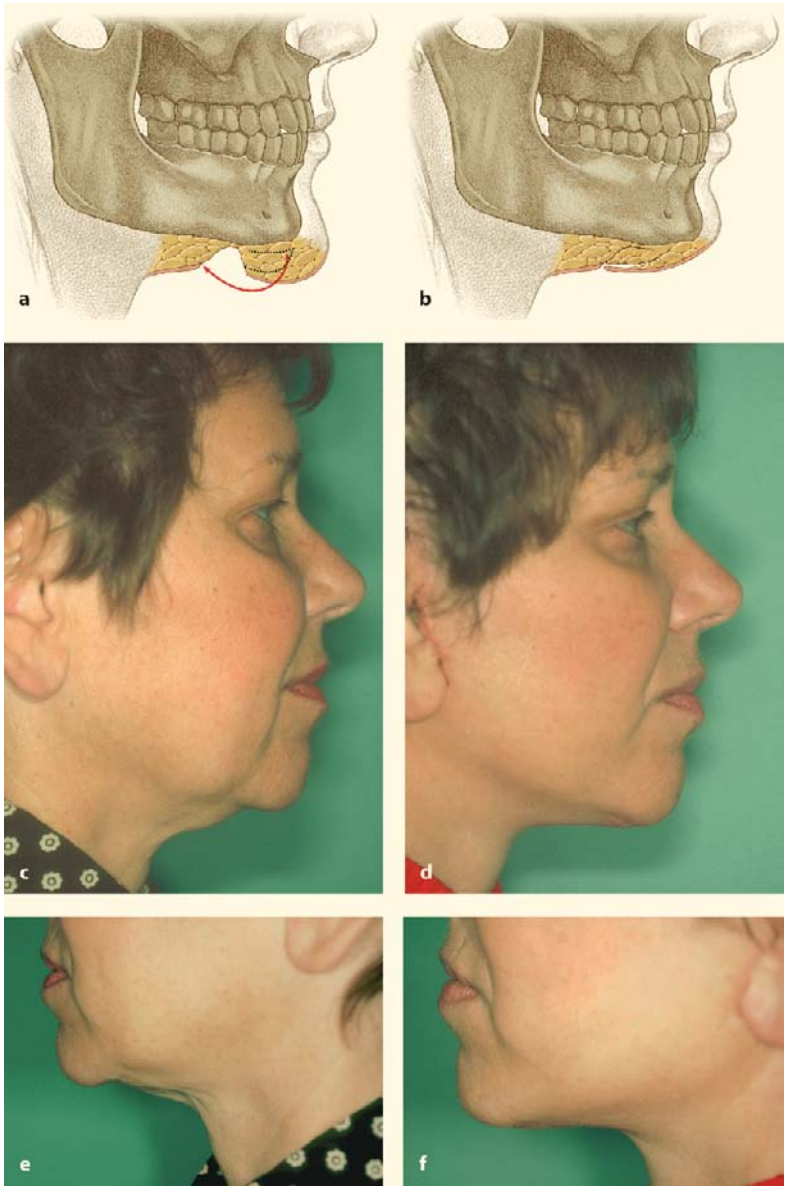

Fig. 56.3. **a** Witch's chin correction. **b** Subcutaneous flap reversed and sutured. **c** Witch's chin with submental excess skin. **d** After face-neck-lift and witch's chin correction, submental skin is tightened and the mento-cervical angle is well defined. The same patient from the other side **e** before and **f** after correction

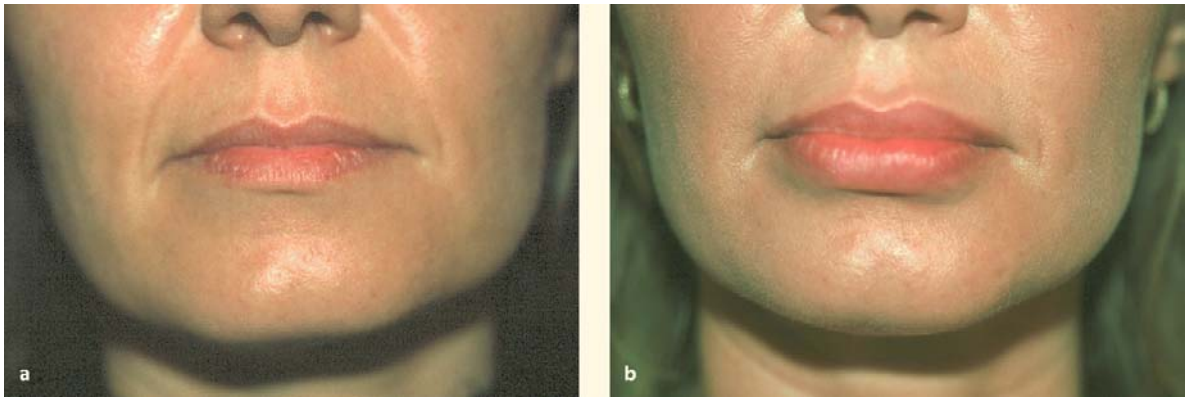

Fig. 56.4. **a** Hypotrophy of left side of the chin. **b** Four months after microlipofilling of the left chin, lips, and nasolabial folds

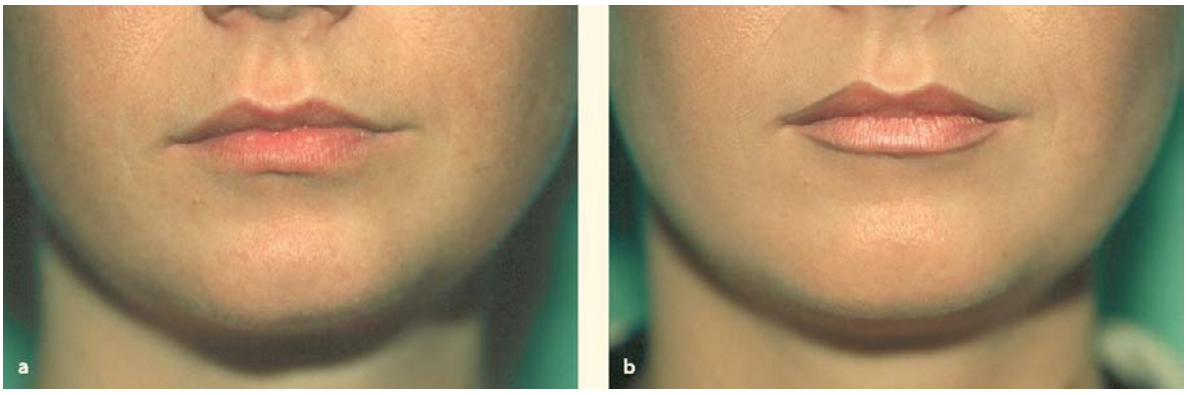

Fig. 56.5. **a** Slight lipohypertrophy of the right side of the chin. Ten years ago, this woman was Miss World. **b** We removed excess fat and used it for minimal lip correction. Nobody can get enough of beauty

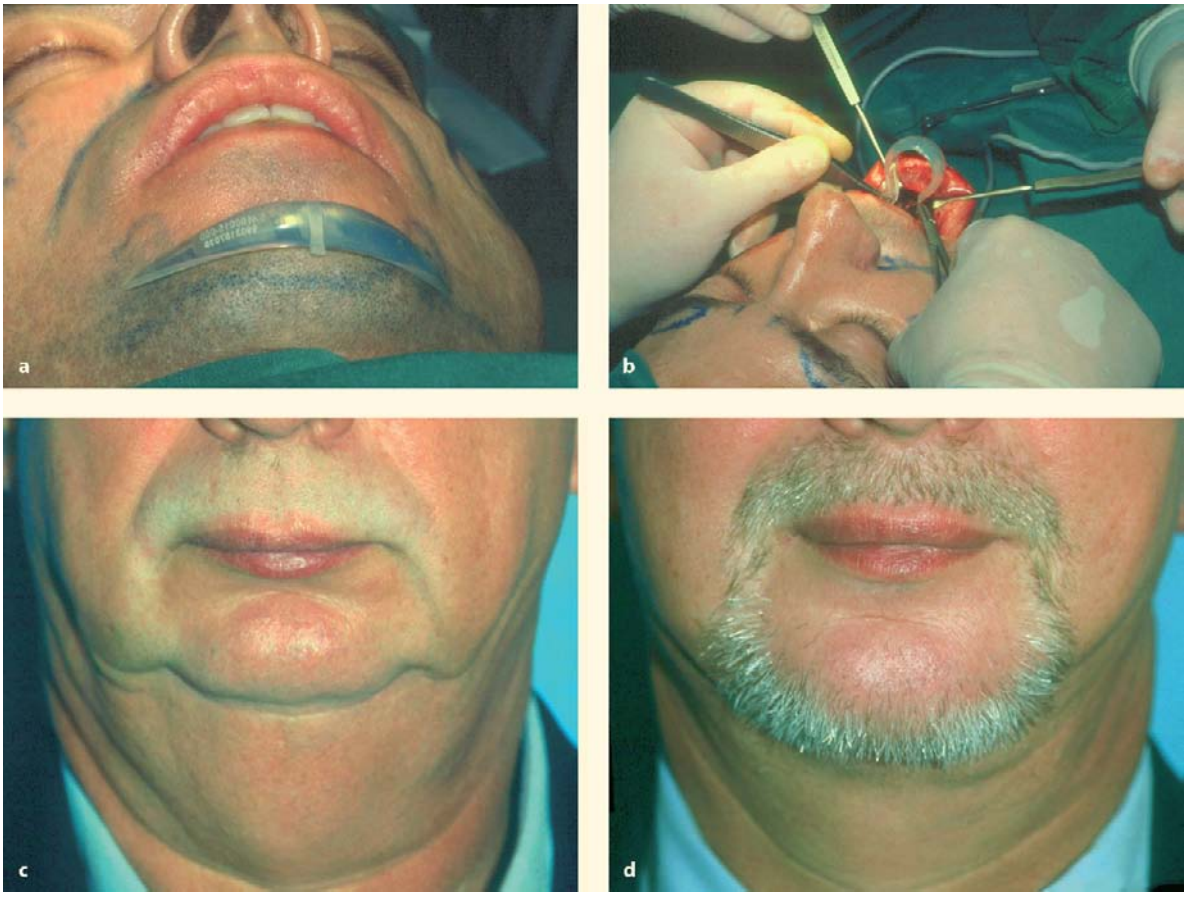

Fig. 56.6. **a** Putting the implant over chin skin, we check if the implant size is appropriate. **b** Translabial approach of implantation. Patient **c** before and **d** after face-neck-lift, submental liposuction, and chin implant

For chin augmentation a horseshoe-shaped silicone implant of proper size is the most suitable and least complicated method. This shape of implant does not produce pressure on underlying bone and consequent atrophy of it.

It is possible to make the implantation through a submental skin incision, but we prefer the infralabial approach without visible scars. The 3-cm-long incision on the lower lip should be done at least 5 mm above the lower preoral vestibular crease. If the inci-

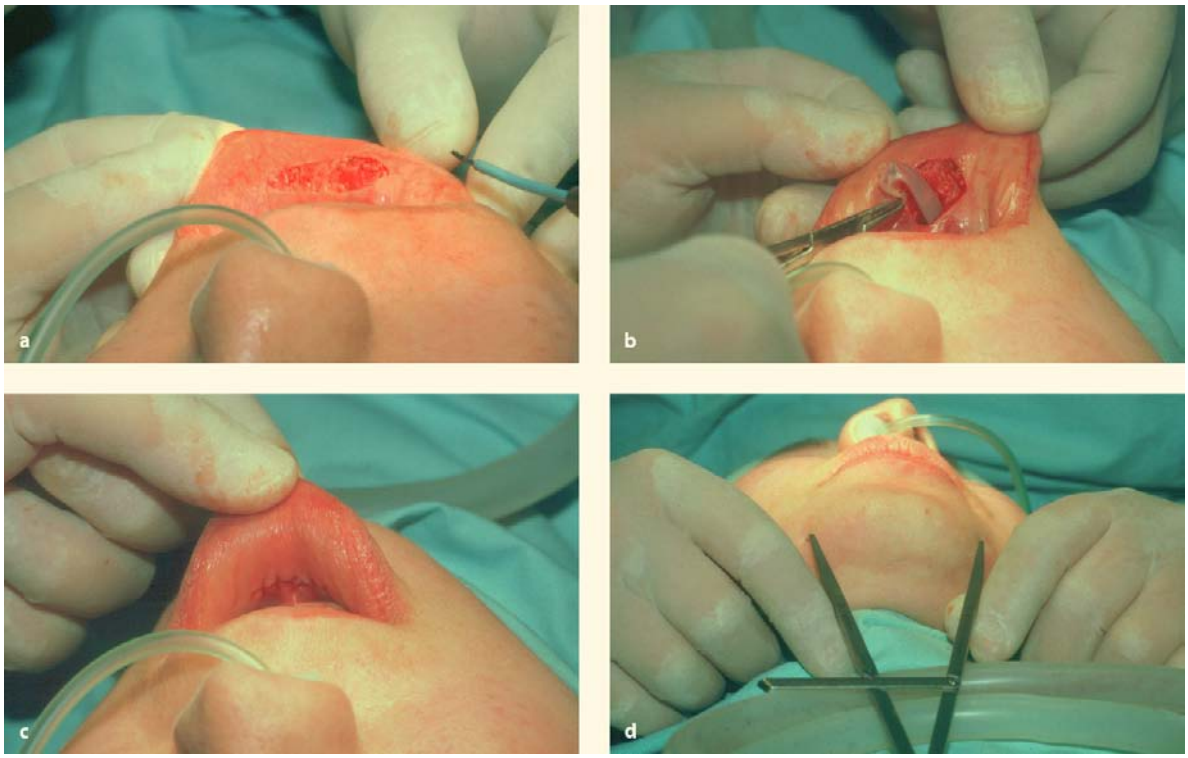

Fig. 56.7. **a** Incision of 3 cm with radiosurgery does not bleed. It is placed 5 mm above the lower preoral vestibule. **b** Implant insertion into prepared subperiosteal pocket. **c** Suture line does not involve the gingiva. **d** Check of the ends of the "horseshoe" silicone implant

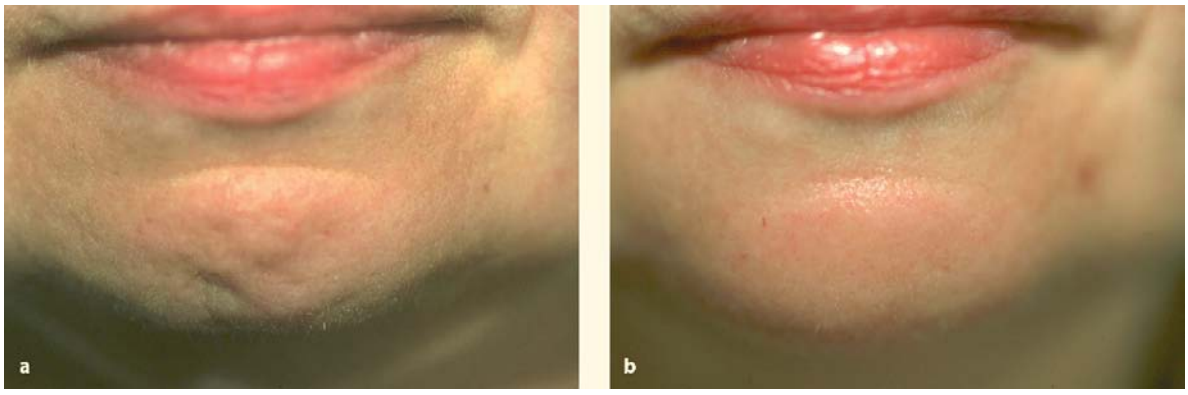

Fig. 56.8. Chin **a** to be corrected and **b** after implantation it looks rejuvenated

sion were in the deepest crease of the lower preoral vestibule, we could not suture it onto the gingiva. Once we have come with our rasparatorium to the tip of the mentum, we should create a subperiosteal pocket symmetrically left and right, but not too wide and not too narrow.

After the silicone implant has been placed, we clean the pocket with dilute Betadine solution.

If somebody has a chin dimple which is undesirable and has excessive alar cartilage of the nose, like "cherry tip deformity", we can diminish it by use of a crushed cartilage graft. Through translabial approach of the lower lip, we reach the subcutaneous layer below the dimple, divide the skin adhesions which connect skin and periosteum like a retaining ligament, and insert crushed alar cartilage into the preformed pocket.

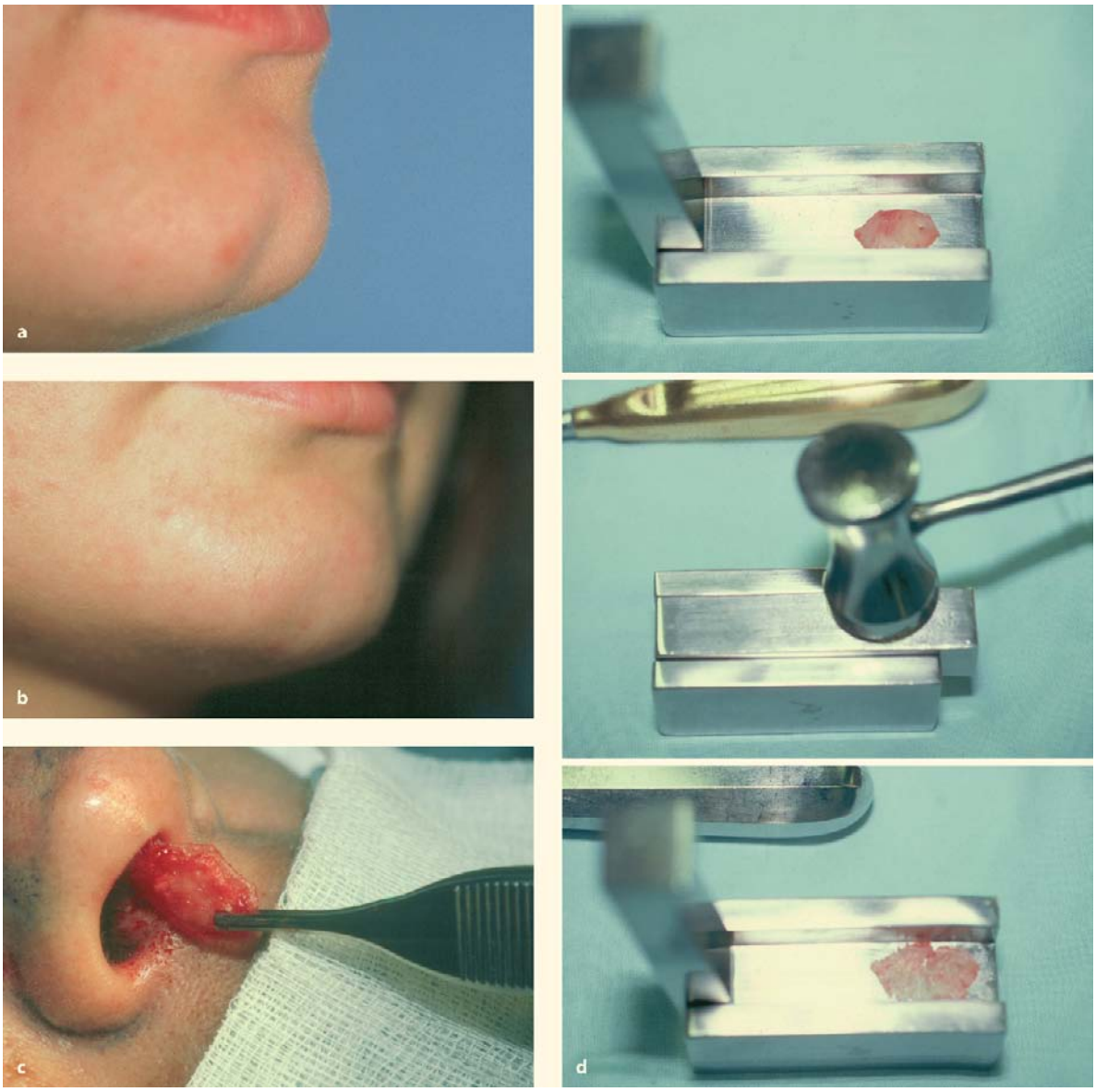

Fig. 56.9. **a** Undesirable chin dimple **b** flattened with crushed cartilage. **c** Alar cartilage removed from the nose. **d** Crushing cartilage with a hammer

Sometimes there is a supramental crease which is too deep and disturbs somebody's facial harmony. We can flatten it in a similar way as for a witch's chin. We excise 2–3 mm of skin, prepare a pedicled slice flap from mental subcutaneous tissue, which is pretty firm, overlap it, and suture it below the upper skin edge.

Bibliography

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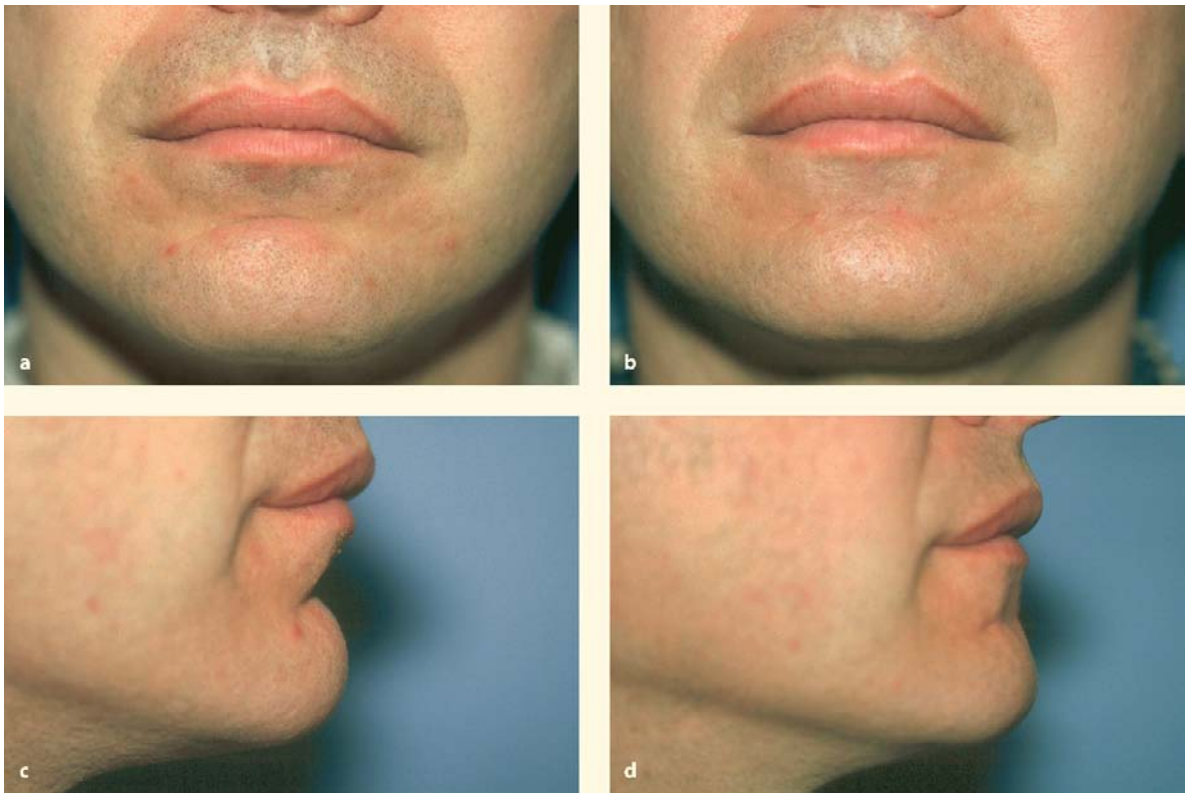


Fig. 56.10. **a** Supramental deep longitudinal notch *en face*. **b** After excisional flattening. **c** Preoperative side view of the same patient. **d** Postoperative look

57 Lip Corrections

Dimitrije E. Panfilov

Only the human race has exposed lip redness to imitate visible mucous membrane. This phenomenon does not exist in primates as they use direct sexual signals opposite from humans, who communicate and mostly copulate frontally owing to an erect gait. Only carps and humans have such a small mouth compared with their face size.

There is a plastic surgery phenomenon: I have done many lip enlargements but only in female patients – none in male patients. I have done some lip reductions but only in male patients – none in female patients (the exception being Mongoloid girls with macrocheily of the lower lips).

When we reduce the lower lip we resect a longitudinal wedge of mucous membrane deep inside the lower lip, so that the consecutive scar stays invisible from outside.

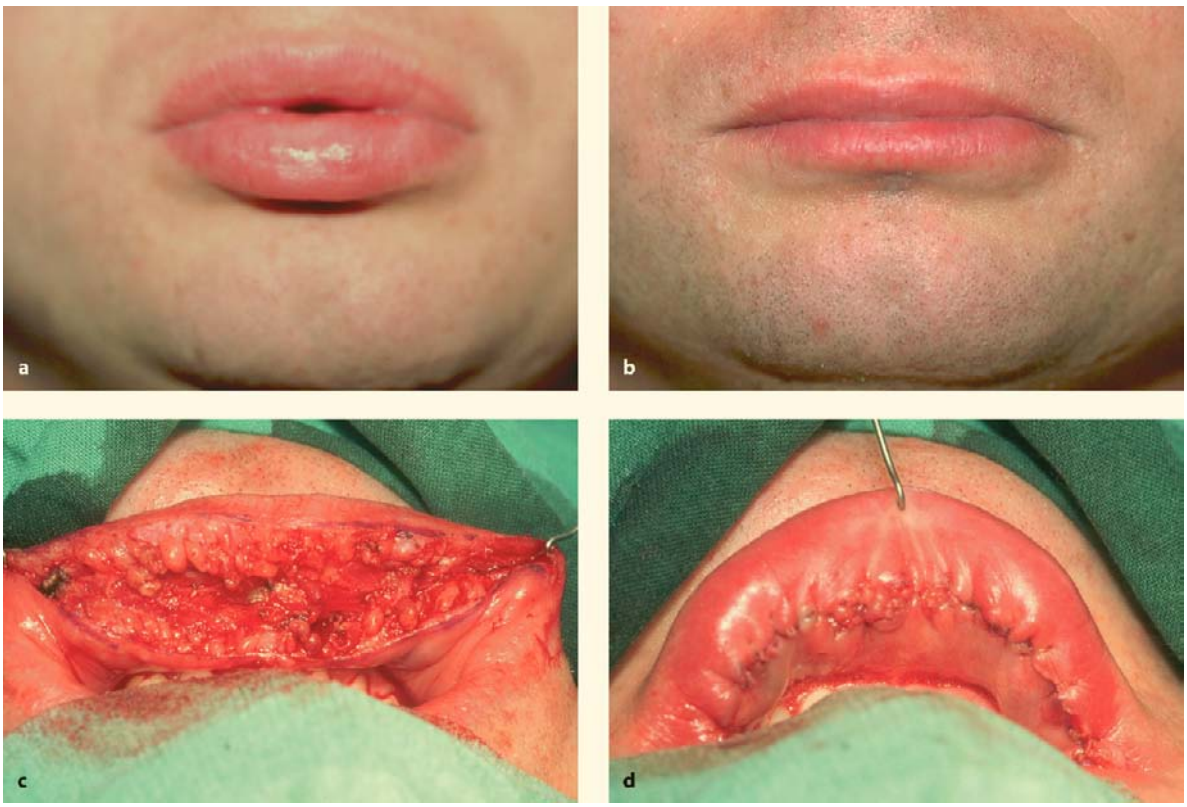


Fig. 57.1. **a** Hypertrophic male lower lip – frontal view. **b** Three weeks after intravestibular inferior (lower) reductive labioplasty. **c** Intraoperative view to demonstrate the size of the excision. **d** At the end of the surgery.

Fig. 57.1. *Continued.* Same patient side view **e** preoperatively and **f** postoperatively

Fig. 57.2. **a** Microlipofilling for facial structuring with autologous fat. Patient **b** before and **c** after autologous fat transfer into upper (3 ml) and lower (2 ml) lip

For lip enlargements there are numerous fillers (see Chap. 73 by Gottfried Lemperle), which provide a simple and inexpensive method. We prefer, however, autologous material because resorbable fillers disappear sooner or later and there is no nonresorbable filler that would be completely free of negative side effects. Nowadays we have the very reliable method of autolipografting which gives stable results for years without allergic or foreign-body reactions.

Fig. 57.3. Patient **a** before and **b** after microlipofilling of lips and hollow cheeks

Fig. 57.4. **a** Too narrow upper lip with teeth-show. **b** First postoperative day after implanting 3 ml into the upper lip. **c** After 4 months the upper lip has been enlarged from 5 to 9 mm and does not look unnatural

Sometimes complex facial lipostructuring has been requested.

It is interesting that different nations have different ideas of the beauty of female lips. German and Slavic plastic surgeons prefer the upper lip with its Cupid's bow as important for attractiveness, whereas French and British plastic surgeons prefer the lower lip. Brazilians and Mexicans balance both lips.

If we perform superficial musculo-aponeurotic system (SMAS)-ectomy during facelift surgery, we can take a strip of SMAS, model it, and insert it into the upper or lower lip or into both.

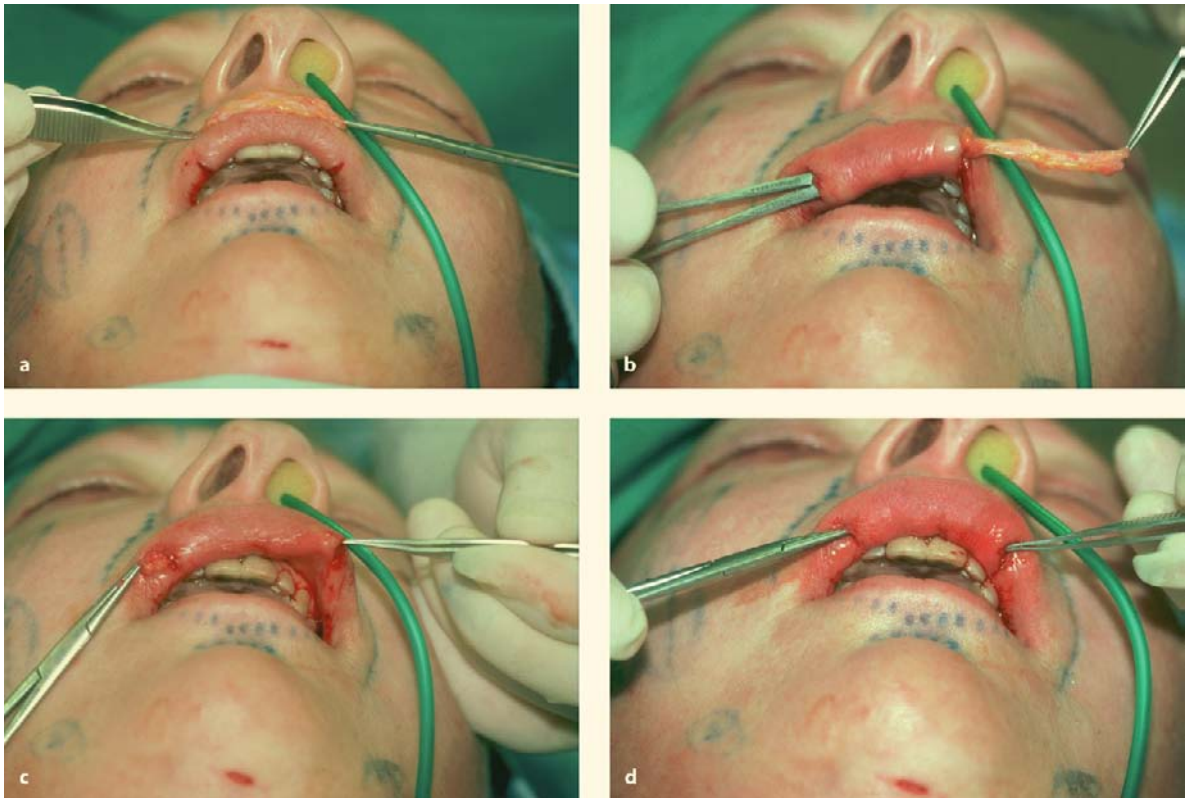


Fig. 57.5. **a** Strip of superficial musculo-aponeurotic system (*SMAS*) adjusted over the upper lip; vertical incisions from the inside of the upper lip have been done. **b** Forceps proceeded from one to the other incision grasping the SMAS graft. SMAS graft **c** pulled out through the first incision and **d** adjusted into the upper lip

Fig. 57.6. The same patient **a** before and **b** 4 months after surgery. Visible but not obtrusive enlargement of the upper lip. **c** Elevated lip with marked incisions **d** which are not visible after a couple of weeks

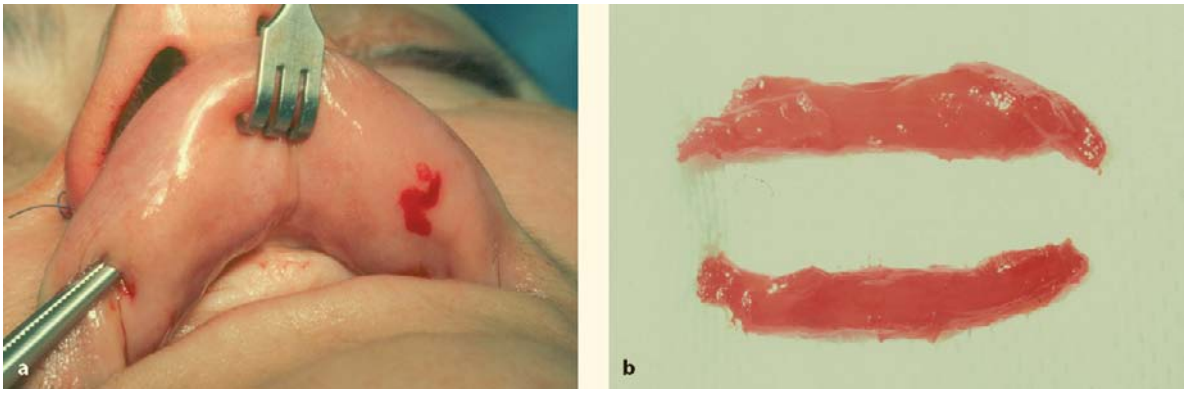


Fig. 57.7. **a** Upper lip prepared for muscle grafting. **b** Strips of pectoralis muscle to be inserted into the upper and lower lip

For lip enlargement we can take also temporal fascia, muscle strips from upper eyelids if we perform upper blepharoplasty at the same time, or from the edge of the pectoralis muscle if we make breast augmentation or reduction at the same time. In our hands muscle take is less than 50% and fat stays stable in 60–80% of cases.

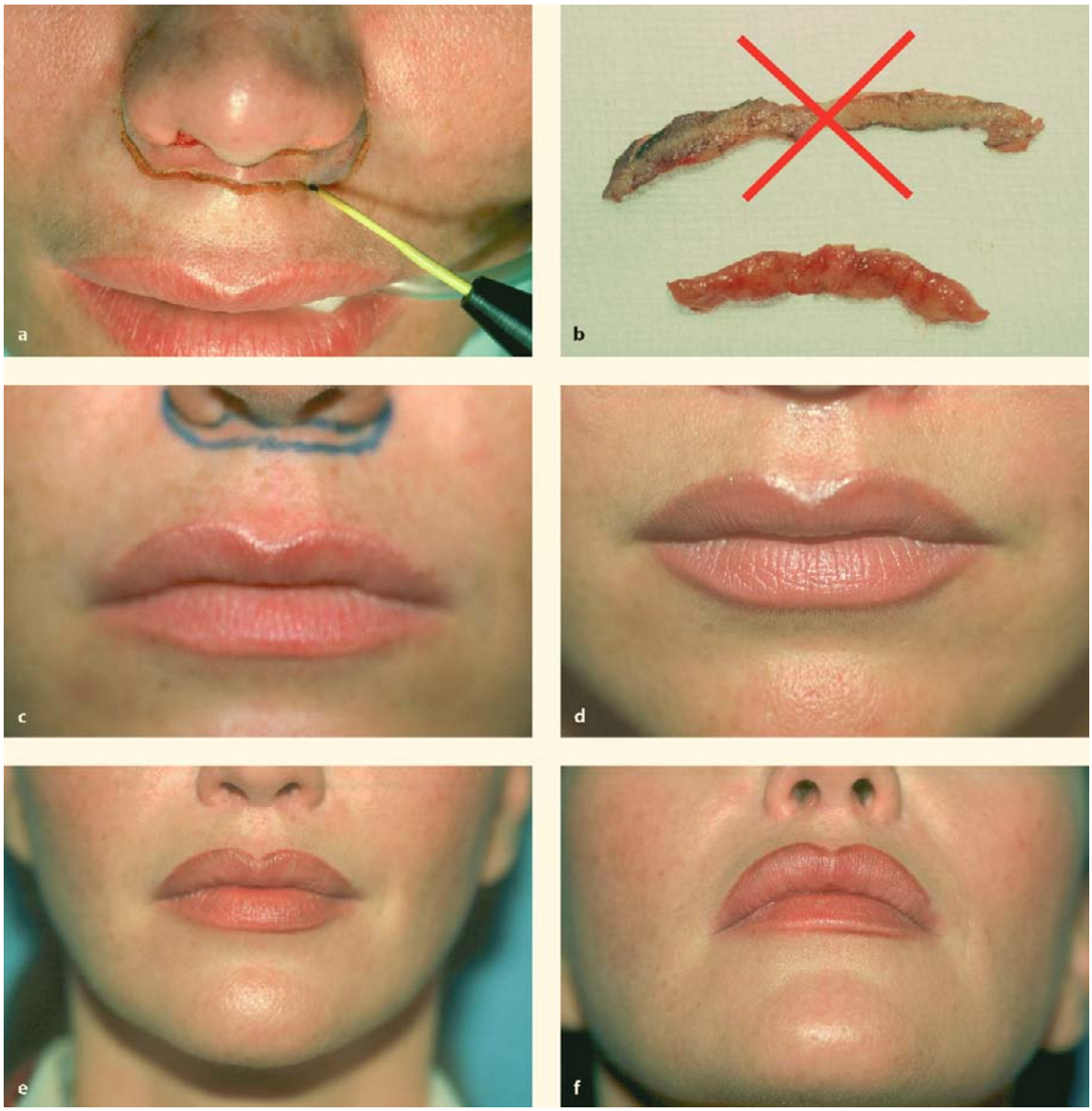


Fig. 57.8. **a** "Bull's-horn" incision performed without bleeding with high precision radio waves: we needed wider excision on the left side, because the left upper lip was smaller! **b** "Bull's horn" deepithelized. **c** Dermographic markings; notice the lower-left upper lip! **d** Augmented and symmetrized upper lip. **e** Harmonious lips after 6 months. **f** Scar below the nose is almost invisible

The "bull's-horn" method is a very nice method to harmonize the upper lip which has been popularized by Ulrich Hinderer (Chap. 41). Sometimes the white area of the upper lip is quite large and the upper lip too narrow. Both can be corrected if we excise skin with underlying solid connecting tissue in the shape of a bull's horn. We deepithelize this strip of tissue, remove the epidermis, and insert a dermis–subdermis graft into a prepared tunnel of the upper lip.

Fig. 57.9. **a** 'Teeth-show" due to frenulum breve. **b** Same patient after facelift and frenuloplasty. **c** Elevated upper lip with a too short frenulum. **d** Prolongation of it through simple Z-plasty

If the opposite happens such that the upper lip looks too short, it produces "teeth-show". Mostly, the reason for this is a too short frenulum. We can prolongate this by simple or multiple Z-plasty.

Around the lips and around eyes there are the only facial muscles which have no attachments to the deep structures or the periosteum, but which have only cutaneous attachments. In these areas small vertical wrinkles on the upper lips are especially noticeable and are called by some patients "lemon wrinkles", recalling the contracted orbicularis oris muscle when tasting something which is sour like lemon.

There are many wrinkle fillers which can give quick help, like collagen, but these wrinkles could be treated with longer-lasting results by peeling, mechanical peeling (dermabrasion), chemical peeling, laser peeling(see Chap. 70 by Ashok Gupta), or, the method we prefer, peeling with radiowaves.

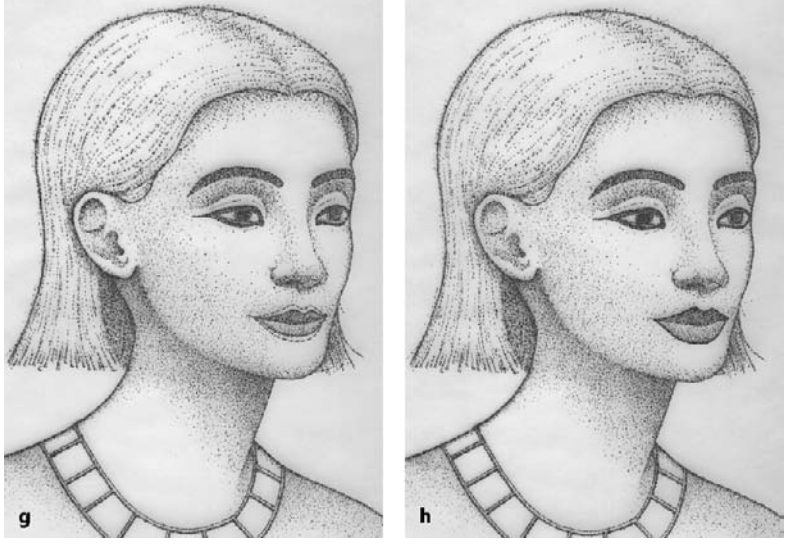


Fig. 57.10. **a** Dermoabrasion – mechanical peeling. **b** Chemical peel. **c** Radiofrequency peeling. **d** Covering of peeled upper lip with bismuth subgallate powder for 8 days. Patient **e** before and **f** 3 weeks after treatment; additionally to the radiofrequency peel, we performed a minimal-invasive, deep-intensive (*MIDI*) facelift, elevation of lip commissures, and microlipofilling. **g** Excision of narrow skin strips over the upper lip and below the lower lip **h** is nowadays regarded obsolete because of scarless alternative methods

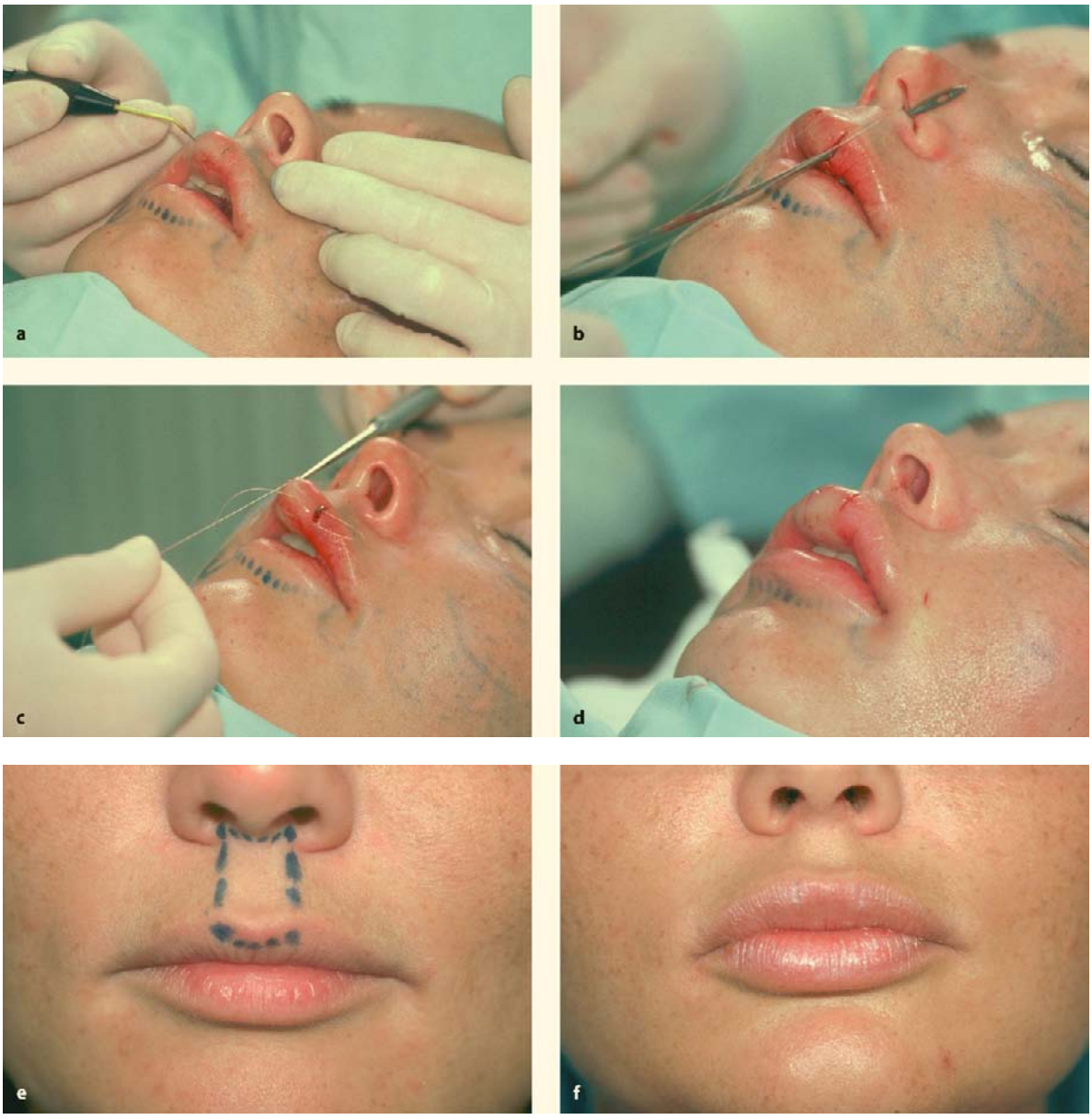


Fig. 57.11. **a** We put vertical incisions of some 3 mm length each on the upper lip and the lower edge of the nasal vestibule with radiosurgery. **b** We pull the hollow probe of small diameter with a 4-0 nylon suture from the nasal vestibule to the ipsolateral incision of the upper lip. **c** We catch the nylon suture with a Dechemp hook and pull it to the contralateral lip incision. **d** The suture should be pulled from the lip to the ipsolateral vestibular incision. With the needle we pass columella and knot the suture under slight tension. In this way we have elevated the vermilion border by 1–2 mm. **e** Dermographic markings. **f** Result 3 months postoperatively

I remember times when we excised 2–3-mm-wide strips of upper-lip and sometimes lower-lip skin to pull out and extend the red surface of the lip, enlarging the lips in this way. Scars after this procedure were not completely invisible. Now I prefer filtropexy, which was introduced by Onur Erol. This is a simple and effective method.

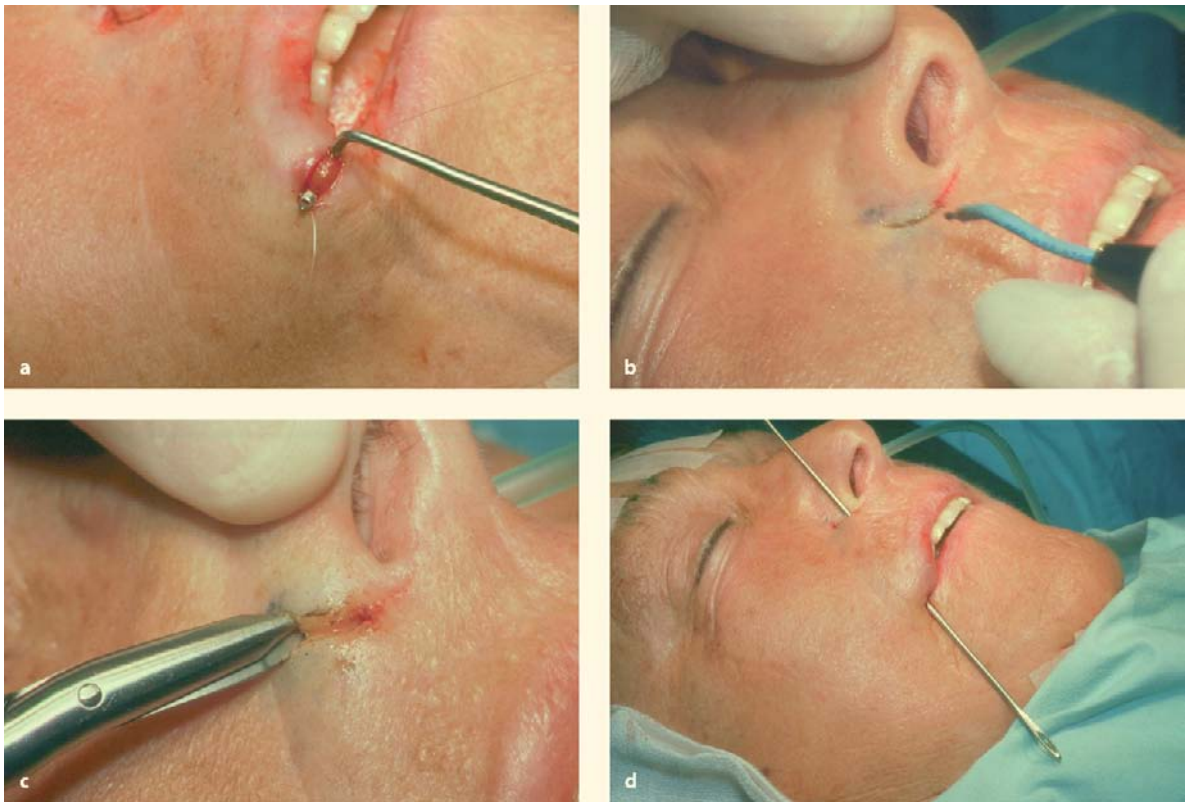


Fig. 57.12. **a** With a Dechemp hook we catch a bundle of orbicularis oris muscle. **b** With radiosurgery we made four incisions of 3 mm length each: in mouth and nose corners. These incisions should be very superficial. **c** With spreading scissors, we deepen the hollows at both ends of all of this incisions to enable the Dechemp hook to drive around the muscle bundle (mouth) or solid subcutaneous bridge of connecting tissue below the nostril. **d** The hollow probe drives below the nasolabial fold from the medial end of the mouth angle incision to the medial end of the alar base incision pulling a 4-0 nylon colourless nonresorbable suture through. (Fig. 57.12 e–h see next page)

Another suspension we have developed and which we presented at the 37th American Aesthetic Meeting in Vancouver 2004 is "optimistic sutures". Many methods have been suggested to elevate descendent lip commissures. This produces sad, pessimistic facial expressions, which is of disadvantage in social life.

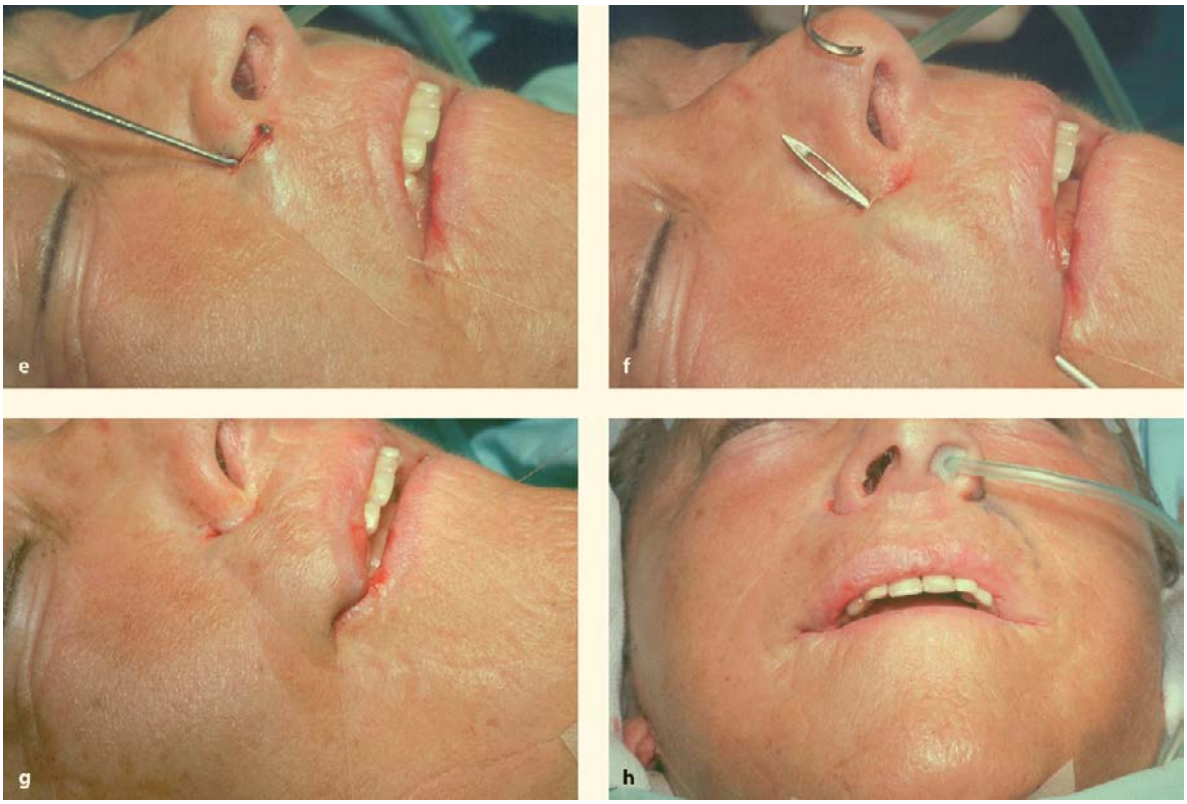


Fig. 57.12. *Continued.* **e** The Dechemp hook is catching the suture and drives it around the subalar bridge of firm connecting tissue. **f** The hollow probe reverses the suture from the lateral end of the nasal base incision to the lateral end of the mouth angle incision, where we tie a knot. **g** No overcorrection in this procedure! **h** We should elevate the lip commissure up to the horizontal line, not further

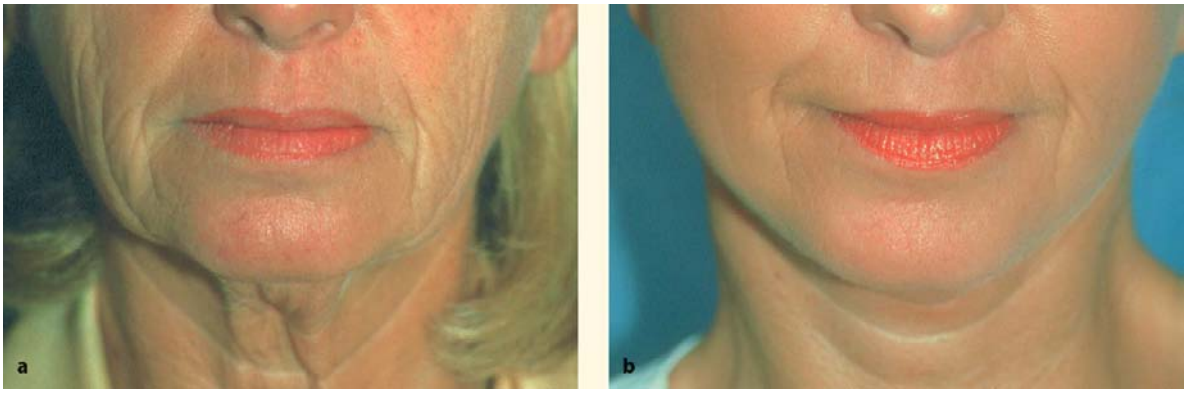


Fig. 57.13. Patient **a** before and b 3 months after facelift accompanied with "optimistic sutures"

Our "optimistic sutures" can optimize the outcome of the facelift.

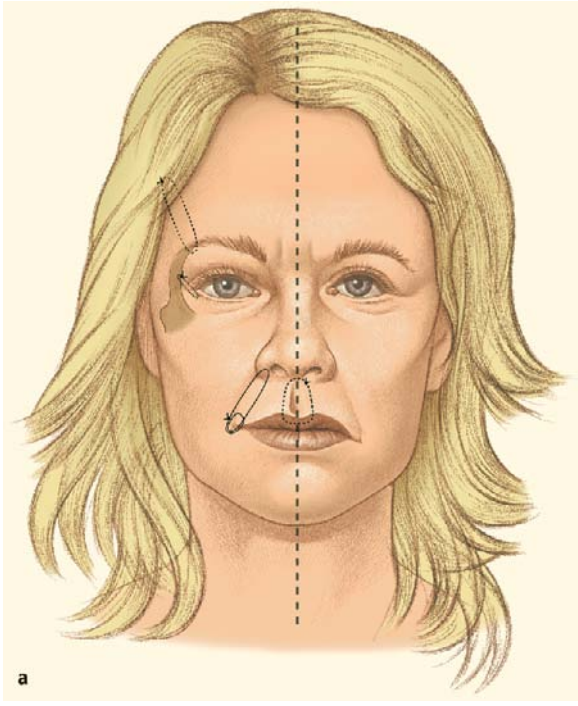
Fig. 57.14. Patient **a** before MIDI facelift and "optimistic sutures" and **b** after 10 days: she does not smile but her lip commissures are better positioned

Fig. 57.15. **a** We only need these two instruments and one 4-0 nylon suture. Patient with **b** classic face-neck-lift and **c** suspension of lip commissures

Many patients can benefit from this simple procedure.

This procedure takes 5 min, we need only two instruments, one suture, and the outcome of the facelift can be optimized.

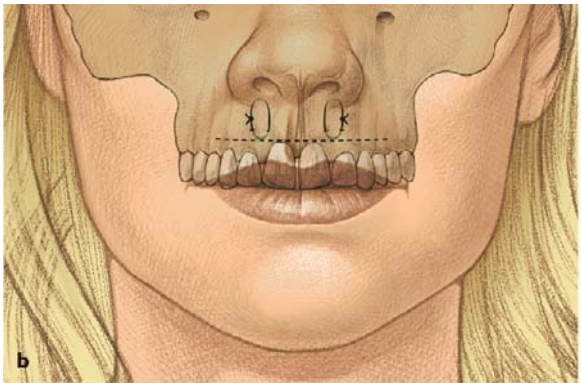
Fig. 57.16. Patient **a** before and **b** 1 year after upper blepharoplasty, MIDI facelift with malar imbrication, and "optimistic sutures"

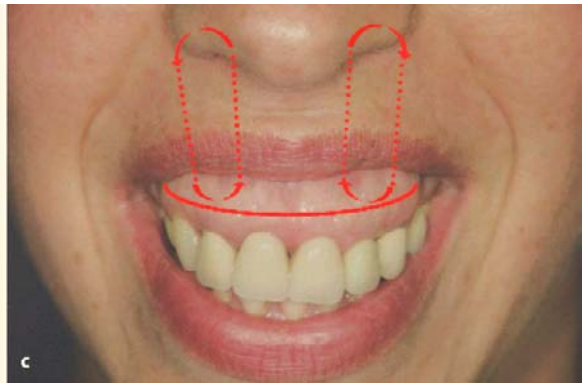


"Optimistic sutures" can be combined with any other facial surgery, just being one of some small but important mosaic stones of facial expression.

We face from time to time patients whose upper-lip insertion is too high. The result of this anatomic variation is an "unpleasant smile" with "gingiva-show". Some patients call it the "horse smile of Mr. Ed".

Fig. 57.17. **a** Suspension sutures are elevating eyebrow, lateral canthus, upper-lip filtrum, or lip commisures. **b** Vestibulectomy with suspension of nostrils in a caudal direction. **c** This suspension simulated on the photograph





Simple vestibulectomy and suturing the supralabial mucous membrane to the gingiva was unsuccessful. These sutures had no stable support and were pulled out after only a few days.

All the suspension sutures we know in the face elevate anatomic structures upwards. In this case we need something which will immobilize the nostrils with strong perilabial and nasal musculature not allowing the sutures to be pulled out.

After having done the upper preoral vestibulectomy, we bore with K-wires a horizontal channel in the processus alveolaris maxillae over the second incisor. Through this we pull the 4-0 colourless nylon suture. We prepare the tissue till we feel firm insertion of the nostril to the periosteum, drive with a Dechemp hook around it, and go down to the other end of the nylon thread and suture it. In this way we have immobilized the nostril and our vestibular suture is not in danger anymore of being pulled out.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 57.18. "Gingiva-show" **a** before and **b** after vestibulectomy with transosseal support. Upper preoral vestibulectomy **c** done and **d** immobilized in a caudal direction for 3 weeks with adhesive bandages. **e** Elevated upper lip **e** with gingiva-show before and **f** 3 months after surgery. New sutures have been saved

Fig. 57.19. Aesthetic principles have to be respected in reconstructive and constructive surgeries too: **a** Bilateral, complete cheilognathopalatoschisis. **b** Lip closure (Tennison), palate closure (Kriens) and pharigeal flap at the age of 6 months. **c** She is now 14 years of age; tip of the nose constructed with two helix-tail grafts, proximaly sutured – tip suture still to be done. **d** Three-level procedure: columella advancement from filtrum; upper lip formation of M-shaped Abbé-lip-flap rotated from the lower lip (for 10 days); donor site of lower lip closed with M-Y-plasty. **e** Her profile before last surgery. **f** Six weeks after profiloplasty; note proper fullness of both lips. **g** Nose and lip correction planed with dermographic markings. **h** Her look 6 weeks after last surgery.

Search for Balance Between the Nose Tip and the Upper Lip

58

Ewaldo Bolívar de Souza Pinto, Priscila C.S.P. Abdalla, Rodrigo P.M. de Souza, Eduardo Hentschel, Sergio Pita

58.1 Introduction

The study of the anatomy of the nasolabial region has been very important in the last few years because it has contributed to the aesthetic rhinoplasty concerning the search for harmony between the nose and the upper lip, and more importantly, the smile [1].

Inspired by other surgeons' experience in the treatment of Negroid nose, in which the substantial subperiosteal displacement for the relaxation of the lateral musculature is indicated [2], the authors succeeded in freeing and treating the fascicules of the nasal septum depressor muscle through the upper gingiva, performing a zetaplasty in the oral mucosa [3–5].

This chapter aims to (1) present our surgical experience in the functional and dynamic treatment of the muscles closely related to the nose tip and the upper lip, (2) establish a semiotic classification of the nasolabial complex and (3) show the results of the association of functional rhinoplasty (septoplasty, turbinectomy) and aesthetic surgery (rhino sculpture).

58.2 Anatomy

There has been an increase in interest in the study of the functional anatomy of the nose muscles [6, 7]. The nasal septum depressor muscle is considered to be the main muscle involved in the dynamic drop of the nose tip, especially when the subject smiles [2–4, 8–10]. It is a muscle localized in both sides of the midline of the upper lip, extending up to the nose septum region, where it is formed by three fascicules, described as follows [6, 7] (Fig. 58.1) :

Medial fascicles: Together, the internal fascicles of the nasal septum depressor muscle have an equilateral triangular shape, with the bone insertion in the

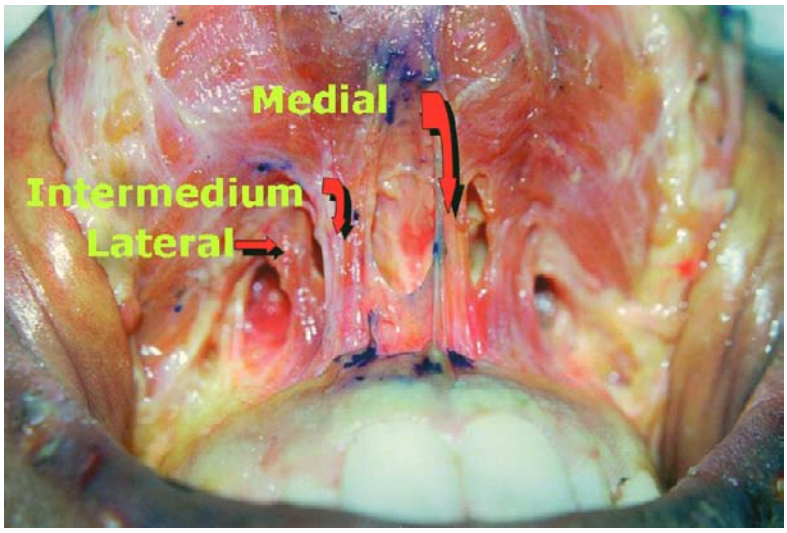


Fig. 58.1. Fascicles of the nasal septum depressor muscle: **a** Lateral fascicle; **b** intermediate fascicle; **c** medial fascicle

lower portion of the nose spine (triangle apex) and the triangle base with a free insertion in the upper lip. During a dynamic rhinoplasty, these fascicles are released from their bone insertions in order to reduce the muscular strength, lift the nose tip and enlarge the upper lip. Afterwards they are replaced by the intermediate fascicules.

Intermediate fascicles: These are placed between the medial and lateral fascicles; they have a fundamental role in the dynamic rhinoplasty (enlarging or reducing the upper lip) when they replace the medial fascicles, being plicated towards the midline.

Lateral fascicles: The nostrils are especially large in Negroid noses, widening the nose wings. They can be freed and twisted towards the center, narrowing the nostril base.

58.3 Semiology

Following up on the dynamic rhinoplasty development, Souza Pinto proposed a classification for patients in six different groups, indicating the specific surgery technique to each one of them (Table 58.1).

This classification is based on the relation between the nose tip characteristics (drooping or projected) and the upper lip (short or long) for groups I–IV ; groups V and VI are considered special cases.

During the preoperative preparation it is important to pay attention to some details:

- Thorough anamnesis with patient data indications
- Physical examination, observing the functional and anatomic features
- Still and dynamic photographic study (patient smiling) to assess the nasal septum depressor muscle's action on the nose tip
- Routine laboratory tests
- Preanesthetic assessment

Computerized studies were first performed in 1988 and have been continuously improved with hardware and software resources, trying to improve the patient–doctor rapport [12].

Table 58.1. Dynamic rhinoplasty – Souza Pinto classification

Group I:	Drooping nose tip and short upper lip (gingival smile)
Group II:	Drooping nose tip and long upper lip
Group III:	Projected nose tip and short upper lip (gingival smile)
Group IV:	Projected nose tip and long upper lip
Group V:	Negroid nose (special case)
Group VI:	Mouth breather (special case)

58.4 Techniques for the Treatment of a Short Upper Lip

After the arrival of dynamic rhinoplasty, the surgery can be divided into four distinct phases:

1. Septoplasty: In cases where there is some kind of septum deviation, surgery is initiated with the functional disorder correction.
2. Dynamic rhinoplasty: This represents the second phase of the surgery, with its own peculiarities for each semiotic group involved.
3. Rhinosculpture [13]: After the septoplasty and the nose tip and upper lip muscular treatment, aesthetic nose feature analysis is performed according to the individual needs of each patient. Concerning the nasal base and dorsum, for example, the surgeon can perform bone and cartilage abrasion, resection, osteotomies and cartilage grafting. In order to improve the nose tip, one can minimally resect the alar cartilage, graft cartilage in the tip or at the nasolabial angle or resect wedges of the alar cartilages in the case of Negroid noses.
4. Turbinectomy: In the case of hypertrophy of the cornets, functional turbinectomy (partial resection of bone and mucosa) is performed at the end of the surgery.

The surgical technique referred to as dynamic rhinoplasty and the resultant muscular treatment of the short upper lip are described as follows:

1. Marking: After overthrowing the upper lip, the marking of the zetaplasty is performed (angle 45–60°) in the labial bridle of the gingival mucosa in the upper lip (Fig. 58.2).
2. Local anesthesia with infiltration of a solution composed of 1% lidocaine and 1:100,000 adrenaline solution.
3. Zetaplasty mucosal incision followed by the undermining of mucosal flaps.
4. Dissection and identification of the nasal septum depressor muscle's fascicles bilaterally. This consti-

Fig. 58.2. Marking the zetaplasty (45–60°) in the upper lip

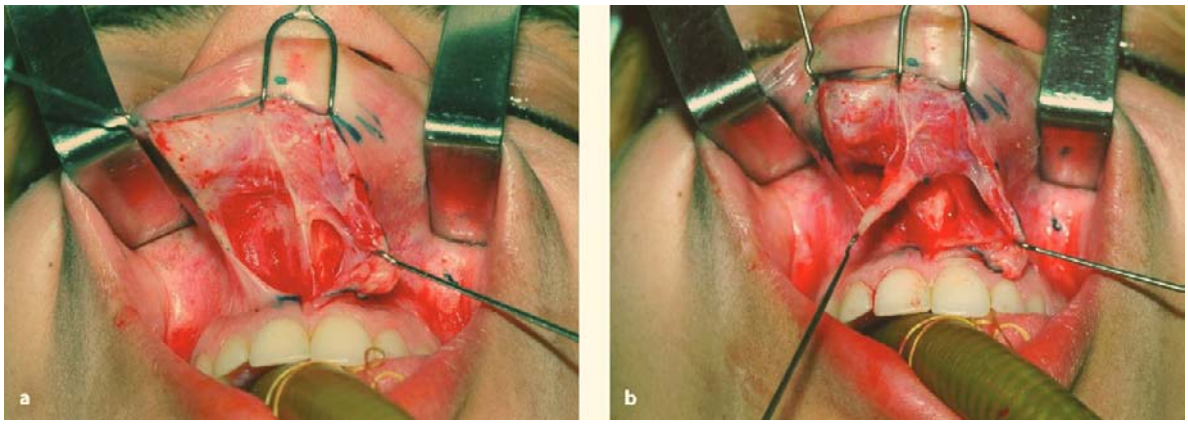


Fig. 58.3. **a** Subperiostal undermining of the medial fascicle of the nasal septum depressor muscle with the aid of a retractor. **b** Medial fascicle freed from the anterior nasal spine

tutes the main step in the technique of dynamic rhinoplasty, where the muscular fascicules are approached and treated on the basis of the semiotic group involved.

With the help of a retractor, perform a periostal undermining; the medial fascicle is totally freed from the lower part of the nasal spine, with consequent lifting of the nose tip, resulting in a projection of the upper lip (Fig. 58.3).

With the improvement of techniques for the muscular treatment of the nose tip and upper lip we concluded that there is no necessity for bone resection below the nasal spine. The next step is undermining the intermediate fascicles in the mucosal plane with delicate scissors, and centrally repositioning them in the midline with the plicature of its bands, replacing the medial fascicles previously freed (Fig. 58.4).

This central plicature allows the columella projection and nose tip lifting, isolating it, functionally, from the upper lip.

After hemostasis, the mucosal flaps are transposed and sutured with absorbable suture, allowing the elongation of the upper lip (1–2 mm) (Fig . 58.5).

Specific precautions regarding the postoperative follow-up of this surgery include strict and proper mouth hygiene. Recommendations concerning the aesthetic (rhinosculpture) and functional surgery (septoplasty and turbinectomy) are based on the demands of each case.

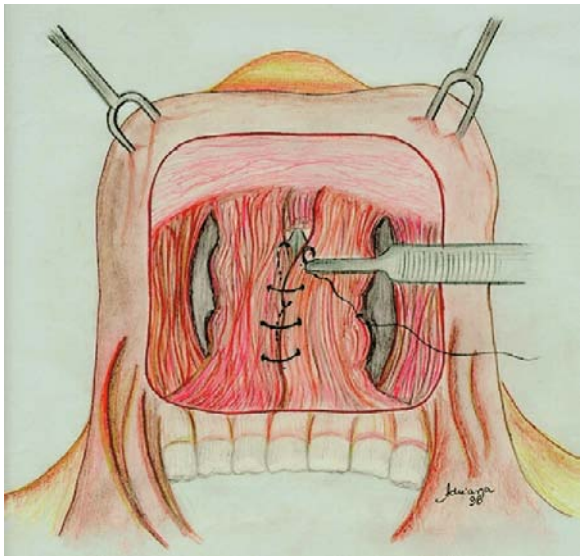


Fig. 58.4. Central displacement and plicature of the intermediate fascicle

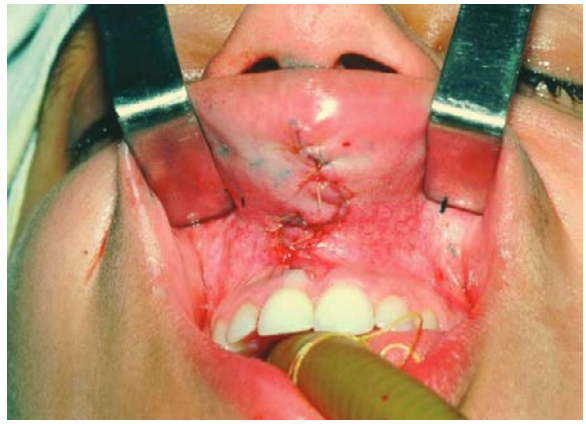


Fig. 58.5. Zetaplasty: transposition of the mucosal flaps; closure with absorbable suture.

Fig. 58.6. **a** Preoperatively. **b** Six months after surgery

58.5 Results

Through the dynamic rhinoplasty it is possible to treat the nasolabial complex, obtaining a more harmonious result. The association of functional (septoplasty and turbinectomy) and aesthetic (rhinosculpture) surgery leads to more satisfactory results.

The association of techniques for a 23-year-old patient with a drooping nose tip, a short upper lip, an obvious dorsal convexity and septum deviation resulted, 6 months after surgery, in the improvement of the dorsal contour, upper lip elongation and nose tip lifting (Fig. 58.6).

Figure 58.7 shows a 21-year-old patient with a dropping nose tip drop, a short upper lip and dorsal convexity, and the postoperative result after 6 months.

In Fig. 58.8, we show a 19-year-old patient, a mouth breather, with a gingival smile, a drooping nose tip, an exuberant dorsal convexity, septum deviation and a short upper lip. Six months after the surgery we notice a more harmonious and projected profile.

Fig. 58.7. **a** Preoperatively. **b** Six months after surgery

Fig. 58.8. **a** Preoperatively. **b** Six months after surgery

58.6 Discussion

At the beginning, this technique, currently known as dynamic rhinoplasty, was used in cases of severe drooping nose tips, patients with a gingival smile, a short upper lip, columella retraction and a Negroid nose. The main achievements observed with the use of this technique are:

- Nose tip lifting and its functional isolation from the upper lip
- Upper-lip elongation and gingival smile correction
- Columella projection with an important reduction in the need for cartilage grafting in the nasolabial angle
- Narrowing of flared nostrils in the case of a Negroid nose

The dynamic rhinoplasty represents only one of the nose surgery stages. When compared with other surgical procedures its advantages are:

- Need for minimal incisions
- Muscular functional treatment of the nose tip
- Significant reduction in the need for cartilage grafting

We still emphasize, however, the importance of the association of aesthetic and functional treatments in order to preserve the facial harmony as a whole, according to the principles of rhinosculpture, individually considering each case and avoiding the stigma of an operated nose.

58.7 Conclusion

We have been performing rhinosculptures since 1993, always trying to individualize our procedures in order to achieve harmony between the nose and the face, not leaving obvious signs of a surgery to the patient.

Encouraged by our work with the anatomical and muscular approach of the nose tip in rhinoplasty, we have been adapting the precepts of functional and dynamic surgery for this segment in particular, which has a close connection with the upper lip. Working with the nasal septum depressor muscle and its fascicles in distinctive ways in each semiotic case, one can achieve natural, functionally satisfactory and long-lasting results.

We have come to be very encouraged in the use of this technique, owing to the facial harmony achieved and the results that show us the improvement in the base–dorsum–nose tip–lip ratio. Used initially in cases of extremely drooping nose tips or Negroid noses, nowadays, this surgical technique is also indicated in cases of a long upper lip and a projected nose tip, and is available for use without restrictions.

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59 Autologous Fat Transfer

Dimitrije E. Panfilov

Charles Conrad Miller from the USA described his method with infiltration of fatty tissue through hollow metal cannulas in 1926. He wrote: "The end-results in free fat transplantation depend, aside from various local and general factors, on the method and technique." As Miller was some kind of controversial physician and not a "real" surgeon, his work was soon forgotten. The reinventor of this method was Yves Gerard Illouz (known as the father of liposuction) from France, but the real breakthrough was made by Jose Guerrerosantos from Mexico and Sydney Coleman from New York.

There are many synonyms for autologous fat transfer (AFT): microlipofilling, structural fat grafting, liposculpturing, liposhifting, liposhaping, and lipostyling. Years ago we all were telling our patients that autologous fat does not stay for more than 4–6 months. It does though. When we implant a fat lump 3–5 cm in diameter, only the periphery of 1 mm can survive, the rest will be transformed into an oil cyst and it will be resorbed. The reason for that is that capillary sproutings cannot grow into the fat for more than 1 mm. We had to change our philosophy.

Fig. 59.1. **a** First patient with facial lipoatrophy we treated in 1997. **b** 6 months postoperatively: only hollow cheeks have been augmented with 8 ml purified fat cylinders on each side

Fig. 59.2. **a** Our youngest patient was 18 years old and had Barraquer–Simon's syndrome (lipodystrophia circumscripta buccalis). **b** Her appearance 2 years after autologous fat transfer (*AFT*) into her cheeks. **c** Dermographic markings to be filled up with 12 ml purified autologous fat, on each side. **d** One day postoperatively. **e** Six months postoperatively we augmented malar regions with 6 ml fat each and refilled cheeks with 3 ml each. **f** Her appearance 3 years after the first operation. **g** After 5 years she became pregnant; it seems that oestrogen has influenced further enlargement of transplanted fatty cells in her face. Half profile contour of the patient **h** preoperatively and **i** 3 years after "contouroplasty" ▶


a
b
c
d
e
f
g
h
i

Fig. 59.3. **a** Our oldest patient with AFT, 81 years of age. **b** Six months after transplanting 38 ml purified fat into her face. Note the relatively good result of the glabellar folds, which is rather seldom

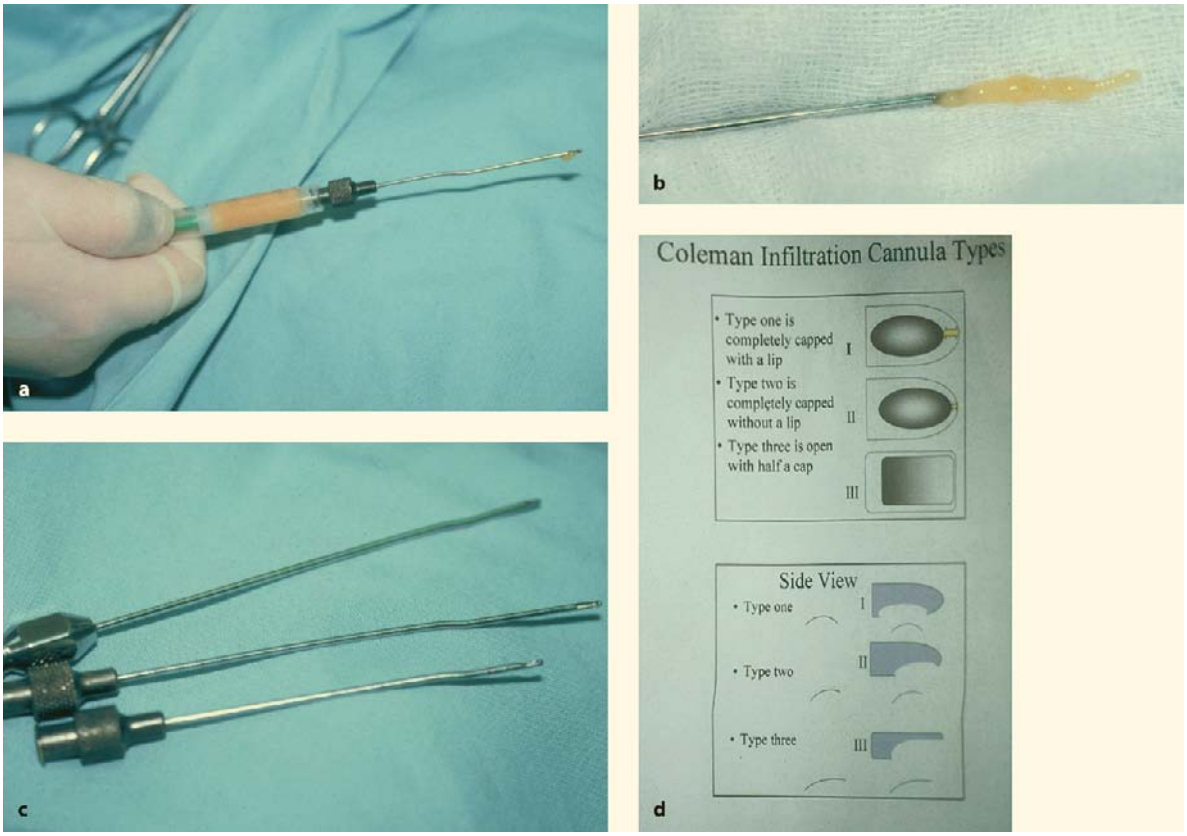

Fig. 59.4. **a** A 2 ml syringe and Coleman cannula ready for lipofilling. **b** Simulation on a layer of gauze: by pulling back we fill up the empty channel with a fat cylinder (diameter 1 mm). **c** Different cannulas **d** with different tips

Fat cells which survive 2, 3, or 5 years do not have any reason not to survive for all the other years up to physiological fat decline of old age. Our oldest patient is 81 years old. She had a facelift some 20 years ago and did not want to undergo the risk of another facelift at this age, so we did the less risky procedure – AFT to her face.

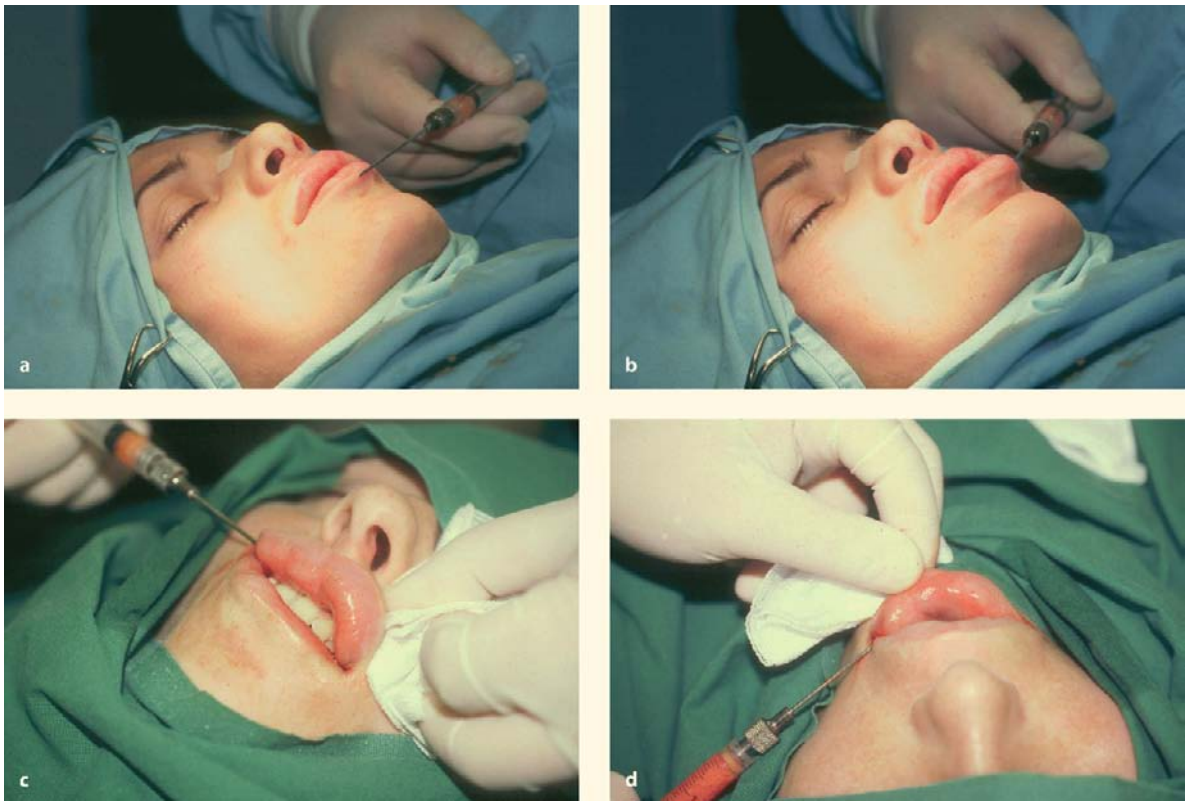

Fig. 59.5. **a** Simulating cannula over the lower lip and **b** performing microlipofilling of the lower lip. Female patients very often wish to enlarge both their **c** upper and **d** lower lips

The new philosophy means that we have to create tunnels of 1 mm diameter each. Sydney Coleman created cannulas for doing this and they are manufactured by Byron with a Luer-Lock. Any ingenious idea is simple when it is proven. But it has to be realized by the first one who had this simple idea. That is why a genius is and stays a genius. After making channels of 1 mm in diameter, we slowly pull this cannula back and fill up the tunnel with purified fat cells. Capillary sproutings can grow into these cylinders and keep fat cells alive. Cannulas have to be blunt, so as not to provoke bleeding.

The best recipient of fat cells is between muscle fibres because of good irrigation with a lot of capillary sproutings, for instance among muscle fibres of the orbicularis oris, for enlargement of lips.

Fig. 59.6. **a** Early fat decline; age mid-30s. **b** Dermographic markings of structures, folds, and wrinkles to be augmented. **c** One week postoperatively. **d** Six months postoperatively. **e** Depressed semicontour. **f** Improved half profile after 6 months – contouroplasty

Autologous fat can survive if:
- Harvesting is gentle
- Fractioning is gentle
- Purification is proper
- Implantation is proper

Fig. 59.7. **a** Removing of 1-mm-thick fat cylinder from the lower eyelid, 6 months after implanting it. **b** In lower eyelids we do not expect longitudinal fat cylinders but fat pads in three compartments. Penis **c** before augmentation with 58 ml of AFT and **d** 3 years later. A circumference increase of more than 25% remained stable for years

Our first AFT was in 1997, 2 weeks after I had visited Sydney Coleman in New York, watching and filming his technique. It was a patient who wished for a nose reduction and enlargement of his penis. I transplanted 58 ml of purified fat into his penis. The initial circumference was 84 mm (measured below the glans–not erect), after 6 months it was 112 mm and after 6 years 106 mm. I followed up this patient for 7 years and the circumference remained stable at the same level. He was young, active, and has had another child in the meantime. We also do handliftings with AFT and in both hands and penis we can measure the circumferences. We have found that 60–80% of fat cells stay stable for years.

Fig. 59.8. **a** Not only lips, but also hollow cheeks are frequent regions patients would like to improve. **b** Result 4 months later. Another patient with the same indication **c** before and **d** 13 months after surgery

Further proof that autologous fat survives was given when I had to remove a cylinder of fat I had implanted into a lower eyelid after 6 months because of prolonged swelling. Frank Trepsat from Switzerland has had very good results with microlipofilling into both lower and upper eyelids but in my hands it does not work so well. As only one third of my results with implantation of autologous fat were good, I had to redo the operation because of permanent oedema in lower eyelids. We have done conventional lower

Fig. 59.9. **a** This patient wanted to improve the projection of her "cheek bone". **b** Six months after surgery

Fig. 59.9. *Continued*. **c** The whole face shows grooves, folds, and dimples. **d** Dermographic planning. **e** We are now able to "shape" and to "style" the face, to achieve more spherical harmony by adding 40 ml fat in this case. **f** A beautiful woman **g** can become even more beautiful

blepharoplasty. I could identify, isolate, and remove a longitudinal fat formation about 1 mm thick. It was the autologous fat graft I had put inside 6 months ago. And it has survived (Fig. 59.7a).

The best acceptability of fat grafts is, according to Guerrerosantos on the body below the level of the umbilicus. After how long is the final result achieved? Coleman says after 4 months. We would say also between 4 and 6 months.

What is the amount of fat we may transplant into face? Coleman transplants 80 ml; our own upper limit is 40 ml. We know that resorption of fat tissue occurs until the final result from 20–40% of implanted lipocytes. I prefer to make a slight overcorrection, grafting some 115% of the volume I consider to be optimal.

Fig. 59.10. **a** Freezer with packets of fat syringes of different patients to be stored for 6 months. **b** Each packet should have a sticker with the patient's name, date of surgery, and number of syringes available inside

Fig. 59.11. **a** Most patients want to accentuate also their malar prominence, which has been achieved **b** 4 months after surgery. **c** Very rarely do patients insist on achieving really "baby faces" emphasizing the cheeks themselves, not the malar prominence. **d** We can also fulfil such demands

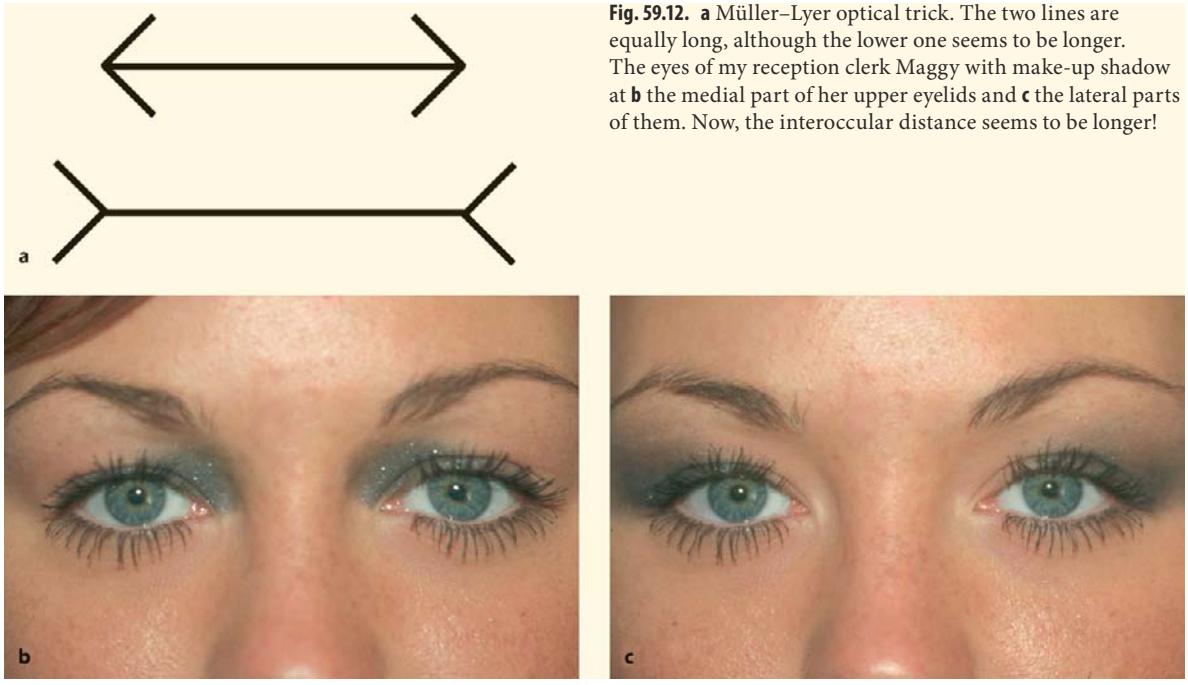

Fig. 59.12. **a** Müller–Lyer optical trick. The two lines are equally long, although the lower one seems to be longer. The eyes of my reception clerk Maggy with make-up shadow at **b** the medial part of her upper eyelids and **c** the lateral parts of them. Now, the interoccular distance seems to be longer!

Plastic surgeon is now able to become really sculptor in vivo. Sculptors themselves say that they have to respect 60 planes, compared with a single plane for a painter. We can add two planes more: we are acting with the living material, which is mobile and changeable, and secondly there is the psychological level of our patients, who are emotional sculptures who cry and smile; therefore, we are acting in 62 planes.

Shadow takes something of the contour away and shining skin emphasizes this area. Richard Corson, a make-up stylist in many Hollywood productions, made a rule for make-up not to accentuate the malar bone medial to the imagined line from the middle of the eye downwards. With narrow faces one should stop more lateral from this line to make the face look wider. With broad faces, make-up accentuation of the malar bone should stop much more distant from the ears to make the face look narrower.

Before starting to do lipofillings we have to think of those rules and to follow them to be able to achieve more harmony in the faces of those who gave us their trust.

We will now consider the procedure step by step. The patient should have had a Betadine shower at home (or in our clinic) before coming to see us on the day of surgery. Then we make photographic documentation if this has not been done before. The patient stands in front of the mirror and we make dermographic markings on her/his face. We follow our plan made at the initial or second consultation, but we accept also "last-minute" wishes and suggestions from the patient. Some patients call our dermography "Aborigine paintings", but it is useful after all.

Fig. 59.13. Individuals with preoperative markings showing where, what, and how much should be augmented by AFT

In the operating theatre we prefer to operate on the patient with intravenous sedation as described in Sect. 36.2. Through two 2–3 mm incisions in the inguinal region, we instill 200 ml of very dilute local anaesthesia in a special solution. In 1 l Ringer's lactate we put 50 ml 1% lidocaine and 0.25 mg epinephrine in each inside thigh, which is the best donor site in my opinion. This solution should be allowed to work for 45 min before we start harvesting fat. In-between we can perform some other surgery on the same patient, like eyelids, forehead lift, or breast augmentation, or we can just leave the theatre for that time. We could do some surgery in the next theatre.

After 45 min we start to harvest fat as one can see in Fig. 59.14. It is important that the syringe should not be bigger than 10 ml. Too high a negative pressure could denature fat cells. And we want to do "lipofilling, not lipokilling", as one of pioneers in liposurgery Giorgio Fisher from Rome used to say. It is also important that our movements are gentle and we should not act against resistance – the same principle as in liposuction.

In this way we can easily harvest 30–60 ml of fat from each inside thigh. Women have 27% fat tissue in their bodies and men only 15%; consequently, fat harvesting is much easier in women. It is most difficult to harvest fat in HIV-positive patients treated by protease inhibitors. They have almost no subcutaneous fat – we have to harvest in many locations, not only inside thighs.

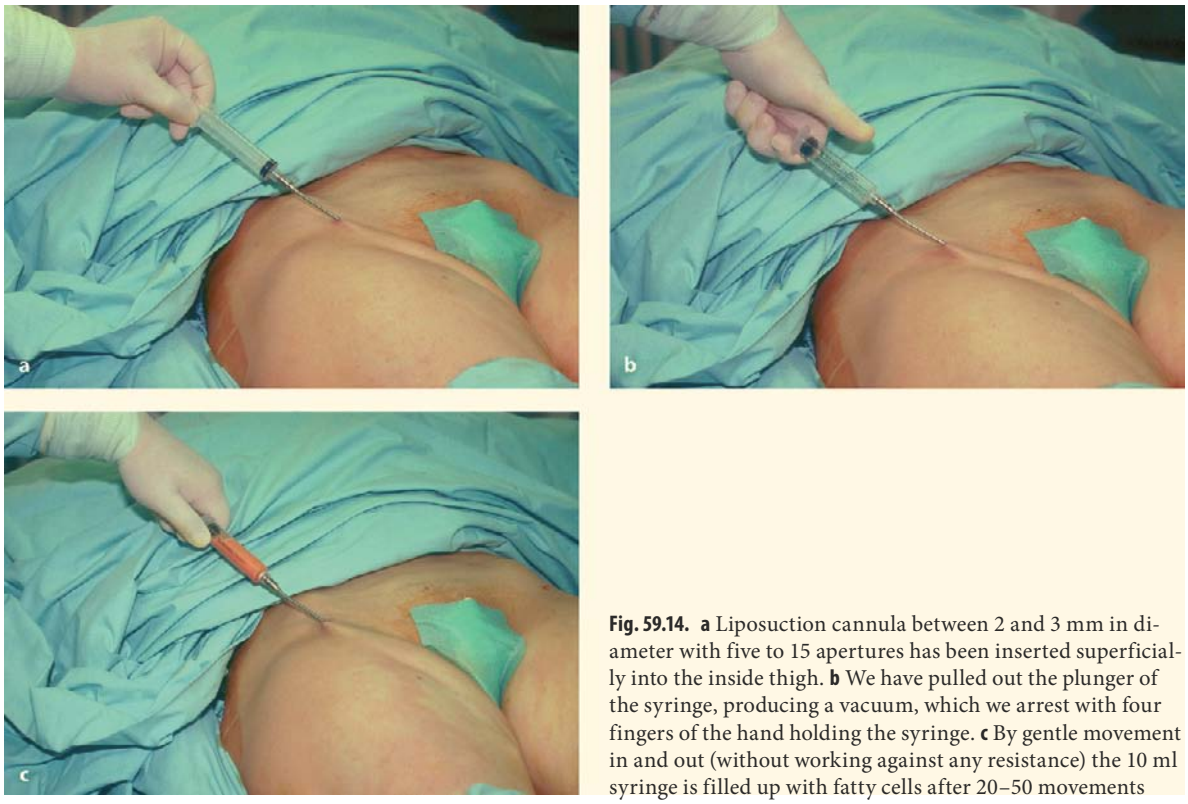

Fig. 59.14. **a** Liposuction cannula between 2 and 3 mm in diameter with five to 15 apertures has been inserted superficially into the inside thigh. **b** We have pulled out the plunger of the syringe, producing a vacuum, which we arrest with four fingers of the hand holding the syringe. **c** By gentle movement in and out (without working against any resistance) the 10 ml syringe is filled up with fatty cells after 20–50 movements

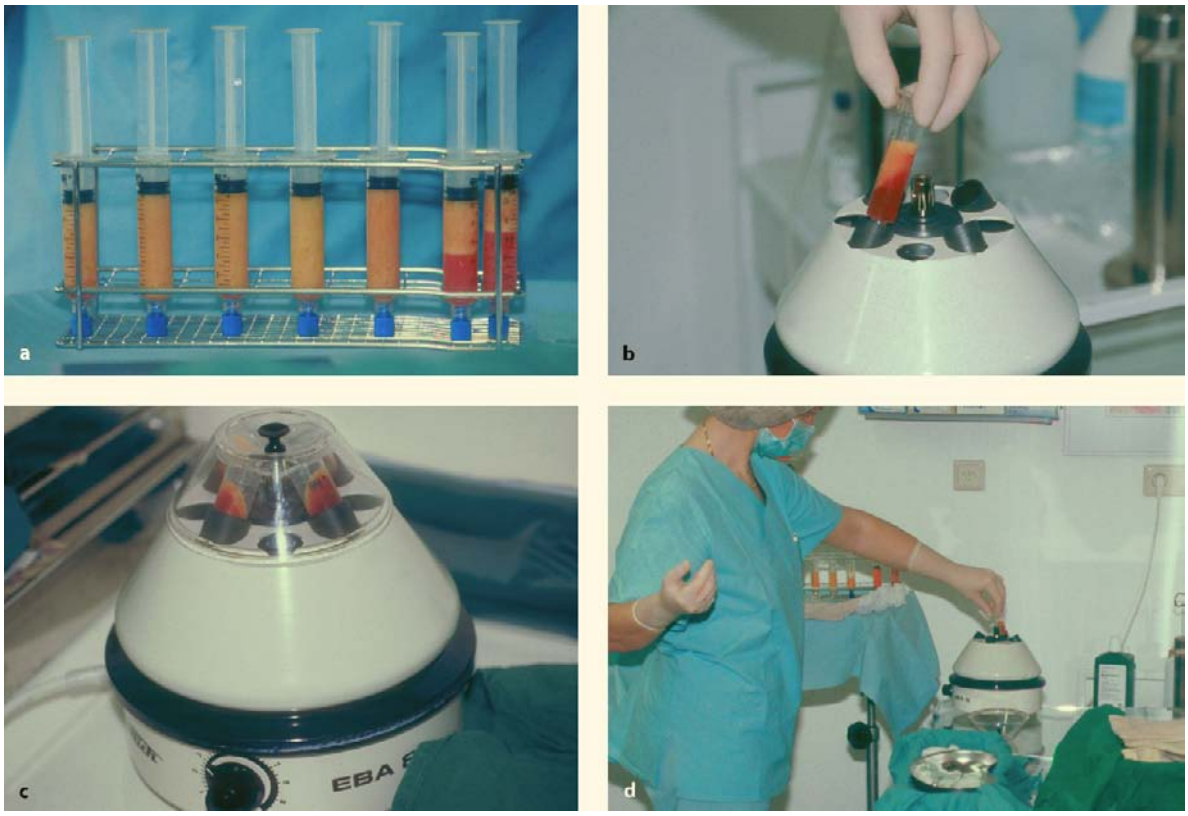

Fig. 59.15. **a** Syringes are put in an upright position in the rack for precipitation and segregation for 10–15 min. **b** Into sterile tubes of the centrifuge we put four 10 ml syringes **c** to be centrifuged for 3 min at 3,000 rpm. **d** All actions have to be done under sterile conditions

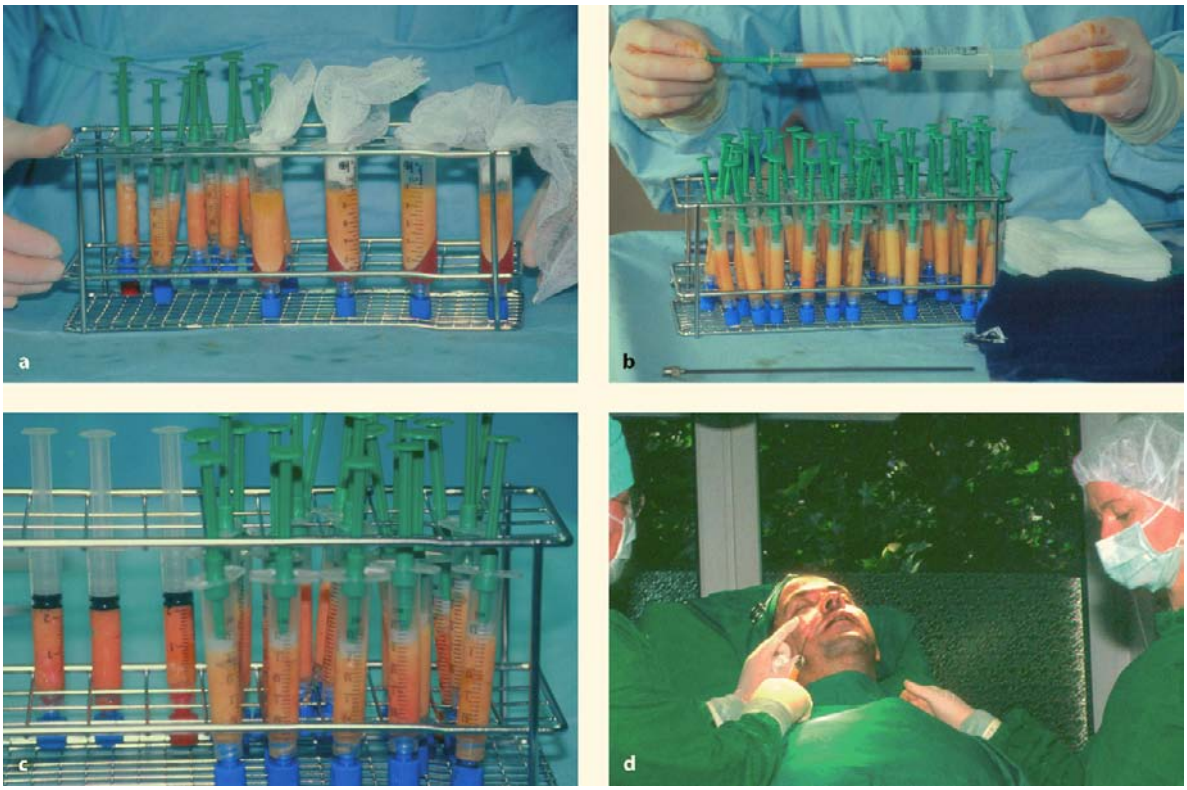

Fig. 59.16. **a** Oil of the upper layer to be removed from the syringe with a strip of gauze, and lowest layer as fluid we allow to flow out by opening the plug for a few seconds. **b** Recharging from 10 ml- to 2 ml-syringes without exposure to the air, so we prevent infection and avoid oxygenation of fat cells which could be damaged in this way. **c** Purified fat in 2 ml syringes closed with Luer-Lock plugs is ready to be grafted. **d** To recognize changing contours better, we sometimes use tangential illumination

Segregation and centrifuging make three fractions in the syringe: (1) the upper layer is oil of ruptured fat cells, (2) middle layer (35–70%) is purified parcels of fat tissue containing living fat cells, (3) the lowest level is serum, water, and lidocaine.

Fig. 59.17. Microincision **a** near to the lateral canthus and **b** at the deepest point of the nasolabial fold. Cannula inserted for malar augmentation from **c** above and **d** below to place liposuction micrografts in a crisscross pattern

The incisions in the recipient area are just 1 mm long; we call them microincisions. We make them with a semirotating movement with scalpel blade no. 12 in the corners of the mouth, eye, nose, below the earlobes, or at the end of skin folds or wrinkles we are going to augment.

Fig. 59.18. **a** A patient with a minimal-invasive, deep-intensive (*MIDI*) facelift planned together with AFT, 33 years of age. **b** One day postoperatively; 30 ml purified fat has been transplanted to her face; reasonable swelling and bruising. Patient **c** before (a beautiful woman – no question) and **d** 3 weeks after both procedures. She is a TV announcer and intends now to stay in this cruel profession for the next 5 years

Facial incisions are only anaesthetized at the entrance point, not further. Some patients do not want any sort of sedation or anaesthesia and they do not feel the advancement of the cannula through the subcutaneous layer or among muscle fibres as unendurably painful. We do not suture these microincisions; we just stick them with suture strips or Dermabond. After a few days scars are not visible and nobody has claimed they are.

If patients do not want to interrupt their taking of oral contraceptives or hormone therapy, haematomas can occur, but they disappear after 10–14 days.

How much fat should we transplant to certain areas of the face? There is a very good German proverb: "Enough is better than too much." Our upper limit is 40 ml. In this way patients will be resocialized earlier – after 1 week, on average – and we can add stored fat cells after 4–6 months by doing relipofilling. Not more than 30% of our patients come to us for secondary lipofilling. In that case we have to thaw frozen syringes at least 3 h before the secondary procedure.

Fig. 59.19. **a** Patient planned for a MIDI facelift and AFT, 35 years of age. **b** Three days postoperatively; haematomas due to hormonal influence

Fig. 59.20. Patient **a** before the first procedure of AFT and **b** 6 months after secondary microlipofilling. The same patient **c** before in posterior semiprofile. and **d** after finished contouroplasty

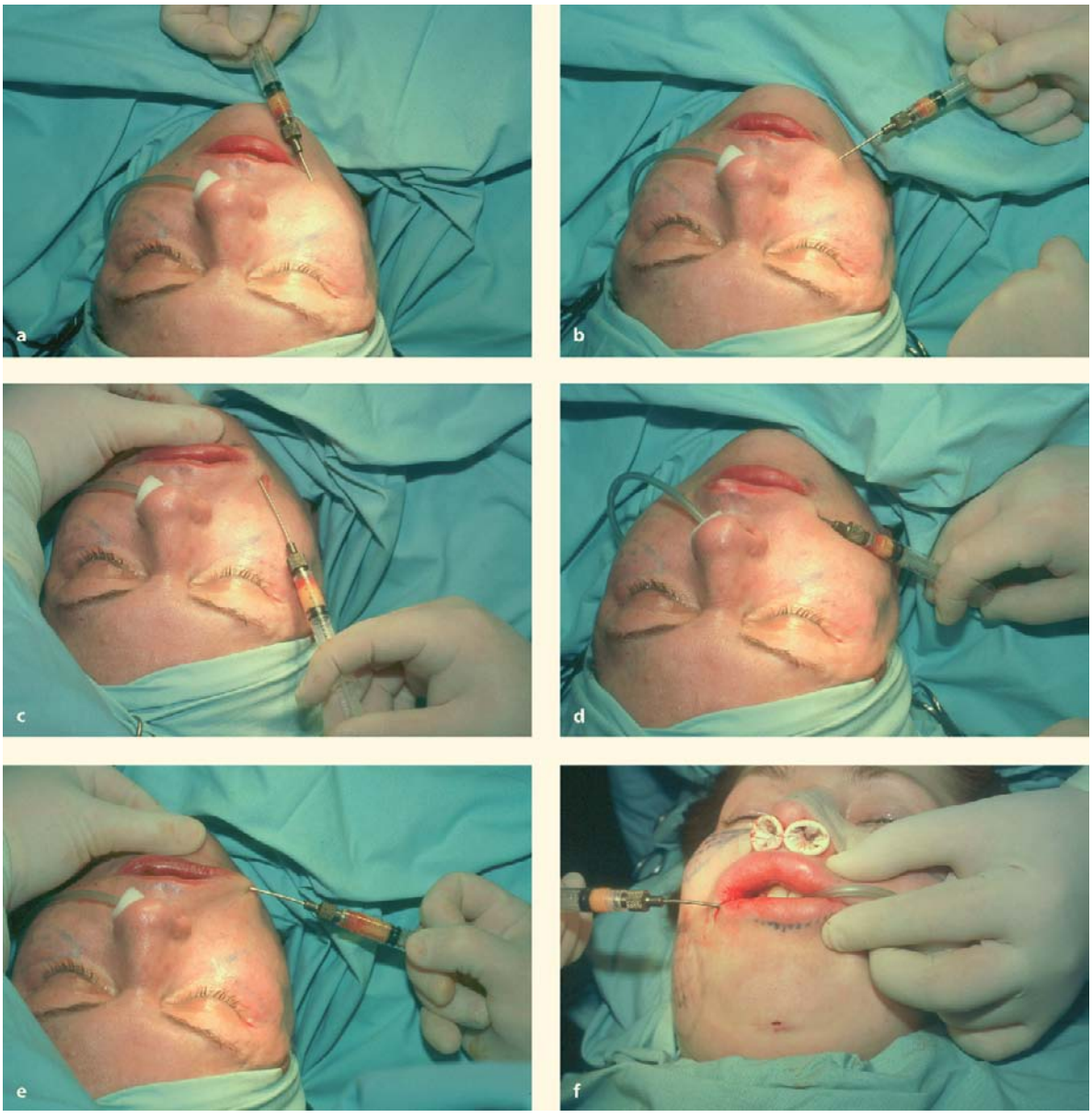

Fig. 59.21. **a** Malar region: 4–8 ml. **b** Nasolabial fold: 1–4 ml. **c** Marionette groove: 0.5–1 ml. **d** Upper lip: 2–6 ml. **e** Lower lip: 1–4 ml. **f** At the end of grafting we apply modest digital pressure to smooth grafting areas; dispersion of fat grafts look harmoniously

Patients in Europe and especially in Germany do not want to look overdone and they pay great attention to resuming their usual activities as soon as possible. We have to respect the wishes of our patients when deciding how much fat is to be grafted.

One of our nurses in the theatre should write down the regions and the appropriate numbers of millilitres of fat on the first side we do lipofilling. When we do the opposite side, we can ask for these numbers so we can work symmetrically. We are always trying to achieve harmonious results.

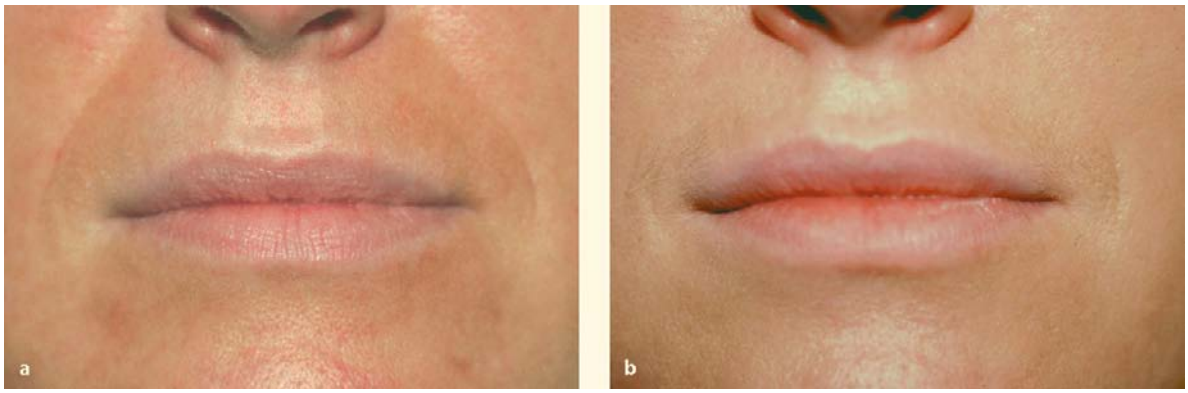

Fig. 59.22. **a** Lips and nasolabial folds to be grafted. **b** We have put 3 ml into the upper lip, 2 ml into the lower lip, and 3 ml below each nasolabial fold

After surgery we apply cold gel to the operated structures to reduce swellings and bruising.

If it seems that we have overdone the lipofilling, it is possible to "kill" the fresh lipocytes by well-dosed digital pressure within the first 2–3 weeks. At the beginning, when I was inexperienced with the new method and my patients were inpatient, I did digital "squeezing" three times in over 500 treatments. In two of those, I had to do refilling after 4 months. Now I know to convince the patient that the volume of transplanted fat will reduce by 30% on average. Now I do squeezing sometimes just on the margin of the grafted area, to harmonize it, if it seems to be necessary.

Fig. 59.23. Cooling of the treated areas directly postoperatively

Fig. 59.24. Digital compression to reduce grafted volume within the first 2–3 weeks

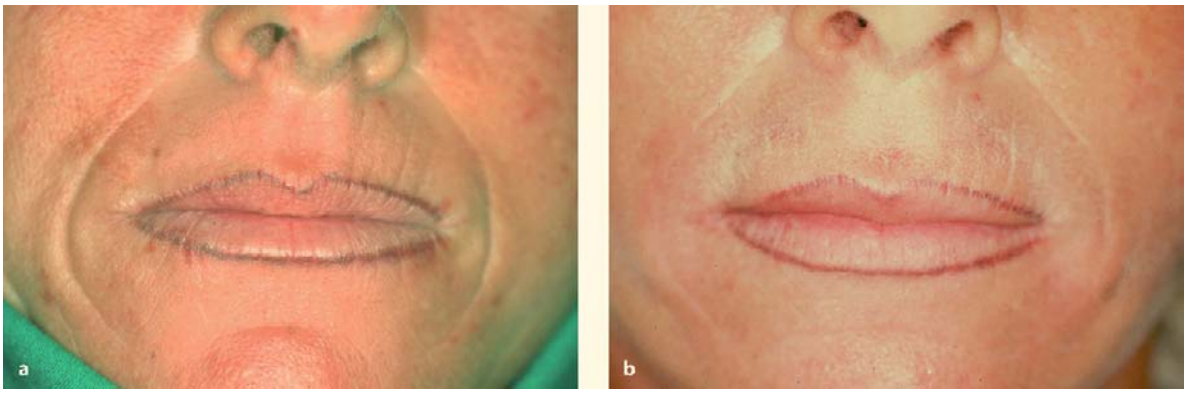

Fig. 59.25. **a** Rough smiling folds ought to be corrected. **b** One week postoperatively

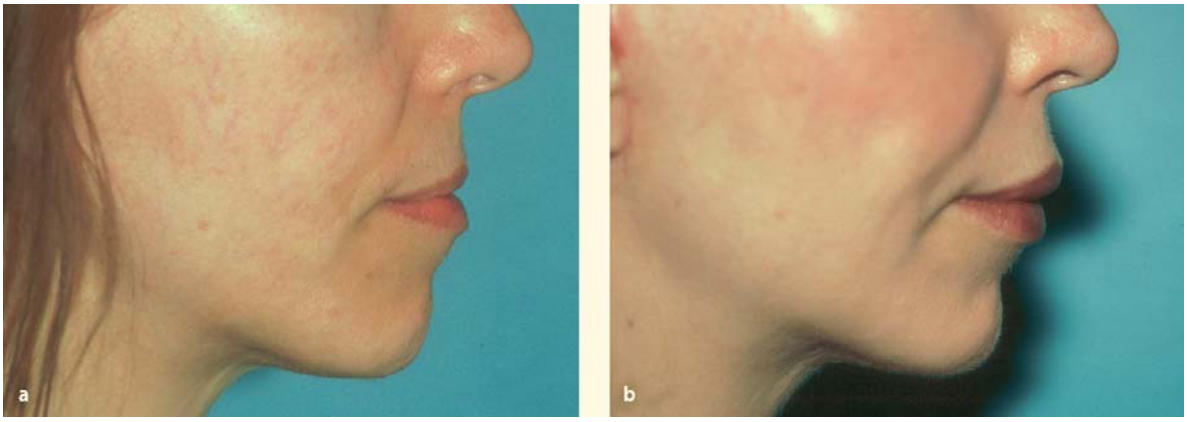

Fig. 59.26. **a** The upper lip should be augmented. **b** We put 4 ml purified fat grafts into upper lip

There are some specific applications of AFT. One of the lips can be made more prominent.

Even slight nose irregularities can be improved with autologous fat grafting. We mostly need two or three sessions for this indication.

Sometimes we can improve irregularities after facelift surgeries like grooves and dimples.

Fig. 59.27. **a** Saddle nose. **b** We have done microlipofilling. **c** Six months after the last procedure

Fig. 59.28. **a** Obviously, during facelift surgery too much of the superficial musculo-aponeurotic system was eliminated over the mandibular angle. **b** We could fill this defect with 8 ml fat and a marionette groove (1 ml each) with AFT. Six months postoperatively

Fig. 59.29. **a** Male patient with HIV facial stigma. **b** Augmentation with 8 ml purified fat each side, 4 months postoperatively. **c** Female patient with the same problem. **d** Four months after augmentation of cheeks (8 ml each) and upper (4 ml) and lower (2 ml) lips

HIV-positive patients treated with protease inhibitors have stigma through typical buccal lipoatrophy. This can be improved but there is a warning: those patients have very little subcutaneous fat on the whole body, especially men.

Fig. 59.30. Skin **a** with pigment marks before and **b** 4 months after AFT. Another female patient **c** before and **d** 6 months postoperatively

Elixir phenomenon: FAT IS BEAUTIFUL

Many plastic surgeons have noticed that the complexion of the skin improves after fat transfer into the face. The skin becomes smoother, shining as if it were oiled and creamed from below, from inside. This is probably due to the fact that fat cells contain receptors for oestrogen. This hormone is known as a soft-maker, fine-maker, or beauty-maker. Transplanting fat into face, we also bring oestrogen there and this is probably the reason why skin starts to "blossom" after AFT, even in women who do not use make-up. It works like an elixir from inside. One can compare previous cases (even those with make-up afterwards) but there are some without make-up.

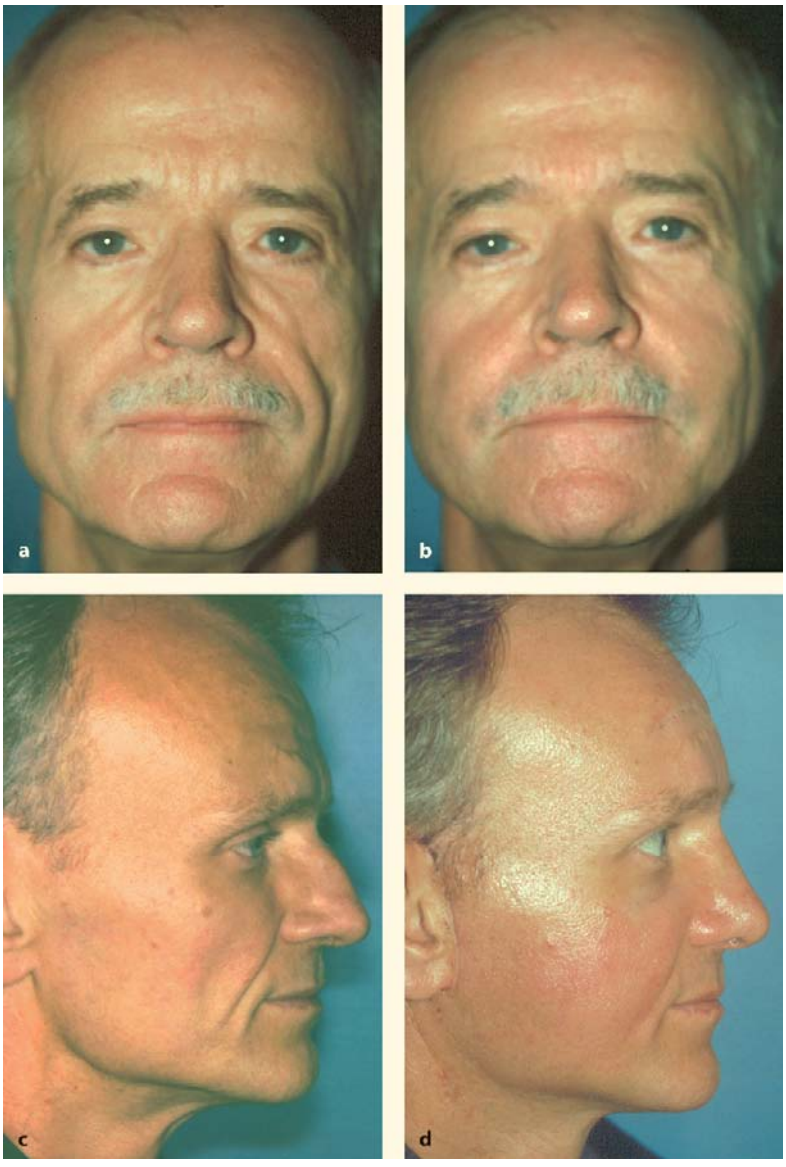

Fig. 59.31. **a** A man with a "tired look". **b** After transplanting 40 ml purified fat into his face, his look and also his complexion improved. **c** Male patient with planned facelift, forehead-lift, nose and ear correction, and AFT. **d** After 12 days his skin is "blossoming"

Make-up is applied over the skin, and autologous fat works from below. If there would not be a semantic confusion, we would introduce a new entity: make down (opposite to make up). Some male cases where we also have noticed the improvement of complexion are given in Fig. 59.31. And men do not use any make up.

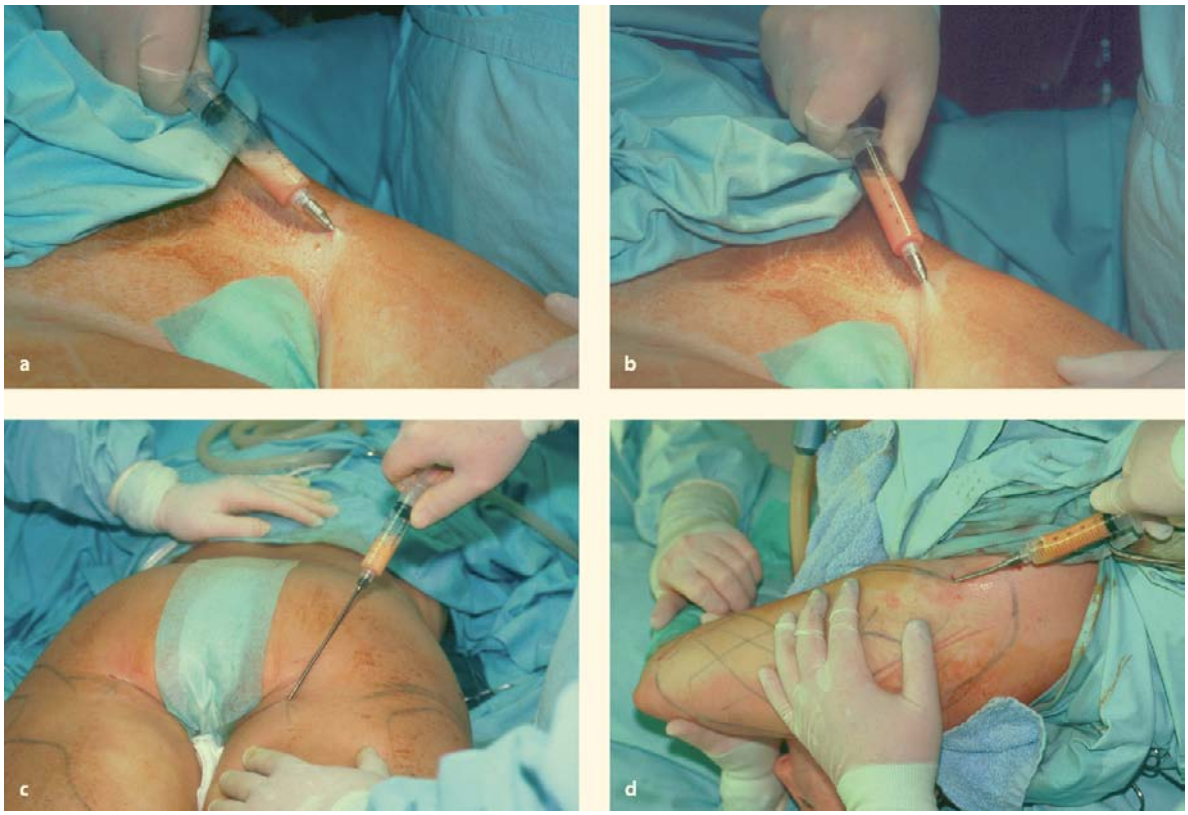

Fig. 59.32. **a** We prefer harvesting fat **b** from inside thighs. **c** When performing liposuction we can reach the inside thighs also from the back side. **d** The upper arm is also a good donor, but we prefer inside thighs

The question arises: What is the best donor site for harvesting fat cells? Certainly, we could take fat from all parts of the body where we usually perform liposuction. The abdominal fat cells have unlimited ability to store fat in them. Otherwise most receptors for oestrogen are those fat cells which are near to the primary gender zones. These fat cells promise to give the best elixir effect to the skin, and that is why we harvest almost exclusively from inside thighs. And it is very easy and comfortable to harvest fat from thighs when the patient is lying on her/his back.

Fig. 59.33. Patient **a** before and **b** 1 year after biplanar facelift. **c** Three months after additional AFT

We had a patient who had had a classic facelift and was satisfied with it. But she inherited some money and asked what we could do additionally. So we suggested microlipofilling of her face (AFT). It was an unintended experiment. Figure 59.33 shows the step-by-step improvement.

Since that experience, I suggest more and more to my patients not to have only a facelift but also AFT into their faces. At least because of the "elixir effect". Not everybody is ready to do it, because of additional costs.

Fig. 59.34. Fig. 59.34. **a** At the end of the facelift we can insert fat grafts **b** under visual control. **c** And it brings **d** more effectiveness. **e** Because of severe rheumatism, the patient could not undergo facelift surgery. **f** Less aggressive method of AFT could help her sufficiently

Fig. 59.35. Patient **a** before and **b** after complex facial beautification: facelift, endoscopic forehead-lift, eyelid surgery, and AFT. A 25-year-old patient **c** before and **d** after filtropexy of the upper lip and AFT. **e** 45 years old patient before and **f** after MIDI facelift, "optimistic sutures" and AFT

Fig. 59.36. **a** Face of a 40-year-old patient preoperatively. **b** Her look after AFT of 36 ml into her face. Her right hand **c** before and **d** 4 months after grafting of 16 ml into each hand

"Handlifting" with AFT

Now we combine more and more mosaic stones of facial structures not only to rejuvenate, but also to harmonize and to enhance the whole appearance.

We all have seen wonderful facelifted actresses with a youthful facial appearance, but to those faces belong hands that look 15–20 years older, especially when they hold microphones. Some of them wear gloves to hide this obvious traitor of well-performed facelifts. Thanks to AFT below the wrinkled, crumpled skin of the dorsum of the hands and digits, we can now rejuvenate also hands to match the faces.

In general, under intravenous sedation and local anaesthesia of four dorsal incisions – two on radial and ulnar side of the wrist and over second and fifth metacarpophalangeal joint – we advance the Coleman cannula and by pulling it backwards, we fill up this tunnel with purified fat.

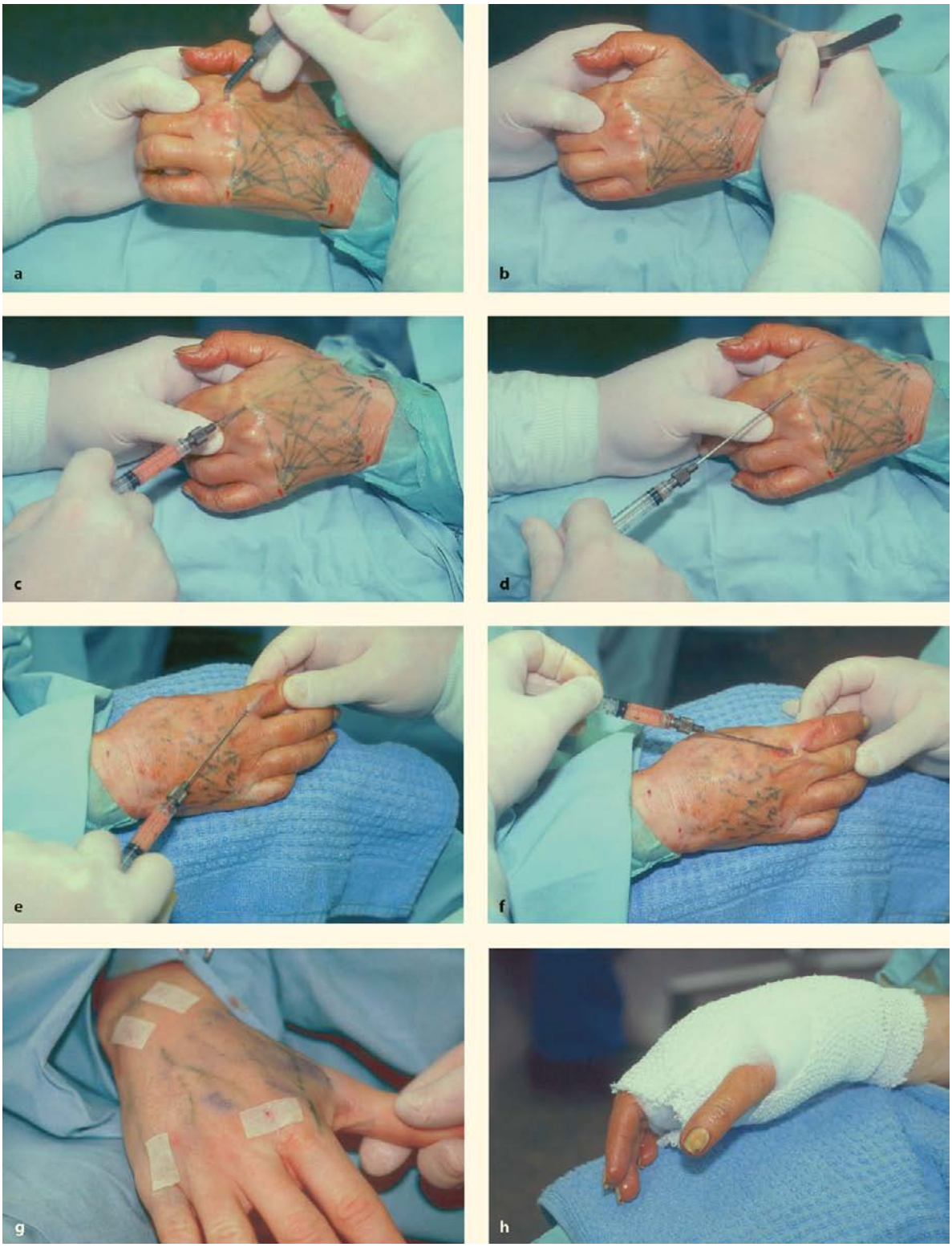

Fig. 59.37 a–h. Microincision **a** over the second metacarpophalangeal joint and **b** in the radial dorsum of the wrist. **c** Consecutive microlipofilling. **d** in a crisscross direction proximal to the phalanx of **e** second and **f** third digit. **g** At the end of surgery. **h** Bandage for 1 day

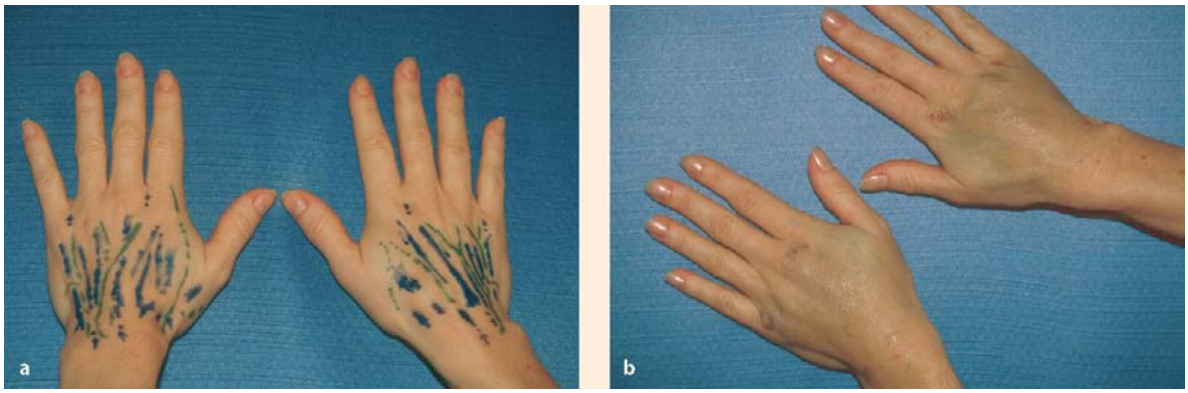

Fig. 59.38. **a** Dermographic markings before surgery. **b** One week postoperatively

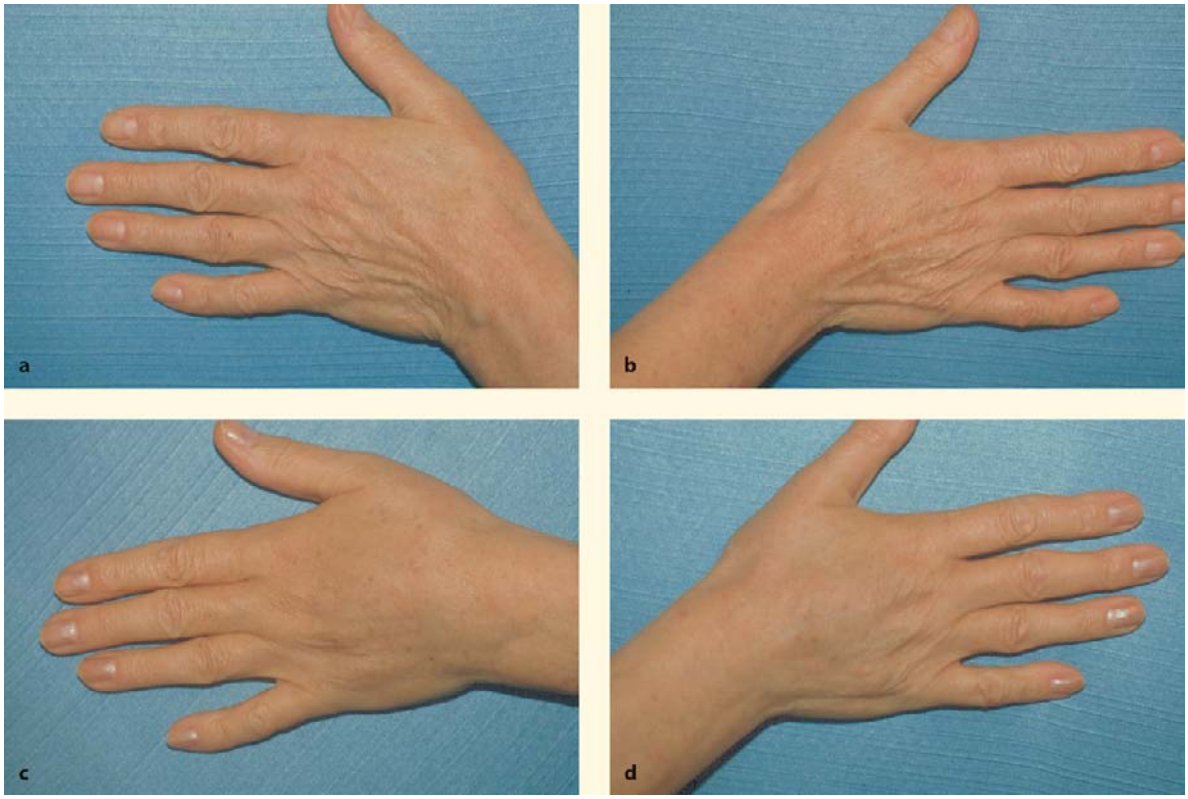

Fig. 59.39. **a** Left hand and **b** right hand before surgery. **c** One year after **d** AFT of 20 ml into each hand

Patients are advised to use their hands very cautiously for the first 3–4 weeks, avoiding any heavy manual work.

After 2–3 weeks the appearance of the hands is already not very suspicious and stable results are to be expected after 4 months. About 60–80% of fat is taken Only 15% of our patients with handliftings visit us for relipofilling after 6 months. In general, they are very satisfied.

Fig. 59.40. Patient **a** before and **b** after AFT: 30 ml into the face and 16 ml purified fat per hand

Fig. 59.41. Patient **a** before and **b** 4 months after facelift, crow's-feet treatment eyelid surgery, and AFT for both face (24 ml fat) and hands (18 ml each)

For our patients with facial structuring, we also offer to treat their hands if they show reasonable improvement after AFT.

It is not seldom that we combine facelift and eyelid surgery with AFT into both face and hands.

We now possess a very reliable, nonaggressive operating method with great resonance among patients. If we do not use a pistol injector, which could cause fat embolism of facial vessels, the procedure is not risky and has only minor complications and even these are extremely seldom if aseptic work has been done.

We can fill missing volume, and act as real "biosculptors", improving contours of the face in any direction, fulfilling volumetric principles. An overdose can be corrected by digital pressure and an underdose by relipofilling after 4–6 months. There is a remarkable elixir effect probably owing to oestrogen receptors with shining, rejuvenated skin. In contrast to wrinkle-fillers there is neither allergic nor foreign-body reactions and stable results for years with only 30% of average volume lost after first 4–6 months are available. We do not only want to earn money but also satisfied, happy patients. That is why we dare repeat: *Fat is beautiful* for both patients and surgeons.

Bibliography

Please see the general bibliography at the end of this book.

Fig. 59.42. **a** AFT to both face and hands. **b** Right malar silicone implant (from another clinic) is in place, the left is smaller and displaced. AFT augmentation to be done. The patient **c** before and **d** 4 days after surgery. **e** Four months later, her face and hands look much younger than her age of 52

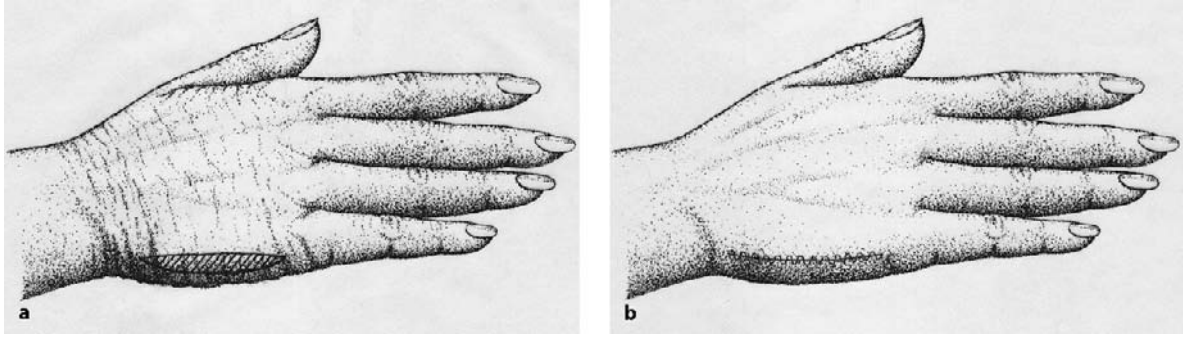

Fig. 59.43. **a** Ulnar skin excision to "lift" hands **b** has been abandoned because of the scarless AFT method

60 Liposuction in Face and Neck

Dimitrije E. Panfilov

Since 1972 we have possessed a very simple and effective method of improving bodily contours through liposuction. The first person to attach a hollow cannula to a vacuum machine was Ulrich Kesselring in Lausanne in 1972. The blunt tunnelling technique of liquid imbibed and anaesthetized fatty tissue was invented by Yves Gerard Illouz from France. The first cannulas were very robust, 1 cm in diameter. Now we have smaller-diameter cannulas – 5, 4, 3, 2, and even 1.6 mm – which allow us to do fine work with them.

One started to dare doing liposuction in the neck and face area, when it is indicated. This helps us in achieving optimal contours. For the face and neck we use a cooled solution of the following ingredients:

- 250 ml 0.9% NaCl solution
- 250 ml aqua destillata
- 25 ml 1% lidocaine
- 0.5 ml epinephrine
- 300 IU hylase

This solution should be allowed to work for at least 30 min before we start with liposuction. We prefer VASER liposuction in other locations, but we do not use it in the face and neck. There is a danger of thermal damage to the nerves.

If we do only liposuction, we make three incisions of 2–3 mm in the submental skin crease and directly behind each ear lobe. In this way we move our cannulas in an almost perpendicular direction to each other, creating a harmonious net of liposuction channels. We start with 3 mm cannulas and end with 1,6 mm cannulas. We never act against resistance and we aim at the skin so as not to damage deeper structures.

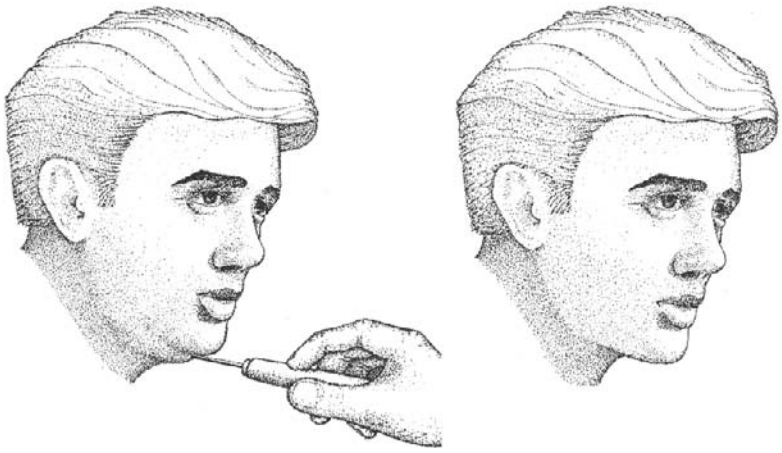

Fig. 60.1. Submental liposuction

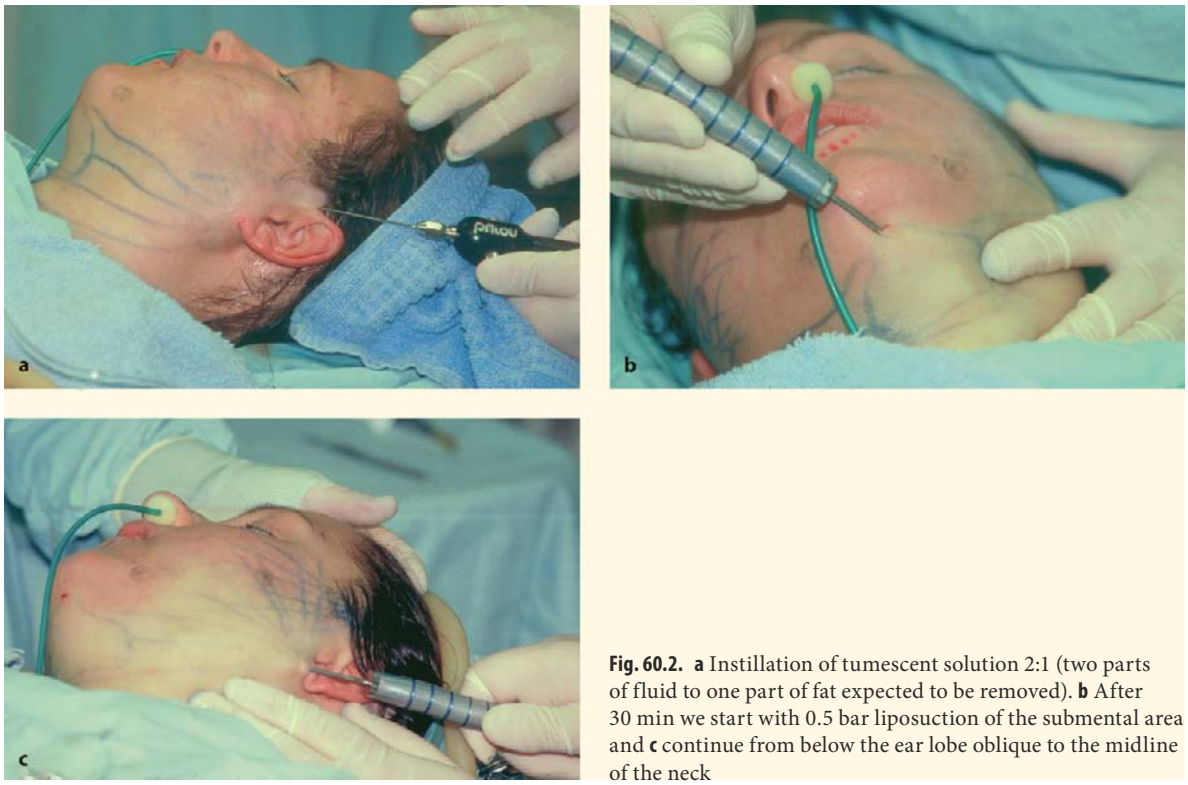

Fig. 60.2. **a** Instillation of tumescent solution 2:1 (two parts of fluid to one part of fat expected to be removed). **b** After 30 min we start with 0.5 bar liposuction of the submental area and **c** continue from below the ear lobe oblique to the midline of the neck

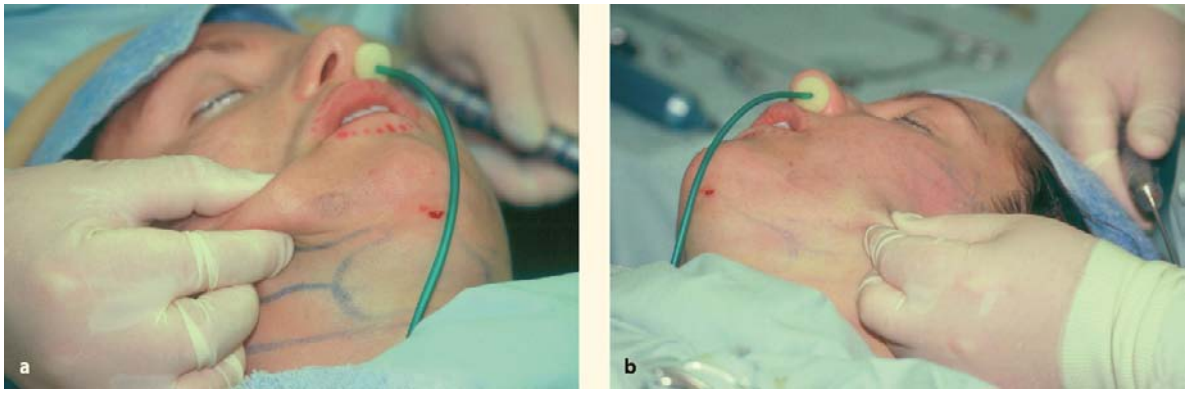

Fig. 34.3. **a** "Pinch test" of the right jowl still not liposuctioned. **b** The left side has been done; we can pinch only 2–3 mm of skin between thumb and index finger

Fig. 34.4. **a** Dermographic planning: *black areas* to be reduced by liposuction and *blue areas* for autologous fat transfer, to augment the malar region and to reduce the cheeks. **b** *Red marking* for the larynx – caution – not to be damaged. **c** Liposuction from submental access. Patient **d** before (square face) and **e** 1 day after surgery (oval face)

In 1986 Michael Cunningham extensively researched female beauty and among the ten most important factors he found the first two to be broad malar bones and narrow cheeks. According to Cunningham, this combination would, like a developed female breast, be a sign of sexual maturity and would prevent paedophilic desire. That is why the half profile should have this convex–concave line, Bill Little's "ogee line", and is why we nowadays look for "contouroplasty".

The other eight factors of female beauty from Cunningham's list are typical for the baby-face phenomenon: broad smile, wide nares, big eyes, high position of eyes, long interocular distance, big pupils, high eyebrows, and small nose.

When we perform facelifts we very often do liposuction in the neck area but sometimes also in the cheeks, especially in the lower parts of them to accentuate the convex–concave ogee line. Some cases of facial asymmetry are caused by unilateral fat hypertrophy. Then we do liposuction only on the hypertrophic side.

Fig. 60.5. **a** Dermographic markings for areas to be liposuctioned. **b** Four weeks postoperatively with pleasing semicontour

Fig. 60.6. **a** Asymmetric face with hypertrophic left side. **b** During facelift surgery we performed liposuction of the left cheek. Patient **c** before and **d** 3 weeks later

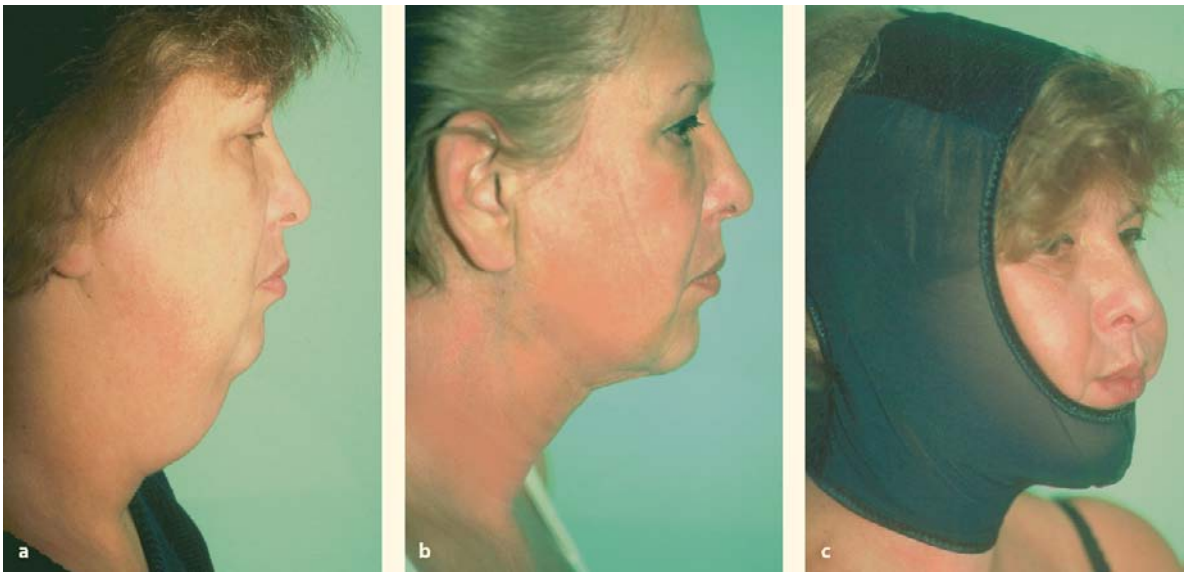

Fig. 60.7. **a** Isolated lipohypertrophy of the neck. **b** With liposuction we have removed 250 ml fat. **c** Special garments should be worn for 3 weeks in this area (body garments should be prescribed for 6 weeks)

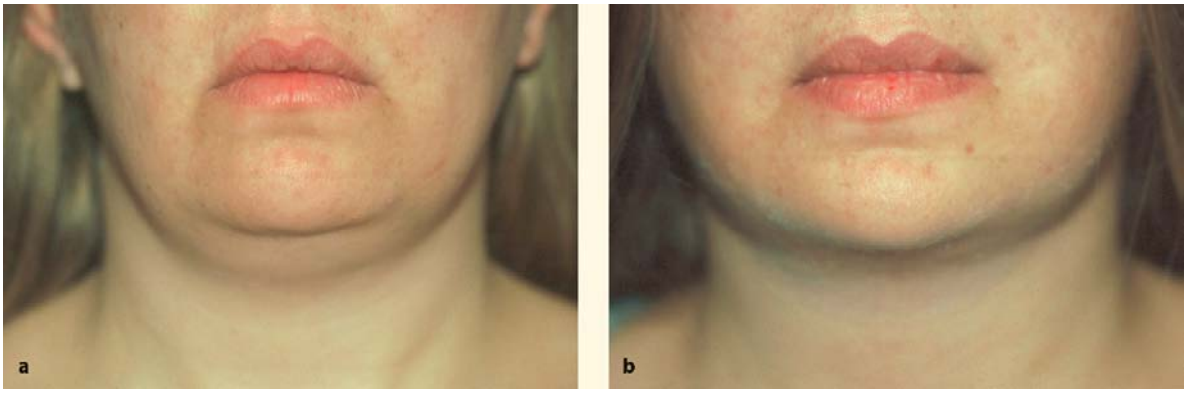

Fig. 60.8. **a** Submandibular fat hypertrophy. **b** The same patient 3 months later

The neck can sometimes have a huge amount of fat. Supraplatysmal fat can be removed by liposuction. Subplatysmal fat is better to be removed under visual control.

Sometimes hypertrophic fat is localized in the submandibular region.

Fig. 60.9. **a** Fat hypertrophy in the lower portion of the neck. **b** Three months after liposuction with a 1.6 mm cannula. Side look of the same patient **c** before and **d** after surgery

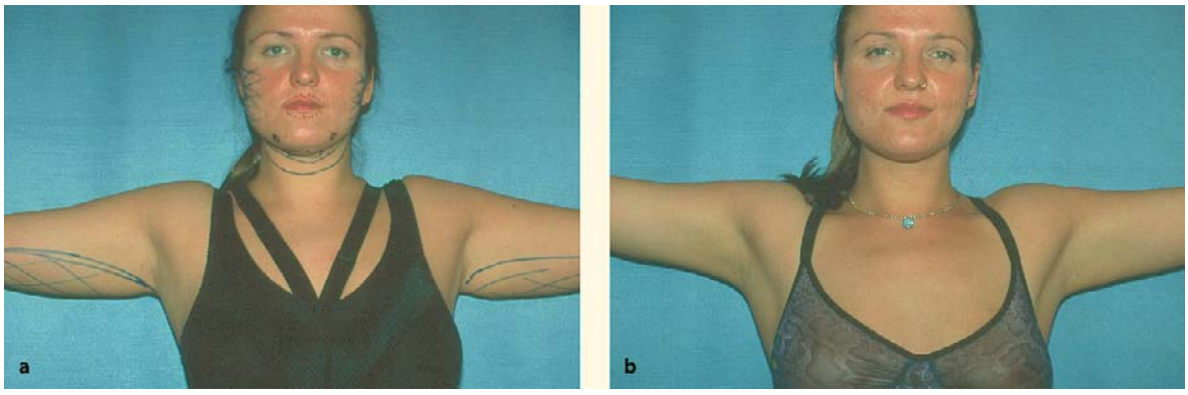

Fig. 60.10. **a** Liposuction of the lower face, neck, and upper arms planned. **b** Four weeks after surgery

Fat hypertrophy can sometimes be localized in the lower part of the neck. As the procedure becomes more precise, we dare operate on patients we would have refused a decade ago.

Liposuction of face can be done isolated or combined with other surgeries, most commonly with liposuction in other parts of the body.

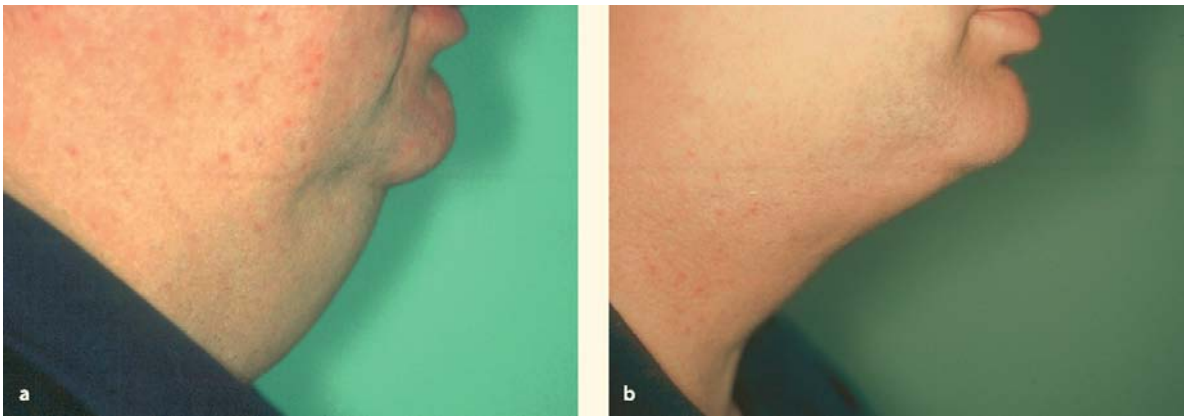

Fig. 60.11. **a** Surgeon with a double chin. **b** Four weeks after autoultrasonolipocontouring

If the surgeon has a fatty double chin himself/herself and masters the method, he/she can do the liposuction in front of a mirror himself/herself. The surgeon does not go to a colleague to be shaved, and it is the same region, just below the skin.

As all photographs in this part of the book originate from the author one can imagine whose double chin it is in Fig. 60.11.

Bibliography

Please see the general bibliography at the end of this book.

Aftercare

61

Dimitrije E. Panfilov

At the end of facelift surgery, we make a head net bandage. Some years ago we used a head and neck garment and observed frequent ecchymosis in the neck area; now we have stopped doing this. There is no need for compressive bandages but we put some more gauze strips behind the ears as a small or big collection of residual blood can be expected there.

When I started my career as a facelift surgeon, I spend almost a third of the operating time completing meticulous haemostasis – mostly through electrocautery. I divided sharply the tissue elements from each other and then I had bleeding. If one does not catch the whole vessel with the electrocautery forceps, it may provoke more bleeding. If we perform electrocautery near some nerve branches, thermal damage to them could occur.

I have learned to prepare skin flaps blindly with "spreading scissors" and "grasping forceps". I start the preparation in the retroauricular region , and when I have advanced medial enough, I leave a strip of gauze there and go to the cheek. When I have finished with cheek-skin flap, I go back to the neck, pull the strip of gauze out, and mostly it does not bleed anymore. This procedure enables me to not use electrocautery except sometimes at McGregor's patch (if it cannot be divided bluntly) or at retroauricular skin edges.

We do not administrate any prophylactic antibiotics except when we insert chin implants through the lower lip. Not more than 25% of our patients ask for analgetics. It seems that positive motivation for surgery sets free endorphins, so some patients say that they had no pain. For we who are performing these operations it is hard to believe that there was no pain at all. We discharge patients on the same evening or in the late afternoon on the day when the surgery was done accompanied by relatives or friends (not alone!). Patients from afar or with accompanied surgeries are advised to stay in the clinic for one or two nights (or to stay in a hotel near the clinic), because on the first postoperative day the bandages should be removed. Usually, we do not leave drains in the wound; if we recognize a tendency for haematoma or seroma formation, we apply fibrin glue as a sealing substance instead of drainage. Four days after surgery, we allow our patients to wash their hair.

Fig. 61.1. **a** Head net bandage for 1 day is sufficient in most cases. **b** A head–neck garment we do not employ anymore; it can cause cervical ecchymosis

Fig. 61.2. **a** Dermographic markings for facelift, autologous fat transfer, removal of three dermatofibromas on the forehead and the left root of the nose, left chin. **b** One day after surgery: bruising, swellings, infraocular haematomas. **c** One week postoperatively; visible scars after removal of dermatofibromas; otherwise she would be ready to go out. **d** Two weeks postoperatively; she is ready for all her activities. Patient **e** before. and **f** 5 years after surgery

Fig. 61.3. **a**–**d** The unlimited fantasy of our patients is applied to hide the traces of surgery (any woman can make from nothing a hat, a salad, and a scene, somebody said); when eyelid surgery has been done we recommend dark sunglasses. **e** Forehead lift with periocular ecchymoses **f** could benefit from large, dark sunglasses

Fig. 61.4. **a** Patient before minimal-invasive, deep-intensive (*MIDI*) facelift and eyelid surgery. **b** First day post-operatively **c** second day. and **d** after 10 days, when anchorage sutures had been removed

After discharge from the clinic, follow-up appointments are arranged. The surgeon will usually want to remove the stitches personally. This is done with the patient fully conscious and makes more of an impression on the patients than the operation itself, especially if surgery was performed under general anaesthesia. On the sixth postoperative day, the intradermal sutures can be removed. At this point about 80% of our patients are ready to appear in public. Nowadays our patients decide to be operated on or not depending on the permanence of the effect of surgery, and on how quick their resocialization is expected to be. In this world of ever-increasing pace, we have to recognize such trends and try to adapt ourselves. Those times are over when a patient after facelift stayed for a week in hospital and returned to her/his activities 4–6 weeks later. "When can I start meeting people again after the operation?" This is a question we hear regularly towards the end of the consultation. On average it takes about 6–12 days before the swelling and any possible bruises resolve. Sometimes it will take a few days more or a few days less.

Fig. 61.5. Make-up stylist is allowed after 10 days

Fig. 61.6. That somebody looks like that on the second postoperative day is almost a bit of impudence. She is 48 years of age; 2 days after MIDI facelift we do not even see suture strips because she wears a wig

After 9 or 10 days we remove the anchorage sutures and a make-up stylist can now help with the patient's appearance – even fresh scars can be treated with make-up. Until that time, cosmetic camouflage can be put only over haematomas but not over fresh scars. Our usual follow-ups are after 3 weeks, 6 weeks, 3 months, one year and any time afterwards.

There is a great difference amongst individuals as to how fast healing process is, and it depends on many factors. We advise our patients to stop smoking, not to take aspirin (and ibuprofen) and oestrogen hormones for 3 weeks before and 3 weeks after surgery, and not to drink alcohol for 1 week before and 1 week after surgery. We cannot force a person to do this; we can just recommend they do so.

Fig. 61.7. **a** A 46-year-old patient refused to stop her oestrogen therapy preoperatively. **b** First day after MIDI face-lift and four blepharoplasties. **c** Two weeks postoperatively – still a lot of haematomas. **d** After 4 weeks – an extremely long period nowadays – she is free of colour marks. **e** Six weeks postoperatively. Her 8-year-old daughter said: "Bingo mom, it is great that you have done it!" **f** Another MIDI face patient, 45 years of age with her 17-year-old daughter; she is happy to be considered as the older sister of her daughter (6 weeks postoperatively)

Fig. 61.8. **a** Patient before facelift surgery. **b** When driving a car on the third postoperative day, she turned her head quickly to the left; a haematoma on the right side of her neck jumped up. **c** Evacuation has been done with a liposuctioning machine. **d** A 50 ml haematoma was removed, but it hurts. **e** It is simpler, easier, and less painful to do it with a syringe

Two thirds of all complications after facelift surgeries are haematomas. If there is intraoperative bleeding, we have to stop it. For our outpatients, we have the rule to monitor them for at least 6 h postoperatively, and to see them next morning, which is about 20 h after surgery finished. After that point all patients are advised to phone at any time after that if they notice something unusual. Sometimes from the second to the fifth postoperative day, some quick movement of the head can provoke late postoperative bleeding. Reoperation is not always necessary. Sometimes the simple evacuation of the haematoma or seroma is enough with compressive bandages afterwards.

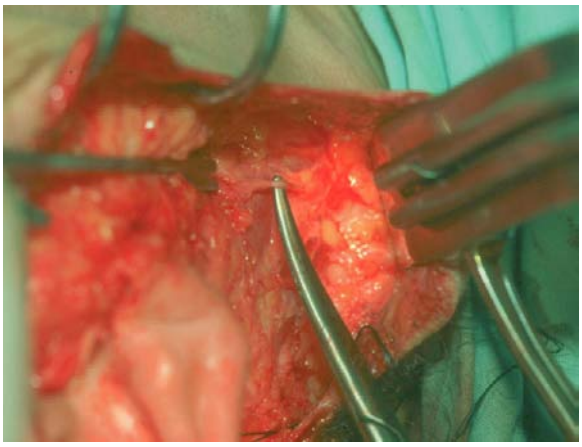

Fig. 61.9. Greater auricular nerve indicated with the tip of closed scissors over the belly of the sternocleidomastoid; beyond the v. iugularis externa

Nerve injuries belong with skin necrosis to major complications after facelift surgery. Injury of the great auricular nerve could occur if we cut it with anaesthesia of the ear and preauricular region or neurinoma if we get it into the suture over the mastoid region. To avoid both, we make dermographic markings preoperatively: 6.5 cm below the external auditory canal or about 5 cm below the ear lobe.

Injuries of motor nerve branches can result in temporary or permanent mimical disorder. Thermal damages caused by electrocautery are reversible; transection of these branches is permanent, It is also advisable to mark the frontal, buccal, and marginal branches on the skin with dermography preoperatively, where these branches come out superficially.

There are some complications which happen really rarely. One patient from Russia underwent in our clinic in Germany a minimal-invasive, deep-intensive (MIDI) facelift, reductive rhinoplasty, and breast and lip augmentation. She insisted on flying to Naples on the fifth postoperative day ("see Naples and die"). I entreated her and her husband: "Please do not do it. We don't have any complications yet, but four surgeries were done. And the air-pressure changes will not support the healing, just the opposite." But, they went – to be back in 3 days. A strange thing happened: any time when she was eating (especially chocolate), a bubble like a cherry jumped out on her left cheek. I made a revisionary surgery and found only clear fluid inside: it was a salivary cyst! This does not need any revision. It disappears spontaneously after 3–4 weeks.

Fig. 61.10. **a** Orbicularis oris muscle transitory paresis after elevation of lip commissures; preoperative appearance. **b** Two weeks, **c** 3 weeks, and **d** 4 weeks afterwards; complete restitution. Since that case we do not apply the double loop when catching the orbicularis oris muscle bundle in our "optimistic suture", but just a single one

Fig. 61.11. Salivary cyst of left cheek after MIDI facelift

Another strange case was a patient who was operated on 3 weeks before had circumscribed inflammation on her right cheek! We went through the reopened wound below the ear lobe with an endoscope and found a swab of gauze there. After 6 months we added some autologous fat there and after 1 year made a mini facelift on that side to improve the appearance of her right cheek.

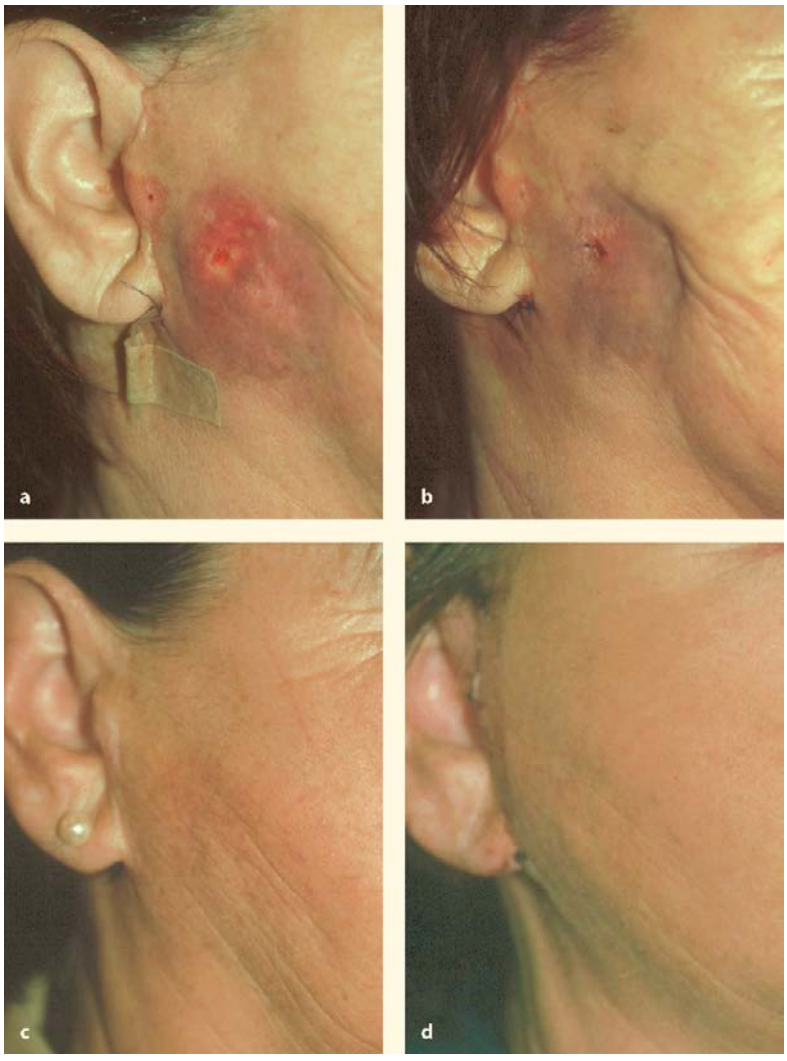

Fig. 61.12. **a** Localized inflammation of the right cheek, 3 weeks after initial surgery. **b** After removal of a forgotten swab of gauze. **c** Six months later the defect was filled up with 5 ml of autologous fat. **d** One year later a unilateral mini facelift has completed the reconstruction of her right cheek

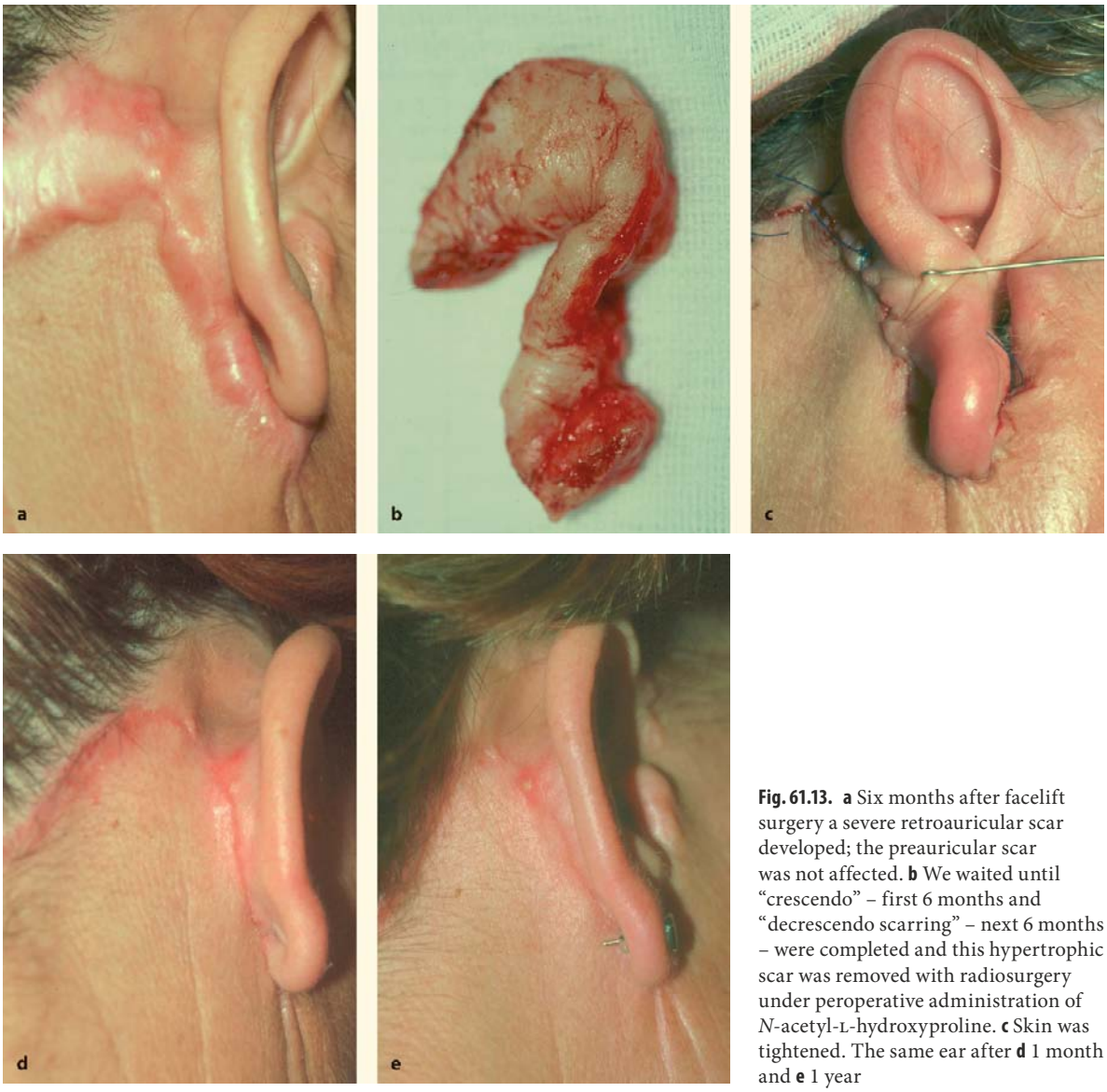

Fig. 61.13. **a** Six months after facelift surgery a severe retroauricular scar developed; the preauricular scar was not affected. **b** We waited until "crescendo" – first 6 months and "decrescendo scarring" – next 6 months – were completed and this hypertrophic scar was removed with radiosurgery under peroperative administration of *N*-acetyl-L-hydroxyproline. **c** Skin was tightened. The same ear after **d** 1 month and **e** 1 year

Hypertrophic scars or real keloids are also rare. If they occur, it is mostly in the retroauricular region. They are very resistant to therapy. We mostly apply direct injections of steroids. There is also a medication against rheumatism called *N*-acetyl-L-hydroxyproline (AHP 200 – Oxaceprol) which should be taken 3 weeks before and 3 weeks after surgical removal of a hypertrophic scar. We administrate two pills containing 200 mg oxaceprol, three times. In the case illustrated in Fig. 61.13, it seems that it was helpful.

Fig. 61.14. **a** Facelift stigma of "operated face" with a distorted hairline. **b** Distorted hairline with overdosed facelift 14 years postoperatively

Nowadays we do not often see faces with overstretched skin and a distorted hairline without mimetic expressions, like masks, like a face from a wind tunnel, often with a "stair scar" behind the ear. These were static "facelift stigmatas" of "operated faces" and negative advertising for our profession usually seen in multilifted patients until the 1970s. Also dynamic "facelift stigma" is possible if the mimetic expression has been distorted like in a uncorrected paraoral K-point.

Many things should come together so that we achieve excellent results: good candidates with developed sagging of facial structure, but good skin conditions, angles of facial structure which promise attractiveness, optimistic patients with realistic expectations. This is very important. We all love to have satisfied, happy patients at the end of our treatment.

But, if something goes wrong, if some complication occur, or if the patient is worried or discouraged, we have to help her/him. Every patient must be guaranteed to receive qualified aftercare and follow-up. It is not advisable, for example, to look in the mirror during the first 2 days after face surgery. Many a patient is seized with fear at the sight of the swellings and bruises: "How on earth do I look! Why did I have this done to me!" The surgeon must then provide comfort and reassurance until the third day after the operation, at the latest, when the mood switches as the patient is happy again about his/her operation and the rapid improvement. We just have to encourage our patients; we can say to them: "Oh, thank you for making my surgery a success." We are those who know hundreds or thousands of such situations; we have something like a "time prism" in our heads. We know how somebody will look in 3 days., 3 weeks, 3 months...

And if patients have objections they could be justified or unjustified. We have to give them the opportunity and time to tell us their complaints. If we have not done the perfect job, we should offer to improve the small irregularities, or if we have not achieved the result which we expected ourselves, we could offer another surgery at a reduced price or free of charge. But anyhow, we should have patience to listen to our patients. If the patient has unjustified objections, I show him/her pictures of before and after. Then all doubts are removed.

Bibliography

Please see the general bibliography at the end of this book.

62 Pre- and Postoperative Skin Care

Desmond Fernandes

62.1 Introduction

No matter what type of operation you do, cosmetic surgery alone cannot create a convincingly youthful impression. The patient's loose skin may be pulled up but often they appear merely as neat, tight-skinned mature people. In the worst case, many surgeons have had the experience of doing a facelift on a severely photoaged patient and it seems that the only distinguishing changes in comparing the before and after pictures is the date! The skin does not simply have to be smooth; it should be fresh, glowing and show few or no signs of accumulated photodamage. (Fig. 62.1) By understanding the basics of the science of skin care, you can guide your patients to use products that can do this for you and complement your work.

Many surgeons make the mistake of believing that they can achieve youthful skin by using drastic measures such as laser resurfacing, heavy peels or other techniques that destroy the epidermis. The epidermis is far too important and complex to be destroyed or tortured into becoming smooth. The epidermis is an extremely thin layer, only 0.2 mm thick, which is thinner than the average sheet of paper. This fine membrane, made up mainly of differentiated keratinocytes, is our only protection from the harsh world outside. It is extremely intricate and is not merely a series of layers of dead or dying skin cells. The destiny of differentiated keratinocytes is to become the complex stratum corneum that is our real protection. This layer is even thinner and is only 0.01–0.02 mm thick so we should be very careful about the use of physical or chemical abrasives. The convoluted lipid bilayers that fill the space between the corneocytes create the protective properties of the stratum corneum. Healthy keratinocytes are ultimately responsible for a beautiful, resilient skin. Our first aim must be to rehabilitate photoaged, inefficient keratinocytes to create a normal healthy epidermis that then sets up the possibility of improving the dermis (Fig. 62.2).

This chapter will explain how to give your patients normal healthy smoother skin with a thick epidermis and a dermis that is rich in collagen, elastin and natu-

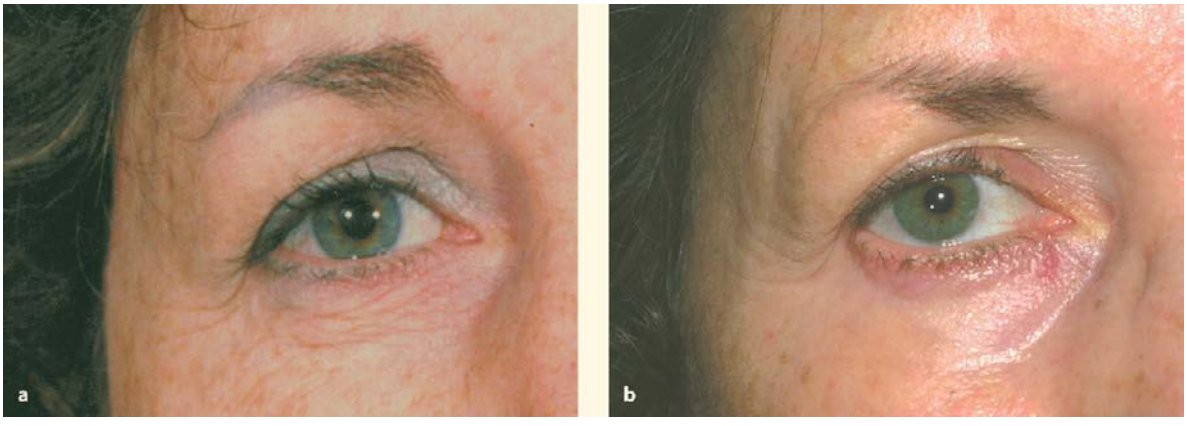

Fig. 62.1. One should judge rejuvenating effects of a cosmeceutic not after 6 weeks or 6 months, but rather by the maintenance of a good result after many years of use. **a** Wrinkled right lower eyelid before using topical vitamin A (retinyl esters in concentrations to equate with retinoic acid preparations), vitamin C and antioxidants (Environ Ionzyme C-Quence and Crème 2001). **b** Five years later showing significantly less wrinkling and healthier skin. The patient should have developed more wrinkles after 5 years under normal circumstances. No make-up was used in **b** and no intervention was done other than daily skin care

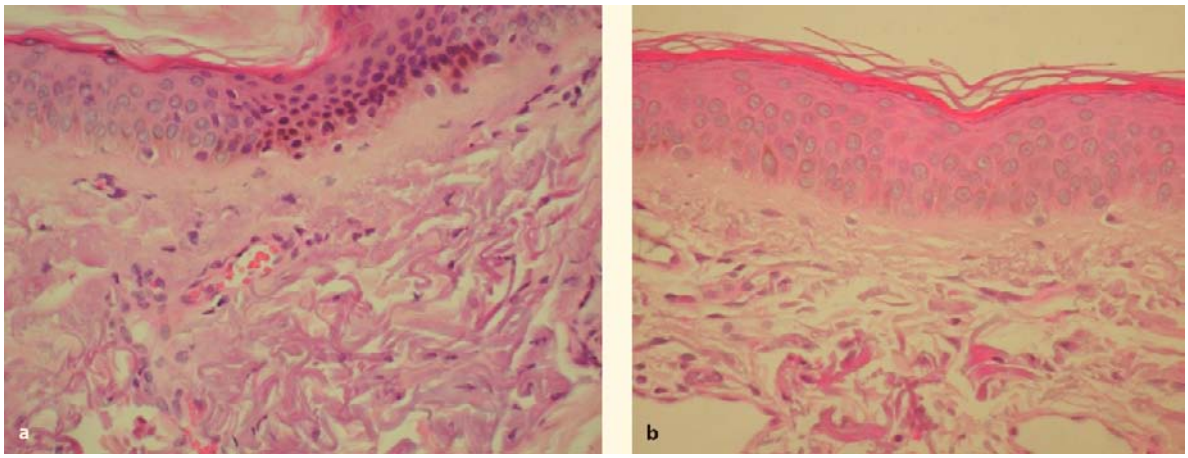

Fig. 62.2. a Histology of sun-damaged skin with irregular pigmentation, dyskaryotic cells and thin epidermis. **b** The effects of 3 months' use of topical vitamin A, and antioxidants (Environ Original Day and Night creams). The epidermis is healthier with a thicker stratum spinosum, regular cells, normal nuclei and more even distribution of melanin. The stratum spinosum is 20% thicker by measurement. Magnification ×100. Haematoxylin and eosin stain

ral moisturising factors. One must use well-formulated, honest cosmeceuticals [1] (a term coined by Kligman) based on essential micronutrients to gently nurture and rehabilitate photoaged skin. However, we have to realise that each person's requirements will be a bit different, and that is why we first have to inspect the facial skin very carefully.

62.2 Skin Analysis

At your first consultation with the patient you should carefully notice:

1. The overall colour of the skin. This will give you a good idea of the care against photoageing that the patient is taking. All of these signs will respond to competent skin care combined with intensive treatments to enhance penetration through the skin. At times it may be necessary to employ serial light peels.
   a) Are they excessively tanned or too pale?
   b) Are there pigmentary blemishes? Check if the patient has been on hydroquinone, which tends to cause secondary, aggressive melanosis that is very difficult to treat. Advise patients not to use hydroquinone.
   c) Check the texture of the cheek skin to the side of the nose to see if the "pores" are dilated.
   d) Is the submental area hypopigmented?
   e) Does the patient have poikilodermia of Cervat?
   f) Is there telangiectasia on the cheeks?
   g) Is there rosacea?
2. The general elasticity of the face skin.
   a) Is the skin thick and firm or is it thin and does it stretch easily? If it is thin and has poor recoil, then intensive skin care will be required and also collagen induction therapy (CIT) [2].
   b) Are there wrinkles around the eyes? Are they there permanently even when the face is in repose? A blepharoplasty will not suffice to correct these. (Fig. 62.6).
      – Are they light or deep wrinkles? Light wrinkles may respond to skin care alone, or may need iontophoresis and sonophoresis treatments. Serial light peels, using low-dose trichloracetic acid (TCA) in the region of 2.5–5%, are also very useful. Deep wrinkles around the eyes will need intensive CIT [3].
      – Are there radiating wrinkles through the eyebrows? These are usually only found with significant depletion of collagen, and there is reduced subreticular fat even though the skin may feel thick. This will not improve significantly with skin care alone. CIT is definitely required. Hormonal therapy may also be required.
   c) Are there "crisscross" wrinkles on the cheeks (which indicate more severe photodamage)? This will require intensive skin care treatments and can be alleviated with iontophoresis and sonophoresis.
   d) Are there wrinkles on the chin? This is found with severe sun damage and usually also indicates some degree of hormonal insufficiency. This will respond slowly to skin care, intensive treatments and CIT.

Fig. 62.3. **a** One year after a full face- and neck-lift. The loss of elasticity is due to photoageing and cannot be corrected by surgery. **b** One month after the patient had completed 24 treatments of iontophoresis and low-frequency sonophoresis (The Environ DF IONZYME machine for pulsed iontophoresis and low-frequency sonophoresis was used. The products used were Environ Crystal Masque and Environ C-Quel. Home treatment was with Environ Ionzyme C-Quence.) of vitamins A and C in conjunction with daily topical applications off vitamin A, vitamin C and antioxidants. **c** Five years later showing that the result could be maintained by daily skin care (Environ Ionzyme C-Quence and Crème 2001) and eight to ten iontophoresis and sonophoresis treatments a year done at about monthly intervals. The change in the elasticity of the skin is not temporary owing to swelling, etc. No surgery or other intervention was done between **a** and **c**

e) Are there signs of elastosis in the lower neck and décolleté? It is good to get an impression of the concentration of the elastotic nodules prior to treatment and surgery. Surgery will not improve this. Intensive skin care, however, will make a big difference. Are there fine vertical skin creases especially below the laryngeal cartilage? In severe cases the combination of skin care with iontophoresis and sonophoresis can at times yield stunning results (Fig. 62.3).
f) These changes are not of short duration but with maintenance treatments, the skin can be kept smoother for many years after the initial course of treatment.

3. The presence of lines on the upper lip will give you an idea of the hormonal nourishment of the skin. Check the lip vermilion to see if it is smooth or creased by radiating lines as well as transverse lines, which indicate severe tissue loss which cannot be corrected by simple skin care. Besides tissue augmentation, the best result will probably require percutaneous CIT of the lip skin.
4. Look for actinic keratoses, skin cancers.

By looking carefully at the skin you will be able to determine the degree of photoageing and intrinsic ageing so that you can work out the best skin care for that patient.

62.3 Photoageing

We know that photoageing is a manifestation of the injury caused by sunlight. High-energy light on the UV and violet side of the spectrum does not penetrate as deeply as lower-energy light on the red side, but most of the damage is done by light ranging from blue through to UV. One can, broadly speaking, say that light on the red side of the spectrum is more beneficial and healing, whereas light on the violet side is more destructive. Melanogenesis is stimulated by damage to DNA of skin cells, so in fact a tan is a sign of cellular scarring. Studies have shown that green light induces melanogenesis [4], which means that even green light must be causing some damage to DNA.

Light damages cells on account of a chemical interaction either at the molecular or at the subatomic level. Each photon has a specified energy depending on its frequency. Molecular damage occurs when certain molecules in the skin, called chromophores, absorb light energy of very precise frequencies. The increase of energy in the molecule may then cause fundamental changes to its chemical structure or may even destroy the molecule. Important examples of chromophores in skin are:

1. DNA, which absorbs UV-B and gets destroyed.
2. Vitamin A, which absorbs UV-A, and becomes inactivated.
3. Vitamin C, which absorbs blue light and is destroyed.
4. Melanin is an amazing molecule because it can absorb the energy of the whole light spectrum without being impaired.

Subatomic damage occurs when photons of sufficient energy displace an electron from the outer shell of an atom to create a free radical: UV-A is the main culprit inducing free radicals in the skin. These free radicals set up chain reactions in their search for electron stability and consequently may damage vital cellular structures like DNA, cellular membranes and important intracellular molecules etc.

Bearing this all in mind, one can start to rationalise the prevention and treatment of photoageing:

1. We must never forget the dangers of uncontrolled free-radical activity so we should always ensure that our skin is rich in a wide variety of lipid- and water-soluble antioxidants. They have to be included in the skin care regimen and should be used both day and night.
2. Obviously we have to focus on damaged chromophores and understand that all photolabile vitamins have to be included. Vitamin A is certainly the dominant chromophore that we have to worry about, but we have to remember vitamins C, E, B_1, B_2, B_6, and B_{12}, folic acid, vitamin K and, paradoxically, vitamin D. Everyone knows that UV-B is essential in the formation of vitamin D (which takes about 20 min), but it is not generally known that vitamin D is unstable when exposed to UV-A light! That is one good reason why people should not stay longer than 20 min in the sun if they intend to make good doses of vitamin D.

62.4 Vitamin A

Vitamin A deserves special attention because it is not well understood by clinicians, who generally regard only retinoic acid as the active form. For decades we have known that vitamin A, mainly available as retinyl palmitate, is vital for healthy skin. Wise and Sulzberger [5] realised that retinyl palmitate was extremely unstable in light and they suggested *in 1938* that there is a localised hypovitaminosis A in wrinkled skin. Almost everyone walks around with a chronic, localised hypovitaminosis A in our exposed skin – mainly in the face and neck. We now know that UV-A rays are responsible for photodecomposition of retinyl palmitate, which is the major form of vitamin A in the skin [6]. Retinoic acid (tretinoin) is not the only active form of vitamin A: it is just the acid form of vitamin A and is the end product of the metabolism of retinyl palmitate to retinol and retinyl aldehyde and finally retinoic acid.

UV-A rays are ubiquitous, plentiful and penetrate through clouds and windowpanes. Each day we leave our homes and expose ourselves to varying degrees to light, and that affects our cutaneous vitamin A. Even on an overcast day, UV-A destroys some vitamin A in the exposed areas of our skin. You may think that vitamin A can easily be replaced by the blood stream, but this is not true and in fact one slowly builds up a deficit of vitamin A during the day and this is only restored quite slowly during the night. Tanning may lower the epidermal vitamin A (as retinyl palmitate) by 70–90% [7]. Once the skin retinoids are depleted after heavy exposure to sunlight, it takes several days before diet alone can restore the normal cutaneous retinoid levels. With repeated exposure to light almost everyone develops this localised chronic deficiency that permits significant degradation of the skin.

Cluver [8] recognised that vitamin A plays an essential role in counteracting sun damage. He showed that every time we go out into sunlight, the photosensitive vitamin A molecule is denatured not merely in the skin, but also in the blood [9]. Women have an added disadvantage because blood levels of vitamin A drop when they menstruate [10, 11]. That means that during menstruation their skin is more vulnerable to photodamage [12]. Deficiency of vitamin A results in an inefficient epidermis with a thick horny layer, delayed healing, keratoses, irregular pigmentation, melanosis, elastosis, disordered collagen production, impaired hydration and lax inelastic yellowish skin, i.e. all the signs of photoageing! With time, investigations have demonstrated that vitamin A is not merely good for ageing skin [13, but is actually essential to prevent problems [14, 15]. We also know from experience that topical vitamin A can restore the normal levels within hours, and with continuous use for many months reverses almost all the signs of photoageing [16, 17].

We do not know precisely how retinoids work but we have some clues:

– In the tissues vitamin A of all forms passes into the cell wall through retinoid binding sites and all of it

is metabolised from retinyl palmitate into retinoic acid. Retinoic acid is the essential active metabolite that controls mitochondrial and nuclear DNA. By supplying retinyl palmitate, one automatically also increases the amount of retinoic acid.
- All-*trans*-retinoic acid and only two other isomers are the key signalling hormones for normal growth and differentiation that regulates between 350 and 1,000 genes and modulates photoageing [18]. It is essential for normal function of *all* the important cells of the skin [19].

Keratinocytes [20], melanocytes [21], Langerhans cells [22–25] and fibroblasts [26–30] can only function normally with adequate amounts of cellular vitamin A. Vitamin A is a powerful inhibitor of the release of matrix proteinases [31, 32] that are induced by UV irradiation and would destroy collagen and elastin. One need not use pharmacological doses of retinoic acid to treat photoageing because retinoic acid is rather aggressive in pharmacological doses. On the other hand, when one uses retinyl aldehyde, retinol or retinyl palmitate, only physiological doses of retinoic acid are produced and presented to the nucleus, while the excess is stored as retinyl palmitate. More than 90% of cellular vitamin A is retinyl palmitate and associated esters, and it seems that the larger the store of retinyl palmitate, the healthier the skin, which becomes less prone to skin cancers [33]. Our understanding of retinoid physiology indicates that we should all maintain high levels of retinyl palmitate in our skin to keep it as young and fresh as possible. Vitamin A also prevents tissue atrophy [34] and the destruction of collagen generally found with intrinsic ageing.

Vitamin A reduces pigmentation by about 60% or more in some cases. Even fairly deep dermal pigmentation may be reduced. The best results are seen after many months – even 18 months.

One constantly hears a rumour that retinoids make the skin thinner. In fact the skin is always thicker but is smoother because the horny layer becomes more compact. This has alarmed some dermatologists because the horny layer is the most important protection against UV irradiation. The fact that it is more compact, may well act as a greater physical barrier to UV light! Reassure your patients that these negative rumours about vitamin A are untrue.

62.5 Principles for Treating Facial Skin Preoperatively

The reason for preoperative treatment of skin is to make sure that the skin is as elastic as possible before treatment and also to make sure that the skin cells are working optimally and will repair any wounds as rapidly as possible. We have to focus our attention on very few special cells:

1. Stem cell keratinocytes, and differentiated keratinocytes
2. Melanocytes
3. Langerhans cells
4. Differentiated fibroblasts and their stem cells

Because their genetic code is most likely damaged to some degree, we have to nourish each of these cells back into optimal health and normalise the DNA as much as we can.

Basically we should be able to treat most of our patients by using combinations of the following:

1. Adequate, *but not excessive* UV light protection every day – remember your patients must make as much vitamin D as they safely can to avoid potential problems like breast, bowel and prostatic cancer.
2. Replenishment of the essential skin vitamins that are unstable when exposed to sunlight, particularly (but not only) vitamins A, B_{12}, C and E.
3. Replacement of carotenoids and other free-radical scavengers.
4. Active peptides, e.g. Matrixyl, Dermaxyl and copper peptides, to promote collagen and elastin production.
5. Use of the α-hydroxy acids (AHAs) periodically *only when necessary*.
6. A light repetitive TCA/AHA peeling system when indicated.

Cosmetic surgeons can use cosmetics as though they are pharmaceutics by examining the declaration of ingredients and then selecting products that have suitable active ingredients.

62.5.1 Sun Protection

Make sure that the sunscreen contains dedicated UV-A and UV-B components. Methoxycinnamate, despite some adverse press in recent years, remains the best UV-B screen at this stage. Methoxydibenzoyl methane (Avobenzone, Parsol 1789), is a far superior UV-A screen compared with benzophenone (oxybenzone) which is commonly used. Newer UV-A screening agents (like Mexoryl SX or Tinosorb-M) are photostable and give better and continuous UV-A protection.

To facilitate vitamin D production, a low sun protection factor (SPF) of 4–8 is all that is necessary in most parts of the world to prevent photoageing [35] under average "working-day" sun exposure. This will also minimise the potential long-term problems from

exposure to sunscreens over many years. Of course, for outdoor activities, SPF 16–20 is required and the patient has to be told to reapply sunscreen every 2 h. We must remember that UV-A protection is much more important than UV-B protection and this is not related to the SPF rating. It is absolutely essential that the sun protection product also contain antioxidants to deal with UV rays that are not blocked from penetrating into the skin.

62.5.2 Vitamin C (L-Ascorbic Acid)

Ascorbic acid is extremely unstable and should not be used in cosmeceutics unless the ascorbic acid solution is made up by the patient. Magnesium (and sodium) ascorbyl phosphate is a water-soluble version of ascorbic acid that is somewhat more stable but generally only lasts at its intended concentration for 6 months. Ascorbic acid cannot easily penetrate the skin, so esters of ascorbic acid have been created to penetrate better and also be more stable. At this time, the most effective form of vitamin C is ascorbyl tetraisopalmitate, which is more effective than ascorbyl palmitate or ascorbyl dipalmitate and can deliver large doses of ascorbic acid into the cell itself. Ascorbic acid upregulates the production of collagen and is an essential coenzyme for the inclusion of lysine and proline into collagen.

62.5.3 Vitamin E (D-α-Tocopherol)

Vitamin E plays an essential role as an antioxidant in safeguarding cellular membranes and when it is applied topically it augments photoprotection; however, this advantage only becomes clear a day or two after sun exposure. Patients using topical vitamin E get less sunburn and a lighter tan. Vitamin E is also light-sensitive and can be oxidised into an inactive form.

62.5.4 Other Antioxidants

β-Carotene is the plant form of vitamin A, but is a most powerful free-radical quencher. Estimates suggest that one molecule of β-carotene can cope with 1,000 free radicals.

Lutein is another carotenoid which has particular value because besides being an antioxidant, it is also a powerful absorber of blue light that can damage cells quite severely. There are many other carotenoids that can also protect the skin.

Panthenol is a coenzyme in fat and carbohydrate metabolism. It has other soothing effects on skin and is also a free-radical quencher.

Pycnogenol, coenzyme Q10, α-lipoic acid, Resveratrol and many other chemicals are important antioxidants and phytonutrients that increase the general spectrum of antioxidant protection.

We should boost the levels of these essential antioxidants prior to sun exposure to minimise the subsequent depletion.

62.5.5 Active Peptides

Recent research has shown that active peptides such as palmitoyl pentapeptide (Matrixyl) and palmitoyl hexapeptide (Dermaxyl) have a special value in stimulating the production of collagen and elastin. They are both peptides made of a sequence of amino acids normally found in collagen and elastin, respectively, and their results have been favourably compared with those of retinol. Palmitoyl pentapeptide stimulates about 16 genes in skin cells, which is only a fraction of the number of genes that vitamin A favourably stimulates in the skin. For that reason one should not make the mistake of believing that these peptides can be an alternative to vitamin A. They should be used in conjunction with vitamin A.

Copper peptides facilitate healing of tissues and may assist in remodelling of collagen. Probably the best indication for copper peptides is when the skin has been injured by peeling, laser or dermabrasion.

With current research, many more molecules will likely come into prominence on account of their stimulating effects on healing and collagen and elastin deposition.

62.5.6 α-Hydroxy Acids

AHAs have been the most misused and misunderstood molecules in skin rejuvenation. Very largely they are simply exfoliants and should mainly be used as penetrant enhancers. In patients with thick rough skin, AHAs have a place to help refine the skin. Once the natural qualities of the horny layer have been restored, then the use of AHAs should fall away. Care should be taken because they do impair the natural protection from the sun and they should always be used in conjunction with vitamin A. Lactic acid is an exception because it has a particularly useful effect on restoring natural moisturising factors and is less irritating than glycolic acid.

Your patient should use a “cocktail” of vitamin A, vitamin C, other antioxidants and active ingredients such as palmitoyl pentapeptide every morning and evening for a minimum of 3 weeks prior to surgery. Remind them to use these products on the areas where incisions are planned. This will ensure that the skin

Fig. 62.4. **a** Acne-scarred skin with photoageing prior to topical vitamin A, vitamin C and antioxidants. **b** After 52 treatments of iontophoresis and low-frequency sonophoresis (The Environ DF IONZYME machine for pulsed iontophoresis and low-frequency sonophoresis was used. The products used were Environ Crystal Masque and Environ C-Quel. Home skin care was with Environ) of vitamin A, vitamin C and continuous home skin care. No surgery was between the **a** and **b**

will heal rapidly and the patient will make the finest and strongest scars. It will also start to help to increase the elasticity of the skin, which will ensure a longer-lasting result as well as younger-looking skin. The longer the patient is on the ideal cocktail, the better the skin will be. However, some patients need more intensive treatment.

62.6 Intensive Treatments

When home-care alone is not sufficient we can resort to iontophoresis and low-frequency sonophoresis to enhance penetration through skin. By getting higher concentrations of vitamin A, vitamin C and various other molecules, e.g. active peptides, one can reasonably expect significant rejuvenation and tightening of skin. Serial light peels can also make a significant difference.

62.6.1 Iontophoresis

Galvanic current is useful if the selected molecule like vitamin A or ascorbic acid can be ionised into positively and negatively charged ions. A positive electrical current repels positively charged ions into the skin and vice versa. This can cause about 400% better penetration than simple topical applications. Treatments should be done for a minimum of 20 min once or twice a week for 24–30 treatments [36, 37]. This is a very successful method for treating photoageing but has to be done by an experienced therapist/nurse.

62.6.2 Low-Frequency Sonophoresis

Low-frequency sonophoresis (about 20 kHz) was first described in 1996 and has become the most effective way to enhance penetration. Up to 4,000% better penetration may occur after only 3 minutes of treatment [38]. Low-frequency sonophoresis should not be confused with ultrasound (about 1.1 MHz), which does not have the same powerful properties. The advantage of low-frequency sonophoresis is that it can be used on nonpolar molecules as well. Cavitation develops rapidly and is maintained for several hours after the treatment, so significant improvement of skin can be seen in a relatively short time. Treatments are best done once or twice a week for about 24–30 times and the best results seem to occur in combination with iontophoresis [39] (Figs. 62.3, 62.4)

62.6.3 Microneedling of Skin

Not everyone can manage to have the specialised treatments of iontophoresis and sonophoresis, so microneedling offers an important way for patients to enhance penetration. Minute holes are made through the stratum corneum only, so this is not a painful procedure. I have designed a special instrument to do this and patients are requested to use it daily before applying their skin care [3]. Significant improvement may be achieved in those patients who are diligent about using the tool every day for about 3–5 min. The results are not due to the microtrauma, but are due to enhanced penetration of vitamin A, vitamin C and

Fig. 62.5. **a** Typical photodamage. **b** After topical vitamin A and C, an upper blepharoplasty, and 6 months after percutaneous collagen induction (percutaneous collagen induction was done with the Environ Roll-Cit). Continuous daily skin care. Note the younger skin texture, the melting away of solar keratoses, the healthier colour of the skin. No make-up has been used on the facial skin

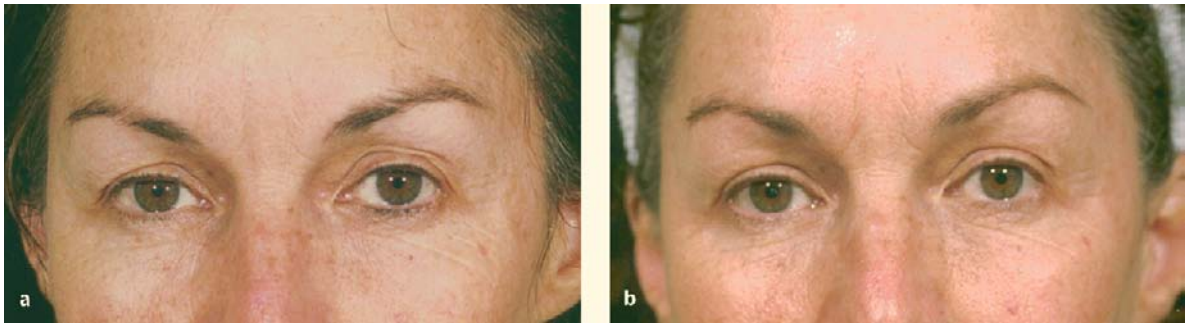

Fig. 62.6. **a** Typical photodamaged skin with wrinkling of the upper eyelids. **b** After 6 months of continuous daily skin care with topical vitamin A and antioxidants (Environ Proactive Mild Day and Night creams) after a series of monthly peels using 2.5% trichloracetic acid (*TCA*) cream for four peels, and 5% TCA cream for two peels (ACM no. 1 and ACM no. 2 from Environ Skin Care). The peels are so safe that they can easily be done on the upper eyelid. The brows are at the same position and the improved elasticity is probably also due to increased penetration of topical vitamin A, vitamin C and antioxidants. No surgery has been done

other active agents (Fig. 62.5). The use of simple moisturisers will not cause any tightening of skin.

62.6.4 Repetitive Light Peels

As mentioned before, deep peels (e.g. the classic phenol peel, 35% TCA) should be avoided because of the destruction of the epidermis. Medium-depth peels (e.g. 15% TCA, Jessner's peel) that do not destroy the basal layer of the epidermis are much safer, though one treatment will not give the smoothening that people demand from a peel, but the recovery might be almost as great as that for a deep peel. On the other hand, serial light peels done once a month in conjunction with daily applications of vitamin A, vitamin C and other active ingredients will give results at 6 months that match those of one heavy peel.

Low concentrations of TCA, as low as 2.5%, have been used with gratifying results. This form of peel is safe to use repeatedly on the upper eyelids (Fig. 62.6). The advantage of peeling in these types of cases is that one can smooth out the fine wrinkles of the upper-eyelid skin that can spoil even the best blepharoplasty. Sometimes the improvement is so great that it mimics an upper blepharoplasty as in the case shown.

Repetitive peeling allows the patient to continue with their daily lives with minimal telltale signs, and as the skin becomes refined, the need for continuing the peels disappears. Patients with thick rough skins should be treated to a peel at the beginning of their skin care programme so that the vitamin A can express its beneficial effects. One advantage of serial light peels in conjunction with vitamin A based cosmeceutics is that the patient will get a better result than expected. Less invasive

Fig. 62.7. **a** Typical photodamage prior to four serial light monthly peels [Environ ACM no. 2 (5% TCA cream) and home care Environ Proactive Ultra Day and Night creams] followed by upper and lower blepharoplasty. **b** How cosmeceutic skin care can give a superior result without resorting to destructive techniques as compared with surgery only. The skin not only looks but also feels natural and has a healthy glow

surgery may then give results that mimic those of bigger operations (Fig. 62.7).

62.7 Oral Supplements

Most antioxidants can be safely prescribed to patients before operations except for vitamin E, which may exaggerate bleeding and bruising. It is not recommended to prescribe oral vitamin A in areas where patients do not get enough sun exposure on account of a risk of osteoporosis. Topical vitamin A cannot be equalled in its effects on skin.

Dimethylaminoethanol (DMAE) can be useful for treating lipofuscin marks on the face and the hands. A daily dose of 100 mg DMAE for 3 months often reduces the yellowish brown pigmentation. At times when treatments for melanosis do not work, lipofuscin may in fact be the real cause.

62.8 Preoperative Preparation for Peels, Dermabrasions, Laser, Intense Pulsed Light, Radio-Frequency (Thermage) and Collagen-Induction Therapy (Skin Needling), etc.

All of these treatment aim to induce tightening of the skin and or lightening of the skin. They all work by controlled damage to either individual cells or all the cells of the epidermis or the dermis. Their benefits arise from the induction of the natural healing process with the release of various growth factors. The safest use of these various treatments is when the trauma or energy is the lowest to give the most effective result. Intense pulsed light (IPL) may be extremely effective in treating melanosis but preventing recurrence becomes important. Vitamin A based and antioxidant-based cosmeceutics should be used for a minimum of 3 weeks prior to the procedure, though even better effects will be obtained if the patient has used this regime for 3 months prior to the treatment (Fig. 62.5) By combining these traumatic treatments with the chemical effects of vitamin A, vitamin C and antioxidants, one can expect:

1. Healthier keratinocytes with faster healing of the epidermis
2. A thicker epidermis eventually
3. Better control of pigmentation and the prevention of postinflammatory hyperpigmentation (especially in conjunction with antioxidants such as the "softer" magnesium – or sodium – ascorbyl phosphate)
4. More intense collagenosis from DNA stimulation
5. Healthier collagen with topical vitamin C
6. Thicker dermis with better support for blood vessels
7. Healthier blood supply to facilitate healing and growth
8. Greater elastin and collagen formation with added peptides such as palmitoyl pentapeptide and palmitoyl hexapeptide

62.9 Postoperative Skin Care

All patients should continue their normal cosmeceutic regime as soon after the procedure as they feel comfortable to do so. With peeling, IPL, radio-frequency, light nonablative laser and skin needling this

is done immediately after the treatment. For ablative laser treatments, the cosmeceutics can be used even on the "raw" areas, though the dosage of topical vitamin A should be rather drastically reduced for the initial 10 days. A soothing vitamin A based gel not only helps to cool the skin but can also supply vitamin A at a suitable level.

Patients who have had a facelift etc., can apply cosmeceutic creams as soon as their bandages are removed. Cosmeceutics may be applied even onto the facelift scars themselves. There is no danger of infection and the scars heal rapidly and eventually become much less visible than untreated scars (personal experience). Another method that has been used is to treat the scars with a low-dose peeling agent, e.g. 2.5–5% TCA gel or cream for about 10 min at each visit after the operation. The TCA probably sterilises the wound and treats subclinical infection and hence reduces the inflammation. I have used this and generally scars heal faster and uninformed clinical observers have often been surprised to see that wounds at 2 weeks postoperatively seem to be similar to conventional scars at 6–12 weeks (personal experience). I have used peeling directly on the scars within 2 days after a facelift for the past 10 years and I think that my scars are now the best I have made.

Weak acids are extremely effective at treating topical infections without destroying the surrounding normal tissue.

Many patients believe that they should be careful with using topical vitamin A soon after surgery because of the popular misconception that vitamin A makes the skin thinner. Retinoic acid I believe is not the best form of vitamin A soon after surgery or surface treatments because it is rather harsh. Clinicians who are used to the dry, pink, uncomfortable skin may see the reaction as a good sign, but to the patient this is extremely inconvenient and, in fact, unpleasant. It becomes a good reason to stop using it or to use it irregularly. When one uses the storage forms of vitamin A, one gets compliant patients with all the benefits of vitamin A etc. but without the discomfort, sun sensitivity and often disturbing appearance. Even postoperatively, persuade your patients to increase the levels of vitamin A etc. until they are using up to 50,000 IU of vitamin A twice daily if possible (it might take many months and episodic minor retinoid reactions!). This will ensure the healthiest, most radiant skin to complement your surgery. Intensive treatments like iontophoresis, sonophoresis and physically enhanced penetration will also ensure that your results are maintained in the best way (Fig. 62.3c). Encourage all your patients to continue using cosmeceutics postoperatively and you will be rewarded with happier patients who have had real rejuvenation.

The combination of cosmeceutics, including light peeling systems, has an important place in cosmetic surgery of the face because one has to remember that cosmetic surgery does not restore youth to the skin. By using cosmeceutics, we can more effectively mimic youthful skin. We also live in an era where more of our patients believe that "less is more" and we can give them good results by including an intelligent cosmeceutic agent for routine daily skin care.

62.10 Summary

Cosmeceutic skin care is essential to complement facial cosmetic surgery and achieve rejuvenation. A brief explanation of the action of the major cosmeceuticals precedes their method of use. Vitamin A, especially in its ester form, gives all the benefits without the irritation of retinoic acid, and should be used on every patient both before and after surgery. Its role is both preventative against photoageing as well as regenerative. Antioxidants work hand in hand with vitamin A and also complement sun protection but act only in preventing photoageing to a degree. Iontophoresis and sonophoresis enhance penetration of vitamin A and active peptides and can help surgeons achieve realistic rejuvenation. Serial light peels may also be useful, giving a fresher appearance to the skin.

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The Use of Polarized Light in Aesthetic Surgery 63

Miodrag M. Colic

63.1 Introduction: Bioptron Phototherapy

The application of light as a therapeutic remedy has been known since ancient times. As early as in the age of ancient Egyptian culture, the beneficial action of sunlight on the human organism was noted. The favorable effects of polarized light rays were discovered during the studies of laser light rays, and in 1981 a group of Hungarian physicists and physicians [1–3] proved that polarized light has a stimulating effect on natural defensive and reparatory functions of an organism.

Bioptron polarized light is produced with a special multilayered mirror, and its characteristics are as follows:

- Polarization, which means that all emitted waves are oscillating, i.e., moving/spreading across a plane linearly.
- Incoherence, which means that every light wave is oscillating at its own wavelength and amplitude; waves are not synchronized either in time or in space, meaning that the waves and thus their intensities are neither added nor changed.
- Polycromy – a spectrum of polarized light wavelengths ranging between 480 and 3,400 nm, which means that it comprises the complete visible spectrum (400–780 nm) and a slight part of the IR spectrum (780–1,500 nm IR-A and 1,500–3,400 nm IR-B). UV, chemically active radiation is completely eliminated by a special filter.

Bioptron polarized light has a specific energy density of 40 mW/cm^2. The light is brought and applied to the required area at constant intensity and very low energy, but it is constant at 2.4 J/cm^2/min.

These constant properties of polarized light rays correspond to a distance of the lamp from the area of the body treated of 10 cm in the case of the Bioptron Compact III device and 10–15 cm for the Clinical Bioptron 2 device (Fig. 63.1). Polarized light rays penetrate the tissue to a depth of 2.5 cm, depending on the time of exposure [4].

Fig. 63.1. Hemifacial exposure to the Clinical Bioptron lamp

A key difference between laser light and polarized light is that the laser light is coherent and monochromatic, which means that it is of one wavelength and one color; the energies of the individual rays can be added, so on the area of application the laser light will have very high energy [5–7].

As related to the natural light, polarized light, when in contact with cells and tissues of a living organism, induces new biological properties, namely:

- Energetic activity of the cell membrane is enhanced
- Regenerative processes are stimulated
- Formation of ATP is accelerated

Such action of the polarized light on the cell and its mechanisms of action can also be applied to the skin, which means that by it acting on the rearrangement of the cell membrane the revitalization of the damaged cells is stimulated. This also provides for better hydration and oxygenation of skin and subcutaneous tissue cells, and the well-hydrated and well-oxygenated skin cells give the appearance of fresh and rejuvenated skin. The phenomenon of the polarized light

bringing increased quantities of water and oxygen, applied on the skin surface (Bioptron Oxy-Spray), deeper into the skin was also observed.

The special effects of polarized light rays for revitalization of the skin as a whole are experimental proof of stimulated proliferation of fibroblasts producing new collagen fibers, and the possibility of reparation of already-produced collagen, which gives back the elasticity to the skin [8–11]. Inflammatory, infectious and viral changes are rehabilitated by activation of both local and general immunity, and by acting on blood, the result is the establishment of normalized regulatory mechanisms at skin level.

For all its aforementioned effects, Bioptron polarized light has also found wide application in cosmetology, most frequently in skins with expanded pores, energy-weakened parts of skin, wrinkles, scalp and hair problems, cellulite, acne, and herpes. Wound healing time is reduced by one third to half the normal healing time [12, 13]. Macrophages might play the central role in the wound healing process, for the polarized light might stimulate them to secrete growth factors [14]. It was also noticed in vital capillaroscopy that local circulation was improved within the area treated with polarized light [15–17]. With polarized-light biotherapy, the healing effect is also evident on the wounds resistant to all other forms of therapy (ulcers of various etiologies, pressure sores, burns, surgical wounds, wounds of various etiologies) [4, 18, 19].

The pain effect of Bioptron polarized light is explained by its direct effect on nerve endings, and also on the entire nervous system by activation of neurotransmitters and enhanced secretion of endorphins (as the most powerful analgesic known today). Polarized light also affects favorably the causes of pain, regeneration, improved circulation, removal/elimination of pain causing mediators, etc. [20–22].

63.2 Materials and Methods

From September 2001 a study of a total of 45 facelifts, 67 bilateral blepharoplasties and 350 facial ancillary procedures (implantation of golden and polypropylene threads, temporal lift, brow lift, autologous fat grafting for lip augmentation and perioral rejuvenation) was performed to investigate the effects of special postoperative treatments with polarized light–Bioptron lamp. These treatments were unilateral, which means that one side of the face and/or one eye was exposed to the light (Fig. 63.2), while the untreated side served as a control group. The exposure lasted 10 min at a distance of 15 cm three times a day, first 24 h after the surgery, and then once per day for the next 6 days. Photographs were taken preoperatively and on days 1, 3 and 7 postoperatively.

Fig. 63.2. Unilateral exposure to the polarized light (right eye)

The details observed were the signs of recovery of the treated areas and the speed of resolution of the swelling, hematomas, bruises, etc., compared with those for the nonexposed side. The evident signs of healing, i.e., cicatrization and scar formation or epithelialization, were also followed up.

63.3 Results

Our patients were divided into three groups, depending on the recovery period (Table 63.1). The first group consisted of the patients who showed a significant difference in edema and bruises resolution between the side which had been exposed to the polarized light and the nonexposed side. In the facelift group of 45 patients, 26 patients (57.78%), in the blepharoplasty group of 67 patients, 48 patients (71.64%) and in the group of 350 patients with facial ancillary procedures, 164 patients (46.86%) showed a significant difference between exposed and nonexposed sides regarding the aforementioned signs of recovery.

To the second group belonged the patients with a moderate difference between the treated and untreated sides: in the facelift group of 45 patients, eight patients (17.78%), in the blepharoplasty group of 67 patients, 13 patients (19.40%) and in the group of 350 patients with facial ancillary procedures, 59 patients (16.86%).

Patients with no difference between the treated and untreated sides belonged to the third group: in the facelift group of 45 patients, 11 patients (24.44%), in the blepharoplasty group of 67 patients, six patients (8.96%), and in the group of 350 patients with facial

Table 63.1. Clinical results of recovery period among different types of procedures

Group	Number of patients	Change (%)		
		Significant	Moderate	No difference
Facelift group, 45 patients	26	57.78		
	8		17.78	
	11			24.44
Blepharoplasty group, 67 patients	48	71.64		
	13		19.40	
	6			8.96
Facial ancillary procedures, 350 patients	164	46.86		
	59		16.86	
	127			36.28

ancillary procedures, 127 patients (36.28%) showed no difference at all between the exposed and the non-exposed side.

63.4 Discussion

We have been using polarized light therapy in the postoperative treatment of our patients regularly since 2000, with much a faster recovery period than before. The only way to try to prove its efficiency on our aesthetic surgery patients was to make an obvious comparison "on the spot", i.e., to expose one side to the polarized light, while the other was left unexposed and served as a control group.

Clinical analysis of the patients treated with polarized light has shown the great benefit of this ancillary procedure in the postoperative treatment in the shortened recovery period. Our experience of 2.5 years confirmed that the best results are obtained in cases of blepharoplasty where in most patients edemas and bruises resolved within 2–3 days, while on nonexposed sides the duration of that period was usually 6–7 days. Regarding the effect of the polarized light on the length of recovery of the exposed side after facelifts and facial ancillary procedures, it was proven to be successful, with a significant difference in more than half of the patients and less significance in more than 15%, which means that, in general, more than two thirds of the patients showed great benefit from the polarized light exposure. In certain cases (Figs. 63.3–63.5) comparison between treated and untreated sides showed a marked difference in favor of the side which was exposed to the polarized light on a regular basis.

Fig. 63.3. Treated and untreated sides of the face after facelift (day 5 postoperatively)

Fig. 63.4. Left eye treated with polarized light after blepharoplasty (day 7 postoperatively)

We strongly believe that the implementation of this method has significant importance in the recovery period in patients who have undergone the aforementioned aesthetic surgery procedures, because it facilitates the resolution of the postoperative symptoms characteristic for these procedures, relieves immediate postoperative pain and, less important, but also worth mentioning, has some positive psychological effect on the patients who strongly believe that a new technological device would help them too. All of them stated that they felt quite comfortable under the yellow light, with the pleasant feeling of pain relief and mild warmth.

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Fig. 63.5. Example with moderate result after exposure of the left eye to the polarized light (blepharoplasty, day 5 postoperatively)

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64 Concepts, Tricks and Tips in Facelift Surgery

Michael Scheflan, Tal Friedman

64.1 Introduction

Achieving a fresh and natural look, safely, with minimal risks and without visible scars, is the key goal of all facial rejuvenation surgery. Some of the unfavorable stigmata of rhytidectomy are visible scars, earlobe malposition, distortion or flattening of the tragus, superiorly or posteriorly displaced hairlines, and unnaturally directed wrinkles (lateral sweep) caused by lateral vector tightening of the lower face with downward and inward sagging of the midface [1].

64.2 Incisions: Planning and Execution

Our keys to fine scars are comprehensive preoperative planning, particularly regarding the auricular contour, the sideburn, the temporal hairline, and posterior scalp hairline, and flap inset with no tension.

Today, our scars are only as long as necessary to directly correct an area that needs improvement. Any facelift incision should preserve the anatomic details of the ear and hairlines. The length, orientation and location of the temporal incision may vary, depending on individual parameters.

In patients with low and anteriorly positioned sideburns, the incision is located within the hair-bearing temporal scalp, proceeding into the temple cephalically.

It is important to realize that unless this incision is carried out well beyond the temporal line of adhesion and the periorbital septum (orbital periosteum) released from the orbit, there will be no lifting effect on the temporal area [2].

Carrying the incision up in that direction will only serve to treat the "crowding" and excess of hair-bearing scalp created by the vertical pull, thus paying a high cost for a relative poor return. On the other hand, a recessed hairline requires intratrichial incision at the sideburn horizontally, curling up as necessary.

Fig. 64.1. If the distance from the lateral cantus to the sideburn is more than 4 cm, then the incision is made at the hairline, in order to avoid further recession

If the distance from the lateral canthus to the hairline at the sideburn exceeds 4 cm, it is considered to be receded and therefore further posterior pulling should be avoided [3] (Fig. 64.1).

The incision is carried out in accordance with the guidelines of Camirand [4] using a no. 11 blade, held at 45°, leaving intact hair follicles distally within the underlying dermis (Fig. 64.2). Hair growth through the scar will follow and make the scar inconspicuous to invisible.

Contrary to what has classically been taught for years, the proper hairline incision should be perpendicular, and not parallel, to the hair follicles (Fig. 64.3). If the incision is made parallel to the hairs, the subsequent scar frames the border of the hairline and is visible.

The preferred incision that we suggest is made 1–2 mm inside the hairline and is beveled perpendicularly to the hair follicles, keeping a residual dermis abundant with hair follicles in the dermis (Fig. 64.4). Frequently, patients allow their hair to be styled in a way that exposes the invisible suture line (Fig. 64.5).

Fig. 64.2. The incision is carried out in accordance with the guidelines of Camirand [4], leaving intact hair follicles distal to the cut, by holding the knife at a 45° angle

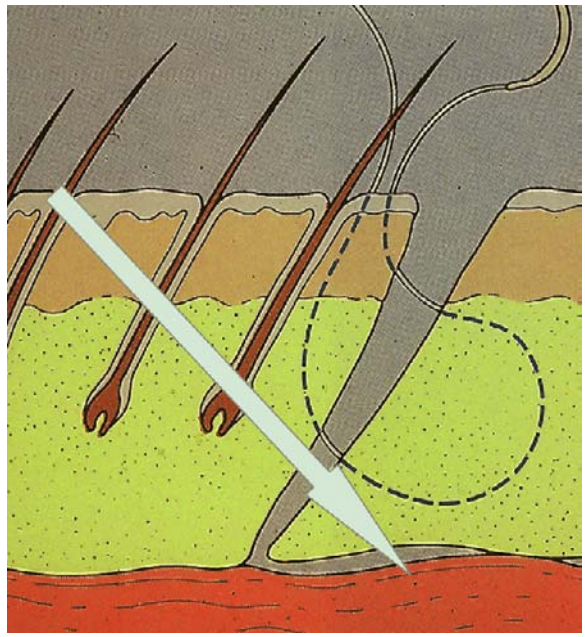

Fig. 64.3. The hairline incision should be oblique and perpendicular, and not parallel to the hair follicles

Fig. 64.4. The hairs grow through the scar, making it less conspicuous, as these different close-ups demonstrate **a**, **b**

Fig. 64.5. These scars become so inconspicuous that patients allow the hair to be styled, exposing the scar

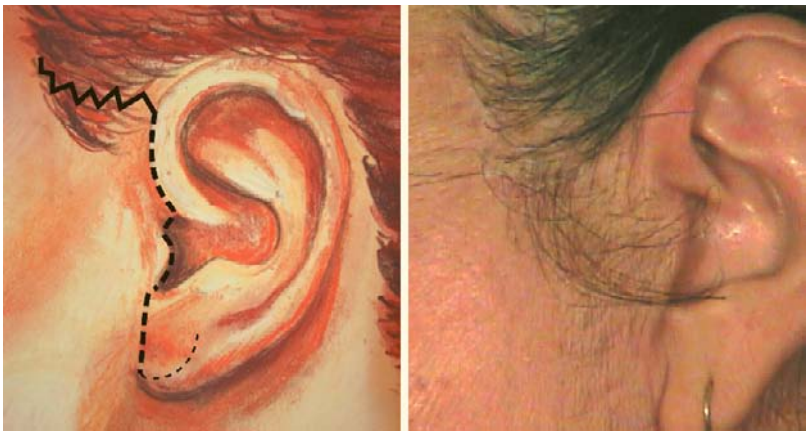

Fig. 64.6. The intratrichial w-plasty incision produces inconspicuous-to-invisible scar

Being relatively short, a vertical "zigzag", or w-plasty incision is made through the hair-bearing scalp, enabling compensation for the incongruent length between the proximal and distal margins, thereby preventing dog-ears, as well as preventing the contracture potential of the linear scar (Fig. 64.6).

Though controversy exists regarding the tragal part of the preauricular curvilinear incision, we prefer a retrotragal placement in women. Commonly quoted reasons for avoiding a retrotragal incision are greater likelihood of distortion of external ear anatomy, including blunting the fold anterior to the tragus, tragal distortion due to tension, external auditory meatal show, and loss of the natural cheek/ear interface [5–7]. A simple through-and-through transtragal suture and no tension as described later, maintains its natural appearance. These possible unfavorable stigmata are rare when using appropriate guidelines and techniques.

After exiting the tragus with a near 90° angle, the incision proceeds anterior to the lobule at the base of the intertragal incisure, and then hugs the inferior aspect of the lobule, towards the postauricular sulcus.

Retroauricular extension is necessary only when significant neck skin redundancy is present. Otherwise the incision is short, ending just posterior to the lobule.

When active platysmal bands are present or whenever opening of the neck is indicated, the submental incision is placed anterior to the crease. This helps obliterate and soften the crease.

64.3 The "Deep" Work

Patients age in a slightly different manner. The quantity, quality and vector of soft-tissue descent vary, necessitating an individualized approach based on the physical examination and the patients photographs. The pull vector of the superficial muscolo-aponeurotic system (SMAS) and the direction of the redraping of the skin flap must be individually determined, especially when dealing with sun-damaged skin [8].

Skin laxity in the aging face also occurs in different directions. Using the skin envelope as a handle to re-elevate deep facial structures is not reliable, as it will stretch in an unpredictable way and may lead to inadequate rejuvenation and early relapse and subsequent facial distortion, especially in individuals with sun-damaged-skin.

We believe that a good result may be obtained by dealing with these two layers individually, utilizing different vectors.

Most patients undergoing rhytidectomy will benefit from deep structure tightening prior to skin flap redraping. In essence, tightening or molding of the underlying SMAS is a reliable scaffold for better and longer-lasting results.

We undermine the adipocutaneous flap superficially, under direct vision, leaving cobblestone-like, thin fat globules on the under surface of the semi-translucent skin.

The flap is elevated using direct vision, sharp dissection in the dense pre- and postauricular areas and blunt dissection in the central third of the face and neck, using the spatulated-tipped dissection scissors, designed by Trepsat [9] (Fig. 64.7).

Fig. 64.7. Trepsat spatulated-tipped dissection scissors used for blunt dissection in the central third of the face and neck

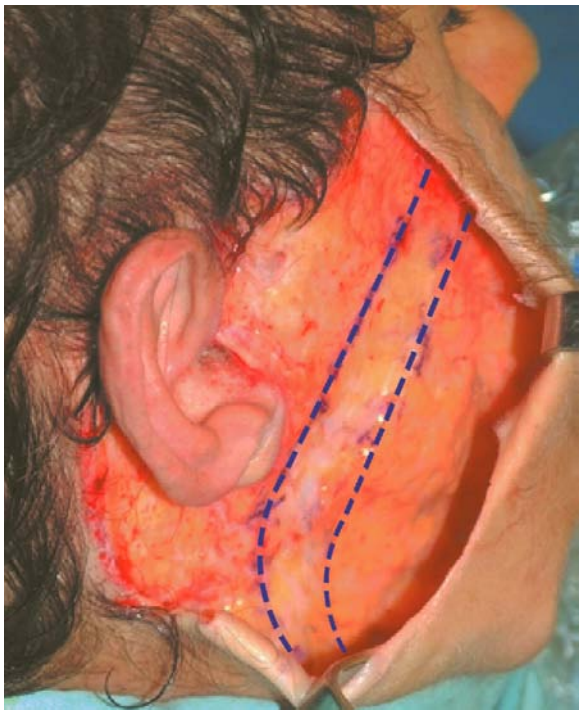

Fig. 64.8. The axis of superficial muscolo-aponeurotic system (*SMAS*)-ectomy is marked, from the malar eminence to the mandibular angle and platysmal border, after excision and before closure

For the last 5 years, we have performed a direct oblique SMAS trim, or lateral SMASectomy (as introduced by Dan Baker from New York), in almost all of our facelift patients, and find this technique rapid, safe, reproducible and long-lasting [10]. In all other (thin and secondary) patients we use direct SMAS plication without trimming.

The axis of SMASectomy is marked, extending on a tangent from the malar eminence to the mandibular angle, directly over to the parotid gland, and caudally along the lateral platysmal border (Fig. 64.8). The SMASectomy is oriented so that the elevation vectors following closure are perpendicular to the vectors of midface and low-face descent.

With forceps, the amount of SMAS laxity is assessed and excised. The first suture is placed from the lateral platysma at 2–4 cm below the mandibular border to the fixed preparotid fascia in front of the ear.

The rest is closed directly with interrupted or running 3/0 PDS sutures from above the malar eminence and down towards the parotid fascia.

64.4 Flap Insetting

The redraped skin flap is closed with no tension whatsoever except for two anchoring points. The superior fixation suture anchors the cheek flap to the superficial temporal fascia, under moderate to high tension. A second suture anchors the more caudal portion of the posterior flap, to the mastoid fascia. The rest of the skin surface is sutured with essentially no tension.

To emphasize a natural pretragal crease, a distinct depression is created by a through-and-through suture entering the skin of the external auditory canal, through the tragal cartilage, tacking the dermis of the skin flap and exiting back into the external auditory canal (Fig. 64.9).

Together with proper defatting of the skin flap and the pretragal region when indicated, this depression is essential for the natural look of the preauricular region, and also serves as a pivot point allowing an angle change form cheek to ear.

Infraauricular skin is redraped around the lobule with no tension. The flap is inset under the lobule with no skin resection, allowing the lobule to hang tension-free before being sutured into place.

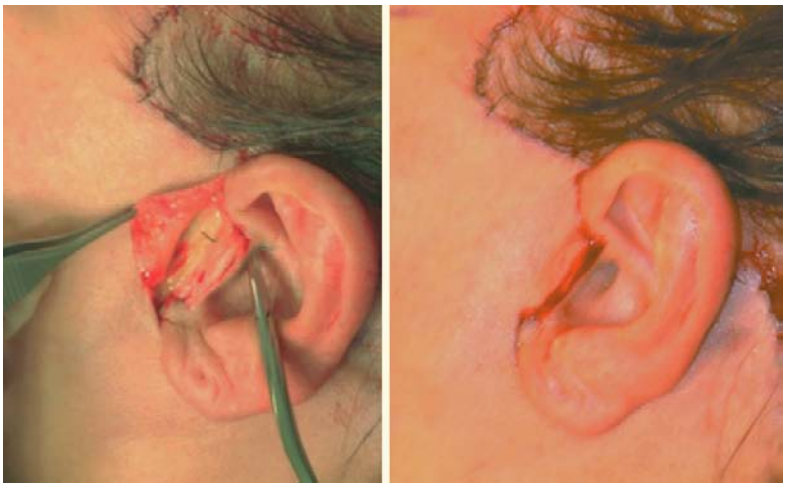

Fig. 64.9. Creating a pretragal sulcus using an absorbable, through-and-through suture, entering via the external auditory canal to the dermis and back

64.5 The Neck

The delineation of the cervicomandibular angle plays an important role in the appearance of the attractive, youthful neck [11, 12]. Occasionally, patients are more concerned with the appearance of their necks than that of their faces. As a direct continuation of the aging process of the lower face, the aging neck is mainly attributed to loss of platysmal tone, loose skin, together with periplatysmal fat deposits.

We manage most necks today by combining liposuction with lateral muscle tightening and skin redraping.

When indicated, a medial plication is added, and in heavy necks or with active platysmal bands, a complete corset platysmaplasty is undertaken as described by Feldman [13] (Fig. 64.10). Lateral platysma plication helps define the jawline at the mandibular angle and improves contouring in the submandibular region.

We use close suction-assisted lipectomy (SAL) to defat the submental area and jowls, both "close" at the onset and "open" prior to skin redraping. Special attention is directed to fat deposits often found between and under the platysmal bands (subplatysmal fat). This fat cannot be addressed by liposuction and should be treated by direct excision using the electrocautry needle as it is quite vascular.

Care should be taken to stay conservative when addressing the subplatysmal fat to avoid creating an unsightly depression under the chin.

As more skin is required to cover a sculpted neck with an acute cervicomental angle than to drape a heavy neck with an obtuse angle, excess skin is rarely a problem in younger patients with good skin elasticity. When there is excess skin, along with poor skin elasticity, there is a need for skin excision. In these patients a postauricular, full extent, hairline incision is recommended, in order to accommodate skin excision without distorting the posterior hairline integrity.

Partial submandibular gland excision is fraught with controversy, as is resection of the anterior belly

Fig. 64.10. Face lifting with complete corset platysmaplasty and suture suspension: *Left to right*: Preoperatively, 10 days postoperatively, 5 years postoperatively

of the digestric muscles [14, 15]. Though the submandibular glands are often visible, most cases of prominent glands are mild, and patients are unaware of its existence. Nevertheless, we always notify the patients that the fullness created by a visible gland preoperatively may be more noticeable after rhytidectomy. Our attitude towards the ptotic submandibular glands and digestric muscles is conservative, which means we leave them untouched.

64.6 Volume Replacement

Tight facial skin is not equivalent to youth. The attractive young face has smooth, soft and rounded shapes [16]. An integral part of almost every facelift procedure in our practice is volume replacement; therefore, at present, we perform a facelift and lipostructure (lipofilling, lipoinjection) in the same operative session.

Volume replacement using liposculplture with simple, operating field processing of the fat has become an integral part of the daily practice of our facial rejuvenation surgery.

The locations where fat is to be injected are marked on the face, with the patient in the upright position. We usually harvest fat from the lower abdomen or pertrochanteric region.

64.6.1 Fat Processing for Injection

The volume survival of transplanted fat has proved difficult to estimate and our impression is that more fat "takes" and remains stable when Coleman's principles of atraumatic harvesting and transfer are respected [17].

There is still no agreement concerning the best way of processing the harvested fat prior to reinjection. Our experience with "cotton towel processing" is quite encouraging (Fig. 64.11).

The ideal processing technique should provide viable adipose tissue, with less subsequent absorption of the injected fat, and should be simple, fast and cheap. Cotton towel processing utilizes a sterile operating room cotton towel as an absorption surface, separating fat cells from fluids, oil and debris. When compared with the closed centrifugation technique, operating field drape technique provided equal or better fat quality (less fibrosis), while there was no difference in fat uptake between the methods [18].

We believe now that centrifugal processing of the harvested fat prior to reinjection may not be necessary.

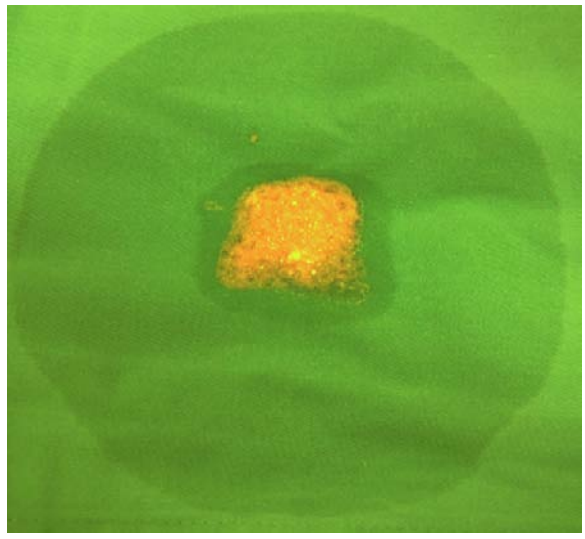

Fig. 64.11. Processing utilizes a sterile operating room cotton towel as an absorption surface, separating fat cells from fluids, oil and debris

64.6.2 Lipostructure

Rejuvenation of the midface using lipostructure may in our opinion obtain results that are equivalent to those of more aggressive techniques of reshaping those same areas [19].

If volume is restored, the face appears rounded, healthy, attractive and younger. We also believe in the importance of cheek sculpture in the younger patient searching for a fuller malar eminence (Fig. 64.12).

The structures we can improve by fat injections are the lips and perioral area, the periorbital area, the chin, jowls, cheeks, glabellar area and nose. The lips and the lid–cheek junction are the two most difficult regions for lipofilling. Lipostructuring these sites is occasionally fraught with significant postoperative swelling, visible grafts and irregularities, and all too often unpredictable survival of the grafted fat particles.

Owing to different soft-tissue properties, motion and underlying structures, a different survival rate in different anatomical areas of the face is observed, and the incidence of secondary surgery and touch-ups varies with recipient site.

It has been our personal experience that only 60% of the patients having lipofilling of the lips are satisfied with one procedure, while 20% require a second procedure, 18% a third, and 2% need more than three interventions to achieve a satisfactory and stable result.

Fig. 64.12. Lipostructure helps shaping and restoring depleted facial fat

The second most difficult area to graft fat in is the cheek–eyelid junction. In this thin and delicate soft-tissue area, 80% of the patients are satisfied with one procedure, 10% with two, 8% with three, and 2% with more than three interventions. The main problem in this area is hiding the fat "parcels" under the thin coverage.

Other areas such as the malar, submalar, glabelar, perorbital, frontal, mental and mandibular regions are more favorable. In those areas, when injecting directly over the bone, 95% of the patients are satisfied with one procedure, and 5% with two.

64.7 Conclusions

Well-planed and carefully executed rhytidectomy incisions are practically invisible. Incision placement should be individualized to fit the needs, desires and specific anatomic characteristics of the patient. Simple and safe manipulation of the SMAS and the platysma is adequate and long-lasting in all patients [20]. Liposuction along with lipostructure helps in shaping and restoring present and missing fat deposits.

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65 Face-Lifting, What Not to Do

Adrien E. Aiache

65.1 The Incisions

65.1.1 The Sideburn Area

Do not make an incision behind the sideburns and elevate the skin flap since it will elevate the sideburns to too high a position leaving a bald spot in front of the ear pinna.

Unless the elevation is minimal it should not be done. To achieve proper excision of thick skin after undermining, a counterincision below the sideburns is necessary. The excess skin is then not removed at the expense of hairy skin and it is only done in removing bald skin and elevating the lower incision edge to the actual sideburn area (Figs. 65.1, 65.2).

Often also in men this approach is necessary and it could prevent a thinning of the sideburns in front of the ear if the beard happens to develop low in front of the ear. If the hairy cheek occupies a large zone, its elevation will prevent a thinning of the width of the sideburn and will be adequate. A curved incision at the sideburn is less visible than a horizontal incision (Figs. 65.1, 65.2).

Fig. 65.1. Excess skin should not be removed at the expense of hairy skin in the sideburn area for fear of ending-up with a bald spot

Fig. 65.2. At the sideburn a curved incision is less visible than a horizontal incision

65.1.2 The Tragal Area

The placement of the face-lift incision behind the tragus reduces the appearance of the preauricular scars; however, a few important points must be kept in mind. Avoiding tension on the skin flap will prevent the distortion of the tragus, which is pulled forward and leaves the ear canal open. Although it might be necessary to defat the flap going over the tragal cartilage, excessive defatting will lead to skin necrosis: thus the maneuver should be done with care. Before suturing the skin flap, which should be rounded or rectangular, it is a good technique to defat the anterior portion in front of the tragus and in front of the auricular canal in an attempt to allow a depression to be created in front of the tragus, keeping a natural look. If this technique is not performed, an unnatural look of the pretragal area will result, taking away the advantages of the postauricular tragal scar.

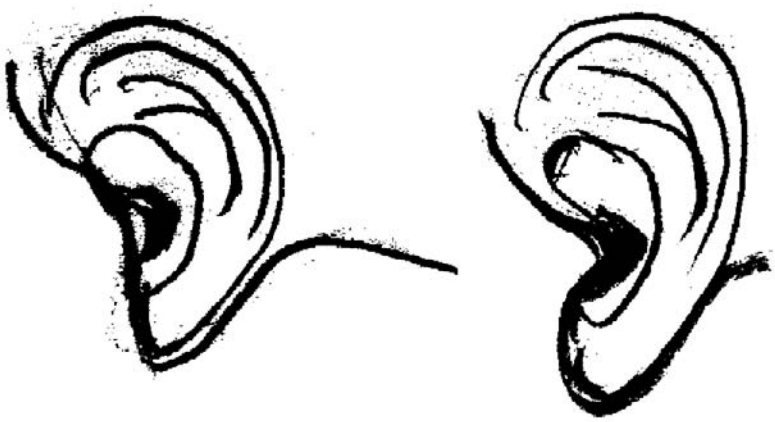


Fig. 65.3. Rounding the skin excision around the earlobe prevents deformity at the ear-cheek junction.

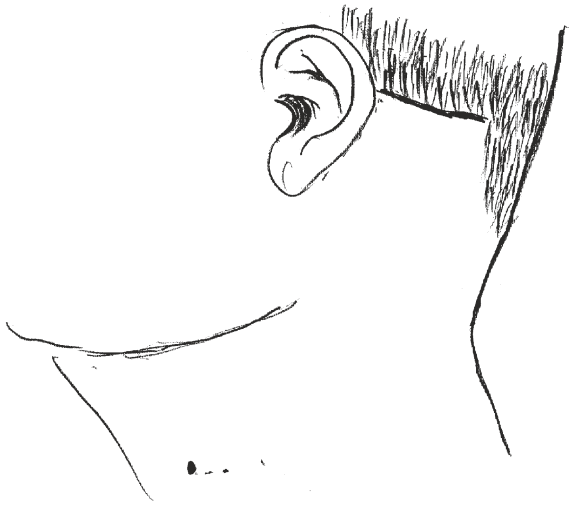


Fig. 65.4. A zig-zag incision makes hair implantation more natural-looking than a straight incision

65.1.3 The Earlobe

Rounding the skin excision around the earlobe prevents the straight effect of the skin flap distorting the shape of the ear–cheek junction (Fig. 65.3). The posterior skin incision should not include some conchal skin since this would obliterate the postauricular sulcus and tether the ear cartilage to the mastoid, making the postauricular area unsightly and the sulcus more shallow than it is normally. This maneuver should be done with care in attempting to leave the postauricular scar exactly in the postauricular sulcus and then more posteriorly over the mastoid. In an attempt to limit the visibility of the scar in the mastoid, a zigzag fashion might be a good idea and, in addition, will make the hair implantation more natural-looking than if the incision is straight (Fig. 65.4).

65.1.4 Facial Incisions

Pretragal versus retrotragal incisions are always discussed. Incisions in front of the pinna can be either vertical or oblique; however, if they are oblique and support the facial skin with a large amount of tension, they can become hypertrophic. A perilobular incision is lifted or pulled in the retroauricular area. The retroauricular incision should be in the sulcus but not situated on the ear since it could obliterate the postauricular fold. The mastoid incisions could be either horizontal or oblique, lying high or low. If they are oblique and there is a fair amount of tension on the skin, they could be hypertrophied, especially in younger patients. If they are horizontal, they might need to be placed very high, thus allowing a bald area to be situated behind the ear, which is not a pleasant situation. If the mastoid incision is performed in the hair scalp junction, the best technique is then to perform a W-plasty which will hide the visibility of the scar and give a better appearance to the hair implantation.

The retrotragal incision, which is useful in hiding the pretragal scar should be done carefully. A rectangular portion of the flap should be left on the skin to allow coverage of the tragus without an unnatural look since a straighter or less-rounded or squared flap could make the appearance of the tragus unnatural. This flap can be defatted, however carefully, and in addition, in men the hair can be plucked. Careful dissection should be performed to avoid sloughing of the skin in that area. The perilobular excision should not leave a low scar which could cause an unnatural look. If the scar is too high, it could pull the ear up, also leaving an unnatural look. It should be performed carefully and with checking that the right amount of skin is removed. It is a good idea to have it rounded around the earlobe and to leave a scar on the skin itself with a very thin amount of skin on the earlobe. This allows a more natural appearance of the earlobe.

Fig. 65.5. Bad wrinkling can result after vigorous suction in the neck and can be avoided.

Scalp incisions should be closed with relatively small tension. A careful galea approximation might release some of the tension from the skin itself but not totally; a second subcuticular level closure should be absolutely tension-free. Muscle excision should be limited to the corrugator and possibly the external superior portion of the orbicularis oculi muscle.

Frontalis muscle excision leaves a thin atrophic expressionless forehead. Extreme tension on the temporal area could result in hair loss of the whole temple and even skin slough.

65.2 The Neck

Extreme platysmal work or bleeding in the neck results in scarring with induration and distortion which can be treated later by steroids, massages and ultrasound.

Fat suction should stop at the level of the mandible or 1 cm below it since the skin is elevated, thus exposing the defatted neck over the border of the mandible, ending-up in an unsightly appearance of the mandibular border. It is better to have a little more fat below the mandible than having a very thinned-out mandibular border. The skin might look fat if it has not been suctioned; however, in banding the neck, ugly wrinkling can result after vigorous suction and can be avoidable unless the neck is not defatted at all (Fig. 65.5).

Extreme defatting of the neck results in a vertical wrinkling of the skin over the hyoid and thyroid cartilage, making it look older and unnatural. Careful defatting in that area is advisable.

Do not sever completely the platysma since it could give a really acute angle to the submandibular area, distracting from the beauty of the neck. Do not suction vigorously the chin area at the level of the mandibular border. The skin elevation of the face-lift might end up placing the suctioned area over the mandibular edge, ending in an unsightly appearance at this level. In suctioning when the platysma's bands are objectionable, only an elongation of the bands can be useful by performing limited myotomies which can help the elongation of the muscle. The corset plication may result in a tight middle band looking quite unsightly.

65.3 Over the Mastoid

The posterior incisions should be designed to accommodate the skin elevation obtained in some cases where the neck skin is not in excess. The scar can remain behind the ear sulcus and not enter the mastoid area, which is then a very good advantage.

A low placement of the scar in the mastoid will help in lifting the neck skin; however, in young persons keloids can develop if the scar is low and oblique. The scar should be made at the limit of the scalp and be in a zigzag fashion to prevent keloid formation. A high incision may be the cause of postauricular bald area and should be avoided; a very large flap excision is necessary when a large amount of excess tissue is present. One should be extremely careful in these cases not to raise the hairline too high in the posterior auricular mastoid area (Fig. 65.6).

Fig. 65.6. One should be careful not to raise the hairline too high in the posterior auricular mastoid area

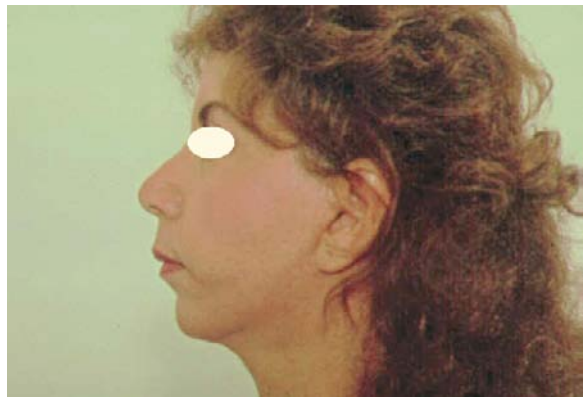


Fig. 65.7. Undermined skin should not be pulled in only one direction since it could give the "wind-tunnel" effect. Levels of elevation and tension have to be at different angles

65.4 The Brow and the Forehead

Do not excise the frontalis muscle. That could result in skin adhesion to the calvarium and an unnatural appearance of a frozen forehead without expression. In elevation of the forehead, the scar should be in W shape to avoid a visible track. Even sometimes it will be necessary to implant hair plugs to minimize that scar.

Do not remove the retro-orbicularis oculi fat under the brow since it could result in brow adhesion to the orbit and prevent its movement.

Do not fix the brow to the orbit by suturing it to the periosteum since it will immobilize it.

Do not excise the corrugator completely since it will eliminate the frown and its attendant lines; however, it will create a depression which is unsightly and difficult to correct.

Check the height of the brows before deciding to raise them. They are often higher than you think and any elevation will result in an exaggerated look (Fig. 65.7).

The shape of the brow is distorted when:

1. An aggressive corrugator procerus removal (even with endoscopy only) is performed on a medial brow that is already positioned too high. The resulting "surprised look" is then difficult to correct.
2. The medial part of the brow is elevated in addition to the lateral and central brow when it is detached from his periosteal attachment.
3. The lateral brow can less often be too high except in cases where it is already highly positioned, otherwise a pleasant lateral elevation is not a problem.
4. On patients who have a tall forehead, it is preferable to place a pretrichial incision. However, depending on the direction of hair growth and the patient's hair style, a straight scar can be visible and it should be avoided by making a "W" incision. Hair transplants on the scar help in attenuating scar visibility.
5. Problems arising from that pretricheal scar include the fact that the continuation of this incision in the scalp might leave a thin, hairless zone, thus giving patients dissatisfaction because of the visibility of that hairless area.

Do not pull undermined skin in only one direction since it will end up giving a "wind-tunnel" appearance to the face. Levels of elevation and tension have to be at different angles up to 90° of divergence.

65.5 The Skin Flap and Its Thickness

Elevation of the skin flap can vary according to the needs of the area. Patients who have had multiple facial injections including fat, Restylane, Perlane and so on may have a scarred cheek area between the skin and the superficial musculo-aponeurotic system (SMAS), leading to potential problems.

The decision of undermining thickness can trigger problems. Undermining of a skin flap could end up with devascularization of the cheek, leading to skin necrosis. *Do not undermine superficially close.* If the surgeon decides to make the flap thicker, he/she could inadvertently end up elevating the SMAS with the skin flap, resulting in multiple problems.

Beware of motor nerve injuries in elevating a secondary skin flap, especially when dissecting anterior

Fig. 65.8. Deep secondary elevation of a skin flap could end-up in a parotid cyst or fistula

to the parotid since it could lead to nerve injury and localized paresis. Deep secondary elevation of the skin flap can enter the superficial parotid, resulting in a parotid cyst or fistula (Fig. 65.8).

65.6 SMAS Elevation

The SMAS should be freed from below in two crucial areas. The parotid ligaments should be released as well as the malar ligaments. During surgery the repeated elevation of the SMAS will eventually determine the ideal point of release and exhibits an increased lower face elevation which will indicate the complete freeing of these ligaments.

The suturing of the SMAS on the arch should be carefully performed in order to avoid injuries to the motor branch of the facial nerve. The SMAS should be elevated vertically to prevent an oblique cutting effect on the facial tissues and laterally it should be sutured in front of the ear canal and the earlobe in order to prevent compression of the SMAS edge on the parotid and facial nerve element, possibly ending in temporary facial paralysis (Fig. 65.9).

Do not suspend the relatively heavy malar mounds to the eyelid zone that could be dragged down by their weight, giving an ectropion or a lower-lid malposition.

65.7 Hypertension

Hypertensive patients should be avoided, otherwise they should be controlled by treatment designed to lead them through surgery. An internist in charge of their problems is often useful.

Postoperative nausea and vomiting should be tightly controlled to avoid the mechanical consequences of retching and vomiting leading to venous congestion in the face. Clonidine, Phenergan, Zofran are all used for that purpose.

65.8 Evaluation of Patients

- Hypertension: Do, if mild and under control. Do not do, if severe, not controlled, or associated with cardiovascular problems.
- Bleeding problems: Do, if mild and controlled. Do not do in patients with von Willebrand's disease, with heavy doses of anticoagulants or supplements, and in patients with easy bruising which is uncontrolled.
- Psychological problems. *No.*
- Unattractive old patients who have hope of becoming younger and more attractive: An ugly young girl will become an ugly old one, no matter how her skin is tightened. *No.*
- The patient who saves her last cent and expects to regain youth and beauty in one shot. *No.*
- The patient who asks multiple questions for an extended consultation, requires many photographs, visualizations, criticizes some of your best results and criticizes other physicians that she has seen previously, and then negotiates your fee to the lowest possible range. *No.*
- The 73-year-old woman who comes in with a picture of herself when she was 20 years old, or even sometimes, when she was a baby. She has saved all her money for that. *No.*

Nose Corrections

66

Dimitrije E. Panfilov

The first plastic surgeon in history was Sushruta in ancient India. In 600 BC he reconstructed noses with skin flaps from the face. In his book *Sushruta Samita* he described his teaching and already well developed instruments. Since that time the "Indian method" of nose reconstruction was known and was applied to cover nose defects until recent times.

Also in Europe in the sixteenth century in Italy, the first plastic surgery which was described was nose reconstruction. The "Italian method" uses a pedicled flap from the upper arm. Gaspare Tagliacozzi from Bologna, the father of European plastic surgery, published in 1597 the first textbook on plastic surgery.

In 1887, the first nose correction by incisions in the vestibule of the nose, thus without external scars, was conducted in New York. The pioneer was John Orlando Roe.

As the first part of the respiratory tract, the nose warms the inhaled air and filters out dust. It is also the organ responsible for the sense of smell, which is controlled by the brain stem, and in evolutionary terms it is the oldest of our sense organs. During ovulation, when the blood levels of oestrogen are at their highest, smells are most strongly perceived. Oestrogen gives women a better sense of smell than men. Humans can distinguish 4,000 different odours. In today's world there is an oversupply of the greatest variety of smells.

In terms of the history of language, the name for the nose must have been one of the oldest words; it attracted the attention of our very first forefather. In many languages the nose has the same name, for example, apart from the English "nose", we have the Italian *noso*, the Slavic *nos*, German *Nase*, etc. – almost the same word in all three families of the Indo-European languages.

We can follow the sad fate of the nose throughout history. Adulterers, prostitutes, thieves, and during the reign of Frederic I of Prussia, also deserters were punished by having their nose cut off. The second most common way to lose the nose was through syphilis.

The nose has a multitude of functions and meanings: not only does it serve for breathing, smelling, and kissing as well as being a sign of potency, character, and ethnic origin, it also has an aesthetic dimension. Blaise Pascal once said: "Had Cleopatra's nose been shorter, the face of the whole world would have been different today." The nose is also firmly associated with a number of sayings and expressions: "to rub someone's nose", "to thumb one's nose at someone", "to lead someone by the nose", "he can't see further than the end of his nose". We speak of the "toffee-nosed" and of "stealing something from under somebody's nose". If you stick your nose too far into the glass you will get a "red nose". James Joyce thought up a great cure for a red nose in his novel *Ulysses*: "Dring like the devil till it turns adelite." Heinrich Zschokke lamented: "Poor nose! It didn't drink the wine but it still gets punished for it."

In his film "The Third Man", Orson Welles still had his small nose which did not at all suit his corpulent physique. In his later films he had it covered by a larger nose made out of plastic. But it was noticeable how his nose did not even move, let alone wrinkle, when he expressed disgust. He must have envied the Englishman Thomas Wedders who had the longest nose ever measured: a whole 9 cm. Normally the nose is about 5 cm long. It becomes longer between the 17th and 70th years of life and sometimes grows longer by a whole centimetre. Surgery to shorten the nose is therefore performed as one of the rejuvenating procedures in advanced age.

The nose is also a central organ in formative art: when sculptors create a bust, the nose is often "set" first. In the human energy field, the nose has a central position from where vibrancy emanates and decreases in concentric circles. The sensors for intuition are assumed to be located in the nose. Apparently they lie on the mucous membrane above the juncture between the triangular and quadrilateral cartilages. It would seem plausible not to injure these sites with the scalpel during surgical corrections to the nose.

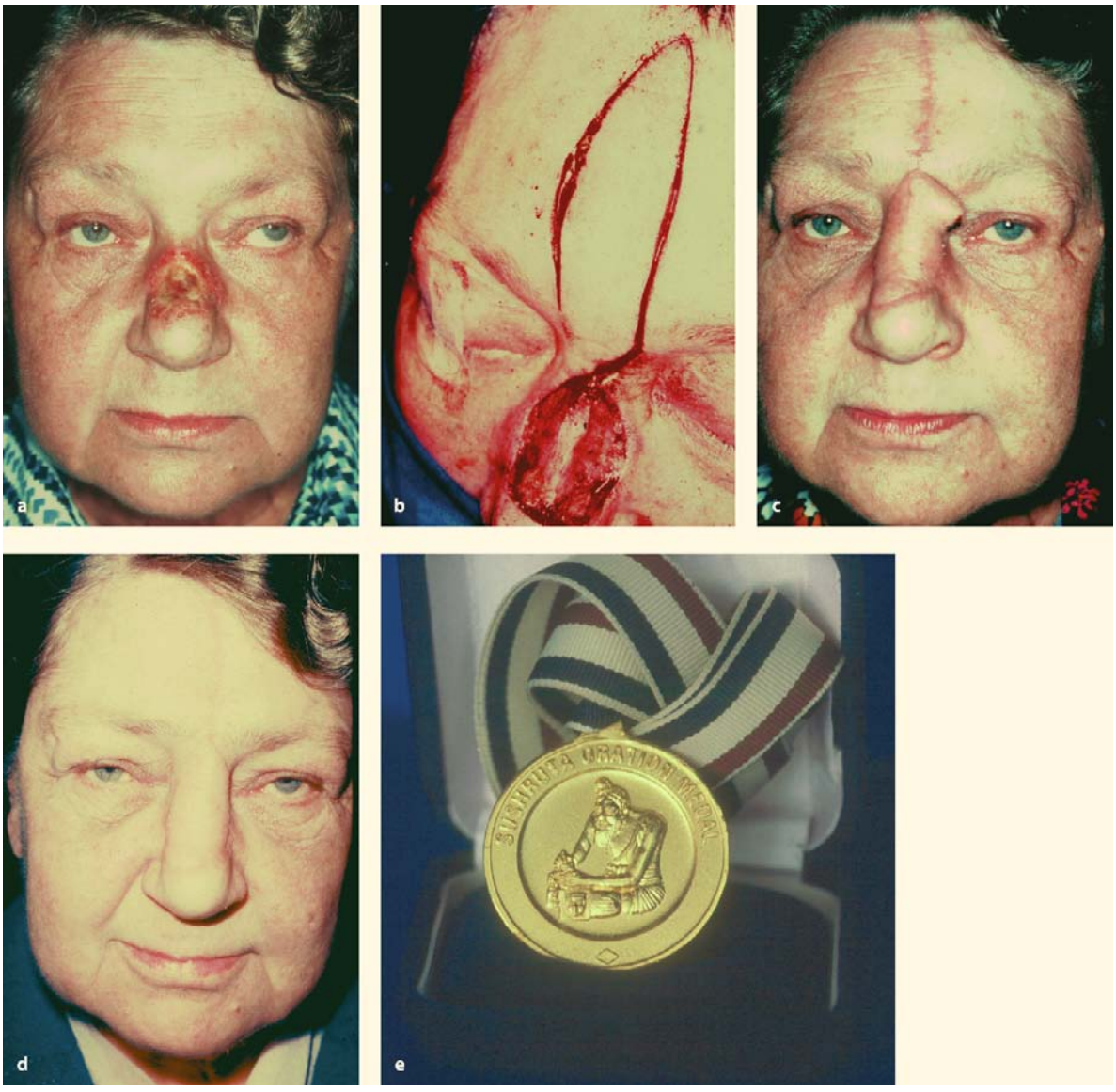


Fig. 66.1. **a** Huge basal cell carcinoma of the nose. After resection of the tumour, an "Indian flap" from forehead has been **b** elevated. and **c** sutured over the defect **d** Acceptable appearance 3 months later. **e** The Indian Association of plastic surgeons has established the award of the Sushruta Medal

Fig. 66.2. **a** Like the "Indian method" also the "Italian method" was applied in twentieth century. **b** The Conway Society in New York has established a special award – "Tagliacozzi bust"

Fig. 66.3. **a** "Closed" reductive rhinoplasty **b** was the most frequent aesthetic surgery of the twentieth century

Fig. 66.4. **a** *En face* appearance of the nose. **b** should also have a pleasing architecture. Anatomic knowledge of the nasal skeleton **c** *en face* and **d** in profile is important for planning and performing rhinoplasties

Fig. 66.5. Misshapen noses draw remarks from others which are often very offending. The reaction of the environment is not curbed by tactfulness where the nose is concerned, unlike other congenital disfigurements. The nose is a very strange organ: the root is at the top, the back is in the front, and the tip is at the bottom

Fig. 66.6. **a** During life the nose "drops" by up to 1 cm. **b** Shortening of the nose in advanced age has been acknowledged as a rejuvenating procedure

Fig. 66.7. **a** Nose correction can be combined with other aesthetic surgeries. **b** like with minimal-invasive, deep-intensive (*MIDI*) facelift in this case

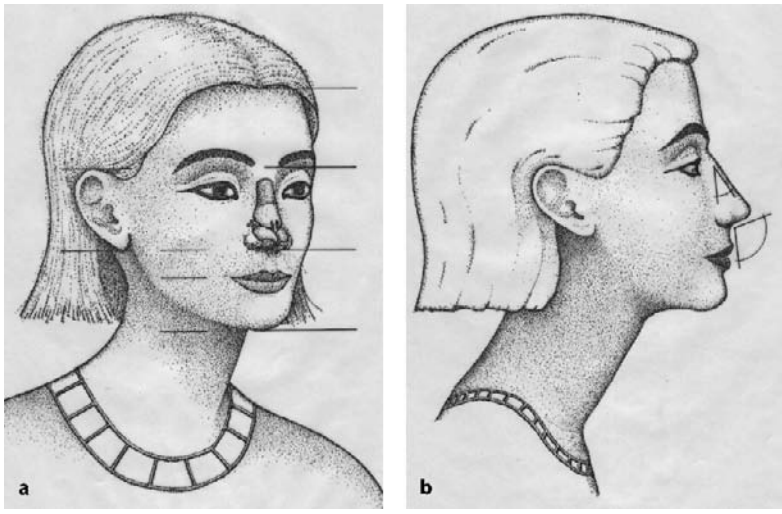


Fig. 66.8. **a** The nose is a key of facial harmony. In the vertical line it divides the face in two halves: left and right. In the vertical direction it builds the middle third; the upper third is the forehead with the eyebrows, and the lower third is the mouth region. **b** The angle between the forehead and the bridge of the nose should be 35°. The angle between the upper lip and the columella should be 90–95° in men and 100–105° in women

The nose has a special significance within our civilization. Noses misshapen as a result of accidents, fights, or congenitally draw remarks from the environment of the affected person which are often very offending. The reaction of the environment is not curbed by tactfulness where the nose is concerned, unlike supernumerary fingers, Mongoloid facial features, or similar appearance.

It is quite understandable that only very resistant personalities can withstand this emotional stress. Especially with adolescents up to the age of 25 years, whose social and emotional standing has not yet established itself, the mirror and the reproachful look returned from it play an important role. Work and family are admittedly a distraction from this problem in later life; the psychological pressure can sometimes be so great, however, that the person in question decides to consult a plastic surgeon.

Given the universal meaning of the nose, it is understandable that mentally ill individuals also project their neurotic problems onto the nose. However, the surgical correction of the nose of a person with an untreated psychosis can have disastrous consequences for both sides. In the twentieth century, 20 surgeons were killed by nose patients. The operative results of the majority of these cases were not even bad – the mistake was that the patient's psychosis went unrecognized.

The most recent tragic incident happened on 27 May 1999 in Ludwigshafen, Germany. The patient, having turned insane, was unable to find the female surgeon who had operated on his nose 7 years previously, so he turned on the head of the clinic, Professor Münker, and killed him with four shots. But that did not make his nose any better! Family, friends, and colleagues of the deceased were utterly bewildered: deepest-felt sympathies and consternation were expressed all round.

If, on the other hand, the indication for corrective nose surgery has been properly defined and technically speaking the operation has been performed impeccably, then the psychological effect gained is the most impressive of all aesthetic surgical corrections. The patient becomes more self-assured, more open, full of self-confidence, and self-esteem increases. This is no surprise, given that the nose is situated right in the middle of the face and cannot be overlooked. When we communicate with one another, we look at each other's eyes and mouth, while in the middle of this trapezoid image sits – the nose!

Before the operation a precise accord must be reached between patient and surgeon. It is not a common occurrence, but it does happen repeatedly that that which the surgeon considers to be in need of correction does not in fact correspond to the patient's wish. This must be clarified in advance.

Not every nose fits every face. Certain forms are to be expected together with a long face and others with a round face. I believe that the nose, as the most personal characteristic of an individual, should not be changed completely because one would then alter the entire person – and that is not our mission. Unfortunately there are also surgeons who pride themselves with having created their own typical nose, for example "the Smith nose".

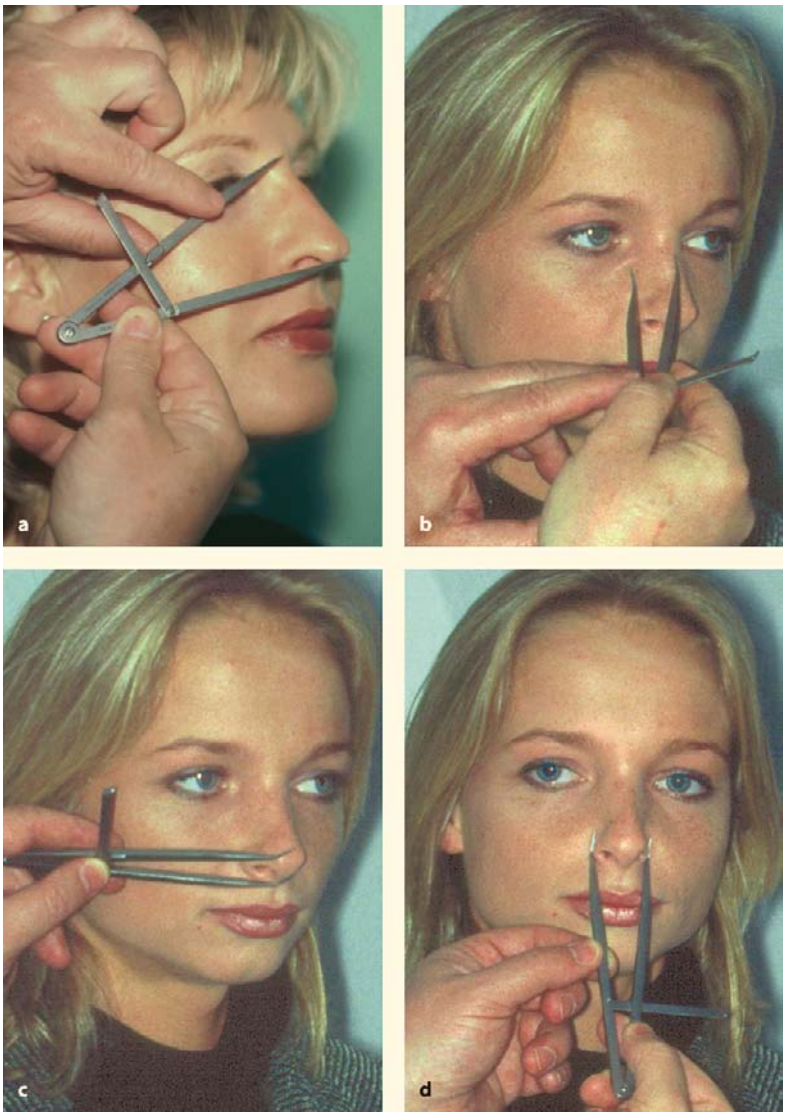


Fig. 66.9. Rhinometry determines the external measurements of the nose and is documented before and after the operation. **a** The length. **b** Dorsum. **c** Tip. **d** Bialar

Fig. 66.10. **a** Well-indicated. **b** and well-performed rhynoplasties result in satisfied patients

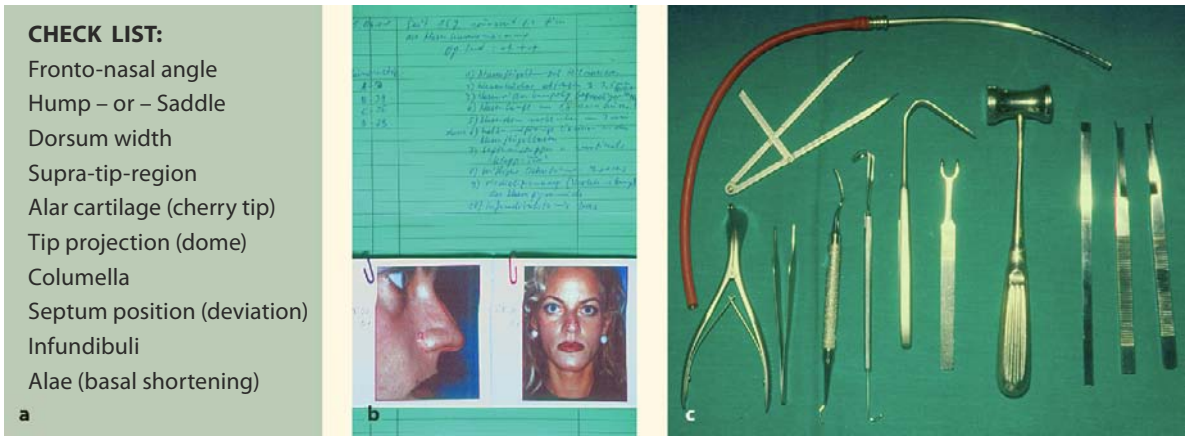


Fig. 66.11. **a** A check list should be taken into account at the initial consultation. **b** Written operative plan and photographs should be taken into the operating theatre. **c** Set of instruments which we use in routine rhinoplasty

Fig. 66.12. The nose should be touched to check the firmness of skin and cartilage; we make individual dermographic markings of the procedure we have planned.

Fig. 66.13. Before starting surgery, we should check the endonasal situation; some functional disturbances could be corrected at the same time

Surgeons should try to entirely respect anthropometric regularities when planning and performing the operation. This includes the millimetre-exact measurement of the nose (rhinometry) and photographic documentation before and after surgery. During the operation one must verify with the tips of the fingers of the left hand, the "viewing" hand, what one is actually doing because the view of operative field is not at all clear. One should take care not to overdo it. The worst mistake, for example, is to remove too much of the hump. The best compliment in my opinion is when patients tell me later that their appearance after surgery has been commented upon in the following way: "You look more beautiful, but I don't know why." I then know that I have not interfered with the personal identity of the patient with my operation.

The attractiveness of the face depends largely on the harmony of the nose, which, in a vertical direction, represents the middle third of the face. The upper third is formed by the forehead and the lower third by the mouth and chin section. The "Frankfort line" runs horizontally through the middle of the ear and through the middle of the nose, at the connection between bony and cartilage parts of the nasal framework,. Ideally, it divides the face into two equal halves, an upper and a lower. "Leonardo's quadrilateral" embraces the nose and ear and should have opposite sides of equal length. The angle between the forehead and the bridge of the nose should be about 35°. The angle between the upper lip and the columella (the vertical strip of tissue separating the nostrils) should amount to as much as 105° in woman and between 90 and 95° in men.

Depending on whether the person is large or small, has a round or long face, the optimal length of the nose is between 4.8 and 5.8 cm. Any deviation of the form of the nose from the norm, be it only a few millimetres, can cause a great deal of mental stress to the person in question. Distinctions are made between:

- Hump nose deformity
- A too long nose
- Saddle nose deformity
- Laterally displaced nose
- Bulbous nose
- Boxy nose
- Cherry tip deformity
- Real rhinophyma
- Combined forms

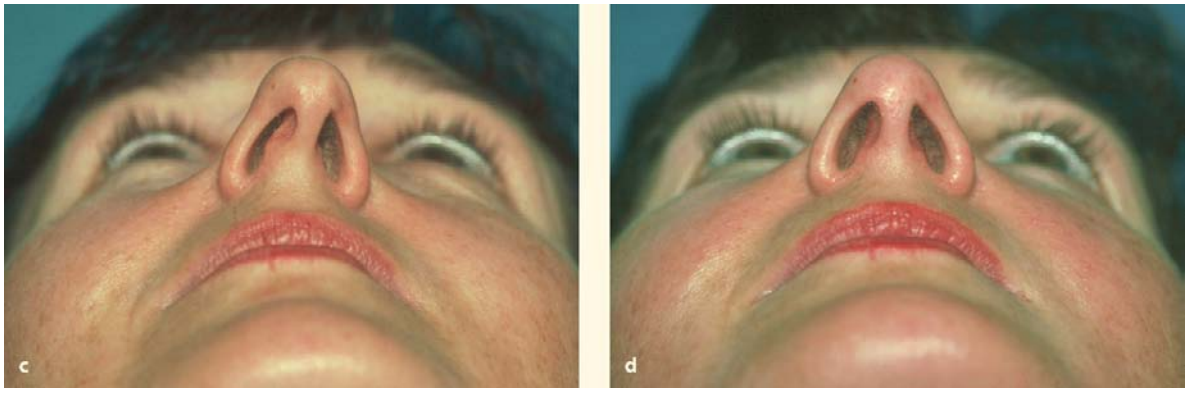
Rarely is it a case of undue perfectionism on behalf of the patient with respect to the form of the nose. Most commonly the patients only want to have the distinctive feature of their nose removed. No other aesthetic operation produces so much elation after successful surgery than a nose correction and, less often, such deep disappointment after a failed attempt – as a result of either an ill-defined indication or a poor surgical technique. So is not courage which is required of the surgeon, but care and a sense of proportion.

Nose corrections are arguably the most delicate of all aesthetic operations. I personally had to revise 5% of about 1,500 noses which I had operated on myself, removing an additional thin layer of tissue from the nose profile under outpatient conditions. I have, however, had to do revisions much more frequently on noses which had been operated on elsewhere. They currently account for up to 34% of my operative workload. The surgical technique is difficult and the intraoperative view is restricted. What is required is absolute anatomic accuracy, spatial sense, dexterity, and the gift of shaping the nose, in addition to a sound psychological understanding. It is no rare occurrence that a latent psychopathologic problem is projected onto the nose.

Limiting factors are what determine the outcome of the operation, such as, for example, contour and form of the face and texture and thickness of the skin. Better results can be anticipated from a bone-cartilage deformity than from a fleshy nose.

In the past a nose operation was almost exclusively carried out between the 18th and the 40th year of life. Nowadays we also operate on patients aged 15–16 years when the facial skeleton has reached maturity. The upper limit of 40 years has also been abandoned because the nose becomes longer in the course of life. For this reason surgery to shorten the nose is regarded as a rejuvenating procedure in advanced age, provided the patient has not already grown accustomed to the form of his or her nose over the course of time.

The operation is commonly performed under general anaesthesia, less frequently in a twilight sleep, or even under local anaesthesia. The incisions are usually placed in the inside of the nostrils so that they remain inconspicuous later. Only with narrowing of the nostrils we leave scars around base of the nostrils, but they too remain inconspicuous. The operation usually takes less than 1 h, but sometimes a little longer or shorter depending on the degree of difficulty.



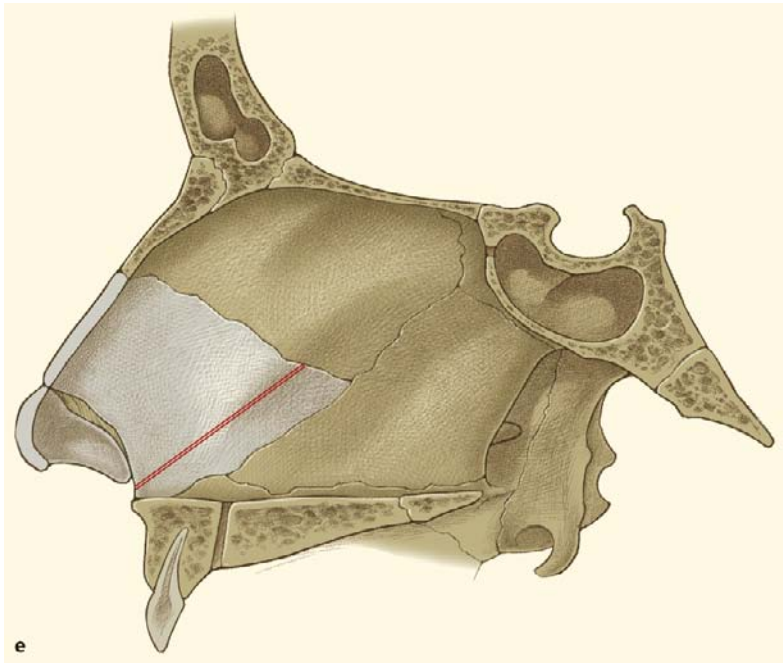


Fig. 66.14. Macrorhinokyphosis **a** before, and **b** after reductive rhinoplasty, **c** but also her respiratory problems. **d** could be solved through septorhynoplasty. **e** Dynamic stripping septoplasty: the air flows determine the optimal positioning of the septum

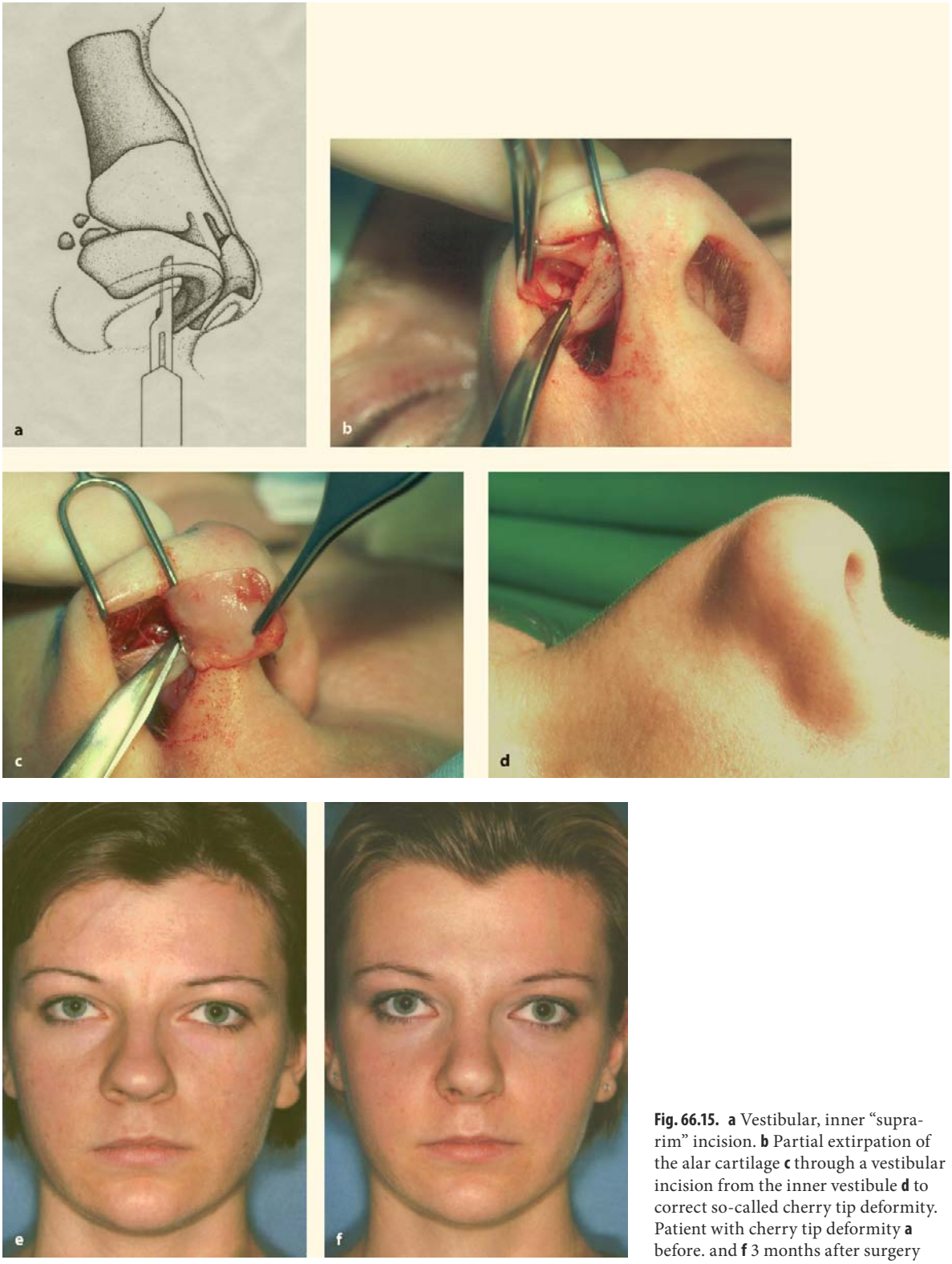
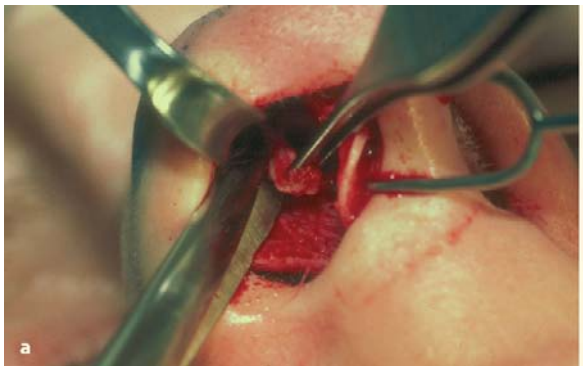
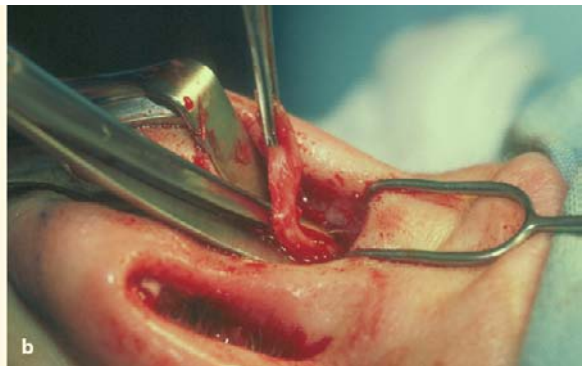


Fig. 66.15. **a** Vestibular, inner "supra-rim" incision. **b** Partial extirpation of the alar cartilage **c** through a vestibular incision from the inner vestibule **d** to correct so-called cherry tip deformity. Patient with cherry tip deformity **a** before. and **f** 3 months after surgery





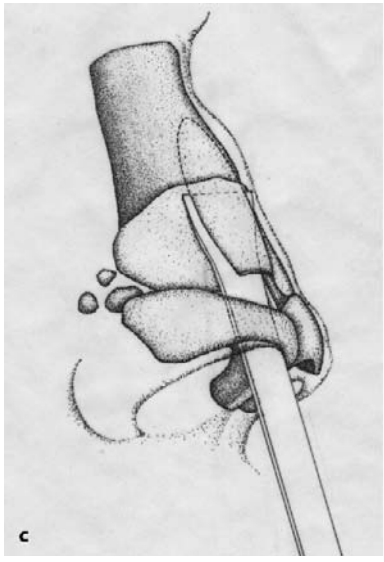
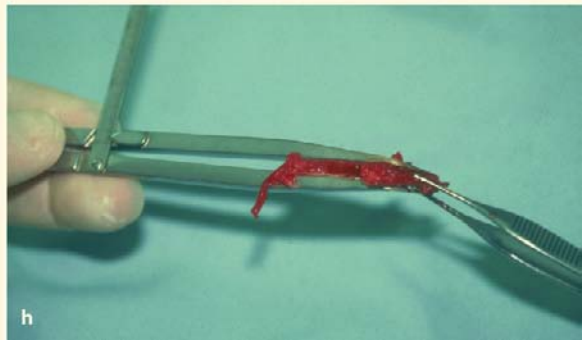


Fig. 66.16. **a** The upper lateral cartilage ("triangular cartilage") should be separated from the septal ("quadrangular") cartilage. We take mostly a strip of triangular cartilage out but not too much, otherwise we obtain an inverted-V deformity: "Citroën sign". **b** When we have to shorten the nose, we cut of a strip off the bottom of the septal cartilage, mostly 1–3 mm. **c** The cartilage – bony hump – can be removed by a chisel, rasp, or saw. **d** We prefer a chisel and hammer. **e** The dominant hand holds the chisel and **f** the other hand leads the tip by palpating it below the soft-tissue cover of the nose. **g** The bony hump was removed with a chisel and the cartilage with scalpel blade no. 12. **h** The removed skeletal hump measured intraoperatively, to be compared with the anticipated reduction



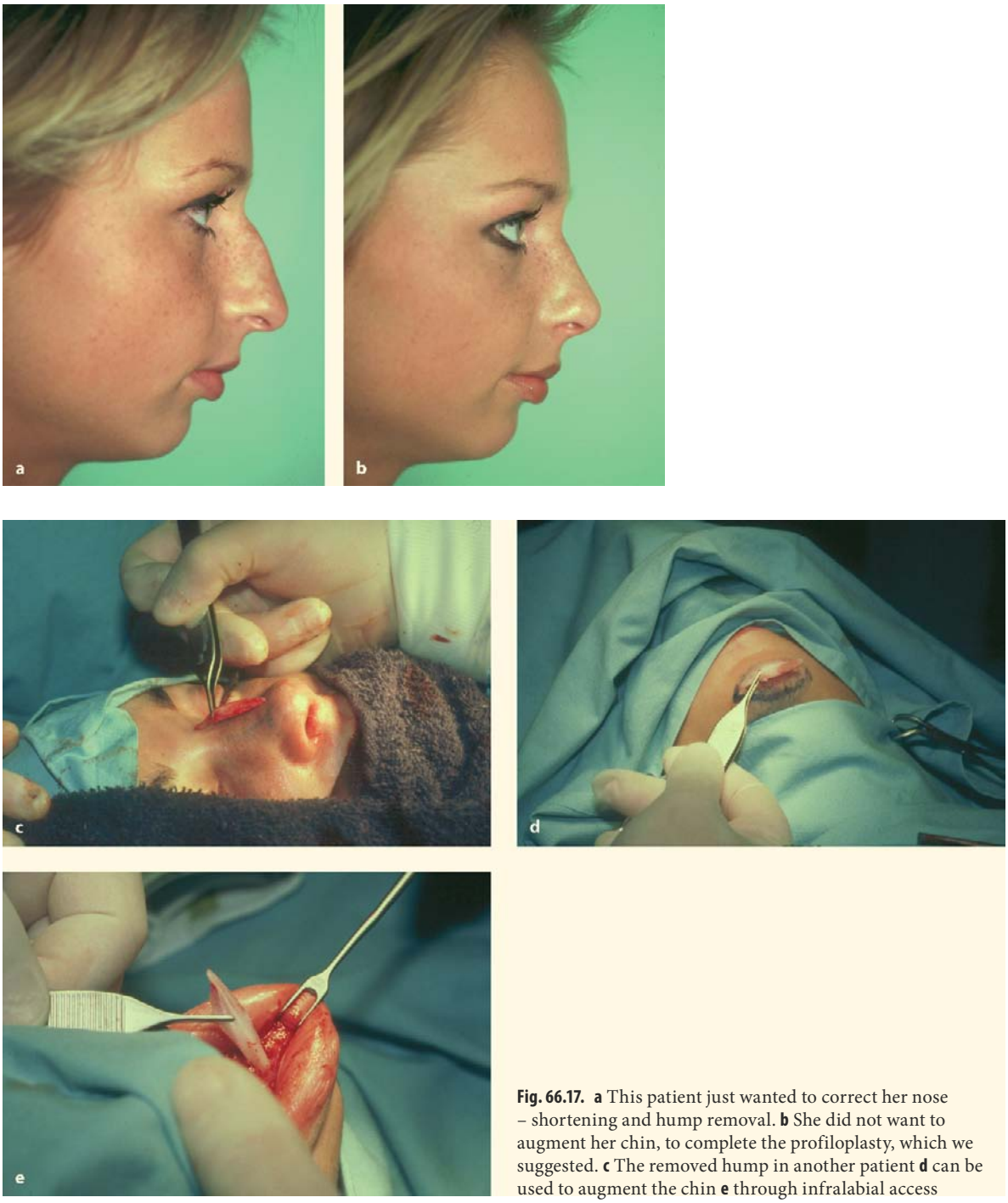


Fig. 66.17. **a** This patient just wanted to correct her nose – shortening and hump removal. **b** She did not want to augment her chin, to complete the profiloplasty, which we suggested. **c** The removed hump in another patient **d** can be used to augment the chin **e** through infralabial access

Fig. 66.17. *Continued*. **f** Macrorhinokyphosis and hypognathy **g** could be corrected by "autobiorecycling" as complete profiloplasty. Supra-tip deformity to be corrected

Fig. 66.18. It is a good habit to collect removed pieces on the strip of gauze for two reasons: (1) we check our own symmetric work; (2) sometimes it is necessary to reinsert some piece of bone or cartilage graft to achieve the ultimately desired shape

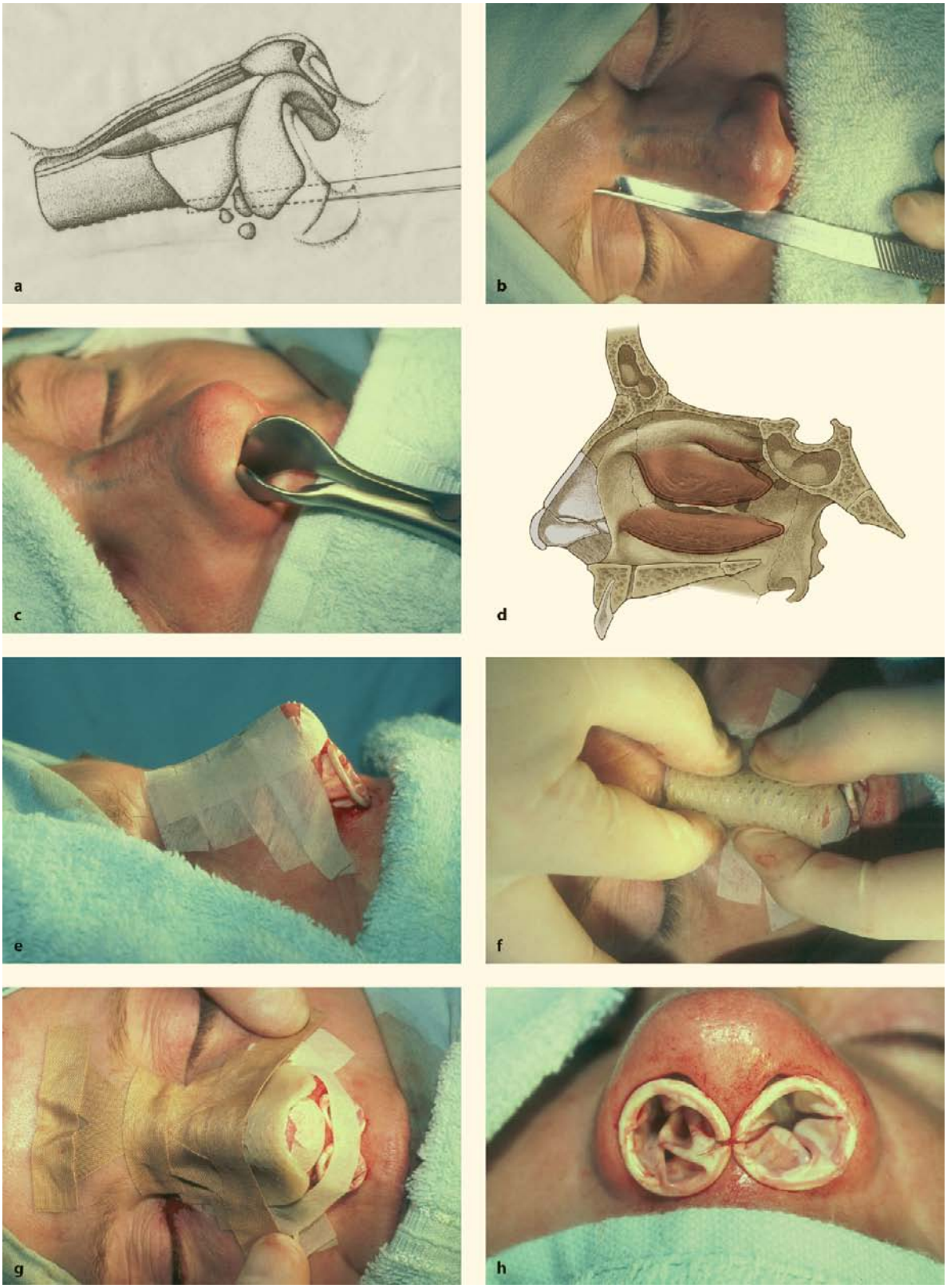


Fig. 66.19 a–i.

Fig. 66.19. **a** After having removed the hump we can palpate the "open roof deformity". This has to be corrected by nasal bone medialization: we make lateral basal osteotomies and then mobilize the nasal bones towards the midline. **b** Lateral osteotoms have a leading tip which we can palpate through the skin to control its advancement. **c** Infundibulotomy with a long rhino-speculum means the widening of nasal airways by crushing off disturbing hypertrophic turbinates; it improves the breathing. **d** Hypertrophic turbinates can disturb breathing. **e** Suture strips stitched over the skin. **f** Splint of warmed thermoplastic takes about 3 min to become hard; during that time we perform digital modelling. **g** Thermoplastic splint fixed over the skin with sticking plaster. **h** Rubber finger-like tampons to be in place for 1–3 days; removing them is painless, in contrast to the removal of strips of gauze, which hurts terribly. **i** The end of surgery

Fig. 66.20. **a** Younger male patient with macrorhynokyphosis. **b** Only reductive rhinoplasty has been performed, and his general facial appearance looks more attractive. Same patient in profile **c** before, **d** 3 months after surgery. **e** Three years after surgery

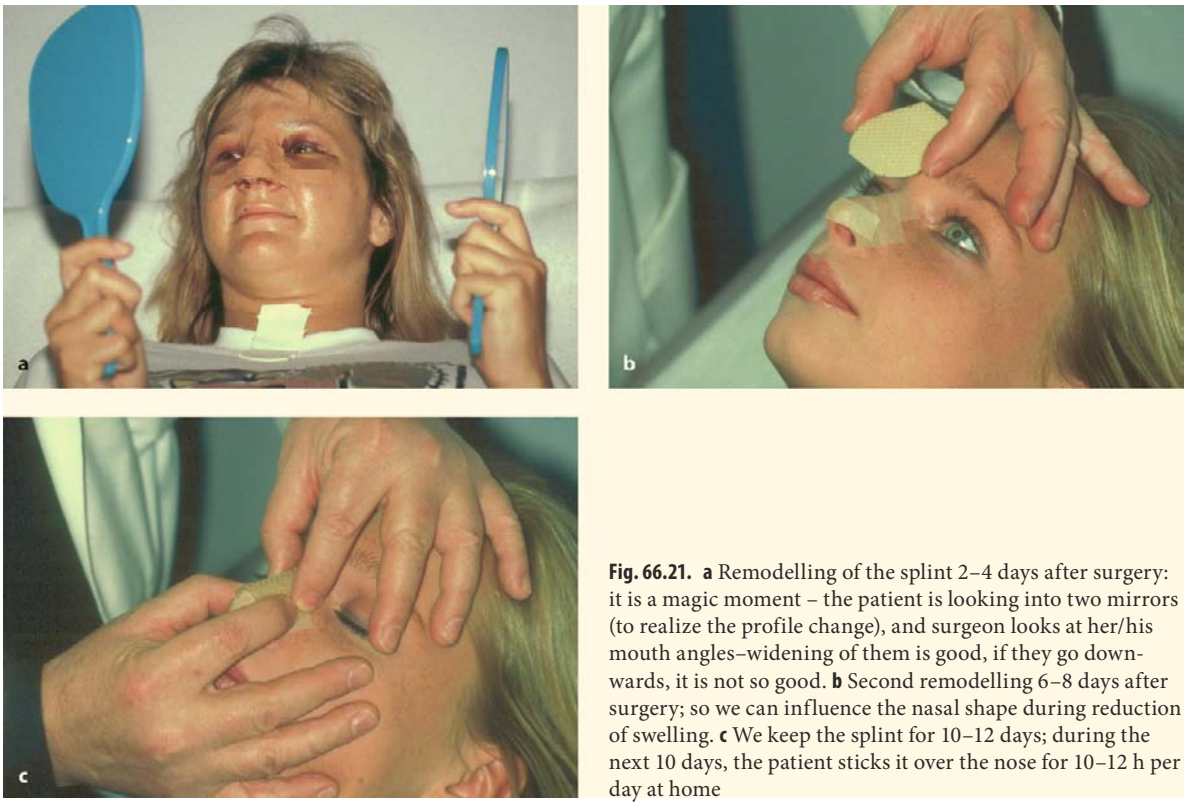
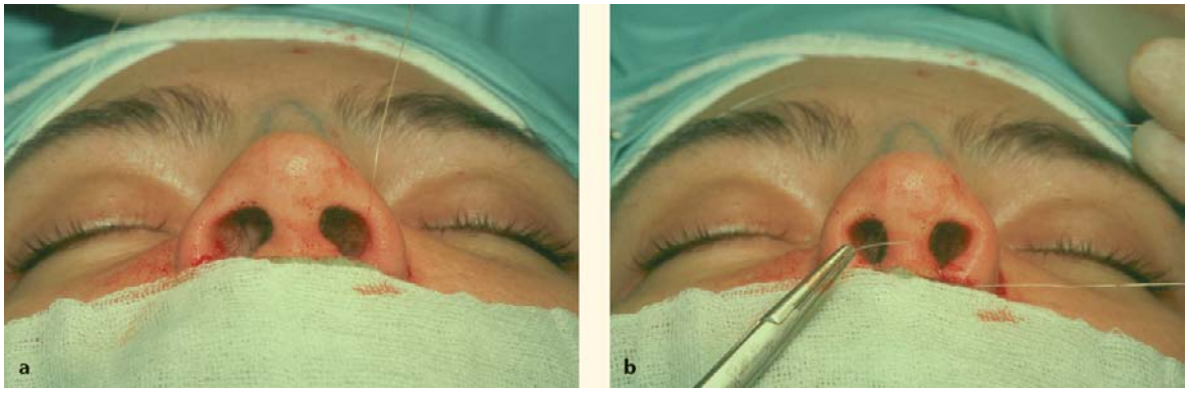


Fig. 66.21. **a** Remodelling of the splint 2–4 days after surgery: it is a magic moment – the patient is looking into two mirrors (to realize the profile change), and surgeon looks at her/his mouth angles–widening of them is good, if they go downwards, it is not so good. **b** Second remodelling 6–8 days after surgery; so we can influence the nasal shape during reduction of swelling. **c** We keep the splint for 10–12 days; during the next 10 days, the patient sticks it over the nose for 10–12 h per day at home

Appropriate medications are injected or the mucous membranes are sprayed with cocaine to reduce bleeding during the operation. An artificial lowering of the blood pressure also provides for bloodless surgery. The soft-tissue covering of the nose is elevated with the aid of special instruments to provide insight into the nasal skeleton. This requires good illumination for which the head lamp is of service. Nasal packs are inserted into the nostrils and blood is drained off with a very fine suction tube.

Fig. 66.22. **a** Nasal pyramid deviated to the right. **b** We have to make a slight overcorrection to the left for it to be in the midposition after 3 months; nose tissues and skeleton have "anatomic memory" – it tends to get back into the initial position

Fig. 66.22. *Continued.* **c** Too broad nasal pyramid **d** narrowed through removal of bony strips from the nasal bridge and medialization of nasal bones



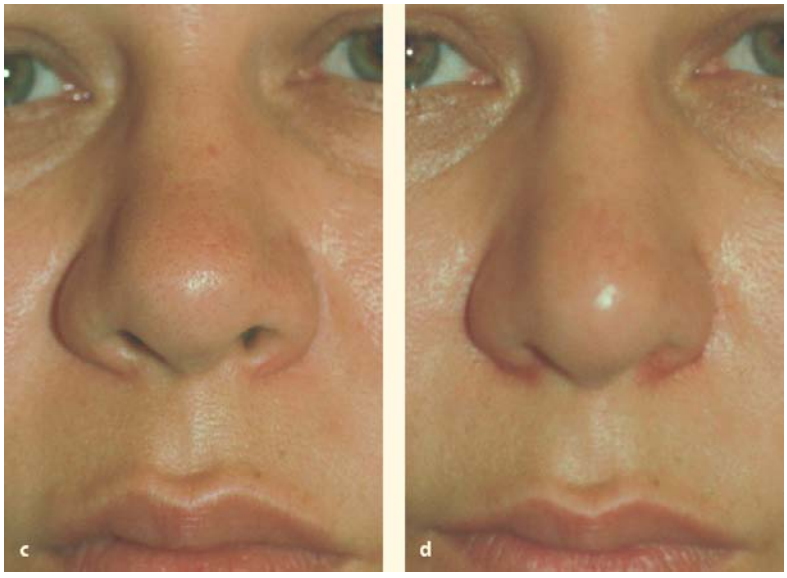


Fig. 66.23. **a** Too broad nostrils can be narrowed **b** through basal bialar sutures. **c** A 38 mm bialar distance **d** can be reduced to 33 mm

Fig. 66.24. **a** Too large nasal openings – nostrils – **b** may be made smaller with radiosurgery through y-v-plasty and basal alar excision. **c** Large nasal apertures. **d** The right side has been diminished but the left not yet

The nasal skeleton is now approached with special instruments. The bony and/or cartilaginous hump is removed and the cartilaginous elements are harmonized according to a specific systematic procedure. The nasal bones must be separated from the upper jaw bone (maxilla) and from the frontal bone and then reunited in the middle. This avoids creating a so-called open roof and forms a narrow nasal bridge. In the case of a saddle nose deformity, the defect is filled with the patient's own bone or cartilage, or with silicone implants. Bone is harvested from the olecranon or iliac crest and cartilage from the septum, ear or a rib.

Cartilage grafts, and sometimes also bone grafts, are being increasingly used to achieve a better nose profile, for example for nasal tip projection.

The nasal septum can be shortened, if needs be, and the cartilage of the nostrils is narrowed. A piece of the removed cartilage can be fixed onto the nasal dome. This achieves a delightful profile to the nasal tip, also known as a "shin tip". Hardly any nose is situated absolutely in the middle of the face. With a more pronounced lateral displacement, shear forces later come into play, making it necessary to score one side of the septal cartilage with a scalpel to weaken it. The incisions are then sutured, the nostrils once again packed with two tamponades, and the usually smaller nose is stabilized with adhesive plaster and with the aid of a small "butterfly splint". The splint can be made from plaster of Paris, aluminium, or – my preferred choice – a thermoplastic splint.

The closed method of rhinoplasty was the most frequent aesthetic surgery in the twentieth century. At the last European congress for plastic surgery in Vienna, in September 2005, I had the opportunity as chairman of the first rhinoplasty session to ask the audience (about 200 colleagues) who was performing the closed, delivery, or open method. I was astonished that over 50% of attendants were preferably using the "open method". It is easier to teach and learn the open method, but I think it should be applied just in special cases when the exposure of the dome region and the columella should be maximal.

We should adapt our technique and access in:

- Female or male noses
- Young or old patients
- Primary or secondary procedure
- Ethnic noses

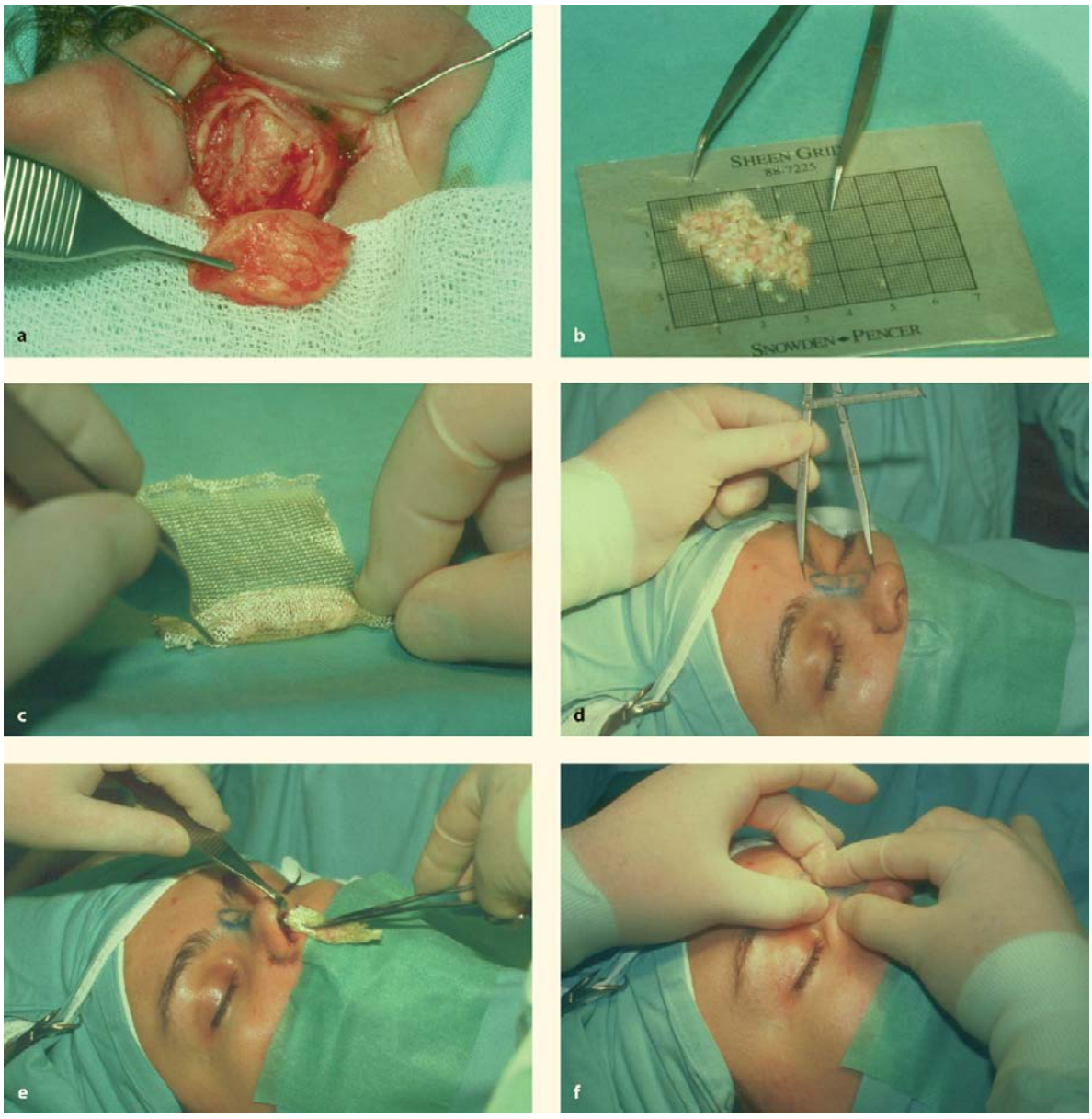


Fig. 66.25. **a** As bony grafts tend to be absorbed, we prefer auricular cartilage grafts **b** which are chopped, **c** wrapped into Surgicel **d** the saddle deformity is measured, **e** the chopped grafts in Surgicel are inserted into the saddle nose, and **f** the nose is modelled digitally to the desired shape. (Fig. 66.25 g, h see next page)

Fig. 66.25. *Continued.* Patient with saddle nose **g** before and **h** after augmentation with chips of autologous cartilage

Fig. 66.26. **a** This young Algerian woman suffered because she wanted not to look much more like a Filipino one. **b** Much time and effort of imaging and planning was spent to define her desired look. **c** Suprarim incision and **d** intercartilaginous incision ("white–red incision"). **e** Outward luxation of the right alar cartilage with underlying vestibular mucosa and right dome. **f** The same procedure on the left side. **g** Right alar cartilage has been cranially reduced with a scalpel. **h** Reduction of the left alar cartilage with Stevens scissors. **i** "On top" dome sutures to increase the apex (tip) of the nose. **j** Elevating dome sutures tightened.

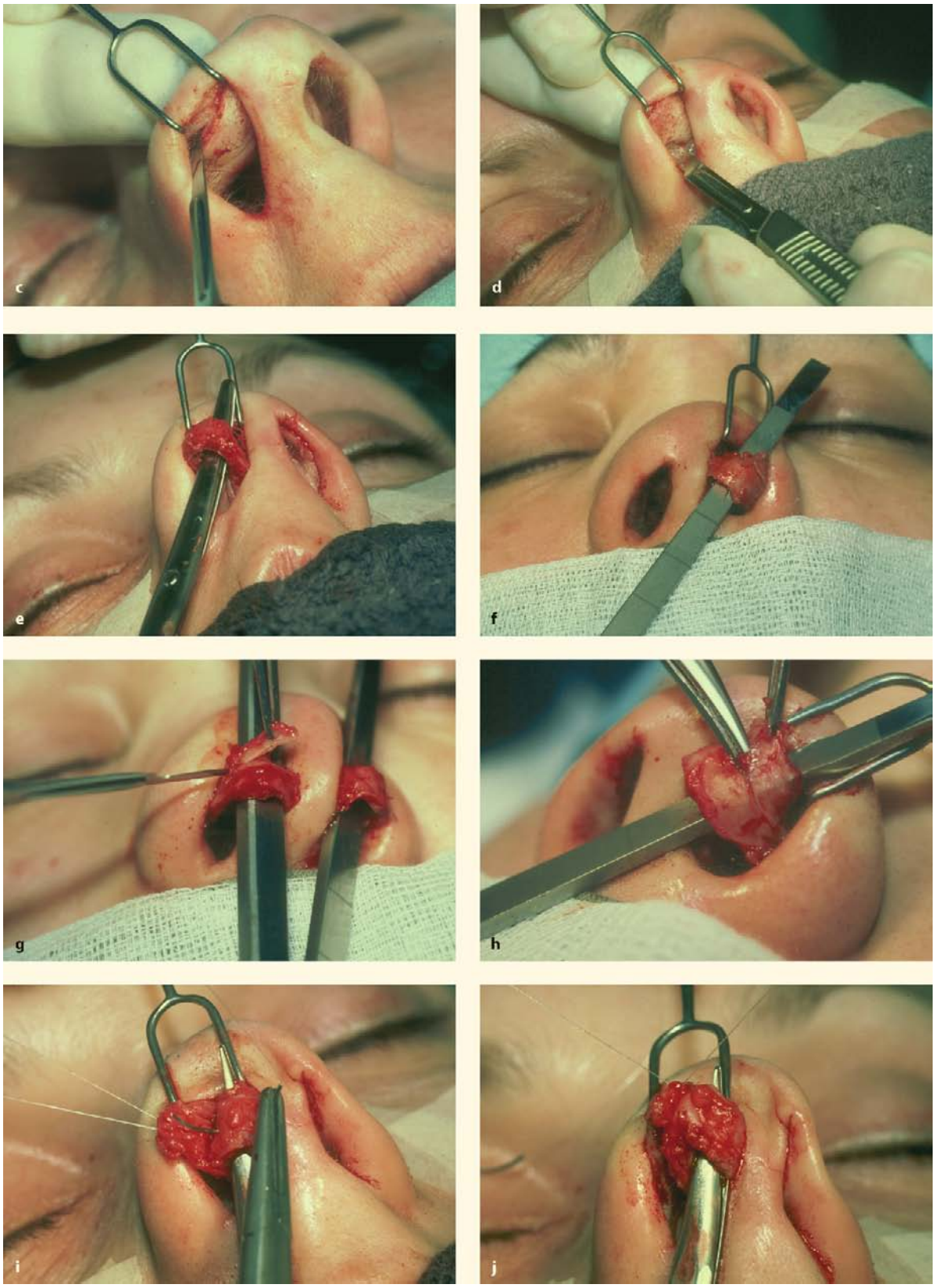


Fig. 66.26 c–j. *Continued.* (Fig. 66.26 k,l see next page)

Fig. 66.26. *Continued.* Profile of the same patient **k** before and **l** 3 months later. We have shortened only a 44 mm long nose to 42 mm to open the sharp columella–filtrum angle

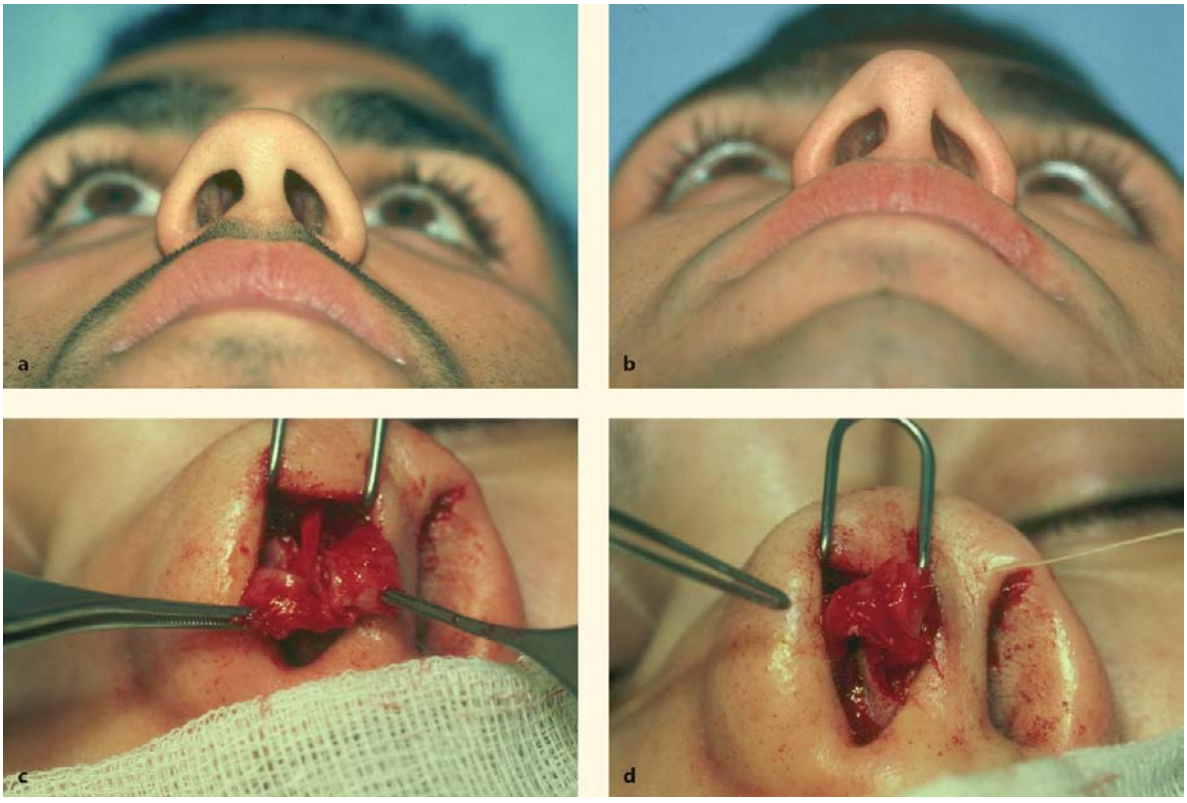


Fig. 66.27. **a** Negroid "bulbous tip". **b** Three months after correction. **c** Broad dome. **d** Dome sutures tightened

We can use the same procedure of elevating dome sutures through "delivery approach" to correct a Negroid "bulbous tip" or the "split tip".

Snub-nosed male patients often suffer because it is the typical female shape of the nose.

Columella approach widely, known as "open rhinoplasty", has its indications when we need extensive exposure of the dome and columella region.

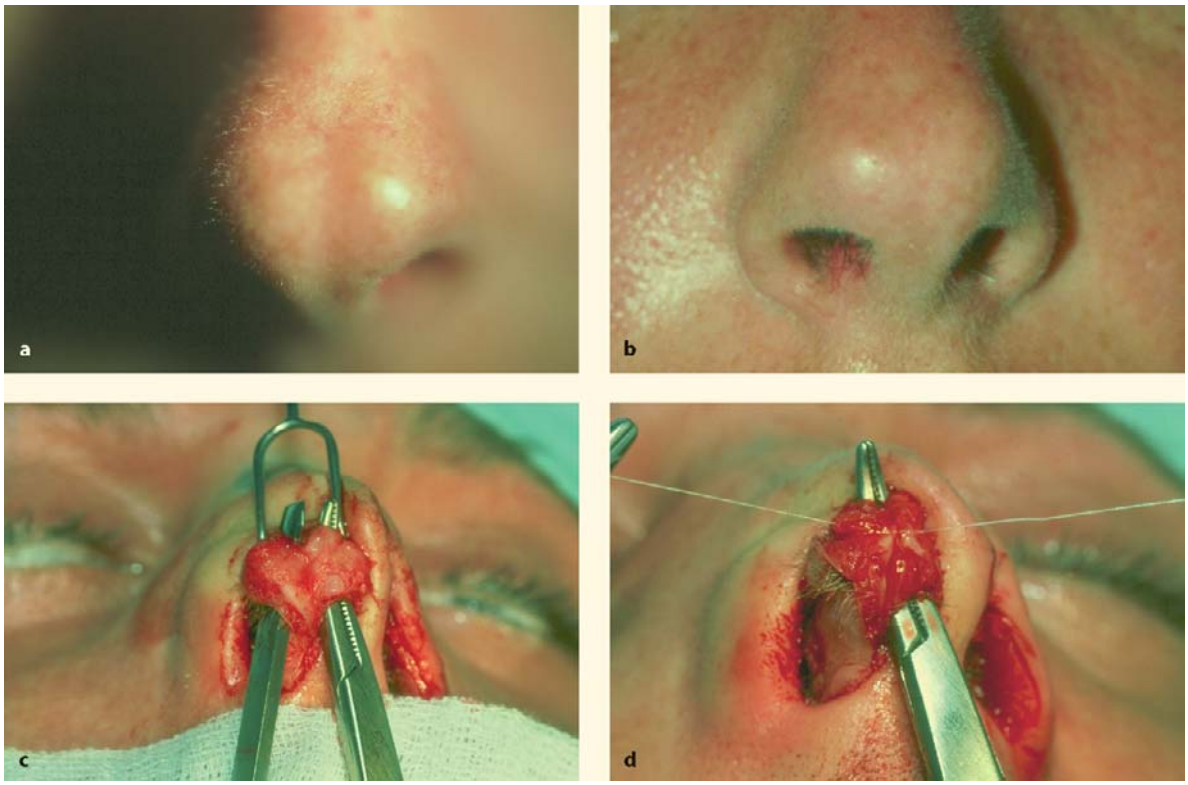


Fig. 66.28. **a** Split tip (apex bifidus). **b** Three months after correction. **c** Operative situation. **d** Dome sutures tightened

Fig. 66.29. **a** Male snub nose: **a** length to be enlarged by 2 mm; **b** tip projection to be reduced by 2 mm. (Fig. 66.29 c–f see next page)

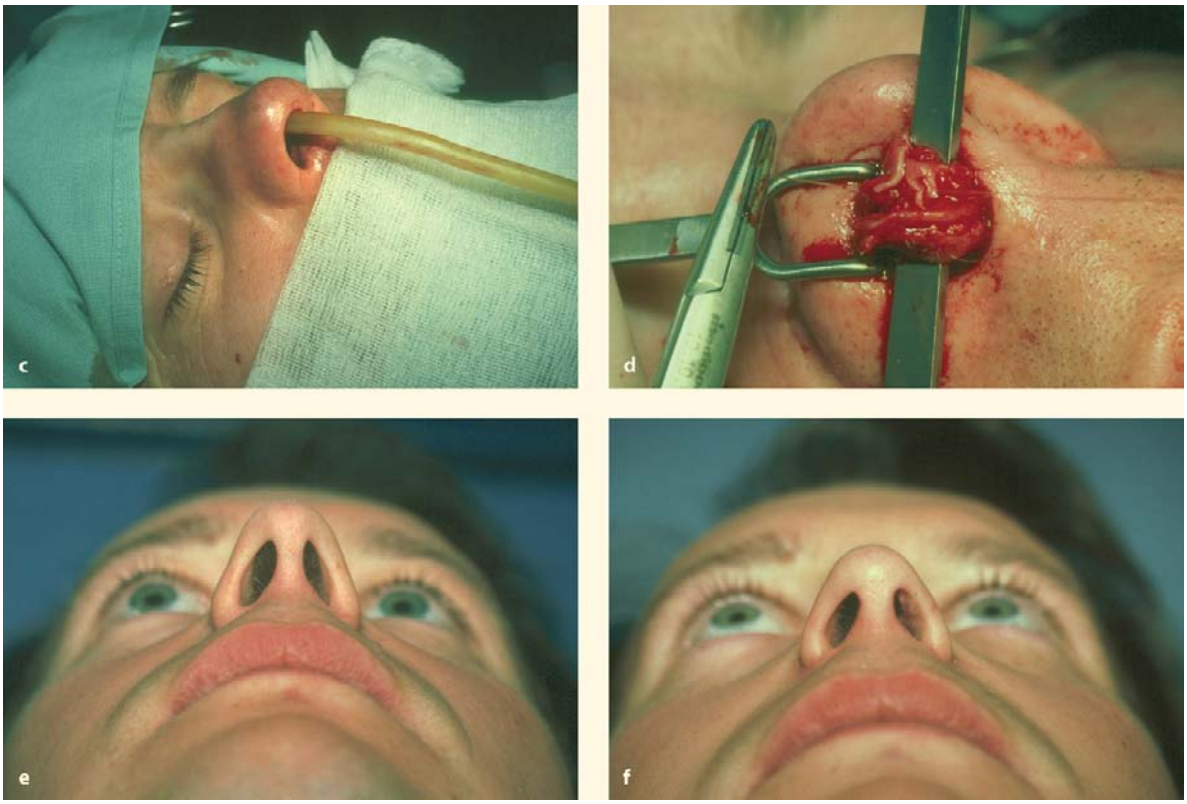


Fig. 66.29. *Continued.* **c** Onur Erol from Turkey popularized the augmentation of the nose by use of urinary catheter ballooning intraoperatively for 15 min. **d** We have resected the dome tip of 2 mm through delivery approach, precise cartilage adaptation, and suturing. Bottom view of the patient **e** before and **f** 3 months after surgery

Fig. 66.30. **a** A 30-year-old man who was operated on four times until the age of 16 for a cleft lip and palate and nose deformity. **b** Result 10 months after reconstructive rhinoplasty through the "open method"

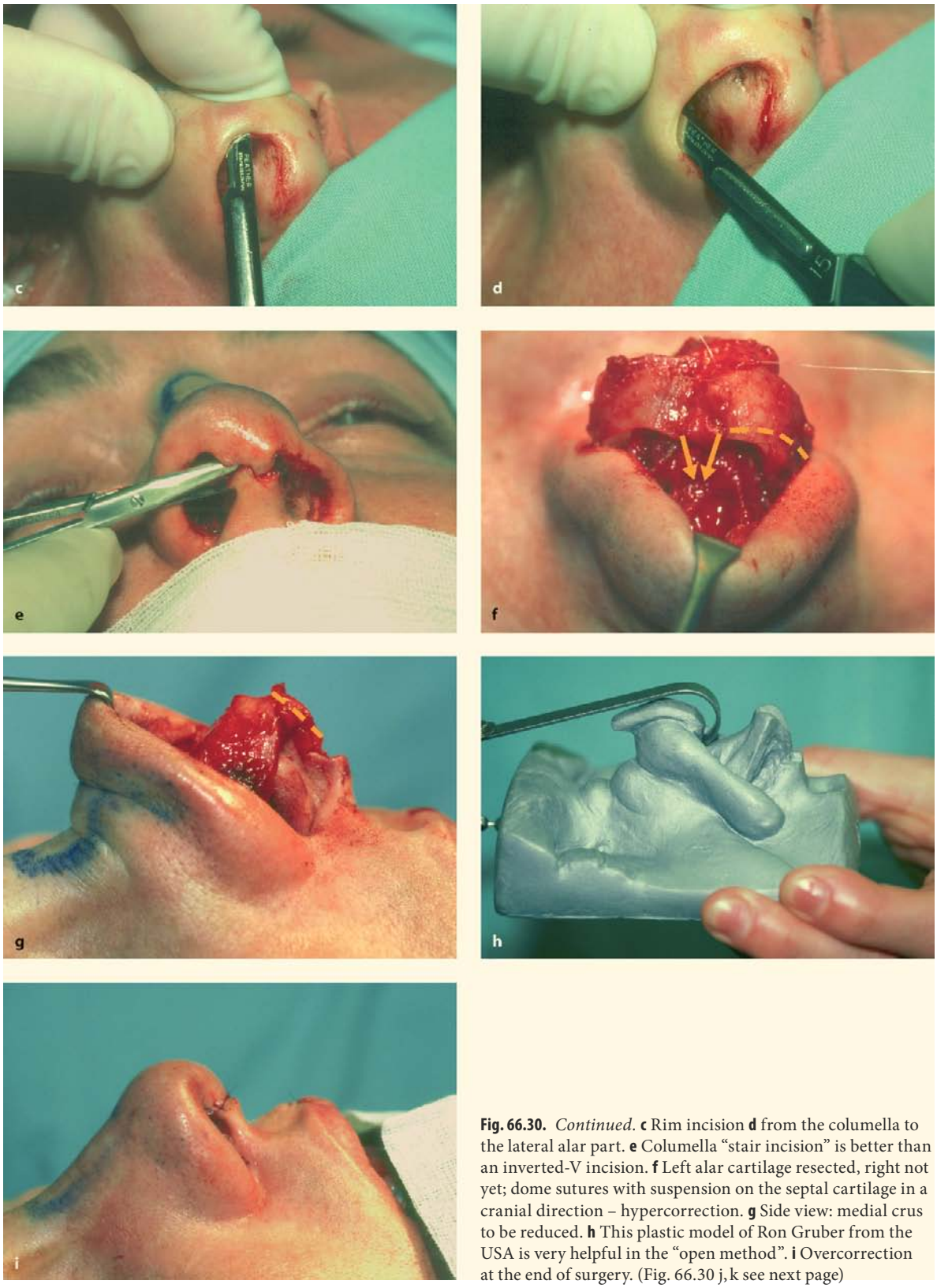
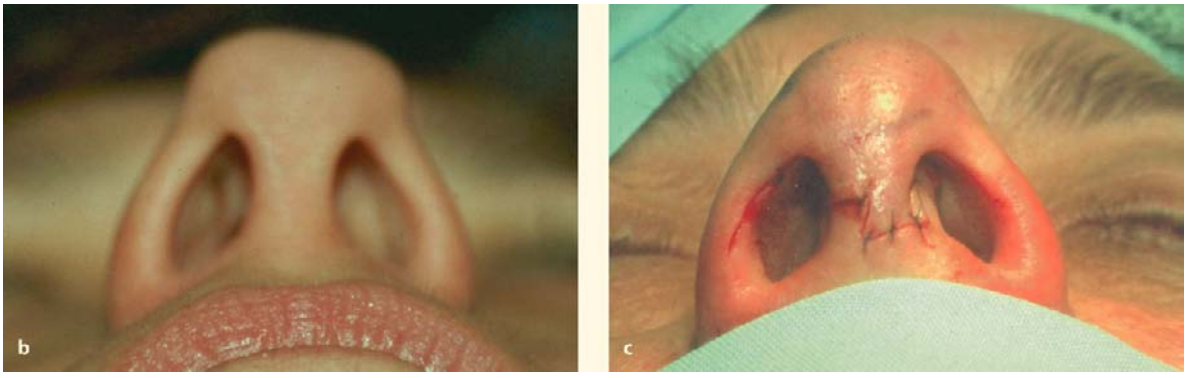


Fig. 66.30. *Continued.* **c** Rim incision **d** from the columella to the lateral alar part. **e** Columella "stair incision" is better than an inverted-V incision. **f** Left alar cartilage resected, right not yet; dome sutures with suspension on the septal cartilage in a cranial direction – hypercorrection. **g** Side view: medial crus to be reduced. **h** This plastic model of Ron Gruber from the USA is very helpful in the "open method". **i** Overcorrection at the end of surgery. (Fig. 66.30 j, k see next page)

Fig. 66.30. *Continued.* **j** The frontal architecture of the cleft nose **k** should also be harmonized accordingly

Fig. 66.31. **a** Dermografic marking. Bottom view of "boxy tip" **b** before and **c** at the end of surgery. Correction done by interdome sutures



Also it is possible to correct a "boxy tip" with intercrural dissociation growing to the tip through columellar approach.

Cartilage asymmetry of higher grade should be corrected through the open method.

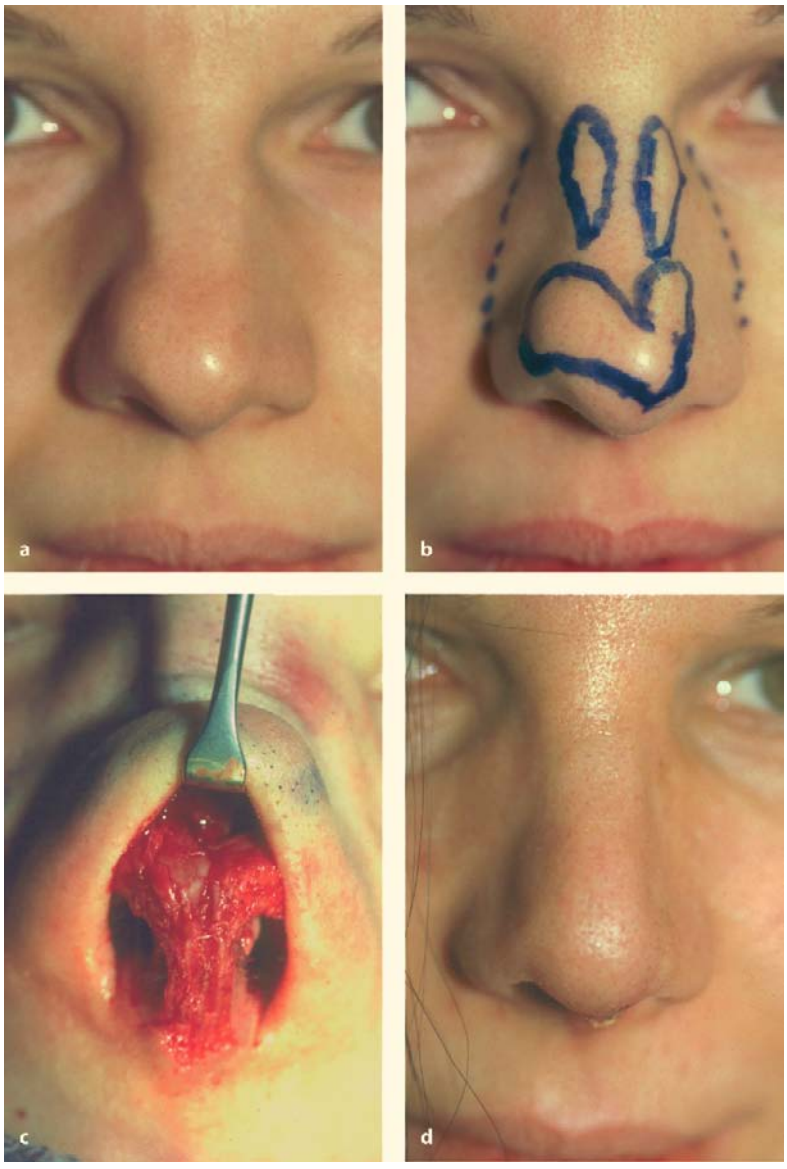


Fig. 66.32. **a** Nose irregularities. **b** Dermography demonstrates the asymmetry of cartilages. **c** Demonstrated intraoperatively. **d** Postoperatively result

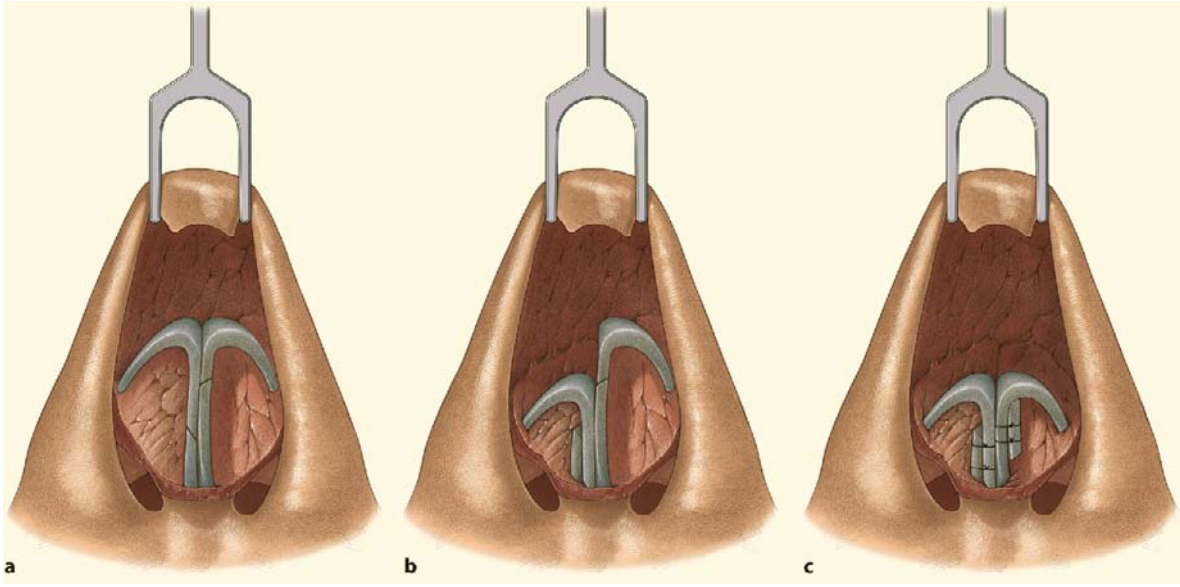


Fig. 66.33. **a** Transection of crura medialia at different levels. **b** Right medial crus shortened through overlapping. **c** Both crura shortened through overlapping and sutured

When we aim at the reduction of the tip of the nose we can shorten each medial crus. We make an oblique transection of the medial crus after liberating it enough from adhesions. Then we pull the upper part of it towards the anterior nasal spine so that each side glides over the other and overlaps it for 1, 2, 3, or 4 mm and suture it. We should avoid making this overlapping for both sides on the same level – the columella would be to broad. We overlap one medial crus lower and the other one higher.

When both sides have been overlapped, we have high tension in the dome region. We should now create a new dome by incising the paramedial parts of each lateral crus, for instance, twice on the cranial and once on the caudal edge of lateral crus. These incisions should not go through the whole lateral crus, just a length of 1–3 mm Now we have a new dome without tension.

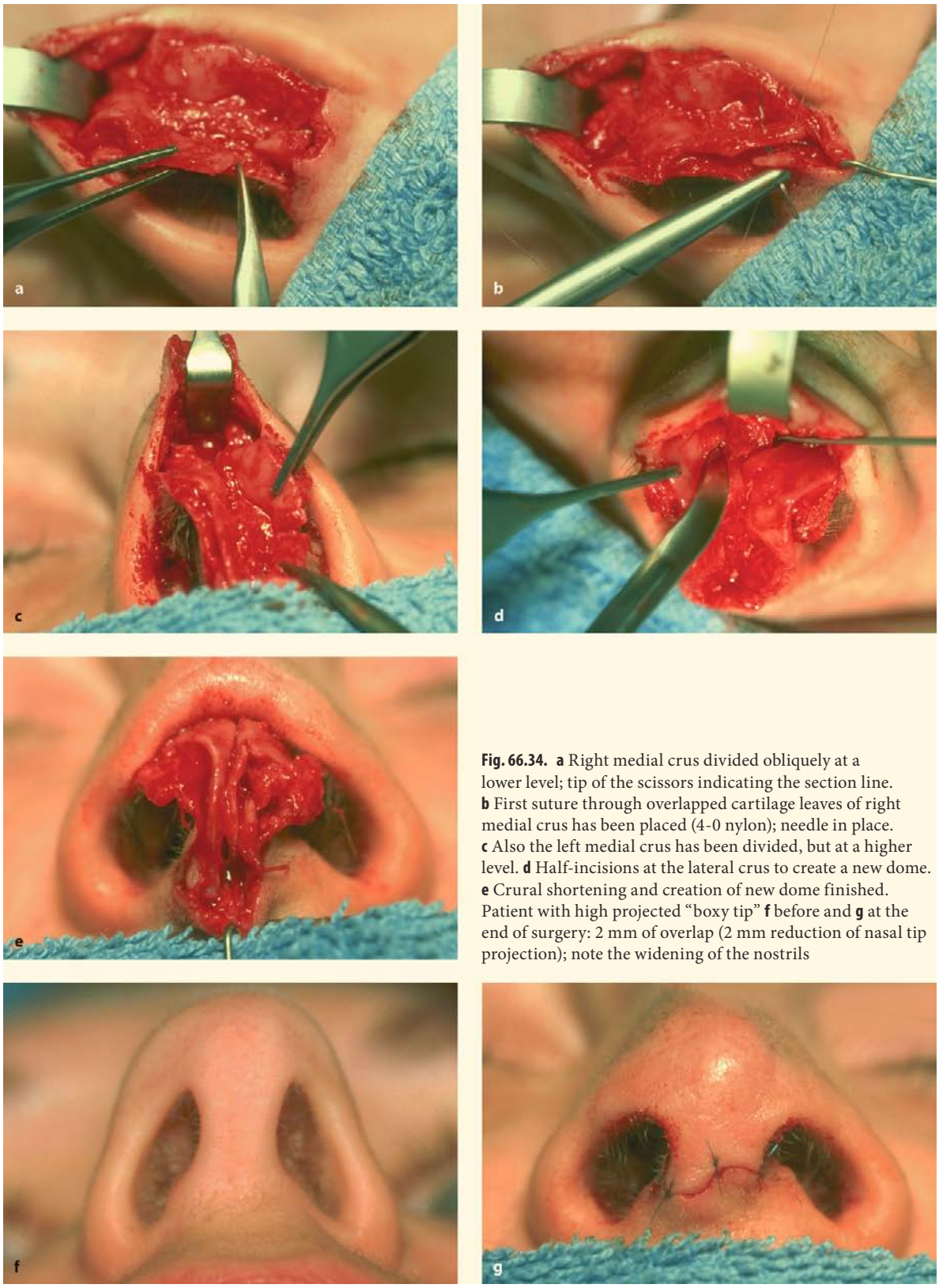


Fig. 66.34. **a** Right medial crus divided obliquely at a lower level; tip of the scissors indicating the section line. **b** First suture through overlapped cartilage leaves of right medial crus has been placed (4-0 nylon); needle in place. **c** Also the left medial crus has been divided, but at a higher level. **d** Half-incisions at the lateral crus to create a new dome. **e** Crural shortening and creation of new dome finished. Patient with high projected "boxy tip" **f** before and **g** at the end of surgery: 2 mm of overlap (2 mm reduction of nasal tip projection); note the widening of the nostrils

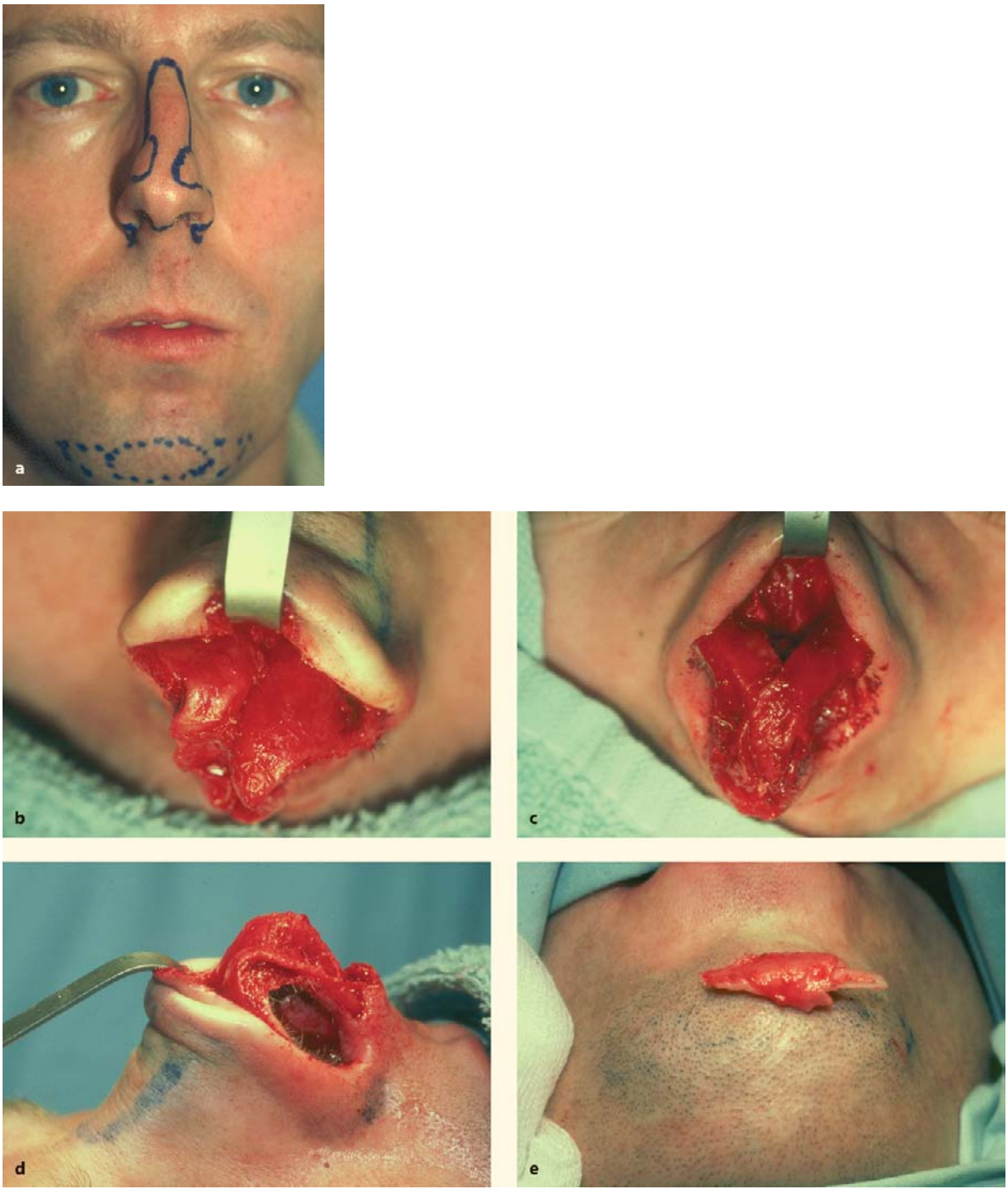


Fig. 66.35. **a** Dermographic marking of asymmetric alar cartilages; skeletal nose excess to correct hypognathy. **b** Cartilaginous irregularities in the dome – alar region. **c** After partial alar resection, columellar shortening, and new dome creation. **d** Side view before closing the skin. **e** Nasal hump to correct hypognathy

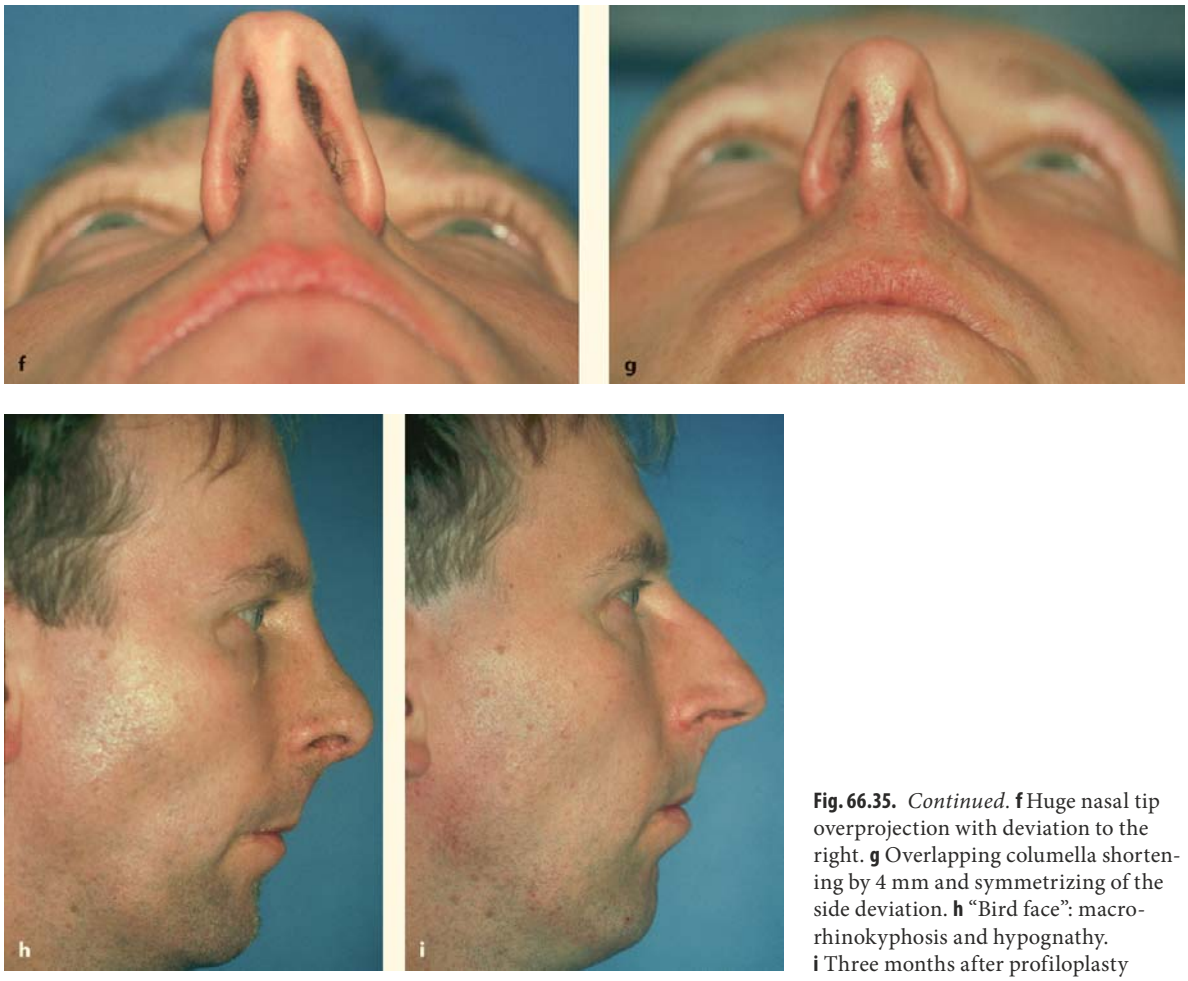


Fig. 66.35. *Continued.* **f** Huge nasal tip overprojection with deviation to the right. **g** Overlapping columella shortening by 4 mm and symmetrizing of the side deviation. **h** "Bird face": macrorhinokyphosis and hypognathy. **i** Three months after profiloplasty

With this method we can do profiloplasty of "bird face" deformities with huge cartilaginous asymmetries.

"Drooping nose deformity" is almost impossible to correct with the closed or delivery method. We need sufficient overview of the dome alar complex and the possibility for proximal fixation to the septal cartilage. This can be only achieved by the open method.

Fig. 66.36. **a** "Drooping nose". **b** Three months after correction. **c** Bottom view with dermographic markings of columellar approach and basal alar excisions. **d** Corrected "bulbous tip" with tip elevation through dome sutures. Frontal view of the same patient **e** before and **f** after complex correction

Secondary rhinoplasties are indicated when the first operation(s) is (are) performed unsatisfactorily and the nose looks "operated upon". If the triangular cartilage is not sufficiently addressed then a "Citroën sign" of "inverted-V deformity" appears. If, on the other hand, the nasal bones have not been shifted enough towards the midline, then the "open roof deformity" at the top of the nasal bridge appears.

Sometimes, through no fault of the surgeon, so-called scar bumps appear above the tip of the nose (parrot's beak or "supratip deformity"). This tends to happen with thick, large-pored skin and fleshy noses. The nose is operated on between its skin coverage and the skeleton. Beneath the skin, tangential scarring occurs which is not always predictable. If the deformity is not only palpable but also visible, it can be relatively easily removed under outpatient conditions.

Dealing with secondary rhinoplasties, we have sometimes to find unusual solutions for specific problems.

Fig. 66.37. **a** The previous surgeon in Georgia had removed almost the complete left lower lateral cartilage. **b** Situation 3 months after corrective surgery. **c** Bottom view of the deformity and **d** 2 weeks postoperatively. (Fig. 37 e–m see next pages)

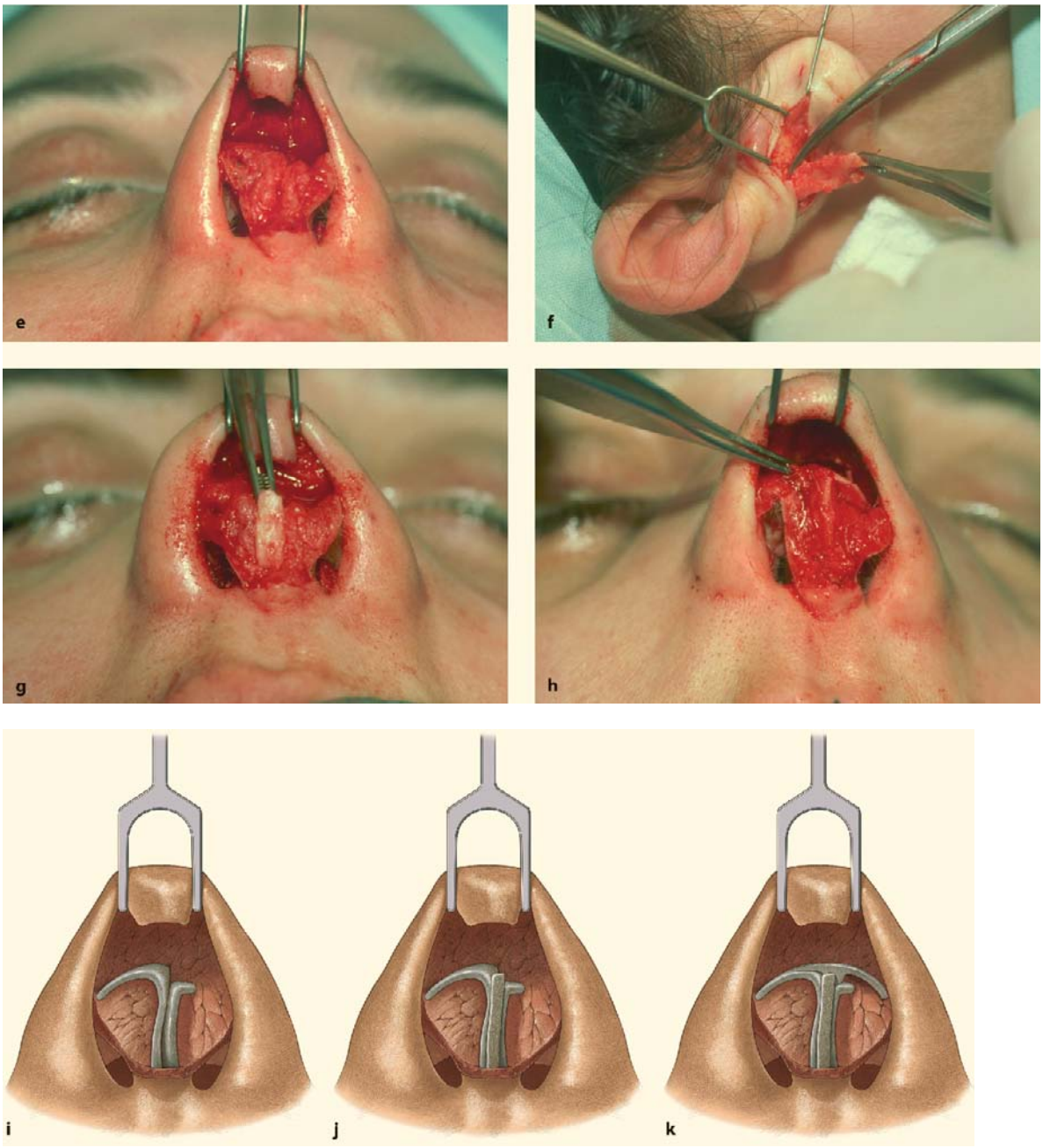


Fig. 66.37. *Continued.* **e** Dome–alar region exposed; the preoperative suspicion has been proved: left alar cartilage was "amputated". **f** We have planned an "asymmetric umbrella graft" for which the ideal donor is helix–tail (cauda helicis). **g** Sagittal graft has been inserted into the columella – intracrurally – and fixed with nylon 4-0 sutures. **h** An asymmetric umbrella (to cover more of the left than the right alar wing) has been inserted and sutured. The tip of the forceps indicates the end of the right wing of the "asymmetric umbrella". **i** Secondary deformity. **j** Columellar strut. **k** "Asymmetric umbrella graft"

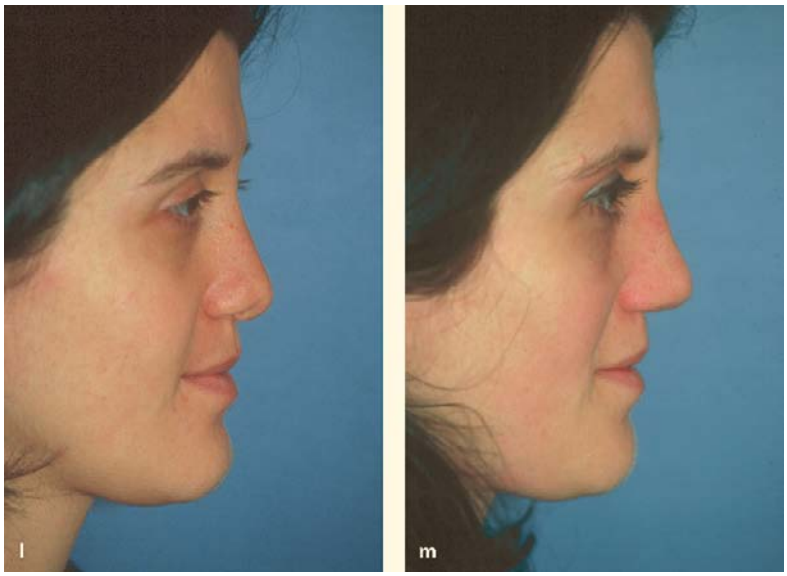


Fig. 66.37. *Continued.* The same patient in profile **l** before and **m** after secondary rhinoplasty; tip projection increased from 20 to 22 mm

Fig. 66.38. **a** In two previous surgeries, the cartilaginous hump was not removed. **b** Three months after secondary procedure

In some cases the previous surgeon has not removed the cartilaginous piece of hump.

Sometimes the cartilage graft is distorted.

Different parts of bony hump may remain in place, creating a disturbing profile.

Fig. 66.39. **a** Graft distortion. **b** After removal of cartilage graft and "on top" dome sutures

Fig. 66.40. **a** Only the middle part of the bony hump was removed. **b** Three months after secondary rhinoplasty. **c** Small profile irregularity **d** could easily be corrected with rasping

Fig. 66.41. **a** Worried look before and **b** enthusiastic one after reductive rhinoplasty

Nose corrections are usually done under outpatient conditions: in some cases a clinic stay of 2–3 days will suffice. The nasal packs are usually removed after 1–3 days and then comes the first feeling of relief: it is possible to breathe through the nose again. The nasal splint remains in place for 7, 10, or 14 days, as required. Shortening of the nose requires overcorrection because the nose tends to become lower with age.

Initially the patient is only allowed to eat soft, semisolid food, should chew, laugh, or speak as little as possible, and should sleep with the head slightly elevated.

The inevitable bruises differ in severity, depending on the individual involved, and can be hidden by cosmetic camouflage. The nasal bones are propped up and held together with the aid of special spectacles. The patient's own spectacles and sports activities should be avoided for 4 weeks. It is quite all right for the patient to be seen again in public after 10–14 days. Minor improvements are a regular occurrence in the first 3 months, but are also still possible within 6–12 months. Both the patient and his or her environment soon forget how the nose used to look, which is why it is good to have photographic documentation ready.

Nose bleeds can occur in the first 2 weeks and, later on the mucous membrane can be too dry. Sensation at the tip of the nose and sometimes also in the region of the upper lip can be initially reduced. Injuries to the tear duct or the nerve supplying the cheek, with disturbances of sensory function as described in the literature, are usually transient and extremely rare.

It should also count as a complication if the patient regards the operative goal, that is, the improvement in form, as not reached or is dissatisfied with the result. Either the patient's expectations did not correspond with what was actually possible, or technically the operation was inadequately performed. If too little was surgically removed, then this can be relatively easily corrected, usually under outpatient conditions. A bad mistake, on the other hand, is when too much has been removed. Then the patient's own tissue (cartilage or bone) must be harvested to fill out the defect.

I regard it as a surgical misfortune if always the same "standard noses" are produced on different types of faces. I personally try never to create two identical noses, but always attempt to fit each nose harmoniously to its unique face. Unless, of course, twins turn up for a nose correction.

Among all aesthetic surgery patients our nose patients have the greatest amplitude of feelings. Patients after well-indicated and well-operated noses are the happiest. After less competent indicated and operated noses, the patients are unhappiest.

Rhinoplasty is the most fascinating but could be the most disappointing aesthetic surgery. Sometimes we receive picture postcards from patients who are writing us that they just have celebrated "the fourth birthday of their new nose". One patient has wondered that she lost her hay fever leading to asthma attacks together with her hump, after rhinoplasty. But one of my patients with one of the ten nicest noses I ever operated on is very unhappy and asked me 3 years after surgery repeatedly to reoperate on her nose. I only could make it worse, and that is why I refused the reoperation. My mistake was not an operative one but the indication was wrong: her psychopathological problems were predominant.

We should try to determine as exactly as possible:
- The indication
- The motivation
- The expectation
- The incubation

I have never regretted it when I said “No” to a patient but have sometimes regretted it when I said “Yes”.

Bibliography

Please see the general bibliography at the end of this book.

Ear Corrections

67

Dimitrije E. Panfilov

67.1 Introduction

As a result of developmental abnormalities, some children have very prominent ears, especially so-called ectomorphs, that is individuals with long-boned, asthenic, athletic body types. There are a large number of variations and possible deformities in the region of the ear and ear lobe. The size of the ear and the severity of its prominence can also vary. Sometimes one ear is very prominent and the other less so or not at all.

When should the ear be set back by surgery? The development of the ear is virtually completed by the age of five, when operative measures can be undertaken. If the parents want the operation, then – according to some authors – it may be assumed that the child also wants. This will avoid possible emotional damage to the child from teasing. Some surgeons, however, prefer to wait until the children themselves are aware of their deformity and develop a positive motivation for the operation. One should surgically correct this deformity by the time of puberty if the children are bothered by it.

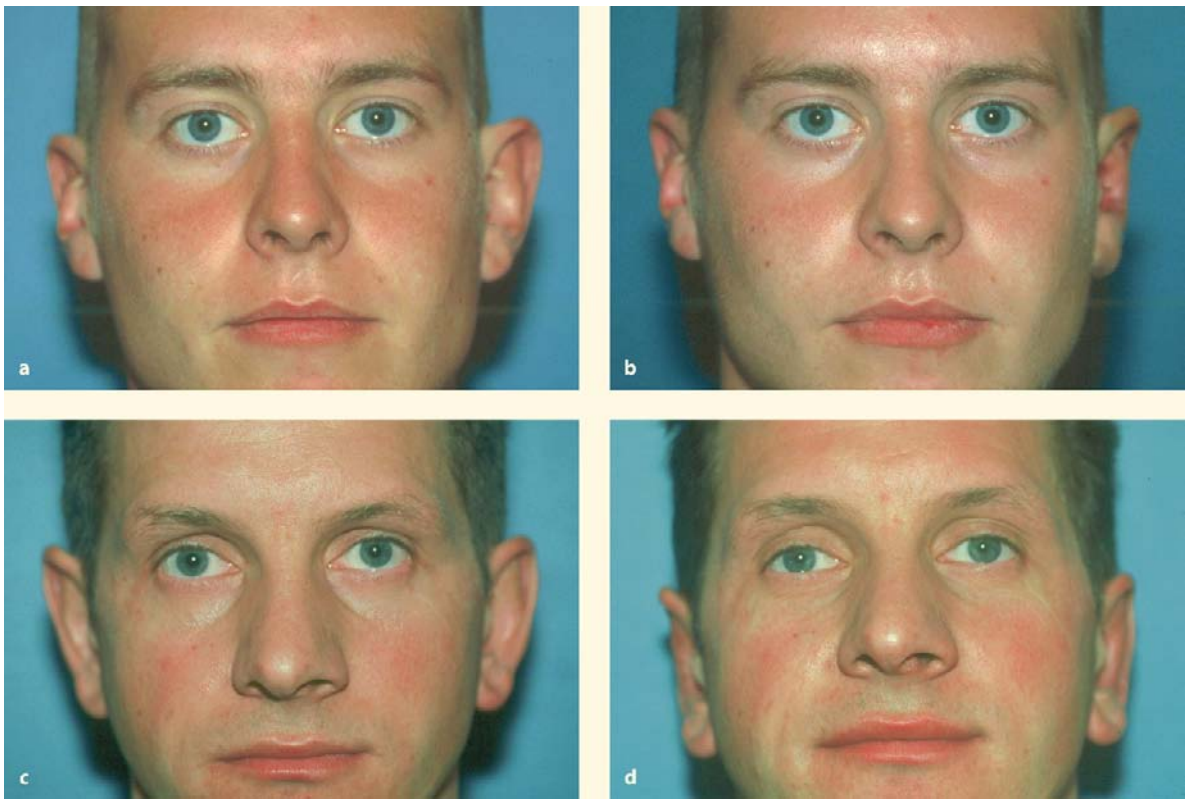


Fig. 67.1. **a** The left ear is prominent, which disturbs the patient; front view. **b** Front view 3 weeks after surgery. **c** Ectomorphic patient: both ears are prominent. **d** One week postoperatively

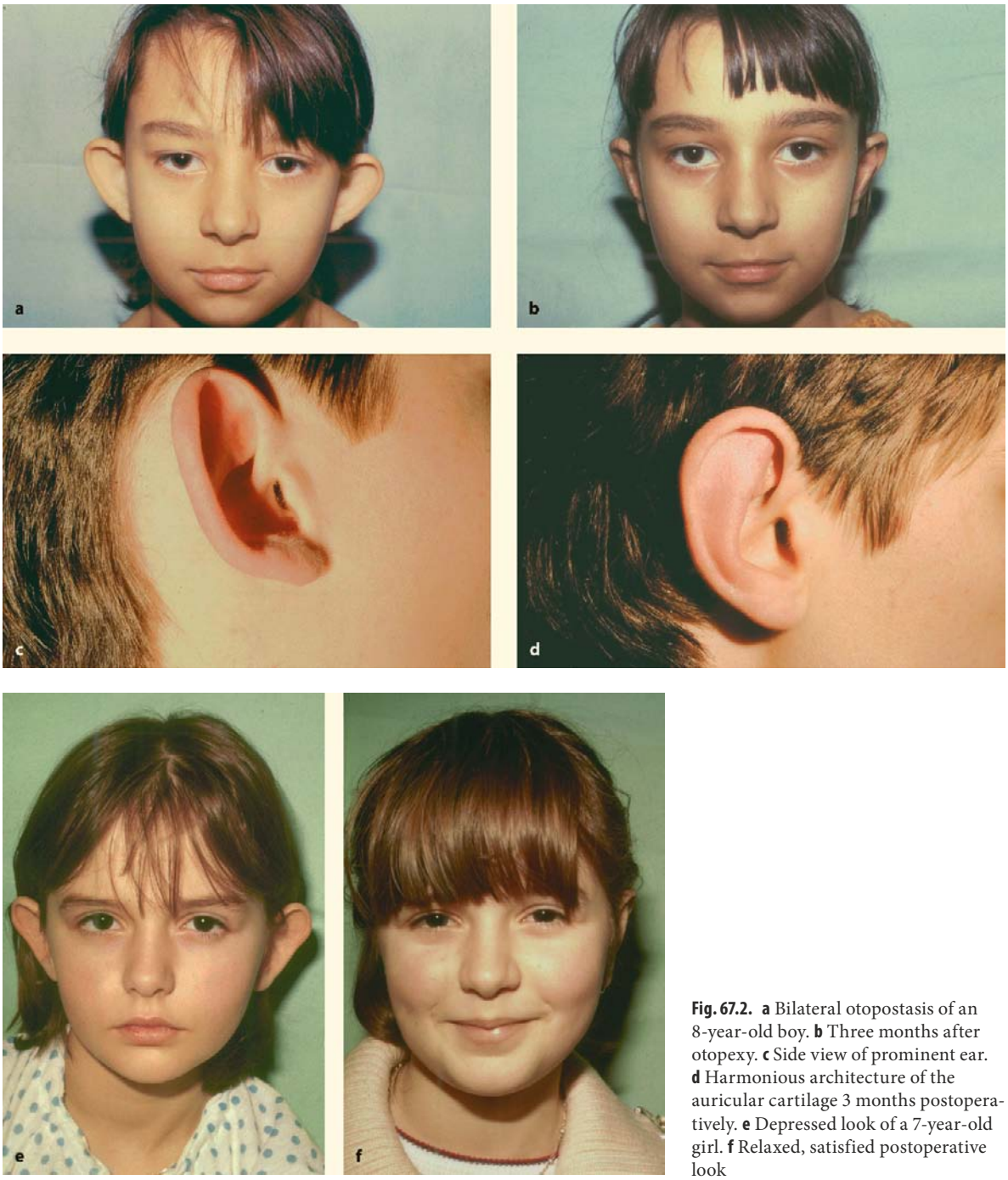


Fig. 67.2. **a** Bilateral otopostasis of an 8-year-old boy. **b** Three months after otopexy. **c** Side view of prominent ear. **d** Harmonious architecture of the auricular cartilage 3 months postoperatively. **e** Depressed look of a 7-year-old girl. **f** Relaxed, satisfied postoperative look

Fig. 67.2. *Continued.* **g** A 6-year-old girl, our youngest otoplasty patient. **h** Six months postoperatively. The same girl – back aspect – **i** before and **j** after surgery

In nature, no two ears are identical, neither before nor after surgery. After the operation, parents and friends usually view the ears much more critically than before. Any lack of absolute symmetry after the operation should not be that troublesome because both ears are only rarely seen at the same time.

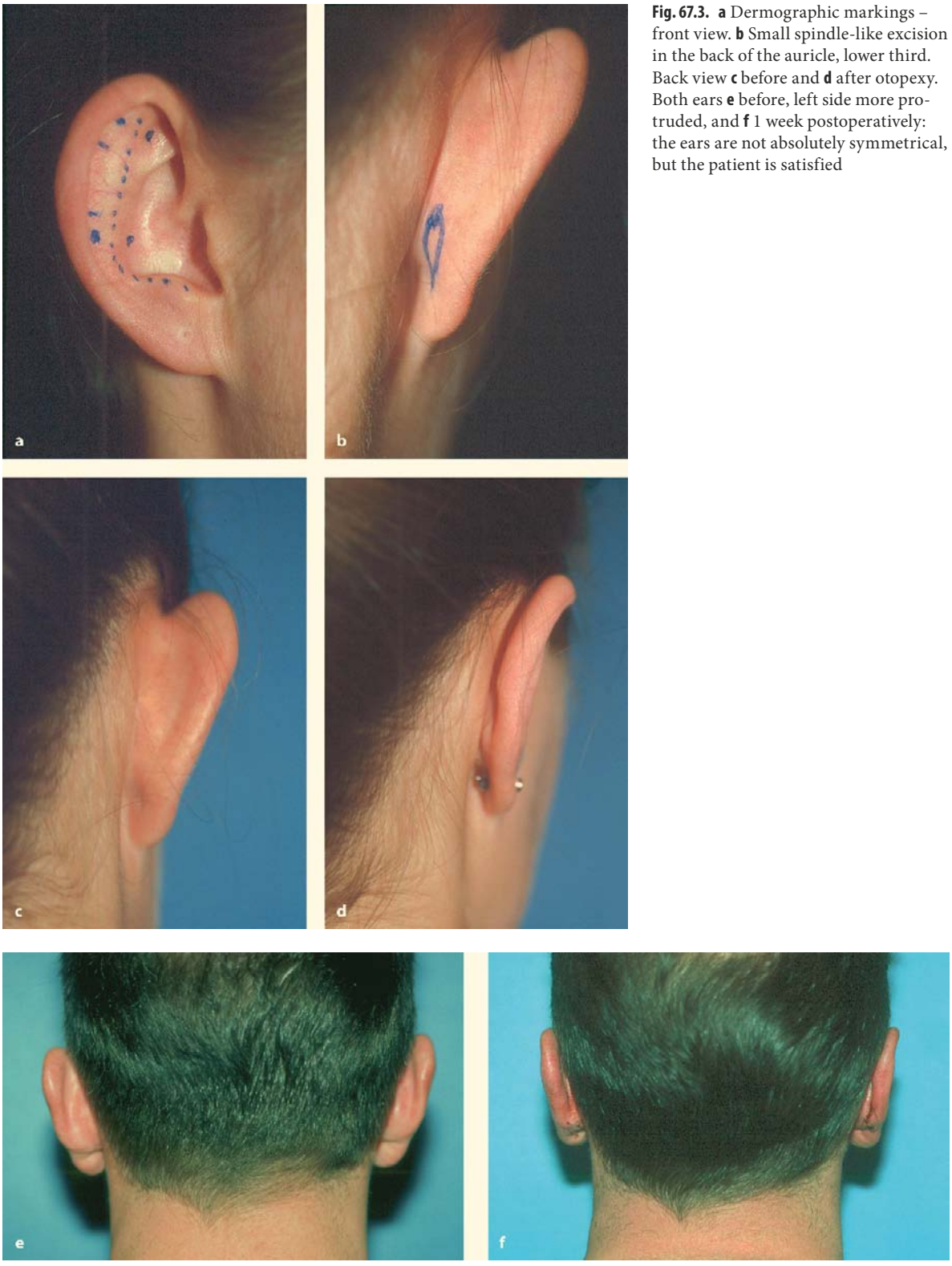


Fig. 67.3. **a** Dermographic markings – front view. **b** Small spindle-like excision in the back of the auricle, lower third. Back view **c** before and **d** after otopexy. Both ears **e** before, left side more protruded, and **f** 1 week postoperatively: the ears are not absolutely symmetrical, but the patient is satisfied

67.2 The Operation

There are a large number of surgical procedures to set back the ears (otopexy or otoplasty). The operative method in which only a spindle-shaped strip of skin is excised from behind the ear should be rejected. If the natural architecture of the ear cartilage is not reconstructed, then the ear will bend forward again after a few months.

I personally prefer a combination of three methods where a spindle-shaped incision of up to 1 cm length is made on the lower third of the ear after the anterior cartilaginous sheet has been scored under the skin in a longitudinal direction. This bends the cartilage back, giving the ear its otherwise natural fold. The ear cartilage is then fixed under the skin with two or three special mattress sutures of transparent, nonabsorbable 4-0 nylon sutures. Only rarely are these sutures not tolerated by the body, in which case they can be replaced by another type of suture material. At the end of the operation the wound on the back of the ear is sutured, with absorbable material if required. The 1-cm-long scar behind the ear usually remains mostly inconspicuous. There are of course other methods to set back the ear which also produce good results; most of them are more aggressive and complicated.

There was a method to fix the helix tail to the periosteum of the mastoid, but it was painful. Muelbauer from Germany has suggested shortening and fixating it deep on the back side of the concha. We went one step further: we evert and suture the shortened helix tail on the posterior side of the concha. The eversion itself rotates the lower third of the auricle backwards.

It remains to fixate the upper two thirds of the auricle. This is very easy to achieve with Kaye's method of introduced three-stitch-mattress sutures which result in stable otopexy of the upper two thirds of the auricle. Sometimes these sutures are enough after filing the antihelix to keep the auricular cartilage in the desired place.

Also adults suffer from otopostasis and they sometimes say they have wanted to have their ears fixed for years, sometimes since puberty. Our oldest patient was a 45-year-old woman.

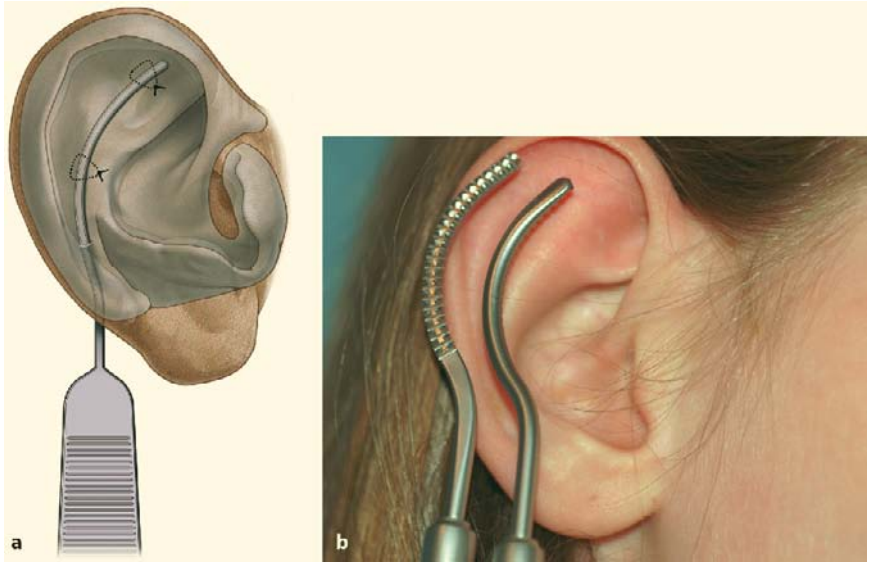


Fig. 67.4. **a** A simplified Kaye's method of otopexy with "Panfilov's file". **b** Side view of the right file in front and the left file behind turned upside down; only a few movements can break the anterior cartilage layer of the antihelix

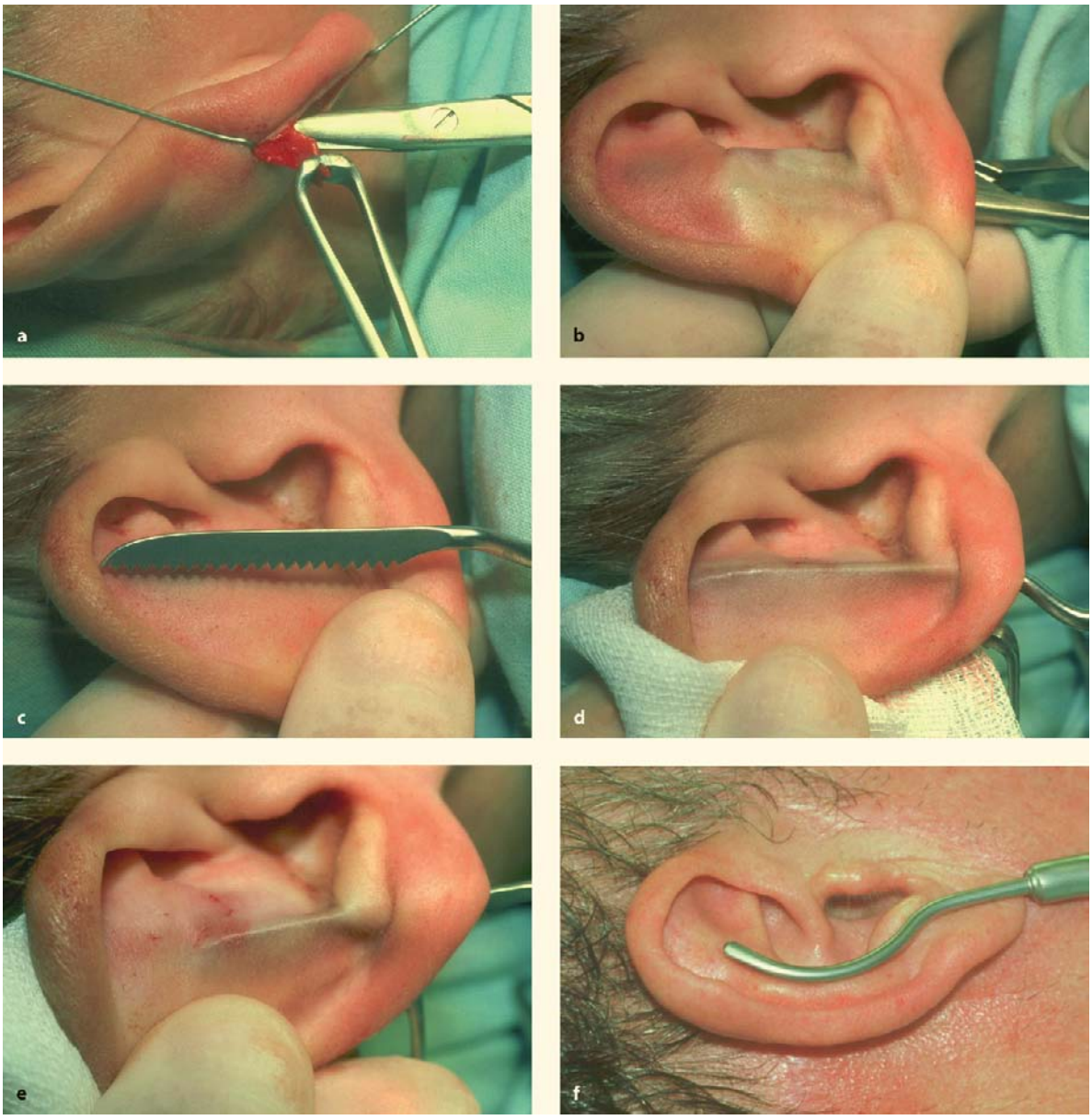


Fig. 67.5. **a** After skin excision the helix tail (cauda helicis) has been isolated; with the tip of Stevens scissors, we advance to the subcutaneous space **b** and prepare a tunnel up to the top of superior crus of the antihelix. **c** Joseph's file simulated in front of the auricle. **d** Superior crus of the antihelix to be smooth-filed **e** turning Joseph's file to follow the curve of the antihelix and smooth filing, so that the front layer of cartilage has been broken, otherwise the architecture of the cartilage would tend to revert to its initial condition – we can palpate it. Use of straight Joseph's file is not so easy as that of the author's file. **f** Panfilov's file simulated over the antihelix which is following its own curvature

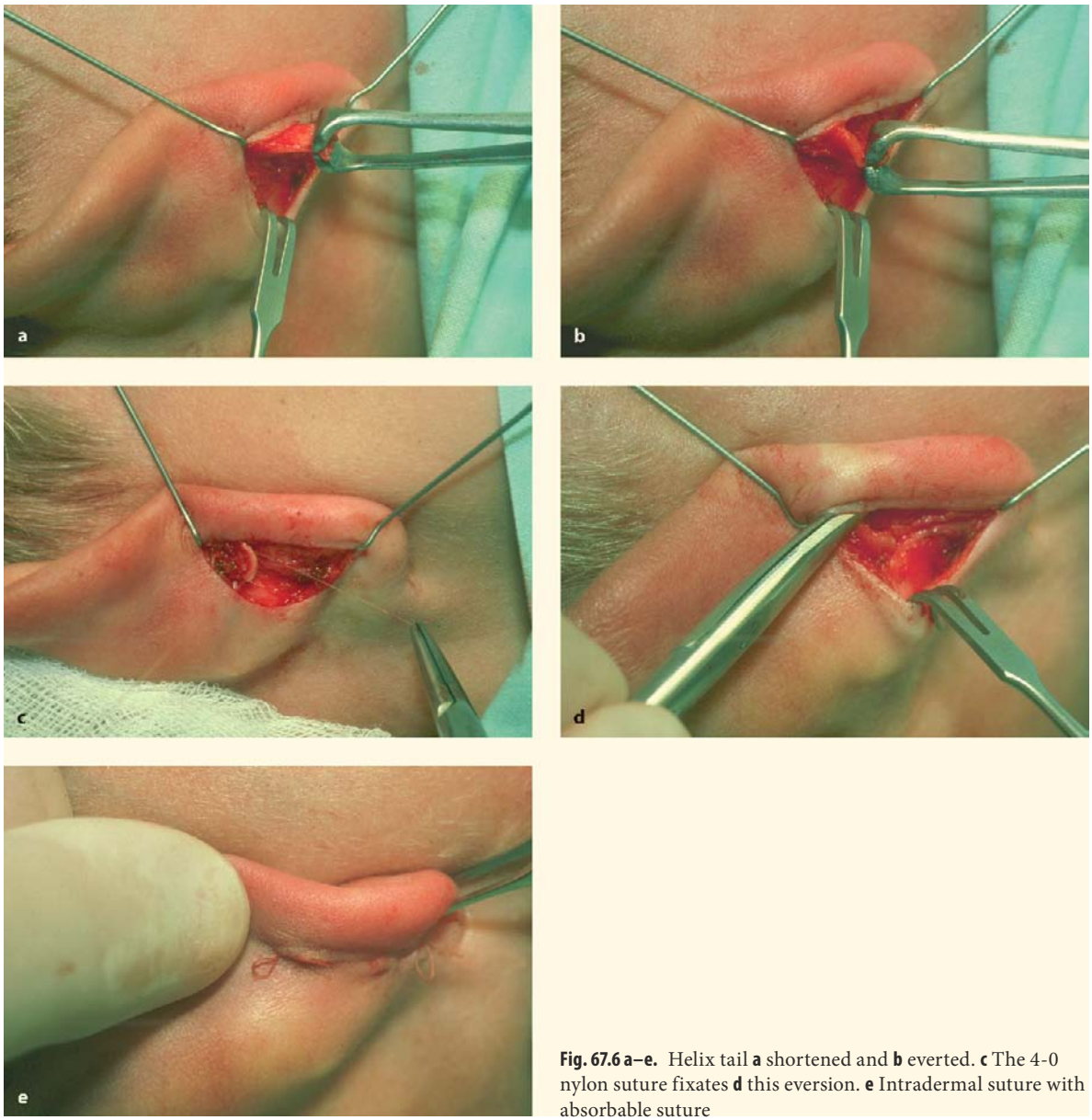


Fig. 67.6 a–e. Helix tail **a** shortened and **b** everted. **c** The 4-0 nylon suture fixates **d** this eversion. **e** Intradermal suture with absorbable suture

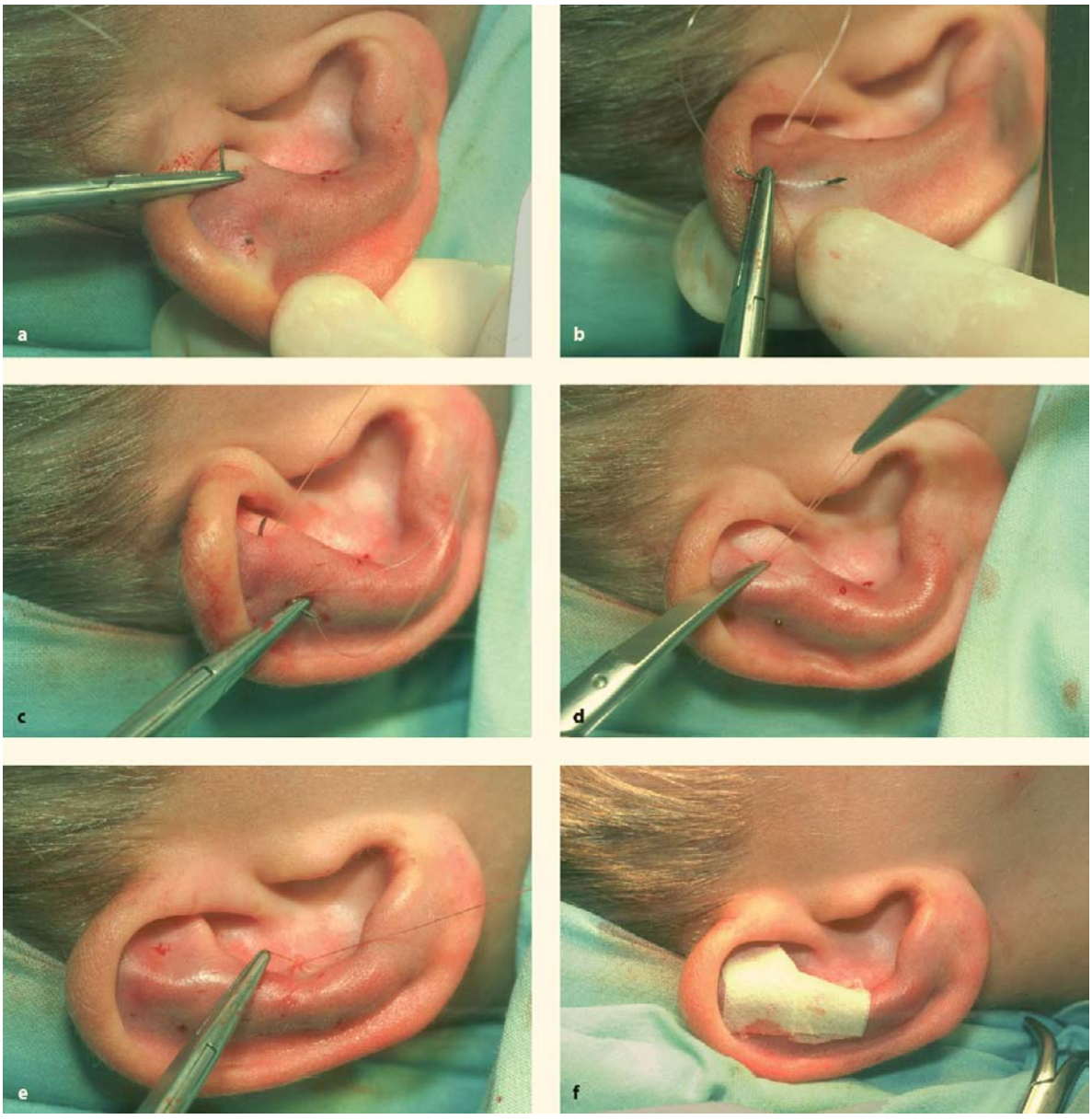


Fig. 67.7. **a** First step: Mini incision of 1 mm on the front side of the antihelix. Stitch from front to back side of antihelix; caution – the suture has to perforate both cartilage leaves but not the skin on the back side of the auricle, otherwise infection will cause recurrence, because a nonabsorbable nylon 4-0 suture was used. **b** Second step: Through the skin punction – the same location where the suture comes out – we put another stitch to proceed the suture subcutaneously in a caudal direction. **c** Third step: Punction of the stitch out is taken to stitch again through both leaves of the cartilage (but not skin of the back side of the ear). **d** Tightened suture pulls the helix backwards and gives more profile to the antihelix. **e** The same mattress suture in the middle third of the antihelix. **f** Suture strips for 1 week. It is advisable to sleep with an elastic headband for 3 weeks after surgery

Fig. 67.8. **a** Adult female patient; otopostasis more left than right. **b** Three weeks postoperatively. **c** Adult male patient: asymmetric otopostasis more right than left. **d** Postoperative look is more symmetrical

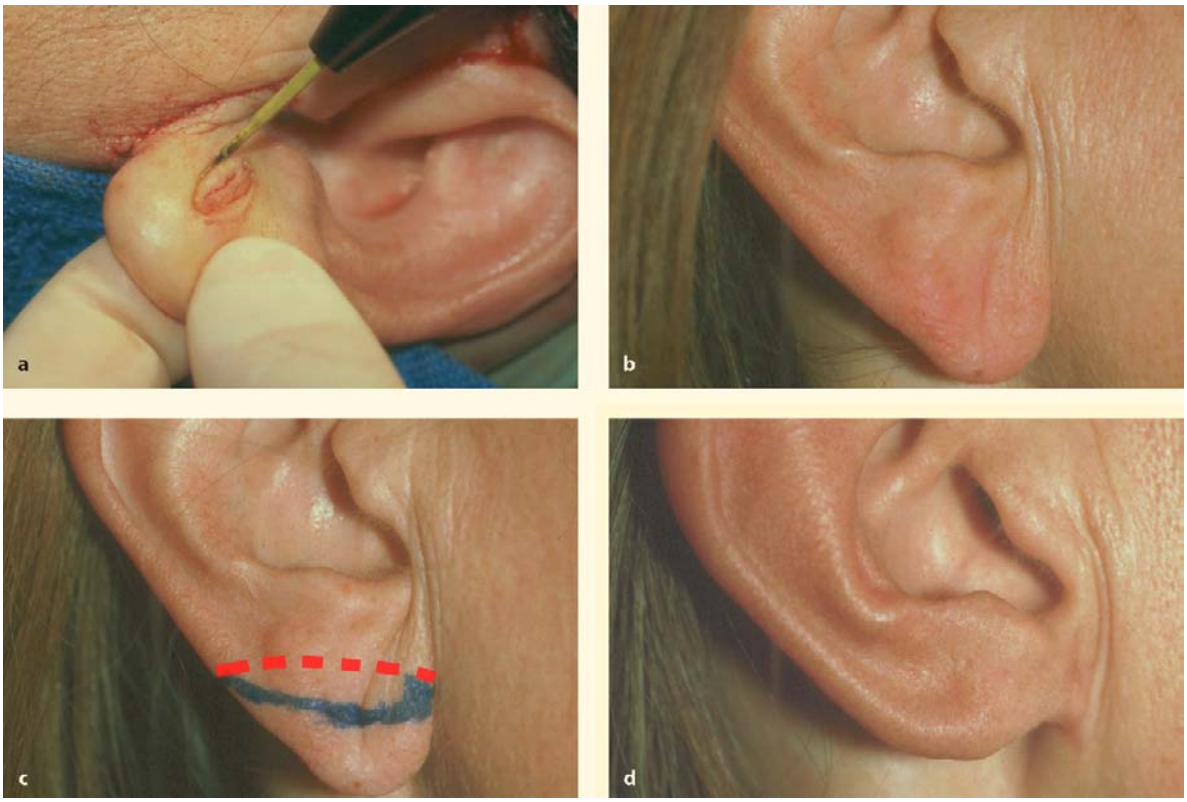


Fig. 67.9. **a** Ear lobe hole excised with radiosurgery. **b** Too long an ear lobe. **c** Dermographic marking: front incision *blue line*; back incision *dotted red line*. **d** Three months after surgery

The operation can be performed under local anaesthesia in adults and older children. The youngest patient on whom I performed this operation under local anaesthesia was 9 years old. He was so strongly motivated that he patiently endured the whole procedure without saying a word. This operation should be done under mild general anaesthesia in smaller children.

67.3 Shortening of the Ear Lob

Sometimes the ear lobe holes are too large. They can be easily eradicated with radiosurgery. Or if the ear lobes are found to be too long they can be shortened. We should make the back incision 3–4 mm higher than the front incision, avoiding visibility.

67.4 Axial Rotation of the Ear

Very seldom patients find the axis of their ears to be too oblique. To correct this, we excise some spindle-like skin area behind the lower pole and in front of the upper pole. Additionally we fix the back lower part of the concha backwards to the mastoid periosteum and the upper cartilage pole forwards to the temporal fascia. In such a manner, we can rotate the ear by up to 15°. Details have to be discussed precisely with the patient prior to the surgery.

67.5 Aftercare

A head dressing is worn for 1 day after the operation – preferably one made of elastic netting. After that an elastic headband should be worn at night for a further 3 weeks. This is to prevent the ear from inadvertently being bent over during sleep, which would put the good operative result at risk. After the operation, the patient should refrain from sport for 4 or 5 weeks.

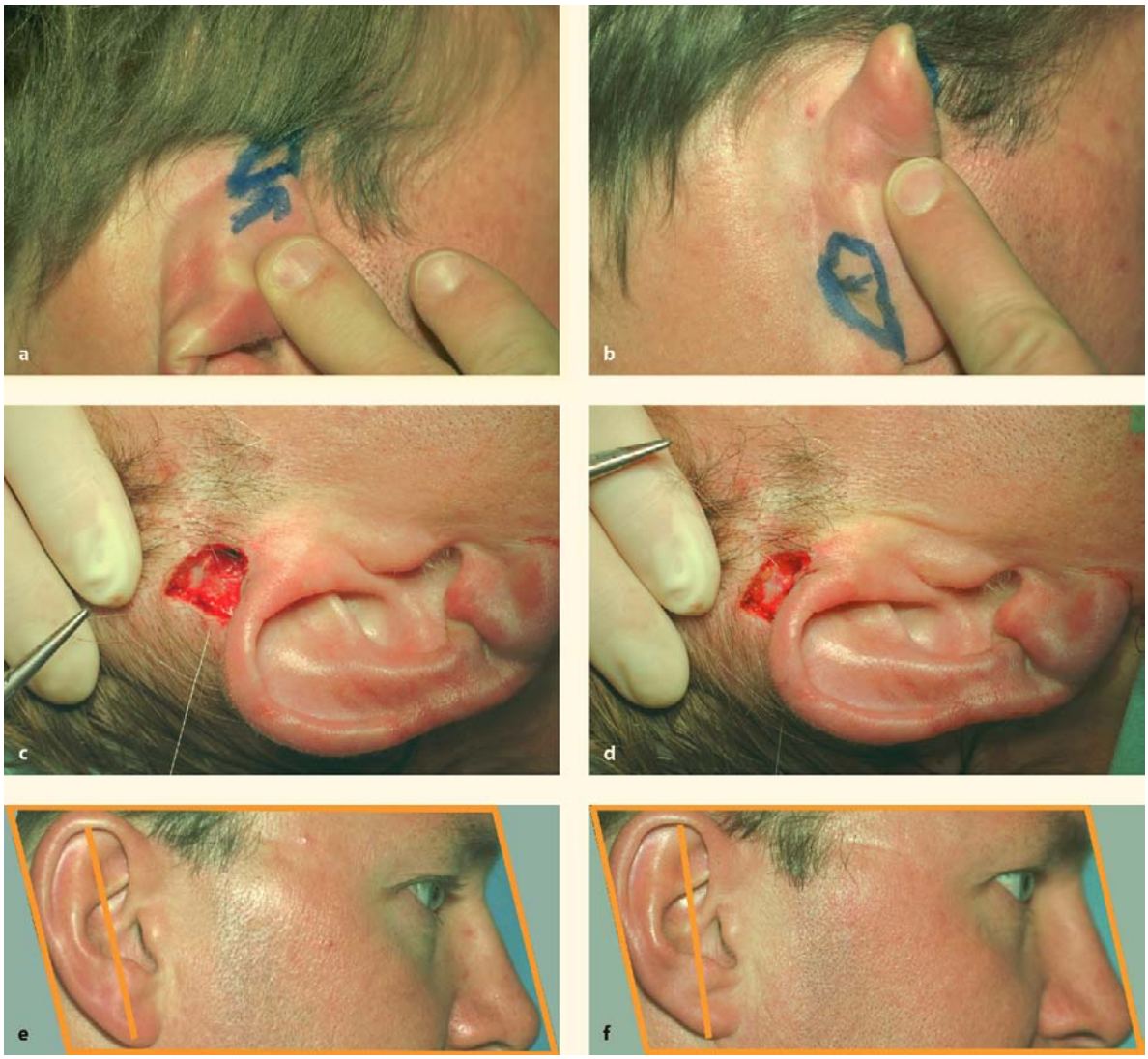


Fig. 67.10. **a** Forward rotation of the upper pole of the ear indicated by dermography. **b** Backward rotation of the lower pole of the ear; it is important to fix the cartilages in the rotated positions. Suture between cartilage of the upper pole of the ear and temporal fascia **c** placed and **d** tightened. **e** The patient (physician) himself found the axis of his ear and nose ("Leonardo's quadrilateral") to be too oblique. **f** Both ear and nose axis have been set more upright; nose correction done by slight augmentation with cartilage chips made from the helix tail

67.6 Complications

Apart from slight bleeding, swelling, and pain, the other usual complications such as infection, excess scar formation, and the like are very rare. Sensitivity to nonabsorbable suture material is also extremely rare.

Bibliography

Please see the general bibliography at the end of this book.

68 Surgical Hair Replacement

Rolf E.A. Nordström

68.1 The History of Hair

During his retreat from Russia in 1812, Napoleon lost more than 450,000 of his original troops of 500,000 mainly due to severe cold. His army's Chief Surgeon, Baron Larrey, noticed that bald men died of the cold before those with hair. Indeed, one functional task of hair is insulation from cold as well as protection from sun irradiation. But its main function is rather social and psychological and concern with baldness goes as far back as history allows us to go.

Hair has been of vital importance throughout human history. A full head of hair has always been associated with youth and good health and since ancient times people have tried to find remedies to treat hair loss. We find prescriptions for restoring lost hair in the oldest known medical text – Egyptian papyrus scrolls.

The father of medicine, Hippocrates, being bald himself, worked on finding remedies to treat hair loss. The area of permanent hair at the back of the head is named after him – the Hippocratic wreath.

In the Old Testament we find the story of Samson, a Nazarene and a legendary warrior, who lost his extraordinary physical strength as soon as Delilah cut his hair, turning him into "97 lb weakling". Even nowadays the followers of some Jewish sects keep their earlock hair uncut in the memory of Samson's story. We are also familiar with the tale of Elisa, who called two bears from the woods to kill some of the children who mocked him for being bald.

Julius Caesar, whose name in Latin ironically means "head of hair", desperately tried to conceal his baldness with his remaining hair. Thus, it is no surprise that of all his honours none was more delightful to him than the privilege of covering his balding head with a laurel wreath.

During the Middle Ages, Christian priests and monks shaved their heads to proclaim their neglect of worldly vanities. Cutting hair was considered a form of personal sacrifice back then.

Wigs came into fashion in the sixteenth century and until the middle of the eighteenth century were a class status also serving to disguise baldness.

Today hair continues to be an important part of self-image.

68.2 History of Hair Transplantation

Transplantation of hear-bearing grafts has been done with varying success since the early 1800s. The possibility of successful hair transplantation in animals was demonstrated as early as 1804 or 1818 by Baronio.

In 1939 a Japanese dermatologist, Okuda [1, 2], first described the use of small full-thickness grafts for the correction of alopecia of the scalp, eyebrow, and moustache areas in severely burned patients. Because of World War II, his work did not become recognised outside Japan until many years later. The principles of hair transplantation to treat male pattern baldness were first described by Orentreich [3] in 1959. It was Orentreich who introduced the concept of donor dominance that was further developed in the mid-1950s. Even nowadays the main principles of hair transplantation remain similar to the ones initially described by Orentreich.

68.3 Classification of Male Pattern Baldness

68.3.1 Norwood Classification of Male Pattern Baldness

The most popular classification of male pattern baldness is that of Norwood [4]:

- *Type I:* The essential feature of type I is no recession or very minimal recession along the anterior border of the hairline in the frontotemporal region.

- *Type II:* The anterior border of the hair in the frontotemporal region has triangular areas of recession, which tend to be symmetrical. These areas of denudation extend no farther posteriorly than approximately 2.0 cm anterior to a line drawn in a coronal plane between the external auditory meatus. Hair is also lost, or sparse, along the midfrontal border of the scalp, but the depth of the affected area is much less than in the frontotemporal region.
- *Type III:* This represents the minimal extent of hair loss considered sufficient to represent baldness. Type III scalps have deep frontotemporal recessions, which are usually symmetrical and are either bare or very sparsely covered by hair. These recessions extend farther posteriorly than a point that lies approximately 2.0 cm anterior to a coronal line drawn between the external auditory meatus.
- *Type III vertex:* In this type, the hair is lost chiefly in the vertex. There may be some frontal recession, but it must not exceed that seen in type III. This type of baldness is most common with advancing age.
- *Type IV:* The frontal and frontotemporal recession is more severe than in type III. Also, there is a sparseness or absence of hair on the vertex area. These areas are extensive but separated from each other by a band of moderately dense hair that extends across the top. This band joins the fully haired fringe on each side of the head. Type IV should not be confused with type III vertex in which the loss is primarily on the vertex.
- *Type V:* The vertex region of alopecia remains separated from the frontotemporal region of alopecia. The separation is now not as distinct, because the band of hair across the crown has become narrower and sparser. Both the vertex and the frontotemporal areas of alopecia have become larger. Viewed from above, types V, VI, and VII are all characterised by areas of alopecia that are outlined by hair on the sides and back of the scalp, forming the shape of a horseshoe.
- *Type VI:* The bridge of hair that crossed the crown in the previous type is now gone. The frontotemporal and vertex regions of alopecia have become confluent; in addition, the entire area of alopecia has increased laterally and posteriorly.
- *Type VII:* This is the most severe form of male pattern baldness. All that remains is a narrow horseshoe-shaped band of hair that begins laterally just anterior to the ear and extends posteriorly on the sides and quite low on the occiput. This hair is usually not dense and is frequently fine. The hair is also extremely sparse on the nape of the neck and in a semicircle over both ears. It should be noted that the anterior border of this band on each side of the head has receded posteriorly to just in front of the ears.

68.3.2 Description of Standards for Classification of Type A Variant of Male Pattern Baldness

The type A variant is distinguished by two major features and two minor features. The major features must be present to make the type A designation. The minor features are not necessary but are frequently present.

The major features are as follows.

1. The entire anterior border of the hairline progresses posteriorly without leaving the usual island or peninsula of hair in the midfrontal region.
2. There is no simultaneous development of a bald area on the vertex. Instead, the anterior recession just keeps advancing posterior to the vertex.

The minor features are as follows.

1. Scattered sparse hairs frequently persist in the entire area of denudation.
2. The horseshoe-shaped fringe of hair that remains on the sides and back tends to be wider and to reach higher on the head.

Type A variants of the Norwood classification are as follows:

- *Type IIA:* The entire anterior border of the hairline lies on the forehead. The usual midfrontal peninsula or island of hair is represented by only a few sparse hairs. The area of denudation extends no farther than 2.0 cm from the midfrontal line.
- *Type IIIA:* The area of denudation is almost to or may actually reach the midcoronal line.
- *Type IVA:* The area of alopecia is now past the midcoronal line. There may be a considerable amount of thinning posterior to the actual hairline.
- *Type VA:* This is the most advanced degree of alopecia described with this variant. If it becomes more extensive, it cannot be distinguished from the usual types V and VI. The area of alopecia has not reached the vertex.

68.4 Scalp Flaps in Correction of Male Pattern Baldness

For many years flaps were one important alternative in hair transplantation both to create the hairline and in the areas posterior to the hairline. The main advantage of flaps is that when successfully carried out they offer the quickest method of putting long dense hair in a bald area (Figs. 68.1, 68.2). Flap procedures require skill and complications such as necrosis can

Fig. 68.1. **a** A male pattern baldness patient. **b** The same patient after the Nordström variety of the temporoparieto-occipital (*TPO*) flap. **c** A close-up of the postoperative hairline

Fig. 68.2. **a** Alopecia due to a burn. **b** Corrected with a flap

occur even in the hands of an experienced surgeon (Fig. 68.3). The main disadvantage is that the direction hair growth is often in a slightly different direction compared with that of the normal pattern.

Numerous designs of scalp flaps have been used throughout the history of surgical hair restoration. A description of a temporoparietal flap was provided by Lamont [5] in 1957. Since 1969, Juri [6] has used a

Fig. 68.3. Flap operation

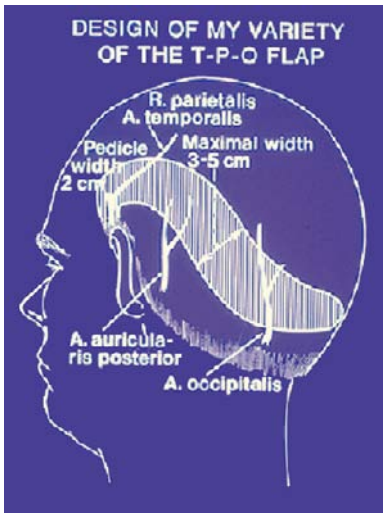


Fig. 68.4. Design of the Nordström variety of the TPO flap

somewhat elongated temporoparieto-occipital (TPO) pedicle flap in the surgical treatment of alopecia. Later on, Nordström [7] published his description of a TPO scalp flap (Fig. 68.4) for the treatment of male pattern baldness. The Nordström variety of the TPO flap has advantages over the Juri flap because:

1. The flap can be performed without delay.
2. It can be performed with local anaesthesia.
3. It is considerably longer.
4. It does not pose the risk of necrosis of the postauricular area below the donor scar that is sometimes seen with the Juri flap.
5. As a result of a narrower pedicle, less dog-ear is created and in addition the correct direction to the flap in the temporal angle is achieved.

Nowadays flaps are used mainly in reconstructive surgery. As no tissue in the human body mimics the scalp in consistency and hair-bearing quality, flaps employing the remaining hair-bearing scalp provide an ideal solution to wounds of the scalp in which tissue has been lost.

68.5 Tissue Expansion for Correction of Androgenetic Alopecia

Artificially induced skin expansion has been practised for centuries. Primitive tribes have practised lip, ear, and nose expansion for decorative purposes.

The use of controlled tissue expansion for reconstruction is a relatively recent development. Neumann [8] in 1956 reported the use of an expanding implant in reconstruction of the upper two thirds of a traumatically avulsed ear.

Twenty years later Radovan [9] developed a new prosthesis for tissue expansion that could be completely enclosed beneath the skin. Initial applications of Radovan's prosthesis were limited to breast reconstruction. This prosthesis provided the impetus for the development of tissue expansion. Unaware of Radovan's work, Austad and Rose [10] at the University of Michigan simultaneously developed a self-inflating tissue expander based on an osmotic gradient. In 1978, Argenta applied tissue expansion to reconstruction of difficult problems in the head and neck area. One of the most comprehensive books on tissue expansion is the one edited by Nordström (Fig. 68.5).

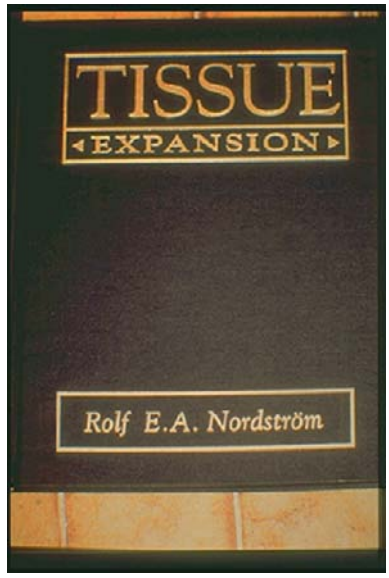


Fig. 68.5. The author's book on tissue expansion

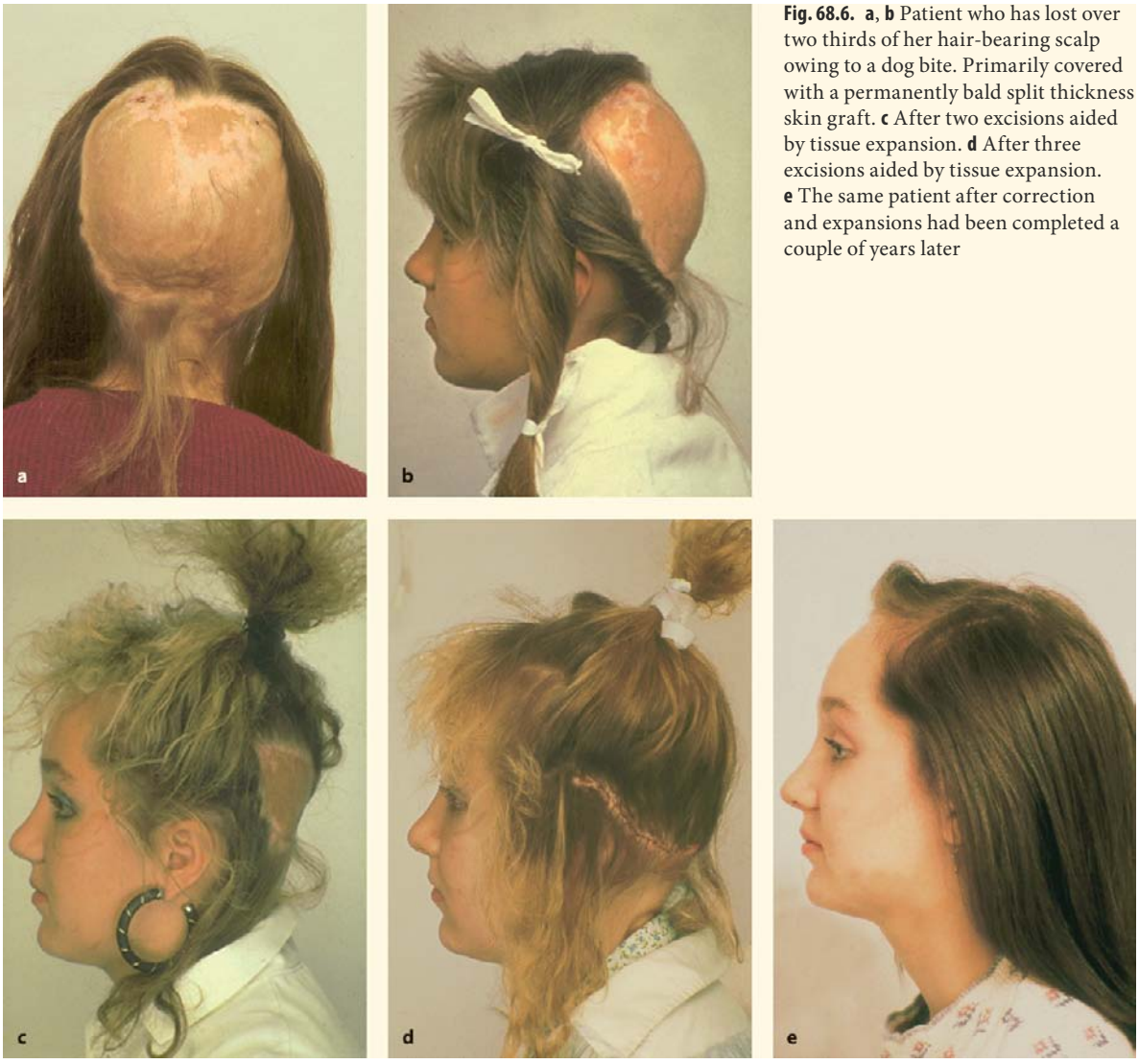


Fig. 68.6. **a**, **b** Patient who has lost over two thirds of her hair-bearing scalp owing to a dog bite. Primarily covered with a permanently bald split thickness skin graft. **c** After two excisions aided by tissue expansion. **d** After three excisions aided by tissue expansion. **e** The same patient after correction and expansions had been completed a couple of years later

Tissue expansion was initially employed in cases of loss of hair-bearing tissue secondary to burns, traumatic scalp avulsions (Fig. 68.6), benign and malignant tumour resections, and congenital abnormalities, and later on also for correction of male pattern baldness (Fig. 68.7).

The scalp is ideal for tissue expansion. The expander is usually placed between the galea aponeurotica and the pericranium. This is an avascular layer, with the rigid galea above protecting the major vessels and nerve of the scalp from the expander. Thus, much higher expansion pressures are tolerated here compared with most other areas.

Tissue expanders are silicon bags with self-sealing injection ports (Fig. 68.8). These ports are either incorporated into the main body of the prosthesis, or, more commonly, separated from the prosthesis by a connecting tube. The entire prosthesis including the inflation port is placed beneath the skin. The injection port is constructed such that percutaneous injection can be carried out and self-sealing of the prostheses occurs. Manufacturers vary in the individual nature of the prostheses and the inflation reservoir. Numerous styles, including round, square, rectangular, and curvilinear expanders, are available. Prostheses of special sizes and configurations can be manufactured on a custom basis by most manufactures. In general, most prostheses are resilient enough to allow inflation to 2–3 times the manufacturer's recommended volume.

The advantages of skin expansion are as follows:

1. Excellent colour and texture match
2. No additional donor defect
3. No new scars

Fig. 68.7. **a** Patient with male pattern baldness prior to correction with scalp expansion. **b** Occipital expander inflated. **c** Patient after correction

Fig. 68.8. Two custom-made tissue expanders for scalp surgery

4. More predictable than immediate flaps
5. Latitude in size adjustment
6. Sensation is preserved
7. Larger areas covered with fewer procedures
8. Minimal operative procedure with respect to
   a) Anaesthesia.
   b) Surgery time
   c) Complications
   d) Hospitalisation
   e) Recovery

The disadvantages of skin expansion are as follows:
1. Two or more operations
2. Multiple office visits
3. Cosmetic defect during expansion phase
4. Discomfort after inflation session

The technique of skin expansion is as follows:
1. Expanders placed adjacent to defect
2. Placement between galea and pericranium
3. Pocket large enough for expander to lie flat
4. Injection port/tunnel away from expander
5. Drain wound after expander placed
6. Inject one or two times per week (variable)
7. Flap rotation or advancement
8. Remove expander when adequate tissue available
9. Drain wound after flap advancement

Also a combination of tissue expanders and flaps could be used for surgical correction of androgenetic alopecia as presented by Nordström [11, 12]. The Nordström system takes advantage of the occipital area, which is usually the largest and most important reserve for hair follicles.

Fig. 68.9. **a** Preoperative male patterm baldness. **b** Result after first scalp reduction. **c** Result of two scalp reductions

68.6 Scalp Reductions: Extenders Versus the Nordstrom Suture

In 1978, two Canadian physician brothers named Blanchard reported a new technique for dealing with baldness in the crown area of the scalp [13].

Since the original report, scalp reductions served as the alternative to hair transplantation and flaps (Fig. 68.9). In the modern era of hair restoration surgery, where the transplantation of large numbers of very small grafts is possible, the role of scalp reduction has been reconsidered. The recent advancements in scalp reduction surgery have been to overcome its technical problems, such as avoiding midline scars with more creative patterns of tissue movement, shortening of the total time to achieve a desired result, and reducing stretch-back. An elastic silicone suture that takes advantage of mechanical and biological creep has been developed and patented by Nordström [14] (Fig. 68.10) for use in scalp reductions for the treatment of male pattern baldness, and other cases of alopecia (Figs. 68.11, 68.12). At present a variety of tissue expanders, extenders, and various external, semiexternal versus semi-internal devices that take advantage of dermal mechanical and biological creep are available to remove and reconstruct various areas of the skin, to facilitate the scalp reduction, to increase the surface of the scalp that can be excised and to prevent stretch-back.

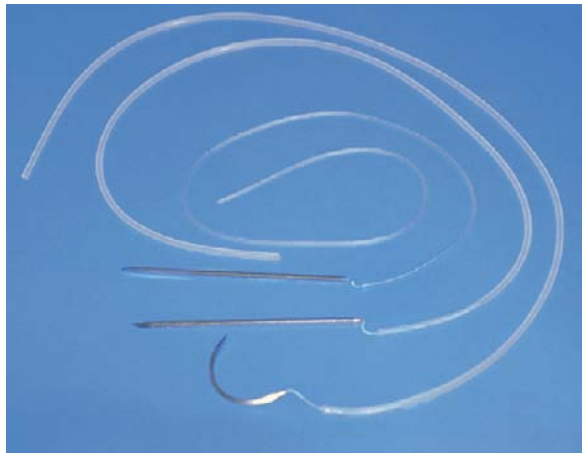


Fig. 68.10. The Nordstrom suture

The Nordstrom suture has following advantages compared with the previous devices:

- Totally buried so as not to be a port for infection through skin openings
- Does not need any filling sessions unlike tissue expanders
- Does not significantly lose tensile strength unlike extenders
- Very versatile when it comes to exerting tension in various directions simultaneously as well as exerting various amounts of tension in various directions

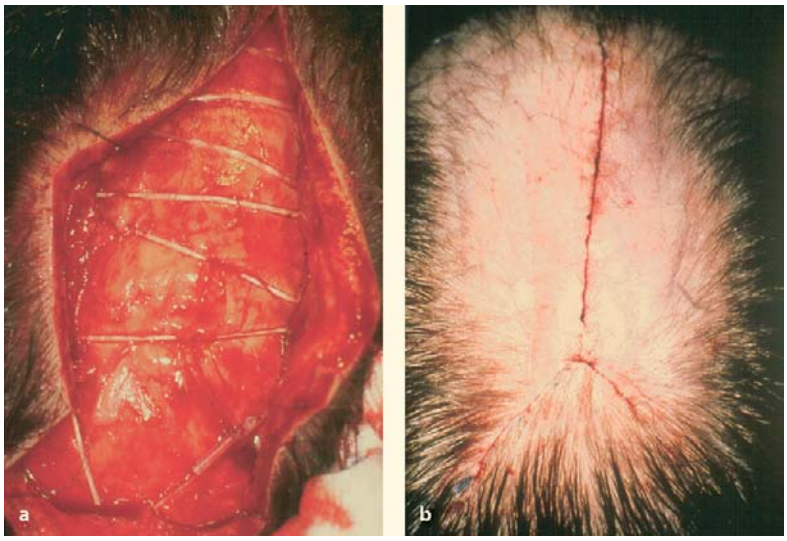


Fig. 68.11. **a** The Nordstrom suture inserted in the galea. **b** The Nordstrom suture tightened to take all the tension

Fig. 68.12. **a** Male pattern baldness. **b** Four weeks after a scalp reduction with the Nordstrom suture. Note the waves created by the compression from the Nordstrom suture

68.7 Hair Transplantation

Hair grafts can be divided into four groups according to their size:

1. Punch grafts are 3–4 mm in diameter and have more than 12–20 hairs per graft (Fig. 68.13).
2. Minigrafts that are usually 1.2–2.5 mm in diameter and contain five to nine hairs per graft.
3. Micrografts that are usually 1.5–1.0 mm or less in diameter and contain one to three hairs per graft (Fig. 68.14).
4. Micrografts cut as follicular grafts – the natural growing groups of hair follicles with each group containing between one and five hairs, usually one to three hairs (Fig. 68.15).

Earlier hair transplantation was performed with punch grafts that measured 4–5 mm in diameter and could contain up to 25 hairs each, but their use had significant problems because of their large size. The inevitable result was a "pluggy" look, disturbing scarring, elevated (cobblestoning) or sunken grafts, and abrupt start of hair growth in the frontal hairline. To meet the demands for a natural-looking hairline, hair

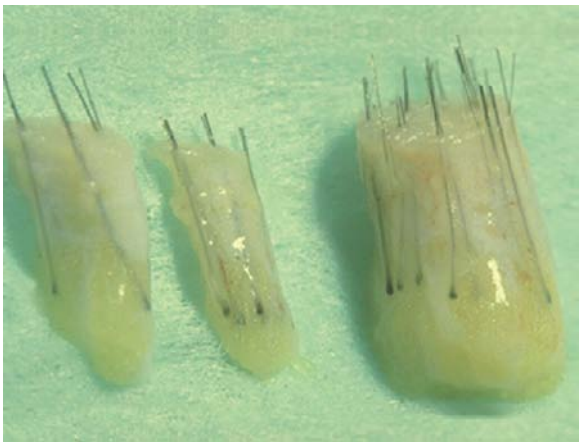


Fig. 68.13. Punch grafts

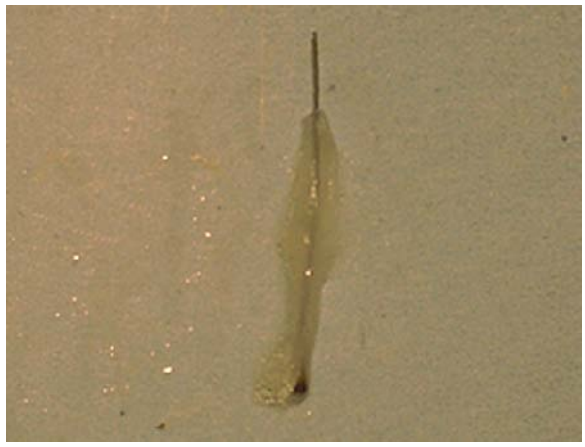


Fig. 68.14. Micrograft

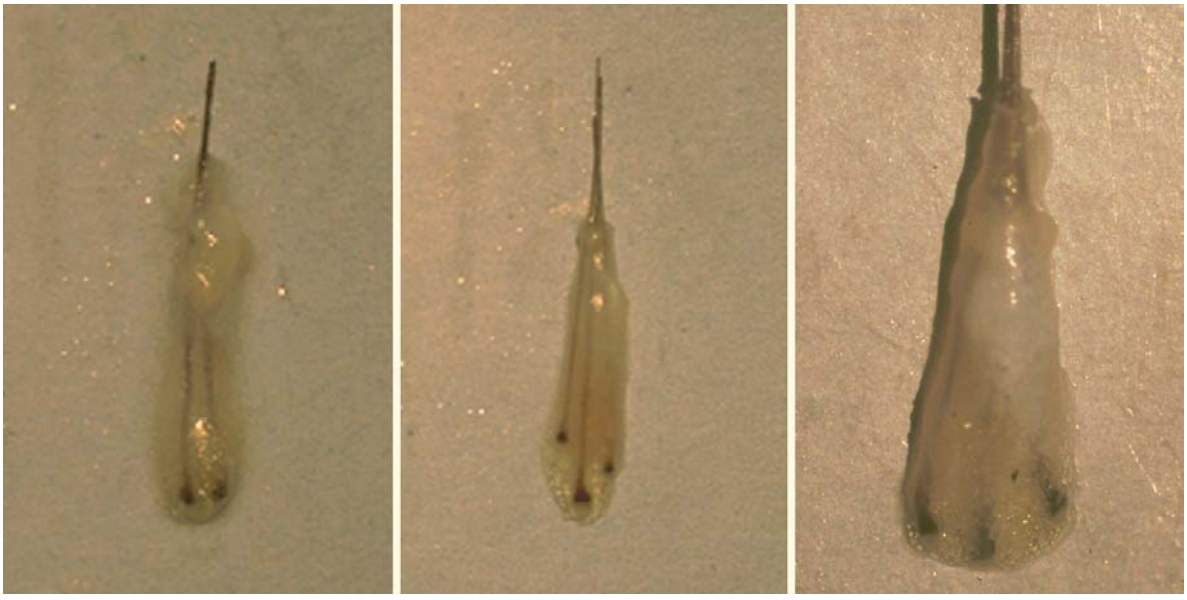


Fig. 68.15. Micrografts cut as follicular units

transplant surgeons started to use smaller and smaller grafts. Nordström [15] became the first to describe the use of these small grafts, the micrografts, for correction of the frontal hairline in male pattern baldness in 1981.

Still earlier, in 1976, in his publication on hair transplantation that was issued in January 1976 as a supplement to *Scandinavian Journal of Plastic and Reconstructive Surgery*, Nordström [16] first reported his observation that several hairs often emerge from the same pilary canal. His observation was confirmed by Headington [17] in his work on microscopic anatomy of the human scalp in 1984. In 1995 Bernstein et al. [18] described the concept and technique of follicular transplantation, recognising the follicular unit as the basic element of tissue to be moved in the transplant. Nowadays, transplantation of micrografts cut as follicular units has gained wide acceptance all over the world as the method giving the best results. They usually look so natural that even the hairdresser cannot see signs of the operation (Figs. 68.16–68.22). But this system with micrografts and megasessions requires a big team especially trained to make transplantation of up to 3,000 grafts and up to 7,000 hairs in one session. Not so many of these teams have been trained yet. That is why minigrafts, which are easier which do not give such good results, – are still the most common and the large vs. small graft argument seems to be ended for good.

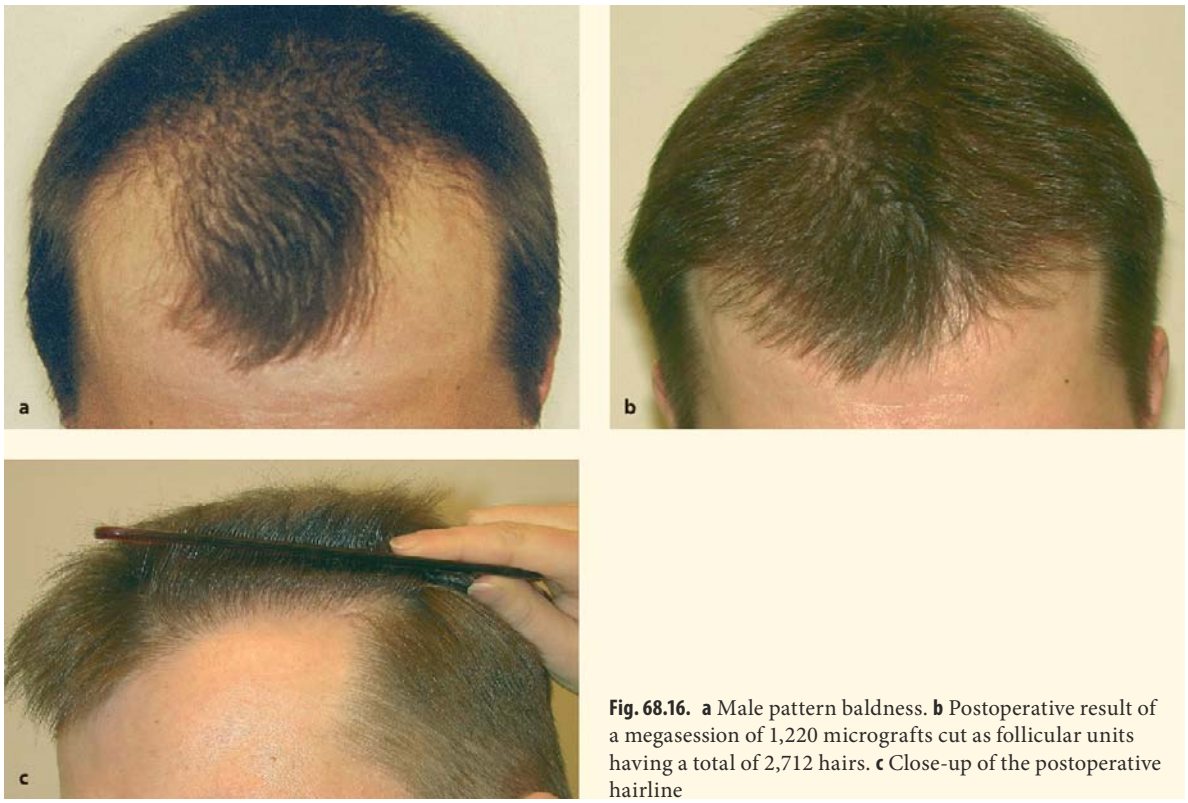


Fig. 68.16. **a** Male pattern baldness. **b** Postoperative result of a megasession of 1,220 micrografts cut as follicular units having a total of 2,712 hairs. **c** Close-up of the postoperative hairline

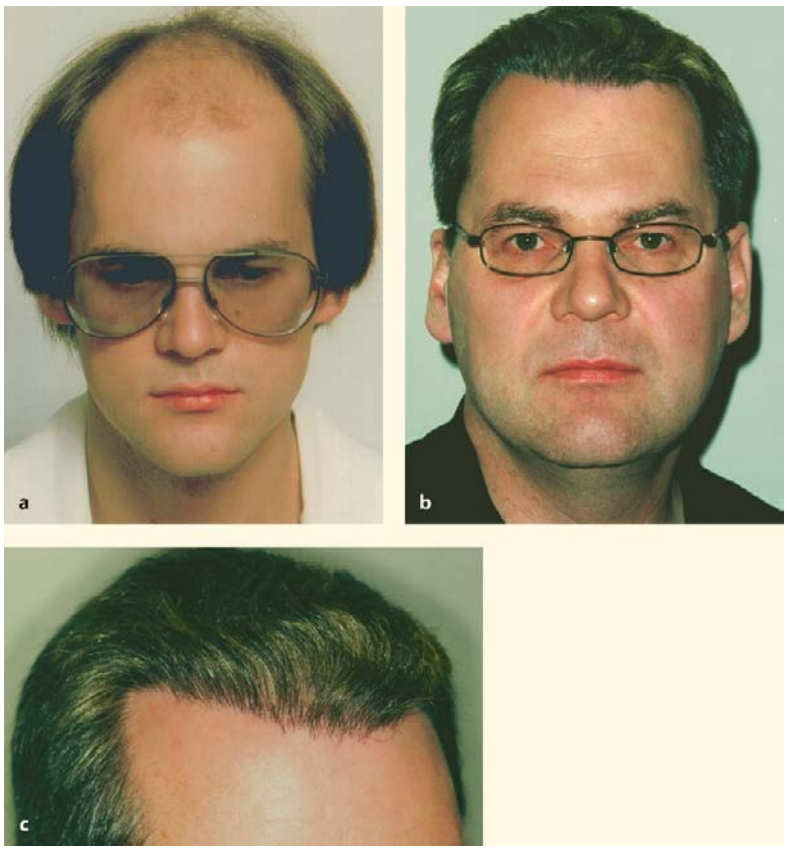


Fig. 68.17. **a** Male pattern baldness. **b** Result of hair transplantation 20 years postoperatively. **c** Close-up of the hairline 20 years postoperatively

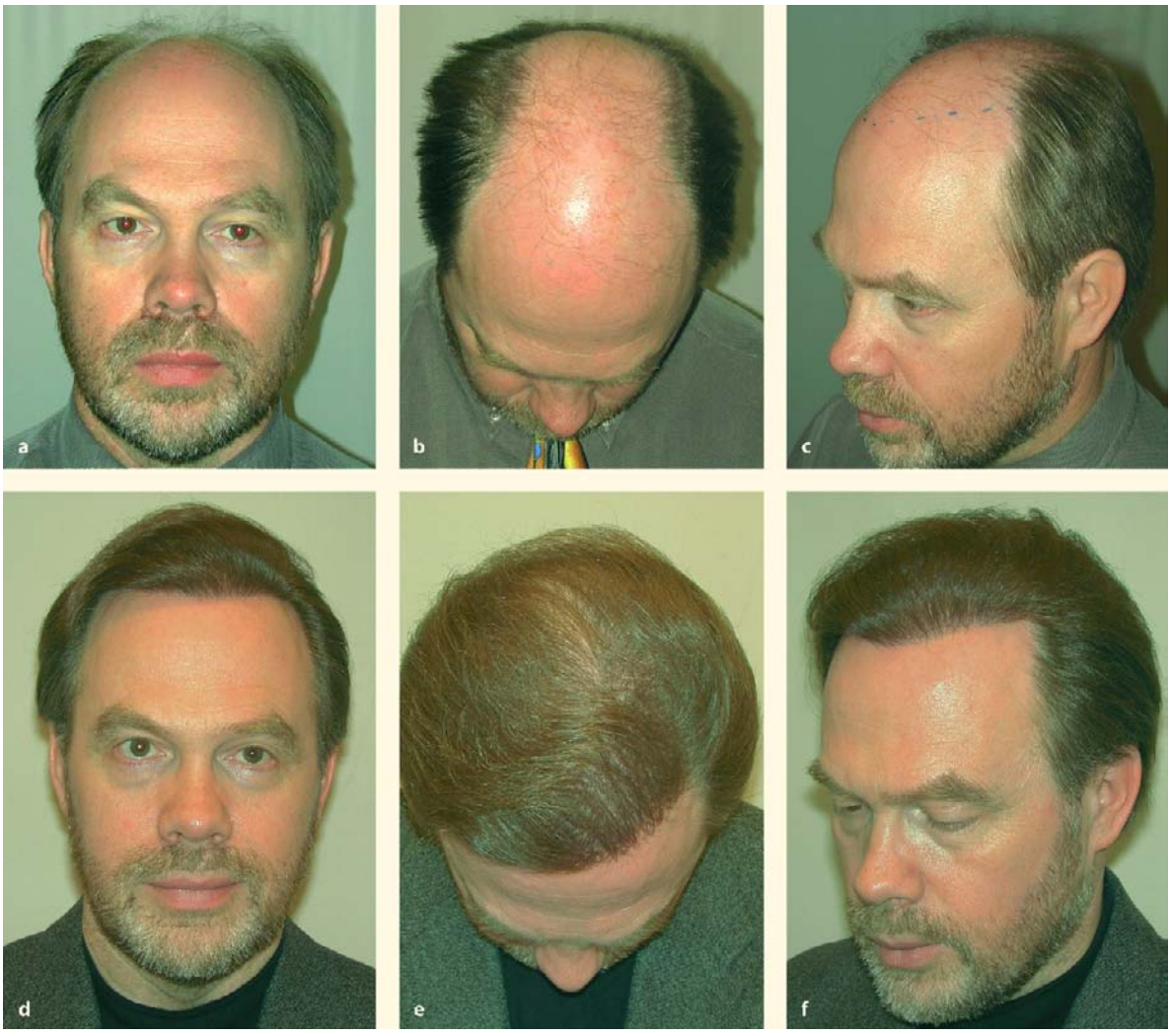


Fig. 68.18. **a–c** Extensive male pattern baldness. **d–f** Postoperative result of two megasessions of over 3,000 micrografts cut as follicular units containing about 7,000 growing hairs per session

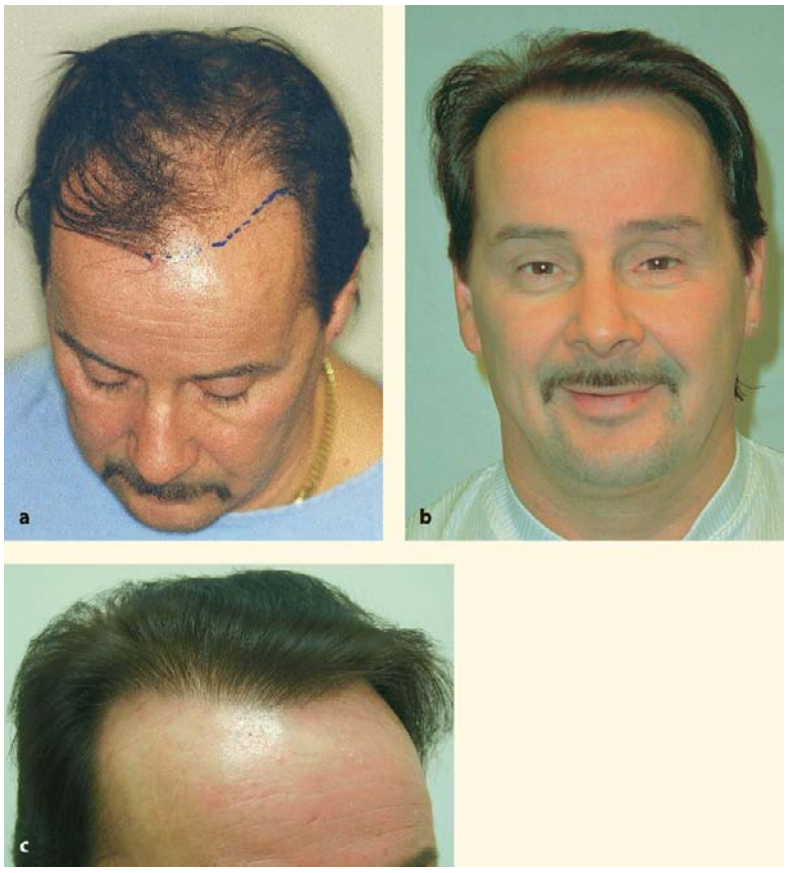


Fig. 68.19. **a** Male pattern baldness. **b** Postoperative result of transplantation of 2,920 micrografts containing 7,957 hairs. **c** Close-up of the postoperative hairline

Fig. 68.20. **a**, **b** Preoperative hairline. **c**, **d** Postoperative hairline

Fig. 68.21. **a** Preoperative hairline. **b** Postoperative hairline

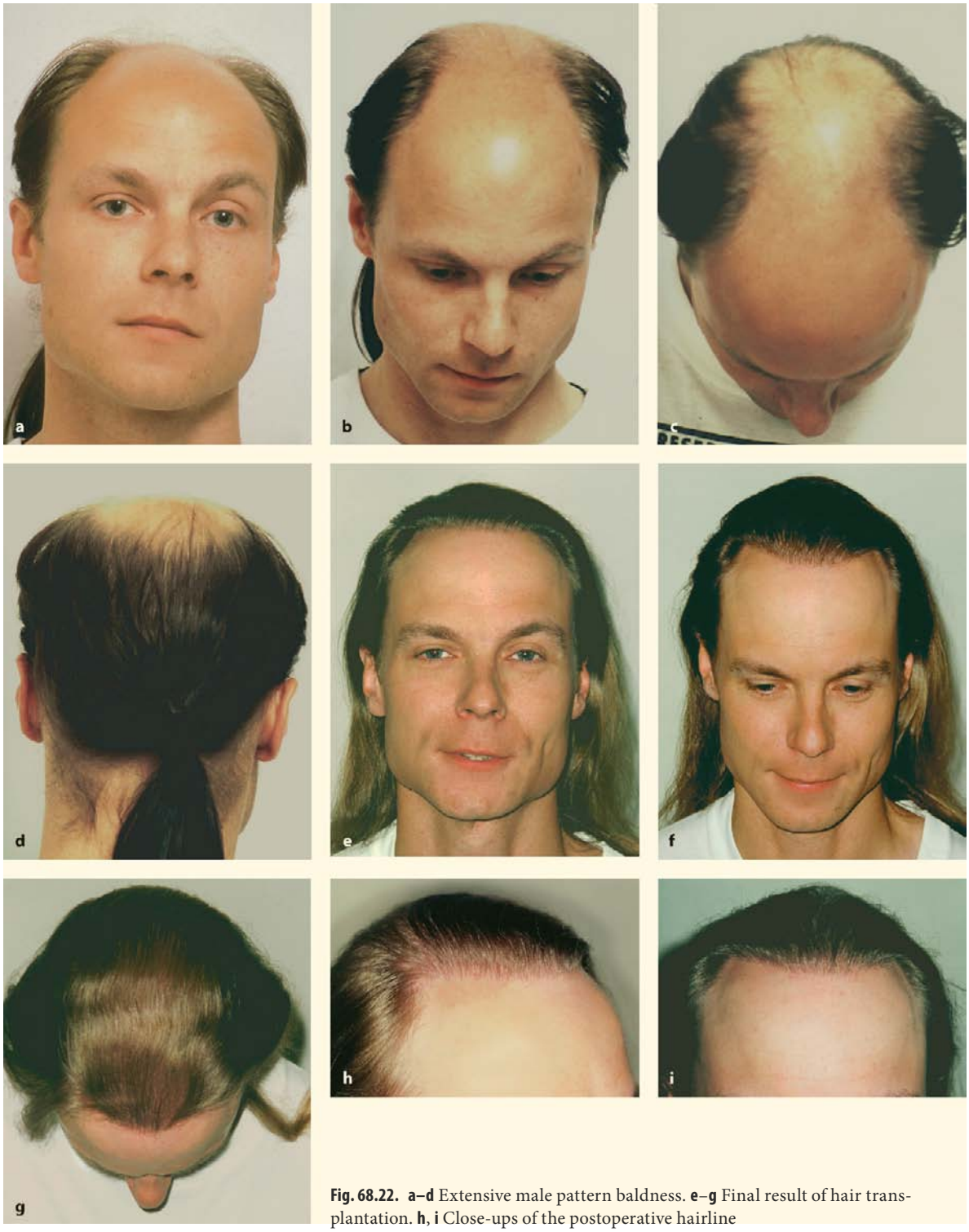


Fig. 68.22. **a–d** Extensive male pattern baldness. **e–g** Final result of hair transplantation. **h**, **i** Close-ups of the postoperative hairline

Fig. 68.23. Postoperative scar in the donor area

68.7.1 Methods

68.7.1.1 Donor Area

A suitable donor area is selected usually in the occipital area. The quality of the donor hair should be as close as possible to the hair quality desired in the recipient. The occipital artery, vein, and nerve are marked routinely using a Doppler probe and preserved in the operation. For local anaesthesia, lidocaine with epinephrine is used. Furthermore, saline with 1:50,000 epinephrine to induce a better haemostasis is infiltrated. As the donor strip is cut, the knife is angled so as not to cut any hair follicles. The donor area is closed in two layers with, for example, 2-0 Dexon in the deeper layer and the surface is closed with a, for example, 4-0 Prolene lock-stitch (Fig. 68.23). The required donor area is calculated according to the number of grafts and hairs to be transplanted.

68.7.1.2 Cutting Slivers and Micrografts as Follicular Units

When the ellipse has been cut from the donor area, it is transferred to a sterile tongue-blade, fixed with two needles, and kept moist with saline. Follicle unit slivers are cut under the microscope (Figs. 68.24–68.27). They are then dissected under the microscope to grafts containing follicular unit. Excess fat under the deepest part of the hair follicles is trimmed off, leaving about 1–2 mm of fat. The micrografts are then placed on moist gauze pads in Petri dishes with saline, and cooled by ice to prevent the follicles from drying and warming up.

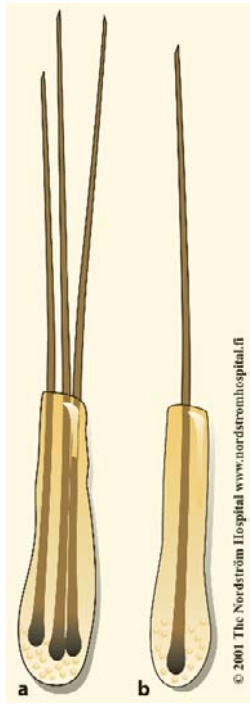


Fig. 68.24. **a** Three hair follicular unit graft. **b** One hair follicular unit graft

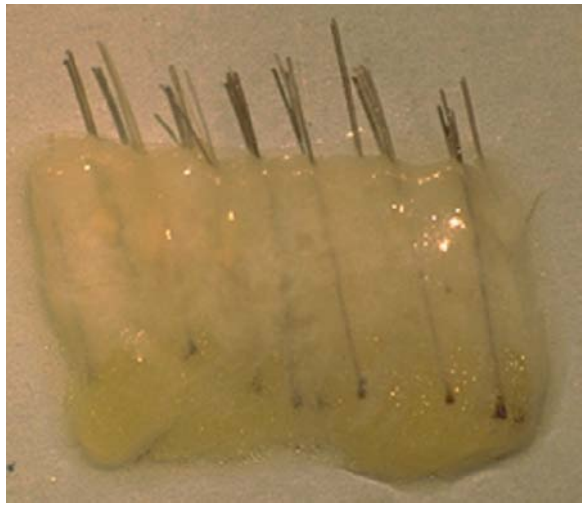


Fig. 68.25. Sliver

68.7.1.3 Recipient Area

The recipient area is washed and anesthetized with 1% lidocaine with epinephrine. The patient is also prepared with intravenous sedation and receives a short-acting analgesic prior to the local anaesthesia both in the donor and in the recipient area (alfentanyl).

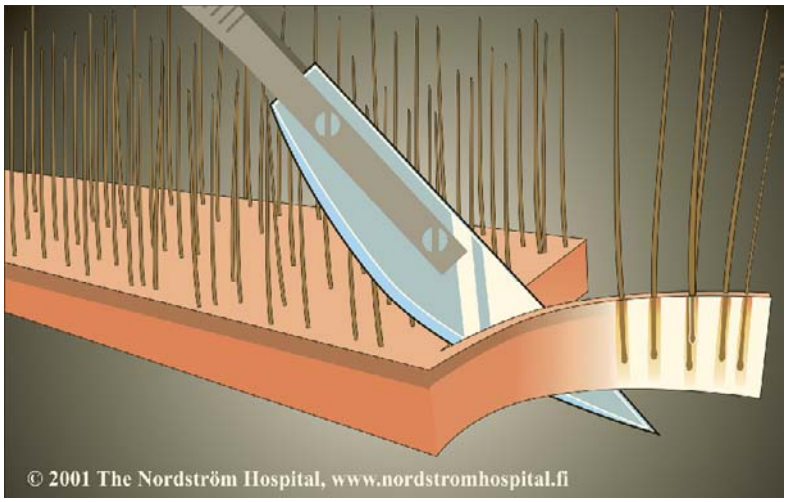


Fig. 68.26. Cutting slivers under the microscope

Fig. 68.27. Cutting follicular unit grafts from the slivers under the microscope

Fig. 68.28. Dense packing of grafts giving a density of 60–80 hairs per square centimetre in one operation

For further haemostasis, small amounts of saline with epinephrine (1:50,000) are injected, which enhances the insertion of grafts and also produces a tumescence that is valuable.

The recipient holes should be as small as possible so as not to create visible scars. Presently 18-, 19-, and 20-gauge round needles are routinely used to enable the insertion of micrografts cut as follicular units and not to leave any visible scar.

The direction of the recipient holes is extremely important in order to achieve the correct direction of the hair growth and this is enhanced by tumescence of the recipient area. It is also important not to make the recipient needle holes too deep so as not to unnecessarily cut and damage the vessels in the deep layer of the subdermis. Damaging as few vessels as possible also enables the dense packing of grafts. With dense packing, a density of over 40 grafts per square centimetre is achieved without risk of necrosis or impaired growth of hair follicles (Fig. 68.28).

68.7.1.4 Postoperative Care

Although the grafts do not necessarily need bandaging postoperatively as they will be glued in place by the fibrinogen of the blood in a natural way (Fig. 68.29), it is preferable to use a bandage overnight in order to prevent the movements of the head against

Fig. 68.29. About 2,500 grafts in place at the end of the operation

the pillow or the patient scratching and dislodging the grafts. The next day the bandage can be removed and the hair washed. Sometimes the patient is recommended to keep a light compression bandage on the area for 3–5 days more so that during sleep the area will not be rubbed by the pillow.

68.7.2 Results

The success rate regarding follicle survival with micrografts cut as follicular units with a good technique is close to 100% as no areas without the anticipated density of hair follicle growth have been clinically observed.

Aesthetically all patients have been very satisfied with the results of transplantation of micrografts cut as follicular units. In many patients, one session has been enough to achieve the desired density. In cases where one session does not accomplish sufficient density, the procedure can be easily repeated after 6 months or more. It is important that the patient is informed that the hairs usually fall out from the grafts within 3 weeks and then start to grow usually in about 3 months, as normal scalp hair probably for the rest of his/her life. In over 25 years of experience with grafts, we have never seen a case where the transplanted hair would not grow.

Infections are extremely rare with a good surgical setup and we have not seen any in the more than 1,500 operations in which we used megasessions of micrografts cut as follicular units.

68.8 Hair Transplantation – What Lies in the Future?

Surgical hair replacement is still a redistribution of hair follicles and does not give a neogenesis of follicles. It is already possible to transplant every single hair to a new and desired position and direction with natural-looking results. Experiments of hair follicle multiplication by transection are already partly successful. Other means of multiplying hair follicles might become successful in the future to help especially those cases with a donor reserve insufficient for an aesthetically pleasing reconstruction.

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69 Ancillary Procedures

Dimitrije E. Panfilov

69.1 Introduction

With advancing age, the skin loses the collagen and elastic fibres of the connective tissue as well as the support of the subcutaneous fat which holds the skin of babies, for example, taut and gives it volume.

The thickness of the skin is also important, with wrinkles developing later on thicker skin. This is why it is difficult to guess the age of Asians, whose skin is generally thicker. They do not develop wrinkles on the face until very much later. Female skin is thinner than that of male skin, which is why women often look older than their male partner of the same age.

Smoking and frequent sunbathing, and use of the solarium, also bring on earlier and deeper wrinkles. Excessive use of make-up also furthers the development of wrinkles. There are basically two types of lines which give rise to wrinkles on the face:

1. Lines of facial expression
2. Gravity lines

Lines of facial expression develop from the activity of the muscles of facial expression and are particularly marked where these muscles lie superficially and insert themselves immediately beneath the skin: around the mouth and around the eyes. Musculus orbicularis oris and musculi orbiculares oculorum are the only muscles of the face without attachments to deeper structures like periosteum. They have the only attachments to the skin. Their only task is to contract skin and, consequently, to produce facial expression and wrinkles. The lines of facial expression are referred to as worry, frown, and thinking lines, as smoker's or "lemon lines" (lines around the mouth), smiling lines, etc. Apart from expression lines, they are also regarded as sleep and age lines.

Gravity lines develop from the effect of gravity on entire units of the face. The skin stretches and "droops": forehead, eyebrows, eyelids, nose, upper lip, cheeks, neck, breast, abdomen, etc. Here too, large individual differences are encountered. The process of ageing takes on a particularly rapid course in the presence of skin atrophy.

Generally speaking we can treat wrinkles caused by facial expression or sun and nicotine damage through smoothing out wrinkles from without, whereas orthostatic drooping of facial structures can be treated by suspensions and operative lifting procedures.

Wrinkles can be filled out from within through different absorbable and nonabsorbable injections (see Chap. 73 by Gottfried Lemperle). To provoke new formation of collagen and elastic fibres as well as proliferation of the smallest vessels, we ought to remove the epidermis of the skin. We can achieve this by

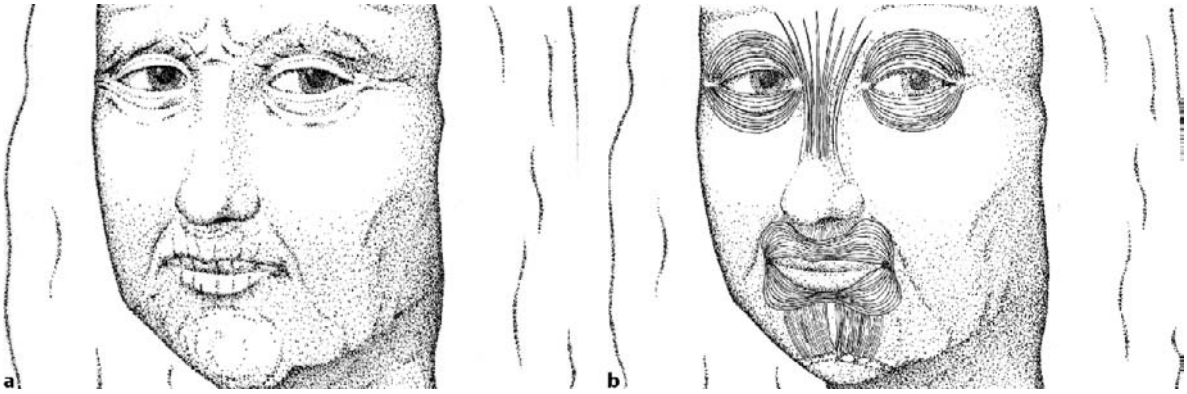

Fig. 69.1. **a** Wrinkled skin in advanced age. **b** Corresponding facial muscles responsible for wrinkles of facial expression

Fig. 69.2. Faster wrinkling and ageing of the skin is provoked

mechanical, radiosurgical, chemical, or laser peeling (see Chap. 70 by Ashok Gupta and Chap. 71 by Carlos O. Uebel).

Dermabrasion is a procedure which has been around for a number of decades and was first used to treat scars resulting from accidents, surgery, and acne, as well as for cornifications and pigment displacements. Later this method was adopted to remove superficial wrinkles and involves the mechanical removal of the uppermost layer of the skin using a high-speed rotating burr coated with diamond particles. The effect of a well-dosed dermabrasion is absolutely gratifying and comparable to that of chemical peeling and laser resurfacing. It is a very reliable method in experienced hands but should not, however, be employed excessively. If the dermabrasion is performed too deeply, then scars will develop. Complications and aftercare are similar to those of peeling and lasering. On completion of the tissue abrasion, fibrin tissue adhesive can be applied as a biological dressing, which also prevents the discharge of tissue fluid. The procedure can be repeated after 4–6 months.

Radiosurgical treatment is also used preferably for smaller regions, like the upper lip, singular wrinkles, or circumscribed pigmented lesions or even obtrusive scars.

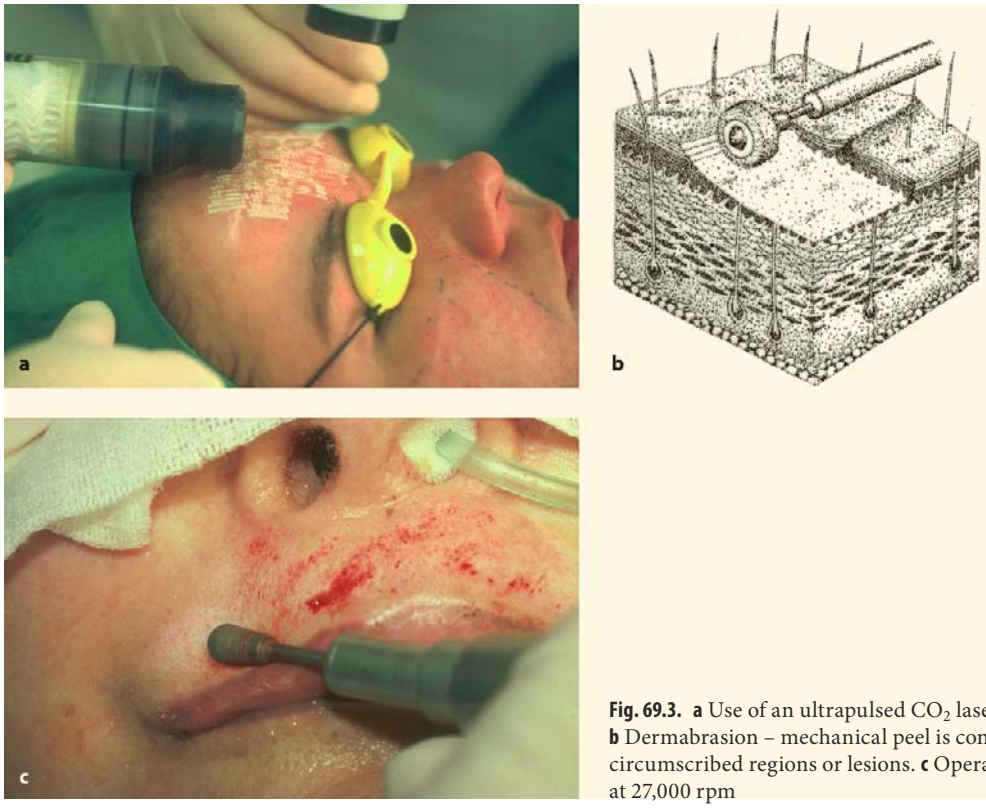

Fig. 69.3. **a** Use of an ultrapulsed CO_2 laser for acne scars. **b** Dermabrasion – mechanical peel is convenient for circumscribed regions or lesions. **c** Operative procedure at 27,000 rpm

Fig. 69.4. **a** Radiosurgical removal of pigmented lesion: start. **b** Radiofrequency 4 MHz: end of the procedure. The same patient **c** before and **d** after radiofrequency treatment. Scar correction: **e** start and **f** end of the procedure

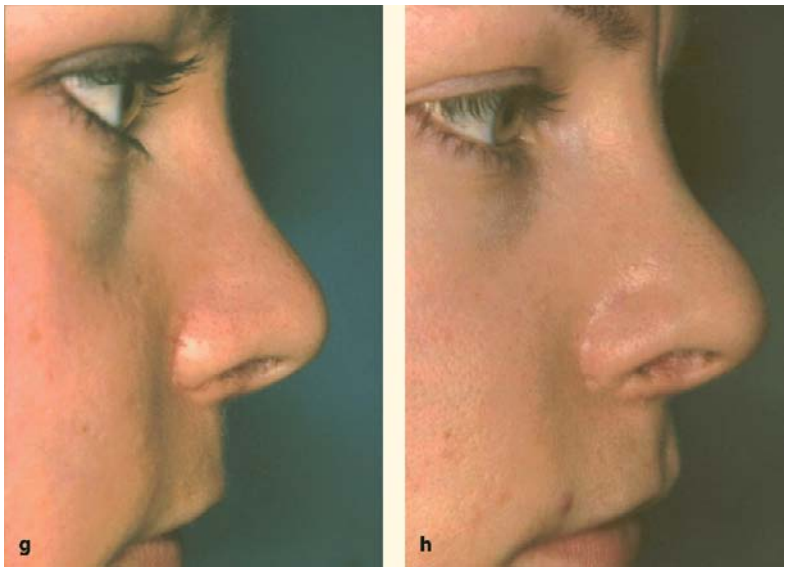

Fig. 69.4. *Continued.* The same patient **g** before and **h** after 6 weeks – the scar is not visible anymore

69.2 Chemical Peeling

There are many ways of stimulating the skin regeneration on a chemical basis. Mention is made of:
- Retin A, or retinoic acid, a synthetically manufactured derivate of vitamin A
- α-Hydroxy acid, which is found in fruit, milk, and sugar, called also glycolic acid
- Trichloroacetic acid
- Resorcin oil
- Phenol in different concentrations from 30 to 99%

Baker–Gordon peel still has worldwide acceptance, and has the following formula: 3 ml phenol (carboxylic acid), 3 qt croton oil, 2 ml distilled water, and 8 qt septisol soap. This formula has very predictable results, but has been modified over the years because there is danger of scars if the skin treated is very thin.

69.2.1 Exoderm Peel

Yoram Fintsi from Israel developed in 1986 a modified solution with a neutralized systemic effect. Exoderm" does not pass the basic membrane of the skin, so it is neither cardiotoxic nor nephrotoxic. Its "liquid formula" contains:
- 1 ml 91% phenol liquid
- 1 ml 99.5% phenol crystal
- 2 qt croton oil
- 10 qt hexachlorophene (septisol)
- 0.3 ml resorcin
- 0.2 ml citronic or salicylic acid
- 0.5 ml distilled water
- 0.5 ml mixture of olive oil, glycerin oil, sesame oil, and ethanol
- 10 ml tris(hydroxymethyl)aminomethane buffer

We apply the liquid formula preferably in intravenous analgosedation in three passes for the whole face, except for the eyelids, where we make two passes, and for very deep wrinkles and folds, where we make four passes. The indications are as follows:
- Ageing wrinkles
- Sun-damaged skin
- Nicotine lines
- Acne scars
- Scars of security-glass particles
- Pigmented and keratoacanthotic lesions
- Porous skin

We prepare the skin with washing, fat removal with acetone, and disinfection. We start with forehead, cheeks, and chin and use almost-dry absorbent cotton wool for the eyelids.

A burning sensation is felt on the skin for 10–15 seconds when the solution is applied and again after half an hour for a further 6–8 h, but this can be treated with analgesics. That is why this procedure is performed under sedation, sometimes even under local anaesthesia, and very often with intravenous analogosedation.

Fig. 69.5. **a** Very simple equipment is necessary. **b** Freezing effect for a few minutes. **c** Sticks with cotton wool

Fig. 69.6. **a** Absorbent cotton wool stick moistened with "liquid formula". **b** Second pass

Fig. 69.6. *Continued.* **c** Third pass. **d** Stitching plaster strips (4×2 cm) like a tiled roof covering the face **e** Occlusive mask is an impermeable cover. **f** After 18–24 h it should be removed. It is a painful procedure. **g** After one additional pass, the "powder formula" with bismuth subgallate for antiseptic protection of skin regeneration below it

Fig. 69.7. **a** Model with porous skin. **b** Watertight occlusive dressing for 18–24 h. **c** Her disguised appearance. **d** Powder (bismuth subgallate) mask for a further 7 days. **e** Her fresh look with shining skin 4 weeks later

Fig. 69.8. **a** Patient before treatment, 62 years of age. **b** After 24 h the occlusive mask has been removed. **c** One more pass (it is painful); powder mask of bismuth subgallate has been applied. **d** The same patient after 4 weeks. After 3 months she underwent classic biplanar face- and neck-lift. **e** Her look 3 weeks postoperatively to be compared with **f** her initial appearance

The swelling occurs mostly on the second or third day, sometimes with a feeling of suffocation, which can be treated with diuretics.

Beneath a watertight face dressing for up to 24 h and further a 7 days under an antiseptic powder mask of bismuth subgallate, the following histological changes take place:

- Elastosis of capillary bodies
- Evening of epidermal layer
- Multiplication of collagen and elastic fibres
- Increase of vascularization

As result of these changes the histological specimen of the skin treated with Exoderm shows absence of the stratum corneum and an almost complete absence of melanocytes.

If the indication for Exoderm peel was good and the very simple procedure was performed properly, we can often achieve spectacular results.

Pigmented lesions can be a problem even in advanced age if there are freckles or there is a combination with acne scars.

There could be also the intention of people with somewhat darker skin to bleach it, or scars of different aetiology could be made smoother with this kind of peeling. Sometimes the redness of the skin can persist for 8 weeks, and in very thin, atrophic skin even longer – for months.

Fig. 69.9. **a** Fine wrinkling from excessive exposure to sunshine. **b** Result after 4 weeks. **c** Wrinkling from nicotine abuse and **d** 4 weeks after Exoderm peel

Fig. 69.10. **a** Freckles and pigmented lesions. **b** Smaller and bigger pigment marks disappeared 6 weeks postoperatively

Fig. 69.10. *Continued.* **c** Pigment marks and acne scars. **d** Cleaned skin 4 weeks after Exoderm peel

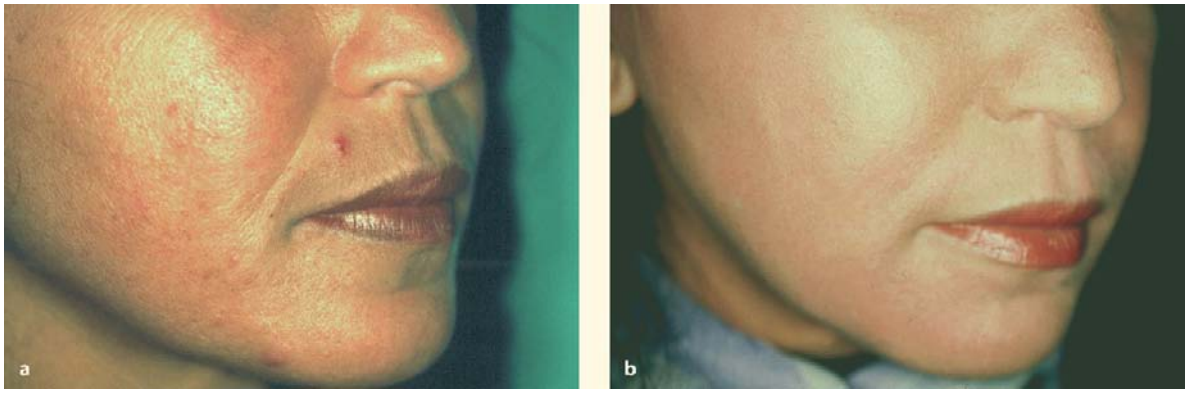

Fig. 69.11. **a** A young woman from Brazil living in Europe wanted to make her complexion less coloured. **b** Her appearance after 6 weeks. **c** Multiple scars in the face following motorcar injury with security-glass particles. **d** Four weeks after peeling

Fig. 69.12. **a** Female patient before treatment. **b** Two weeks later. **c** Six weeks later. **d** Eight weeks after peel

The only contraindications for this kind of chemical peeling are:
- Acute herpes labialis
- Acute kidney insufficiency

Complications are seldom and temporary:
- Milia
- Visible demarcation line
- Hyperpigmentation (caution: Addison's disease)
- Hypopigmentation (caution: Fitzpatrick skin types V and VI)
- Herpes simplex eruption

Fintsi found no permanent complications after the 4,000 procedures he did.

Thank to this liquid formula we remove the upper layer of the skin within the first 24 h because of powerful acids which do not pass the basal layer of the

Fig. 69.13. **a** Female patient with porous skin. **b** Two weeks after Exoderm peel. **c** Usual follow up – after 5 weeks

Fig. 69.14. In-between the patients are allowed to perform any kind of hiding what has been done

skin. The buffer effect of bismuth subgallate neutralizes the pH – so there are no systemic dangers for heart and kidneys.

After 8 days the mask is carefully removed with white Vaseline. None of the potential complications are of a permanent nature (pimples and a herpes simplex eruption, demarcation line, hyperpigmentation, prolonged redness). The results are, in part, very convincing, making it a reliable method which does not take more than half an hour and can be performed on an outpatient basis.

Fig. 69.15. **a** Straight needle leads the gold thread through the basic layer of the dermis. **b** The ends of the gold threads should be cut off as deep as possible to prevent their expulsion. The same patient **c** before and **d** 3 months after treatment

69.2.2 Gold Threads

Fine filaments of 24 carat gold are coated with polyglycolic acid and can be implanted with the aid of a guiding needle to wave them under the skin. Mostly, we treat the cheek skin in this way. As with the process of scar formation, this organic coating brings about a gradual contraction of the skin of the cheek, which subsequently appears smoother within a period of 3 months.

Sometimes the patients report a slight stabbing sensation which lasts some time or the gold threads penetrate the skin and are removed by the patient himself/herself. The gold itself is only a bioinert guidewire and is no longer required for tightening the skin. This method of "gilding the cheeks" has no effect on the skin of the eyelids.

The procedure can be done under local anaesthesia with or without intravenous sedation on an outpatient basis. This treatment does not have overwhelming successful outcomes, but it has no permanent complications or serious risks. It is very popular among Russian patients.

69.2.3 Barbed Threads – a 15 min Lifting

The first to do this was the Georgian plastic surgeon Marlene A. Sulamanidze from Moscow, who invented APTOS sutures, meaning antiptotic suspension. It was a very simple idea to apply nonresorbable or resorbable sutures which have side application similar to the skeleton of a fish. These side arrows should be directed against the ptotic facial tissue. If they have been inserted in the proper way, the threads are able to keep cheeks or other ptotic structures in an elevated position for 2–3 years.

Meanwhile Sulamanidze himself applies such sutures to lift also other structures, like breasts and upper arms. Woffles Wu from Singapore (see Chap. 72 by him) has described Woffles lift, with his own manufactured threads, and Nicanor Isse from the USA invented silhouette sutures and his feather lift.

We have had very pleasant experience with Woffles lift, which really can be done during a break for lunch – it does not take more than 15 min to be completed. The head should be washed in antiseptic solution completely. After having made photographic documentation, we make dermographic markings on the lowest parts of the facial units –the jaw line, nasolabial folds, etc. – and we mark the vectors of traction.

Under analgosedation or even only local anaesthesia, we incise the temple region for 4–8 mm and instil tumescent or just diluted (1:3) local anaesthetic solution along the vectors of traction downward until the lowest markings we made before. After that we lead the longitudinal strait needle with a mandrel until the temporal incision. After removing the mandrel we put the end of the Woffles thread into the temporal opening of the long straight needle and proceed it by pushing until its other end appears at the lower end of the needle. Now the needle should be removed holding the upper end of the thread with our nondominant hand. Then we stitch another corresponding point marked before and come out with the needle tip through the same temporal incision. Now, the other half of the thread should be proceeded downward in the same way and the needle should be removed. The U-loop part of the thread catches the part of the temporal fascia. We keep both ends of the thread and push gently the ptotic facial structure toward the temple. We always need an even number of ptotic points to be elevated: two, four, six, eight.... At the end of the procedure we cut off the ends of the threads, pushing

Fig. 69.16. **a** Heavy square face before treatment. **b** Elevating vectors marked **c** 1 day and **d** 3 months postoperatively. (Fig. 69.16 e–g see next page)

Fig. 69.16. *Continued.* **e** Waptos thread to be proceeded downward through the straight needle. **f** Right side has been done; cutting off the thread ends on the left side. **g** Different barbed sutures: **a** APTOS; **b** Woffles (Wu); **c** silhouette (Isse)

Fig. 69.17. **a** Patient before treatment. **b** Waptos-lift done by Wu himself. **c** Appearance of the patient at the end of the procedure

the skin upwards, and release the remaining dimples at the ends of the threads by smooth massage. We suture or staple the temporal incision. The whole procedure should be done with the patient in the sitting position.

This is a very simple procedure which can be done on outpatients with local anaesthesia within 15–20 min. The response of our patients up to now has been very good. The effect could be good for 2 years, but our actual experience at the moment is not so

long. This procedure could also be applied in reconstructive surgery to elevate the tissues descendent for other reasons.

69.3 Ruby-Laser Depilation

Hair removal can help beautify some person, to increase his/her social acceptance. The most common areas where patients want hair removal are upper lip. cheeks, chin, neck, shoulders, axilla, breast, bikini-line, buttocks, and calves. Surprisingly enough, up to 20% of our patients are in fact men who wish to shed unwanted hair.

Until recently, depilation was a tiresome topic in the fields of medicine and cosmetics because the outcome was so short-term, done by wax, electrolysis, or mechanical pull-up. Electrolysis works by electrothermolysis or by electrochemical generation of toxic free radicals. The disadvantage of such treatment was that only small areas could be treated, often leaving small scars of follicular bumps. Goldman described in 1963 the first ruby-laser injury to pigmented hair follicles and Grossman reported in 1996 a quantitative, controlled study of human hair removal by ruby-laser pulses. Nowadays there are many laser and flash-light systems available for the purpose of depilation. We prefer a long-pulse ruby laser of 694 nm which works though selective photothermolysis using melanin as the target chromatophore.

Fig. 69.18. **a** Upper lip and **b** cheeks are areas where women often have undesired hair

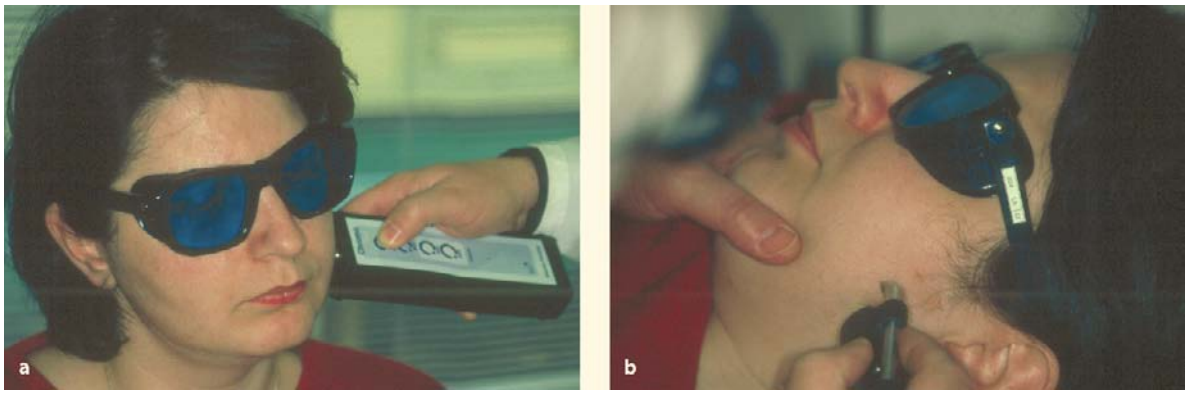

Fig. 69.19. **a** We use a spectrometer to decide which energy should be applied. **b** Ideal combination is dark hair and light skin; maximal energy of 20 J can be applied. Below 12 J a ruby laser is not effective

Fig. 69.20. **a** Hairy nasal root in a 20-year-old male patient **b** to be treated with 20 J from a ruby laser. **c** Result after second session

Humans have 100,000–150,000 hairs; dark-haired people have more hairs. The roots of the hairs are deeper in women (4.5 mm) than in men (3.5 mm). That is why men get bald more often than women. Roughly speaking, hairs grow 1 mm in 3 days, they grow for 1,000 days, and rest for 100 days. Each hair has three distinct regions: the bulb, which is near the insertion of the arrector pili, the isthmus and the infundibulum. Pluripotential cells responsible for hair growth are in the bulb. Melanocytes are also a target for laser rays.

There are three phases of hair: the anagen phase is the cycle of active growth, transition is the catagen phase, and the telogen phase is passive, when the hairs rest. We can eradicate hair follicles only in the active phases of each. In the face there are 60% of active follicles, so we need two to three sessions of depilation–to be compared with legs, where there are only 20% of active follicles; here we need six to seven sessions.

What is the function of hair in humans? There is the thermoregulative function (less and less important in evolution), photoprotective function, function of dry lubrication, and *aesthetic* function (more and more important). Shiny and magnificent hairs are symbols of beauty *and* health!

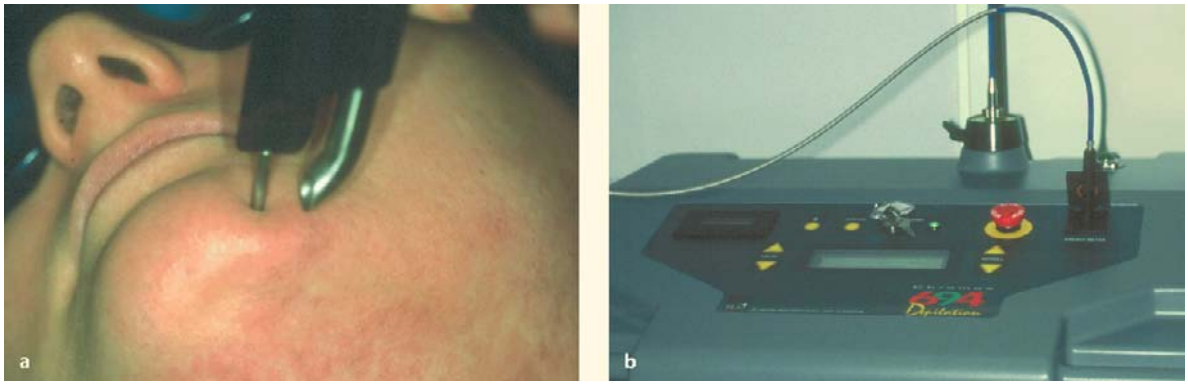

Fig. 69.21. **a** Laser energy applied perpendicular to the skin surface onto a round area of 6 mm diameter. **b** Chromos 694 is a ruby laser especially designed for depilation

Fig. 69.22. **a** Hairy female neck, chin, and lips. **b** Three days after first session. **c** Three weeks after first session. **d** Three months after third session

For at least 3 weeks before the procedure, no method should be used for the removal of hair (plucking, wax, etc.) other than shaving. The patient should have had the last shave 24 or 36 h before the treatment session. The hair stubbles serve as conductors to direct the laser energy down to the lowest point of the hair root. The hair is vaporized and the hair root destroyed.

We apply topical anaesthesia (Emla cream, cooling) and antiseptic cleaning of the skin before treatment. Cooling devices like cryogen sprays are able to reduce pigmentation, blistering, and scarring.

We do not recommend more than 150 shots per session. Each shot feels like an insect bite. Too many shots could cause discomfort to arise like by excessive insolation.

Fig. 69.23. Twenty percent of our patients developed pigmented marks after treatment with a ruby laser. These crusts disappear spontaneously after 5–6 days

Complications like hyperpigmentation and blistering are reversible. If too much energy by repeated shots has been directed onto some spots, scarring could occur.

P. Bjerring from Denmark acknowledges that treatment with a ruby laser has the highest efficiency in hair eradication known today. He found 80% of hair roots were destroyed 190 days after the second treatment in the face. Even if this method does not guarantee 100% success, it is by far more reliable than all other methods hitherto known.

69.4 Hair Replacement For Baldness

Attempts have been made since antiquity to try and reverse decreasing hair growth. The ancient Egyptians and Greeks used various substances for this purpose, ranging from the bile of shrimps to pigeon dung. The present-day cosmetic industry also has a lot to offer, while the worldwide search for the miracle cure goes on. The quickest means is still the toupee or the wig.

Different societies have their own different ideals of beauty, but pure skin as a sign of health and a full head of hair as a symbol for youthful beauty are in demand everywhere. About half of all Caucasian men lose the hair on their head sooner or later. Even the hair of women can become thin with time. Baldness troubles all those affected by it, and it can even result in serious mental disturbances in some sensitive individuals. It is estimated that over € 80 million is spent each year in Germany on medications to promote hair growth. A human being has 100,000–150,000 hairs on the head, depending on the colour of the hair. The hair root produces the hair shaft and is located deeper in women than in men. A person normally loses 50–100 hairs each day. If more are lost, the hair starts to thin out and bald patches appear. There are various types of baldness in a man. The commonest form is the appearance of bald areas at the temples (frontal type), on the top of the head (vertex type), and the central type. The causes are predisposition, age, and, above all, the concentration of the male sex hormone, testosterone. Even Hippocrates noticed that eunuchs do not go bald. The widespread assumption that bald men are more potent, however, is false.

Attempts at using hair other than the patient's own have failed: it is rejected by the body as foreign protein and leaves behind scarred skin. The use of artificial hair is illegal in the USA, for example, on account of the sometimes catastrophic results. The hairs break off and also leave behind scarred areas.

Hair restoration for sensitive areas can be achieved by various methods:

- Skin excision (scalp reduction)
- Hair-bearing skin flaps
- Skin stretching using the expander method
- Hair transplantation

69.4.1 Skin Excision (Scalp Reduction)

In the case of small areas of baldness, the bald patch can be removed, or substantially reduced, by excising the hairless part of the scalp. Any subsequent hair transplant is less time-consuming and requires less effort, if it is still at all necessary. A particularly popular method is the excision of a so-called Mercedes star or inverted-Y pattern. These types of operation can be repeated.

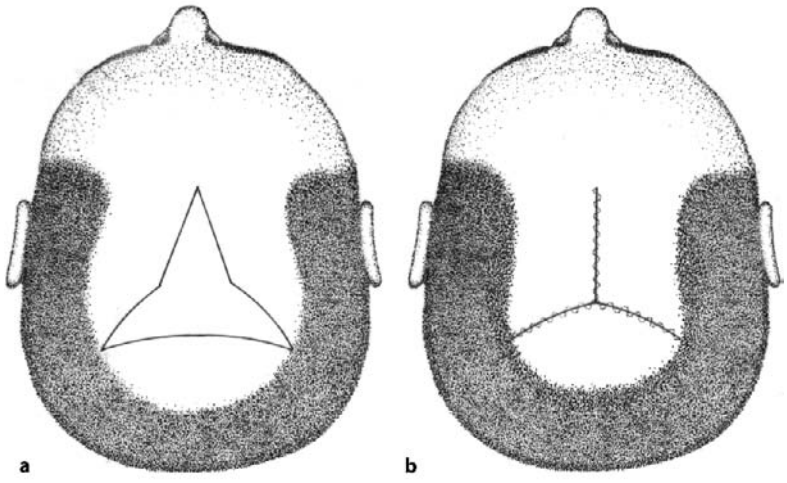

Fig. 69.24 a, b. Bald scalp **a** before and **b** after a Mercedes-star, or Y-shaped operation

69.4.2
Hair-Bearing Skin Flaps

Scalp flap surgery was developed particularly by those involved in trauma surgery and involves covering bald areas with hair-bearing skin (Fig. 69.25). A "visor flap" transferring hair-bearing scalp from the back of the head to the front has also been reported. Pedicled temporo-parieto-occipital flaps from the area of the scalp covering the region of the temple, crown, and the back of the head can be transferred from one or both sides of the head. The flaps are supplied by a pedicle of 2 cm breadth at its base, with a width of 3–5 cm. Recently free scalp flaps have been used, the vessels of which can be sutured microscopically to the vessels of the recipient area. They have the disadvantage, however, that the hairline along the top of the forehead skin does not always have the desired direction of hair growth.

69.4.3
Skin Stretching Using the Expander Method

When skin defects have developed as a result of an accident, scarring, tattooing, or the removal of a tumour, good healthy soft-tissue covering must be recruited from an area nearby or farther away. The expander method makes this possible, whereby a silicon balloon is inserted under the healthy skin and then successively inflated with saline solution. The skin covering the balloon stretches every time the expander is filled, resulting in excess skin. After about 3 months the balloon, together with the poor-quality skin or scars, is excised and the excess, healthy skin is spread out. This method can be utilized for bald patches, resulting in a head once again covered with hair. The disadvantage, however, is the conspicuous balloon on the top of the head becoming enlarged over the 3-month period – hardly to be reasonably expected of sensitive individuals.

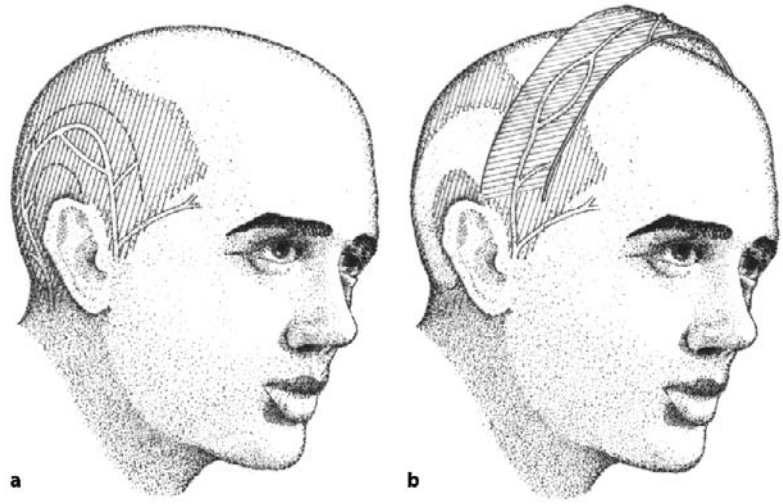

Fig. 69.25. a Baldness can be corrected by the construction of a special hair-bearing skin flap. **b** This requires precise knowledge of the vascular blood supply along the axis of the flap

69.4.4
Hair Transplantation

Today hair transplantation is the most common and most popular form of hair replacement. As early as 1804, Baronio managed to transplant hair-bearing skin in an animal study; in 1939 Okuda in Japan and in 1959 Orentreich in the USA transplanted islands of hair-bearing skin for the purpose of treating baldness.

Their method involved transplanting hair with the aid of so-called punch grafts which are excised, or "punched out", with a trephine or round, cylindrical cutting blade. They can have a diameter of 4–5 mm when harvested. The recipient site is prepared by making holes with a slightly smaller diameter because the excised islands of skin tend to contract.

The larger islands of skin have the advantage that the procedure is faster and less expensive. However, the frontal hairline, that is, the junction between forehead skin and new hair, takes on a brush-like, or tufted, appearance which is not particularly aesthetically satisfying. For this reason, minigrafting and micrografting were developed to harmonize the frontal hairline. This is usually achieved by the second or third session.

About 20 hair follicles survive in the punch grafts of 4 mm diameter. Minigrafts contain three to five hair follicles, while one to two follicles are contained in one micrograft. The recipient sites for micrografts are punched out with a needle 1.4 mm in diameter at distances of 2 mm.

Which are the best sites of the body for harvesting hair? The hair roots at the back of the head, below a line connecting both ears, have so-called donor dominance. Whichever site they are transplanted to, these hairs will grow reliably and survive into old age. Some skin diseases, for example, lupus erythematosus, however, demonstrate recipient dominance, that is, the hair follicles are destroyed and do not grow. For this reason the recipient sites must be carefully examined before transplantation.

The patient must abstain from pain relievers containing acetylsalicylic acid, from alcohol, and from nicotine a few days before and after the operation. The head should be washed with a medicinal shampoo on the morning before the operation. An antiseptic shampoo is available at any pharmacy.

The frontal hairline should be designed before the operation with the patient standing or sitting. This should take into account hair style, parting, and direction of hair growth. The temporal hairline should not be corrected. The patient is given a hand mirror for the examination and is involved in deciding these important details.

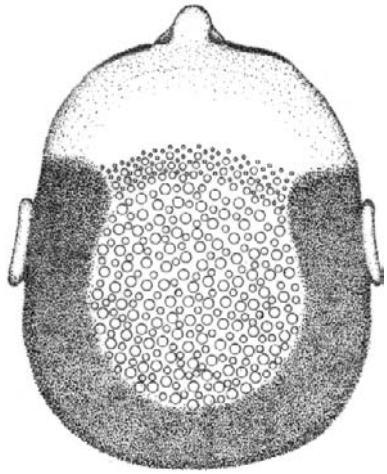

Fig. 69.26. Free hair transplantation. The punch–graft technique involves harvesting islands of skin 3–5 mm in size. Minigrafts with three to five hair roots or micrografts with only one to two hair roots can be used, or both techniques can be used together. Baldness is most commonly corrected by free hair transplantation

It should be borne in mind when planning that the face is divided vertically into three approximately equal sections. The forehead represents the upper third. The middle third is the narrowest of the three sections.

The donor region should also be precisely defined before the operation. The hair should be cut back to a length of 1–2 mm to allow recognition of the slant of the growth axis. Harvesting is done with a sharp, hollow, cylindrical trephine which can be driven mechanically or by a motor system. With the aid of a special scalpel holder and three to four blades, several strips of skin can also be removed in one go. These are then divided into minigrafts or micrografts. The donor site, which can be as wide as 15 mm and up to 12 cm long, is then closed directly with sutures.

69.4.5
The Operation

The entire operation is usually performed as an outpatient procedure under local anaesthesia. The donor site is "pumped up" by injecting a large volume of saline solution together with an anaesthetic – this makes the procedure easier. The harvested strips are then divided into small pieces, or "slivered" as it is known. Slivering produces the implantable grafts and demands much patience and time. No spectacular technique is required here, just extreme care.

This is done by trained assistants who grasp the small slivers by the fatty tissue beneath the skin, dissecting out the fat down to 1–2 mm below the hair

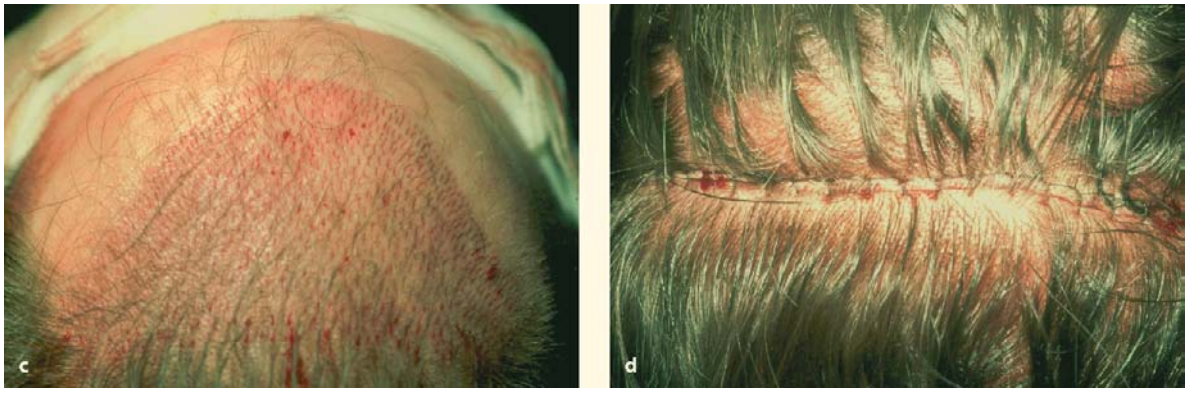

Fig. 69.27. **a** Hairy strip from the back of the head up to 12 cm long and up to 15 mm wide to be cut into micrografts with a no. 11 blade scalpel. **b** Insertion of micrografts into prefabricated holes made by a no. 11 blade scalpel. **c** At the end of the procedure with 800 micrografts. **d** Donor site closed directly after undermining and mobilizing of wound edges

follicle. The thus-prepared grafts are kept in a Petri dish on gauze swabs soaked in chilled saline solution.

Meanwhile the surgeon prepares the recipient site; he/she must take into account the angle of the canal which will later determine the direction of hair growth. About 100 larger grafts can be obtained from a two-rowed sliver. The procedure must be done as quickly and as smoothly as possible to minimize the risk of infection. Well-practised teams manage 1,000 minigrafts or micrografts in 3 h.

Another method that was developed is the capillary microtransplant technique. It involves an apparatus which removes one micrograft per second from the back of the head and guides it through a 1-mm-thick tube to the prepared recipient site. However, the system is very expensive and this is reflected in the cost of the operation.

On completion of the hair transplantation, a light compression bandage is applied. Can completion of the hair transplantation also be done by laser? The reply is a "Yes, but" answer; the recipient hole can be vaporized with the aid of a laser. It should be borne in mind, however, that this will hamper capillary growth to the transplanted grafts. This will increase the number of lost hairs.

69.4.6 Aftercare

The dressing is removed after 3–4 days and careful showering is allowed after 1 week. The transplanted area has a cobblestone appearance at first which should be explained to the patient at the outset, given that it does look fairly conspicuous. Some hairs fall out during the first weeks, while others start growing rather early on. After 3–6 months hair growth has returned to normal again. Provided the operation is performed carefully and the surgical team is well-practised over 95% of the transplanted hairs will survive.

Fig. 69.28. **a** Before and **b** 8 months after first session of hair transplantation

At least 4 months must elapse before the remaining gaps can be filled at a new session.

69.4.7 Complications

Apart from general complications, postoperative bleeding as well as an infection can jeopardize the "take" of the root-bearing grafts. For this reason medications containing acetylsalicylic acid (e.g. aspirin), as well as alcohol and nicotine are not allowed. Infections are very rare, given the good blood supply to the head. Meticulous prepping and draping, combined with a careful and quick operating technique, help to reduce this risk to a minimum.

See the chapter on this topic by Rolf Nordström (Chap. 68).

Bibliography

Please see the general bibliography at the end of this book.

Aesthetic Laser Resurfacing

70

Ashok Gupta, Vinay Jacob

70.1 Introduction

"Beauty is only skin deep," this age-old adage does not hold water any more. There was once a Calvinistic view that one should age gracefully. Not any longer in this jet-age technology-driven generation, where people pop antiaging pills or receive soft-tissue fillers and neurotoxin injections in their lunch breaks, and opt for body sculpturing over the weekends in order avoid taking time off from their high-profile jobs.

During the mythological period in India (Vedas), restoration of youthfulness dates back to around 3,500 BC, when the "twin Ashwani Devataso brothers" used agents like salt, animal oil, alabaster, sulfur, mustard, lime stone and the like for facial rejuvenation (Figs. 70.1, 70.2).

An anthropometrically and aesthetically appealing face is a summation of the bony foundation as well as the overlying soft tissue. A comprehensive study of the facial form is essential for surgical planning and volumetric restoration of the aesthetics of the face. Procedures to address the soft-tissue rejuvenation combined with contour enhancement with or without ancillary procedure options have offered appreciable results for a total volumetric profile enhancement.

Presumably, on average, 75% of the facial wrinkles are caused by gravitational, chronological and environmental factors in varying combinations (Fig. 70.3). Also, dermatoelastosis (atrophy of the subdermal collagen and loss of elasticity), dermatoheliosis (actinic damage i.e. hyperpigmentation, hyperkeratosis) and surface irregularities are not correctable by skin-tightening procedures alone.

Fig. 70.1. Twin "Ashwani Devataso" brothers from *Rig Veda*, the Indian mythological treatise

Fig. 70.2. Twin "Ashwani Devataso" brothers from *Rig Veda*: surgeons who practiced the art of rejuvenation aside from other surgical skills

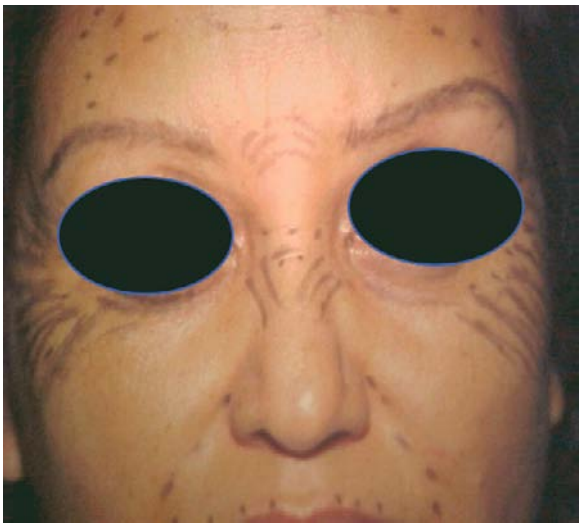

Fig. 70.3. A 48-year-old female patient showing dynamic and gravitational folds

For the deep, dynamic and/or gravitational rhytids, such as those on the forehead and around the eyes or the mouth (due to attachments of muscle to the skin) that are not correctable by resurfacing of the skin and the collagen tissue remodeling alone, a combined endoscopic browlift with soft-tissue fillers offers a more definitive treatment option.

The authors prefer a varying combination of rejuvenation procedures, custom-suited for each individual to achieve a volumetric restoration of facial form and aesthetics:

1. Procedures to address the skin and subdermal tissue
   a) Laser-assisted rejuvenation
   b) Soft-tissue fillers
   c) Barbed wires
2. Procedures to address soft-tissue/skeletal contours
   a) Endoscope-assisted soft-tissue plication and repositioning
   b) Rhytidoplasty (endoscope-assisted and nonsurgical)
   c) Midface resurfacing and rhytidoplasty
   d) Facial implant (autogenous/alloplastic)
   e) Osteotomies/bone lengthening
3. Ancillary procedures – Surgical
   a) Auto fat grafting – nasolabial fold
   b) Auto fat grafting – lip enhancement
   c) Augmentation rhinoplasty
   d) Blepharoplasty
4. Ancillary procedures – nonsurgical
   a) Botox
   b) Skin care and cream program

The preferred combinations for facial rejuvenation are:

1. Surface: laser planing
2. Subsurface: collagen remodeling and soft-tissue repositioning
   a) Tightening and plication
   b) Suspension of ptotic muscle and fascia
   c) Relocation of herniated dystrophic fat deposits
   d) Subperiosteal lift
3. Profile/regional remodeling
   a) Micro fat grafting
   b) Blepharoplasty
   c) Rhinoplasty
   d) Follicular unit hair restoration
   e) Facial implants for bony enhancement

70.2 Laser Skin Rejuvenation

Lasers/intense pulsed light in aesthetic plastic surgery and dermatosurgery practices have revolutionized the concepts of facial rejuvenation during the last two decades. The cutting-edge technology allows predictable and precise collagen enrichment with resultant skin rejuvenation to produce a fresh and youthful appearance. Newer wavelengths, pulsing techniques and delivery devices have confirmed the resurgence of this technology in aesthetic plastic surgery.

CO_2 lasers have consistently proved to be the *gold standard* in skin rejuvenation. They have offered several advantages over chemical peel/dermabrasion by precisely ablating layers of tissue with minimal thermal damage. Additionally, lasers are also being used as a precision cutting tool in procedures like blepharoplasty, rhytidoplasty and endoscopic forehead lift/browlift.

David first reported the use of CO_2 laser resurfacing for correction of facial actinic damage. Fitzpatrick standardized protocols for the treatment of wrinkles and other surface irregularities of the skin (Figs. 70.4, 70.5).

The first author has 14 years of experience in the use of lasers in aesthetic plastic surgery on skin types III, IV and V with a long-term follow-up assessment ranging between 2 and 7 years and confirming lasting results.

Contrary to the popular belief that patients with skin types III, IV and V (darker and olive-complexioned skin) are at a greater risk for hyperpigmentation, the author has successfully demonstrated effective repigmentation and color blending in these skin types.

Fig. 70.4. A 55-year-ol male patient with chronological aging and dermatohelosis: plan – full-face laser resurfacing and ancillary procedures

Fig. 70.5. Four weeks postoperatively: full-face laser resurfacing and auto fat grafting – nasolabial folds and upper lip

70.2.1 Patient Selection

Caution must be exercised for laser resurfacing, especially in patients who have severe actinic skin damage or has had previous dermabrasion or a deep chemical peel. Fitzpatrick opined that patients with actinic damage greater than grade IV always experience hyperpigmentation after the procedure and that it could take many months for this pigmentation to resolve. It is mandatory to have a complete clinical and laboratory evaluation, discussion and informed consent prior to undertaking laser resurfacing.

70.2.2 Contraindications/Precautions

Patients with active herpetic infection, psychoneuroses, alcohol and drug abuse, history of hypertrophied or keloid scars, who have been treated with Accutane within the past 6 months, or with unrealistic expectations and those who cannot or will not follow postoperative instructions should be accepted with a guarded prognosis (Fig. 70.6).

Fig. 70.6. Patient with keloid in the neck

70.2.3 Pre-Laser Regimen

For optimum results, all patients scheduled for laser resurfacing are placed on a pre-laser therapeutic program wherein they are encouraged to avoid factors that might increase hyperpigmentation, such as excessive sun exposure and/or ingestion of high-dose estrogens. A daily application of 0.025% tretinoin and/or α-hydroxy acid and 4% hydroquinone for a period of at least 3–6 weeks appropriately prepares the patient's skin for the surgery.

70.2.4 Anesthesia

70.2.4.1 Topical Anesthesia

EMLA (eutectic mixture of lidocaine and prilocaine 1:1 oil/water emulsion) cream anesthetizes the skin

Fig. 70.7. Topical anesthesia for full-face resurfacing – after smallpox scarring

for laser resurfacing of relatively small areas. To be effective, a thick layer of the cream must be applied on the areas and covered with an occlusive dressing for about 60 min (Fig. 60.7).

70.2.4.2 Regional Nerve Blocks

Regional nerve blocks provide excellent anesthesia of the forehead, nose, chin and middle of the face. All regional blocks are initiated with a skin wheal of the local anesthetic solution and a small dose of a neuroleptic drug to minimize the pain of the passing of the needle through the skin.

Forehead Nerve Block
The forehead block anesthetizes the supraorbital and supratrochlear nerves. The supraorbital rim should be palpated to feel the foramina of the supraorbital nerve. The supratrochlear nerve is 1 cm medial to the supraorbital nerve. Anesthetic solution (2 ml) is injected just superficial to the orbital rim above the foramina and the needle is directed medially.

Nasal Nerve and Medial Cheek, and Upper-Lip Nerve Block (Infratrochlear, Infraorbital, External Nasal, Nasopalatine Blocks)
Anesthetic (1 ml) is injected on each side of the root of the nose between the medial canthus to anesthetize the infratrochlear nerve, and 0.5 ml is injected on each side of the nasal dorsum at the junction of the bony vault and the upper lateral cartilage to anesthetize the external nasal nerves. The infraorbital nerve is anesthetized by injecting 1.0–2.00 ml of anesthetic solution on the maxilla, 1.0 cm below the infraorbital rim, along the middle of the pupillary line. The nasopalatine nerve is blocked by injection of 1.0 ml of anesthetic solution on either side of the base of the columella at the squamomucosal junction.

Lower Lip and Chin Nerve Block
The mental nerve is located along the same middle pupillary line, 2.0 cm above the inferior mandibular border, at the base of the first mandibular premolar. Solution (2 ml) can be infiltrated intraorally and extraorally.

70.2.4.3 Sedation Analgesia and General Anesthesia

Some patients are best treated with regional nerve blocks and conscious sedation analgesia. Other patients are best treated with general anesthesia.

70.2.4.4 Author's Experience

In the author's experience, regional nerve blocks work well for one or two areas such as forehead, cheeks or chin; however, when attempting to do a full face resurfacing, conscious sedation analgesia is preferred. In some of the hypersensitive patients, or those undergoing other combined procedures, a general anesthesia is the best option.

Each procedure must be customized according to the wavelength and the type of laser to be used. Most CO_2 lasers are capable of producing a 500 mJ single pulse with a duration near the thermal relaxation time of skin. The computerized pattern generator (CPG) or scanner enables the user to treat larger areas uniformly as well as repeatedly; however, it requires a higher level of skill and training.

70.3 Surgical Technique

Drape the patient with towels soaked in saline solution. First demarcate the area and wrinkles to be treated with a marking pen. Laser the shoulder or high points of the wrinkles. Try not to overlap the bubbles, although it is believed that an overlap of 10% is acceptable. When the lased areas are covered completely with gray opalescent bubbles, wipe the area with a saline-soaked sponge to remove all epidermal debris. The skin surface will appear pink, indicating papillary dermis (Fig. 70.8). Next, make a second pass, filling the entire aesthetic unit. This provides uniform coverage of the unit and is also a second pass

Fig. 70.8. Laser-assisted resurfacing – first pass with epidermal blistering

Fig. 70.9. Deep smallpox marks using an annular pattern for feathering the shoulders

Fig. 70.10. After the third pass, full-face resurfacing and blepharoplasty of the upper and lower eyelids (bilateral)

for the most wrinkled area. After the pass, the surface is again wiped free of any debris.

The *first pass* vaporizes the epidermal layer and the gray opalescent bubbles (*epidermal debris*) are seen. Pink tissue (*the papillary dermis*) can be seen on wiping off these bubbles.

With the *second pass*, visible contraction and shrinkage of the skin is appreciated because of desiccation of tissue and collagen shrinkage. This creates a whitish or grayish appearance, indicating further injury to the papillary dermis. The *third and subsequent passes* create a yellow or tan (*chamois cloth*) appearance, which indicates that the level of the upper reticular dermis has been reached. The *final pass* is made at right angles to the previous passes to create a homogeneous laser effect to the entire area and to eliminate residual wrinkles or irregularity. With this pass, the skin usually shrinks or contracts visibly and the skin is left with a whitish-gray or pale-yellow appearance.

Additional passes may be performed at special areas like ice-pick scars, deep small-pox marks (Fig. 70.9), etc. using an annular pattern, which allows us to laser only the shoulders as well as to elevate the unlasered central part owing to shrinkage of the peripheral treated areas.

Significant variations exist in the thickness of skin among the different areas of the face and between individuals of different skin types and also between individuals with varying amounts of actinic damage causing an appreciable thickening of the skin. To implement safety norms, the surgeon must be familiar with the visual signs or feedback of the depth of tissue injury.

The number of passes and depth of treatment may vary within the aesthetic unit; however the entire unit must be feathered and treated with at least one pass for the sake of uniformity of repigmentation. That is to say, if the patient has a small area of wrinkling, the wrinkles need to be treated with multiple passes and the remaining part of the unit with fewer passes. If it is necessary in the course of the laser treatment to cross into an adjacent aesthetic unit, then that unit also should be feathered. Awareness of the varying thickness of the skin in the different facial regions will guide the surgeon in deciding the number of passes permissible within the unit (Fig. 70.10).

70.4 Elimination of Debris

Generation of char, which is created if the nonvital and desiccated debris is exposed to radiation from a laser, merits a thought when present in the surgical field. A sterile saline-soaked gauze is made use of to remove the epithelial debris and has two beneficial effects. First, it prevents the occurrence of char and, second, it permits an accurate assessment of the visual feedback to evaluate the clinical end point of the laser application, which is the depth of injury to the skin; hence, it is pertinent to remove all epithelial debris in-between passes.

Attention should also be given to the evacuation of the laser plume, which is toxic and contains air-borne contaminants, including carbon particles and DNA particles of viruses.

70.5 Wound Management

Wounds are treated in an open method. A profuse exudate is produced, which must be removed gently to avoid the formation of a crust. The patient must use continuous wet compresses for the first day and keep the skin covered with a moisturizing cream subsequently. In the early postoperative period there may be considerable swelling, some bruising and mild discomfort for up to 1 week with a mild burning sensation. From the third to the fifth day onwards, the treated area is soaked with water for 10–15 min, four to five times a day. It is advised not to pick or rub to remove dead skin or scabs, as this may increase the risk of scarring (Fig. 70.11).

Following each soak, a thin layer of a moisturizing ointment is applied to keep the skin moist. Patients who are not vigilant enough to avoid the development of a crust and those who pick the crust off may end up with hypertrophied scarring. A bath or shampooing is permitted, but except for use of the moisturizing ointment, the face must be kept dry. A fluid intake using a drinking straw drawn is preferred should there be any perioral edema. Vigorous or strenuous activity, which would raise the blood pressure or pulse, should be avoided for 2 weeks. The crust or scab on separation leaves the underlying skin smooth and reddish/pink in color and may last for as long as 4–6 weeks prior to blending gradually.

Fig. 70.11. Open wound technique – fourth day after laser treatment. The patient is advised not to pick or rub to remove the scabs as this may increase the risk of scarring

70.6 Post-Laser Care

70.6.1 Skin

Retin-A (0.025%) should be applied when the wound has stabilized, usually by 4–6 weeks after the laser resurfacing. In some patients whose skin re-epithelializes earlier, Retin-A application can be initiated after 3 weeks. Patients who are at a higher risk for hyperpigmentation after operation (skin types III and IV) or patients with severe actinic damage should also be treated with hydroquinone (4%) starting 4 weeks after the laser resurfacing. Hydroquinone competes with active melanogenesis and thus helps lessen the troublesome and often-persistent hyperpigmentation after resurfacing.

70.6.2 Exposure to UV Rays

Laser resurfacing removes the protective skin barrier provided by the outer layers of the skin. The patient must avoid direct exposure on the treated area at least until normal skin color has returned (up to 3 months). This dermal injury can be prevented by the use of UV-A and UV-B blocking agents with a sun protection factor of 15 to 30% and shading devices. Patients may be allowed to go outdoors after 2 weeks, provided the treated area is covered with UV-A and UV-B screening agents.

Fig. 70.12. Two months after laser treatment, acne flare-up and dyschromia

70.7 Sequelae/Complications

Complications are rare, if proper technique and selection of laser criteria are followed. Most complications are invariably temporary. Persistent erythema resolves in about 4–6 weeks, although in some patients it may last up to 6 months. Use of a topical steroid cream can shorten the duration of the erythematous phase. Herpes and milia are other common complications and need antiviral regimens. Acne flare-up and dyschromia are less frequent sequelae (Fig. 70.12).

70.8 Laser Safety

Laser safety standards have been published by the American National Standards Institute (ANSI) for the safe use of lasers in health care facilities (Z136.3). Laser safety is grouped into five areas, which are detailed in the following.

70.8.1 Electrical Safety

There must be adequate amperage and voltage supply as required by the specific laser unit and it is recommended that a wall outlet be provided and that extension cords not be used. Liquids should be kept away from the laser to prevent spillage and a short-circuit.

70.8.2 Fire Safety

Flammable materials, including oxygen, anesthetic agents and volatile preparation solutions, drying agents, petroleum ointments or flammable plastic should be kept at bay. Sponges and swabs in the operative field as well as drapes must be soaking wet with sterile saline solution. The surgical drapes should be covered with wet sponges and towels. A basin of water or saline and a fire extinguisher should be kept immediately available.

In surgery of the upper airway and face, endotracheal tubes or plastic tubes used for delivery of oxygen should be made of nonflammable, laser-impermeable material or should be wrapped with laser-impermeable material, such as wrinkled, duff-side-out tin foil covered with wet towels. The cuff should be inflated with saline solution instead of air and protected with moist sponges. When lasering an awake patient, the author prefers to turn off the flow of the oxygen during the process of lasering. A helpful technique is delivery of oxygen deep into the pharynx by insertion of a pediatric feeding tube after topically anesthetizing the throat; but again, the tube must be protected from the laser using tin foil.

70.8.3 Respiratory Safety

A mechanical smoke evacuator is essential and should have an inline suction filter to remove viral particles and reduce the risks. Special surgical laser masks can filter particles as small as 0.3 μm.

70.8.4 Eye Safety

Strict guidelines are available that define the nominal hazard zone (NHZ) for each laser wavelength. Personnel must wear protective eyewear as specified for the laser being used. For the CO_2 laser, regular industrial safety glasses with polycarbonate lenses are best. When procedures are performed near the eye or directly on the eye with the laser, stainless steel or impermeable eye shields should be used to cover the cornea of the patient (Fig. 70.13).

Fig. 70.13. Stainless steel eye shield in place (rough on the outside and smooth on the corneal surface)

Fig. 70.14. Preoperative view: dorsal nasal implant for profile enhancement along with laser resurfacing

70.8.5 Avoid Char

Char is carbon. If char accumulates on tissue, it is a sign that temperatures have reached 300 °C. Continued lasering of char can produce temperatures of 600 °C (the temperature of red-hot coal). If char is seen, thermal injury has occurred.

70.9 Facial Implants

Silhouette enrichment along with the laser resurfacing can be better achieved with a minimal procedure such as an augmentation. The preferred implants that can be safely inserted as combination therapy with laser resurfacing are the malar, the dorsal nasal, and chin and angle mandible implants (Figs. 70.14, 70.15). The access route for implant placement is decided on the basis of the area to be augmented and the type of laser being used. Extensive undermining of the tissue should be avoided, with staying on the subperiosteal plane at all times so that the implant capsule is less obvious or palpable. Antibiotic solution should be used to frequently impregnate the implant and to irrigate the surgical field.

Fig. 70.15. Postoperative view: dorsal nasal implant for profile enhancement along with laser resurfacing

70.10 Laser-Assisted Blepharoplasty

Additional regional procedures that are executed along with laser resurfacing include laser-assisted blepharoplasty, wherein the laser is used in cutting mode to excise the upper-eyelid skin fold and in the resurfacing mode for the lower eyelid and periorbita.

70.11 Mini-Facelift

A limited undermining facelift can be combined with laser resurfacing at the same sitting, taking care not to laser the undermined skin.

70.12 Endoscopic Procedures

The endoscopic forehead and browlift with the flexiguide laser probe allows shrinkage of the procerus muscles and subperiosteal lift without damage to the supraorbital/supratrochlear nerves.

70.13 Soft-Tissue Fillers

Soft-tissue fillers/substitutes are most commonly used for immediate correction of natural or acquired depressions caused by aging or building up of volume for nasolabial creases, the lip rolls and sunken cheekbones. Options for soft-tissue fillers are as follows:

1. Alloplastic
   a) Semibioresorbable: acrylic hydrogel and hyaluronic acid contain nonanimal stabilized hyaluronic acid in various proportions.
   b) Bioresorbable: *collagen* is derived from a bovine source. The disadvantage is allergy and the effects are temporary, lasting for only about 12 months.
2. Autogenous
   Micro auto fat injection or lipofilling is the preferred option of the author to achieve stable aesthetic results. The microglobules of the fat are harvested using a 2.00 mm super Luer-Lock cannula (malleable) attached to syringes ranging from 2.00 to 20.00 ml. This fine cannula allows harvesting of a core of fat globules without distorting the fat cell architecture to enable viable micro fat transplant.

This 2.00 mm super Luer-Lock cannula is also used for lipodissection and lipocontouring in areas of fat excess. Alternatively, a small-bore cannula is attached to a sterile mucus extractor and with low-power suction the aspirated fat is collected in a closed system that maintains the sterility of the tissue. This aspirated fat is not centrifuged and is allowed to form two supernatant layers over the fluid, i.e., the fat globules at the top, the oil-based suspension in the middle and the plasmatic fluid at the bottom. These fat globules are subsequently transplanted using a no. 16 gauge needle (Figs. 70.16, 70.17).

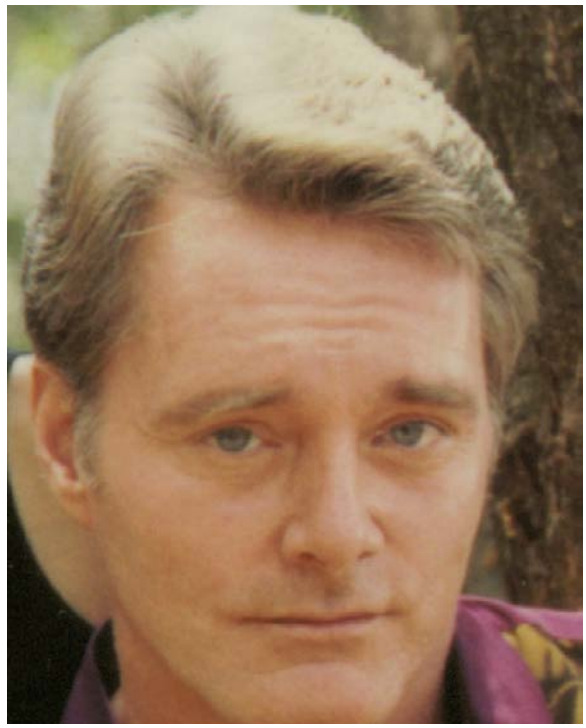

Fig. 70.16. Long-term follow-up results: full-face laser resurfacing plus micro auto fat grafting of nasolabial folds and upper lip plus augmentation rhinoplasty

Fig. 70.17. Long-term follow-up results: full-face laser resurfacing plus micro auto fat grafting of nasolabial folds and upper lip plus blepharoplasty

70.14 Botulinum Toxin

Though temporary, the effect of botulinum toxin as an agent for smoothing dynamic wrinkles is well accepted. The conditions that can be addressed with this toxin simultaneously along with laser resurfacing are the horizontal forehead lines, the glabellar frown lines, the lateral canthal lines or crow's-feet, discrete chin lines, platysmal bands, and the horizontal and vertical neck lines.

70.15 Barbed Wires

Suspension barbed wire sutures for the sagging temples, cheek, jowls and neck in management of the tissue ptosis are achieving great popularity as office procedures. They are of additive benefit with laser resurfacing.

70.16 Ancillary Treatment

Numerous skin-toning lotions and antiaging creams available across the counter for texture and color enhancement allow further enhancement of the final result. These include *cleansers* containing chamomile, *toners* containing hydroquinone, *sunscreens* containing ZnO, and agents like lactic acid and tretinoic acid, anti-inflammatory medications, *natural antipigments* such as licorice roots, *Triticum vulgare*, and *antioxidants* like lupine oil.

70.17 Aesthetic Laser Resurfacing: What I Have learned over the Past 14 Years

Though the laser is a remarkable surgical tool in the hands of the aesthetic surgeon, it is not a panacea for all needs. It has a high learning curve and requires expertise to avoid complications. Most of the unfavorable or unacceptable results tend to arise from an inappropriate selection of technology, equipment and patient. The other detrimental factors are poor or no, pre- and post-laser treatment, an associated history of keloid formation and inadequate patient compliance.

In the author's experience, whenever there is a safety issue, it is essential to perform a test on a smaller and hidden area before beginning the full-face resurfacing. While treating patients with skin types III and IV, it is best to treat the entire face by feathering the wrinkle-free or scar-free areas with either a lower-power setting or fewer passes. These yield the same results with less chance for complications and the darker skin tones can be treated safely and effectively when the treatment is superficial.

Progressive improvement in elastosis in the deep dermis continues for an average follow-up period of 5 years and has been conclusively proved, and physician, patient and histological evaluations have confirmed that clinical benefits persist even longer. An effective and harmonious repigmentation with volumetric rejuvenation of the face can be safely achieved by a combination of multiple aesthetic surgical procedures along with laser resurfacing simultaneously.

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71 Facial Contouring Surgery Combined with Skin Resurfacing

Carlos Oscar Uebel

71.1 Introduction

Facial resurfacing with an erbium–YAG-laser has become a very common procedure in these last 9 years and a good alternative to chemical and mechanical peelings. The new generation of lasers called erbium–YAG lasers, with their greater ablative and lower thermal action, has brought new progress in the treatment of wrinkles of the mouth and the eyes as well as of actinic and sun spots of the skin. In facial lifting the laser has also been shown to be a very versatile tool for finishing the surgery. In this chapter we try to show its indications, advantages, results and also its complications.

71.2 Method

A total of 126 patients were treated in the period from 1996 to 2004. The age group varied from 31 to 82 years and 88% of the patients were women. The main complaints they had were facial wrinkles around the mouth and the eyes, and actinic and sun spots of the skin. An erbium–YAG laser (Derma 30, ESC Medical Systems, Yokneam, Israel) with 3.0 J of energy was used. This is a pulsed laser with 50% of erbium ions in YAG, with an energy that varies from 100 to 3,000 mJ. It has great absorption in water at a wavelength of 2.94 µm, while the CO_2 laser, with a wavelength of 10.5 µm, has smaller penetrability in water (Fig. 71.1). This means that the erbium-YAG laser causes less thermal damage in the skin; it does not burn like the CO_2 laser and postoperatively has one of its greatest advantages – the shortest time of erythema. This physical property allows it to act in deeper layers of the skin hardened by time, smoothing its surface and returning its original texture with a brief recovery period. In the same way, this type of laser is used in combination with facial lifting when removing the actinic and sun spots of the skin mainly in gerodermic skins that have suffered from the ageing process owing to the overexposure to solar radiation.

The procedure is accomplished under local anesthesia with standby sedation. We use 5 mg midazolam (Dormonid) and 2 ml of fentanyl citrate (Fentanil). We block the infraorbitary as well as the mandibular branches with 0.5% Xylocaine (lidocaine) with 1:160,000 adrenaline. We use the rest of the solution to infiltrate the whole area to be detached or submitted to the laser. The patient's eyes are protected with ocular shells and the whole surgical nursing team should use protective glasses.

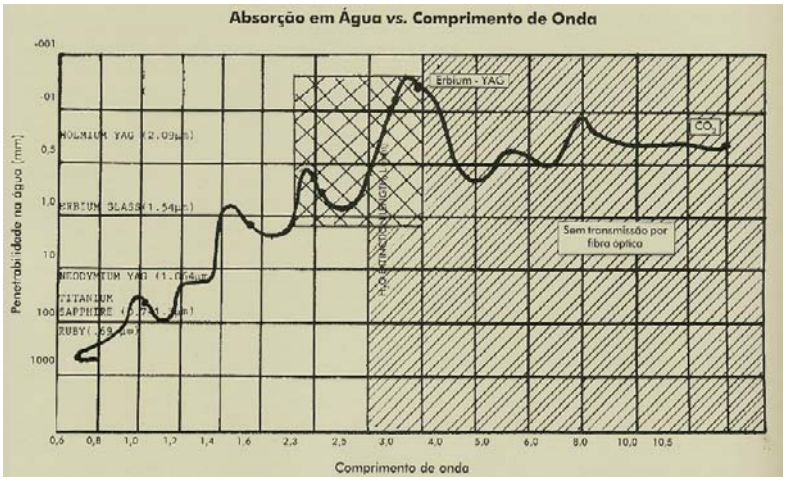

Fig. 71.1. The wavelength of light emitted by an erbium–YAG laser is 3 times smaller than that of a CO_2 laser and its absorption in water is 10 times larger than that of the CO_2 laser. This means that erbium laser radiation is absorbed more by the blood, does not coagulate the blood vessels and does not produce thermal damage in the deepest dermal layers

Fig. 71.2. The hand-piece applicator is of 3 mm diameter and it is articulated in a mobile arm. The eyes of the patient should be protected with intraocular shells

The hand-piece applicator of the laser is of 3 mm diameter (Fig. 71.2) and it is connected to an articulate arm that allows mobility and comfort of the surgeon. The application can be in a circular movement or forwards and backwards, depending on the individual case. For the correction of wrinkles and palpebral spots, we use an energy of 1,800 mJ at a frequency of ten pulses per second. The ablative process in this area is more delicate as the skin is much thinner. We recommend one or two blasts until bleeding from the dermis appears. In the lateral area, close to the "chicken" feet, we can pass the bundle of light rays two to three times until the basal layer is reached. In the face, principally in the area of the cheeks and the zygomatic areas, we use an energy of 2,200 mJ, which allows more efficient removal of the actinic and sun spots of the skin. In facial lifting, we have been using an erbium laser almost routinely, because of its minimum thermal damage and since it is applied in one or two blasts, it allows us to detach the skin without causing trauma (Figs. 71.3, 71.4). The lips are an area where we can get outstanding results – we use an energy

Fig. 71.3. **a**, **b** Patient of 48 years with cutaneous aging, actinic spots and multiple facial wrinkles. **c**, **d** Three days postoperatively. Two passes of the erbium laser with an energy of 2,200 mJ, associated with minilifting and blepharoplasty. Skin appearance with a discreet erythema around the zygomatic area. (Fig. 71.3 e,f see next page)

Fig. 71.3. *Continued.* **e**, **f** Six months postoperatively showing skin of good texture and elasticity

Fig. 71.4. A 36-year-old patient with ageing skin and hyperchromic sun spots submitted to a minilifting and two passes of a 2,200 mJ erbium laser.One year postoperatively with a good skin resurfacing

Fig. 71.5. In the peribuccal and superior lip areas, we found one of the best indications for the use of an erbium laser. The controlled ablation, with an energy of 2,400–2,600 mJ, can remove in layers the thick and hardened skin. The end point is when bleeding begins

from 2,400 to 2,600 mJ depending on the thickness and the depth of the wrinkles. The prolabium is very susceptible to the ageing process, with multiple wrinkles and thick dermal layers. The ablation in layers allows us greater control and we can apply several passes even before we reach the basal layer. The beginning of bleeding is the point where we should interrupt the procedure (Fig. 71.5), unlike for the CO_2 laser, which coagulates the blood and cauterizes the microvessels.

71.3 Erythema and Postoperative Care

At the end of the surgery we apply an ointment, proteolytic enzyme base (Fibrase, Iruxol), which should be applied daily for 5–7 days until the first crusts begin to fall off. We did not use the closed method, preferring to maintain the open face and moistening it with creams and ointments. We did not recommend antibiotics but in some cases we indicate anti-inflammatories of the type Propoxifeno. For patients who complain of pain or ardency we recommended the use of Tylex (paracetamol and codeine). After the crusts have fallen off, the patient starts to apply skin creams and sun block with a sun protection factor of 30 or 40. That is of great importance as the skin no longer has the superficial layers and this will increase hyperchromia owing to stimulation of the melanoblasts. We recommended the patient avoid exposure to the sun as well as exposure to fluorescent lamps and television screens.

The postoperative erythema can last for 3 weeks to 3 months. For patients with superficial laser treatment, the erythema tends to disappear more quickly (Fig. 71.6), while for patients with deeper ablation, with the intention of removing scars or more pronounced wrinkles, the erythema can last up to 2–3 months. The unprotected skin will leave the deepest layers exposed and a longer time will be needed for reepithelialization. It is important that we inform the patients that the final result will not be apparent before 3 months.

71.4 Results

Facial resurfacing with an erbium laser has shown surprising results. The quality of the skin, i.e., the elasticity and the softness, is improved in patients treated with this method. The ablation of the superficial layers together with the actinic and sun spots of the skin and of the small wrinkles returns the skin to its youthful and original texture. In 90% of the cases we also perform minilifting, with a small scar, minimum detachment and skin excision, allowing a more effective and long-term result (Figs. 71.7–71.9). In these cases we recommended an operative program of maintenance of skin quality using moisturizing creams and sunblock for an indefinite time. Any of the advances that we can achieve with chemical, mechanical or laser peeling are of little significance if we do not advise the patient to take care of the effects of time, of diet and of physical health. This concern is

Fig. 71.6. A 46-year-old patient submitted to minilifting with an erbium laser in the whole face using an energy of 2,200 mJ in two passes. After 3 weeks discreet erythema and a face with edemas are still noted and after 8 months a quite natural result with skin of good texture is seen

Fig. 71.7. A 46-year-old patient with precocious ageing submitted to facial minilifting with an erbium laser. Four months and 2 years postoperatively showing good skin resurfacing

very important and we recommended frequent reviews with the surgeon or dermatologist. Some patients do not accept the idea of the minilifting and they just want to have the skin spots removed to have a healthier appearance and at the same time they want to eliminate mainly the spots on the backs of their hands (Figs. 71.10, 71.11).

The area of the eyelids is very delicate and the application of the laser should be made with great care, protecting the ocular globe with intraocular operculum. The results are as significant in women as in men (Figs. 71.12, 71.13). Hyperchromia, which has the aspect of "hollow circles," is difficult to treat once it reaches the whole thickness of the palpebral skin. We can achieve an effectiveness of not more than 70% (Fig. 71.14).

In the peribuccal and the superior lip areas we have obtained good results. This is where the skin is thicker, with less elasticity and where larger number of expression wrinkles can be found (Figs. 71.15–71.17).

Fig. 71.8. A 62-year-old patient also submitted to minilifting with an erbium laser in the whole face. In the close-up, a good result is observed around the mouth and lips

Fig. 71.9. A 71-years-old patient showing the result at 3.5 years with the same technique: minilifting with an erbium laser in the whole face and peribuccal region

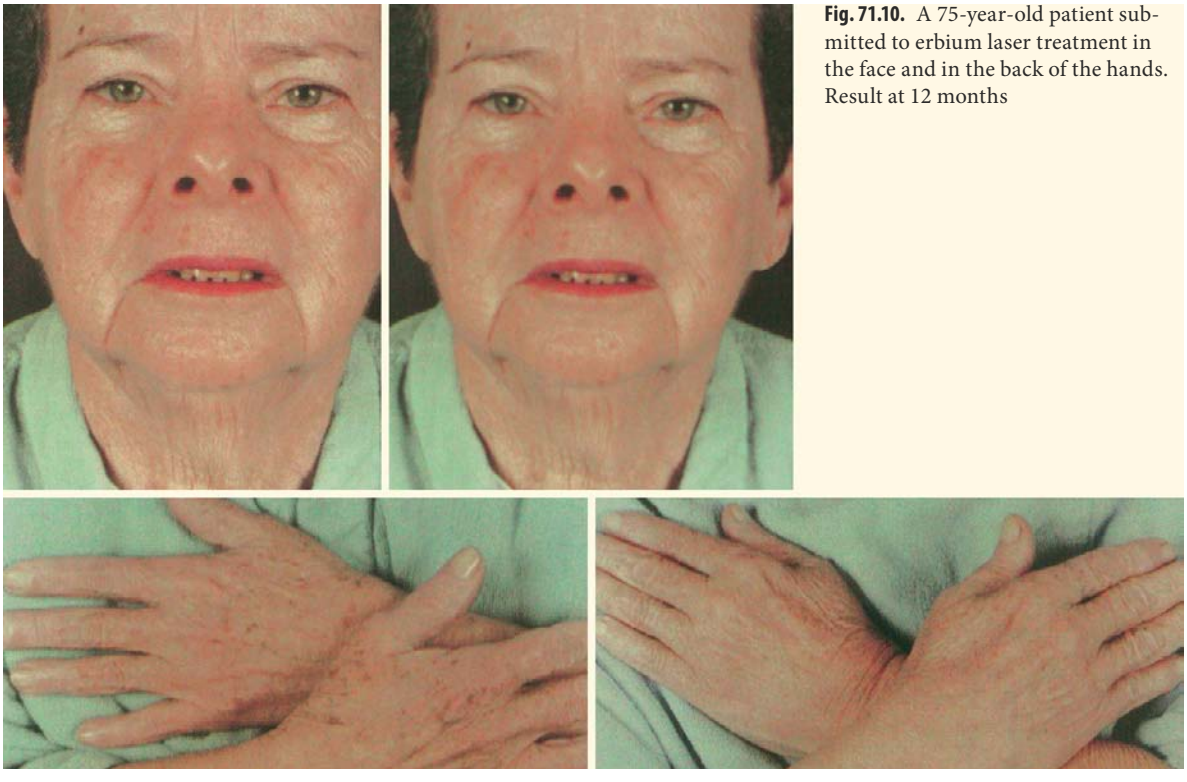

Fig. 71.10. A 75-year-old patient submitted to erbium laser treatment in the face and in the back of the hands. Result at 12 months

Fig. 71.11. A 68-year-old patient also submitted to skin resurfacing with an erbium laser. The good recovery of the skin after 8 months can be seen

Fig. 71.12. A 47-year-old patient submitted to blepharoplasty. Postoperative result at 3 week

Fig. 71.13. A 38-year-old patient submitted to blepharoplasty with an erbium laser with 1,800 mJ. Result at 8 months

Fig. 71.14. A 54-year-old patient with inferior eyelid hyperchromia and "hollow circles." Result at 3 months showing an improvement of 70%

Fig. 71.15. A 72-year-old patient with intense ageing in the peribuccal area with deep wrinkles "crocodile"-type skin. We used an energy of 2,600 mJ. Postoperative result at 3 months with discreet erythema and at 2.5 years

Fig. 71.16. A 68-year-old patient submitted to minilifting with an erbium laser in the whole face (2,200 mJ) and three passes of 2,400 mJ around the mouth and lips. The results after 3 months and 3.5 years show the respective "close-up." In a later postoperative stage, discreet hypochromia is observed

Fig. 71.17. A 53-year-old patient submitted to conventional lifting with eyelids. Erbium laser application in the whole face and around the mouth. After 8 months we improved the "Cupid's arch" with filers

71.5 Complications

The most common complication is hyperchromia in the order of 20% of the patients treated. The skin without its superficial layer is unprotected from UV radiation. It is not enough for the patient to protect himself/herself against the sun, protection must also be sought against radiation from fluorescent lamps and television screens. In these cases there is stimulation of melanoblasts and melanocytes and so there is an increase in melanin. A sun protection factor of 30–60 is indicated for effective protection. For treatment of hyperchromia we indicate pure 5% hydroquinonecream for 2 months (Fig. 71.18). Hypochromia is rare and appears in those cases where the ablation is deeper. It happens 12 months after application of the laser. Perforation lesions or burn scars are more related to the thickness of the skin and to the attempt to eliminate wrinkles, stains and deeper actinic lesions by concentrating the bundle of light rays for a prolonged time at these points. This can cause an ulcerated lesion that will undergo a second healing process without visible scars (Fig. 71.19). Herpetical lesions can occur on the lips in about 5% of the patients (Fig. 71.20). The herpes simplex virus already exists in these patients and because of the decrease of the local immunity the signs become evident within 4–5 days postoperatively. We recommend the use of acyclovir (Zovirax) in a dosage of 800 mg/day for 5 days and in patients that have a history of herpes we recommended the use of prophylatic acyclovir, 6 days before the application of the laser in the same dosage of 800 mg/day.

71.6 Conclusion

The erbium laser's use in facial resurfacing has shown very interesting results mainly in the areas of the eyes and of the mouth where we have difficulty with the action of chemical and mechanical peelings. Its versatility and its minimum thermal damage with short postoperative time of erythema allow it to be associated in undermined areas in facial contouring surgery. The medium-tem and long-term results showed that the erbium laser is a device that can add value to the surgery and allows a better refinement of the facial contour.

Fig. 71.18. Patient submitted to conventional lifting and application of an erbium laser in the whole face. Hyperchromia occurs in the third month after surgery owing to exposure to the sun. It was treated with 4% hydroquinone and the result after 2 years is shown

Fig. 71.19. Ulcerated area in a patient submitted to minilifting with an erbium laser of 2,200 mJ. The concentration of the energy of the laser in the attempt to eliminate an actinic lesion produced a superficial ulcer that reepithelialized after 45 days. One year postoperatively showing the complete recovery of the area

Fig. 71.20. Herpes simplex virus lesions in a patient's peribuccal area submitted to erbium laser treatment. Involution of the process after 45 days using of acyclovir

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72 Non Surgical Facial Rejuvenation with the 4R Principle: Innovative uses of BOTOX and facelifting with the Woffles Lift, a barbed suture Sling

Woffles T.L. Wu

72.1 Introduction

The sudden explosion in recent years of nonsurgical rejuvenative techniques is patient-driven. The modern patient, man or woman, desires quick, safe and predictable nonsurgical techniques that will confer some form of facial rejuvenation and at the same time allow them to get back to work or their social lives with a minimum of downtime. By that is meant a modicum of bruising and swelling for 2–3 days (i.e., over a weekend) and not the 2–4 weeks of downtime and scars that often accompany open surgical techniques.

Whilst nonsurgical techniques are not a substitute for traditional rejuvenative surgery, the combination of several nonsurgical tools and procedures has become a powerful adjunct to or a temporizing substitute for open surgery.

BOTOX and collagen injections started this trend over a decade ago when it was seen that they could significantly relax and change facial expressions as well as diminish rhytides of the face associated with muscle movement or loss of facial volume. BOTOX was and still remains superb for softening crow's-feet lines and glabellar and forehead frown lines, whilst collagen was classically used for filling nasolabial, glabellar, marionette lines as well as lips and other superficial hollows of the face. The only practical problem with the latter was occasional allergic reactivity and lack of longevity.

Since then, many new fillers have entered the arena, giving plastic surgeons a vast array of permanent, semipermanent and completely resorbable fillers to choose from. The problem for the young surgeon is in developing a strategy for using these fillers and knowing which filler is safe in which region of the face. Collagen itself is hardly used today although patients commonly refer to filler injections as "collagen injections" whether or not the filler is indeed collagen, an indication of how entrenched the term has become in our specialty. Most modern fillers in fact use hyaluronic acid in variable percentages of cross-linking and may be combined with a variety of nonresorbable particles to enhance longevity.

The indications for BOTOX have also gone beyond mere eradication of wrinkles and it is now used for a variety of reasons ranging from browlifting, eyebrow shaping, facial contouring or slimming (BOTOX facial slimming technique) to improvement of skin texture and tone (microBOTOX technique). It has become a significant adjunctive tool even for open surgical techniques.

Technology has also advanced so quickly that a variety of machines today can significantly lighten, freshen and tighten the skin envelope in ways we could not imagine 10 years ago. Many innovative protocols by inventive physicians around the world have contributed to a burgeoning and revitalized branch of aesthetic medicine [1].

The mark of a skilled aesthetic surgeon is the ability to transform an aged face into a youthful one using the combined techniques of upper and lower facelifting and necklifting, upper and lower blepharoplasties, microfat grafting for volume replacement and enhancement in the appropriate parts of the face and, where indicated, some form of skin resurfacing technique (whether chemical or ablative in nature).

Since the concept was introduced and brought to our attention some years ago, the restoration of the patient's ogee curve on three quarter profile has become a goal for every aesthetic surgeon and we now look at our postsurgical facial results in a more critical fashion than we used to.

Until recently, a combination of any or all of the aforementioned nonsurgical techniques could do nothing to lift sagging facial tissues or restore or create that vital ogee curve. In the late 1990s, the APTOS [2, 3] concept of barbed suture insertion was introduced which allowed some form of facial lifting and firming to be achieved but the lifting effect was not as powerful as many plastic surgeons wished it to be [4].

Then in 2002, this author introduced the barbed suture sling concept (the Woffles Lift using Woffles Threads) [5–8] which was able to lift sagging facial tissues and suspend these from the dense tissues of the scalp, thus achieving a true facelifting effect and restoration of the ogee curve. It suddenly became obvious that a vital key in nonsurgical rejuvenation had

been discovered that allowed the combination of nonsurgical techniques to now become a powerful contender or even substitute for traditional open surgical techniques in creating a volume restored, facelifted effect.

In the next sections I will outline how I have incorporated these various techniques into a concept I call the 4R principle.

72.2 Hallmarks of a Youthful Face

Successful rejuvenative surgery depends not only on clinical skill and mastery of techniques but also on a sound assessment of what needs to be done, judgement and artistry. Without understanding fully the characteristics of the youthful and the aging face it is impossible to successfully transform the latter into the former.

The hallmarks of a youthful face are:
- Smooth, clear skin
- A taut, firmly projected midface
- An unbroken, smooth contour from the lower lash margin to the upper lip
- A triangular or oval face with highlights over the malar and chin prominences
- A clean, taut jawline with fullness and softness at the cervicomental angle
- Relaxed appearance and absence of muscle imbalance or strain

This is in contradistinction to the aging face where there is an inversion of the "triangle of youth" and which has shrunken and sagged as a result of (Fig. 72.1):
- Bone resorption and distortion
- Soft-tissue atrophy and shrinkage
- Tissue displacement due to deflation and gravity
- Compensatory overactivity and hypertrophy of central muscles such as the corrugators, procerus and mentalis
- Skin changes
- Loss of teeth

72.3 Aims of Rejuvenation

The aims of rejuvenation whether surgical or nonsurgical are therefore to:
- Reduce the action of hypertrophic or overactive muscles
- Restore volume and facial tautness to the appropriate areas of the face
- Remove the stigma of ageing skin such as photodamage, telengiectasiae, pigmentation, fine lines and deeper rhytides
- Lift sagging tissues to their youthful position
- Triangulate the face
- Restore facial highlights

72.4 Nonsurgical Facial Rejuvenation with the 4R Principle

The addition of the Woffles Lift to the armamentarium of nonsurgical techniques allows the conceptualization of four distinct pillars of nonsurgical facial rejuvenation. These are the four "Rs":
1. *Relax* (and recontour) facial muscles with BOTOX
2. *Restore* facial volume with synthetic fillers

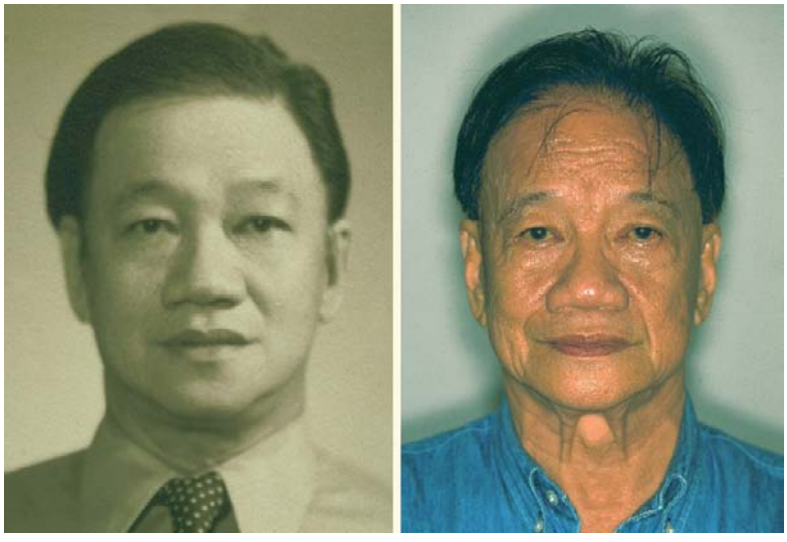

Fig. 72.1. Man at 45 and at 75 years of age showing facial changes over 30 years

3. *Resurface* the skin envelope with no downtime procedures such as intense pulsed light, Cooltouch and Thermage
4. *Redrape* sagging facial tissues with the Woffles Lift and restore the ogee curve and a youthful face shape

72.4.1 Relax with BOTOX

BOTOX is used not just for the eradication of wrinkles but also for the creation of a "chemical" browlift, to relax and rejuvenate the chin, to narrow the lower facial width and to improve the luminosity of the skin. The most important factors in the successful use of BOTOX in creating these effects are knowledge of the correct injection sites, the correct dilution to use and the volume injected. If any of these factors are disregarded, complications can occur.

I use 2.5 ml saline to reconstitute a vial of 100 units of BOTOX (Allergan, USA). This dilution has been chosen as the most efficient and logical after nearly a decade of experience with the drug and injecting it into various parts of the face, armpits and the rest of the body. This figure is directly related to the amount of fluid injected at each point, which is the most critical factor in BOTOX administration.

For most injections around the periorbital region and in the chin, 0.05 ml is the preferred volume of fluid that should be injected with each discharge. With a standard 1-ml insulin syringe this is the easiest amount of fluid that one can consistently control during the injection process. Anything less than this is inaccurate. This volume radiates in a circular fashion up to 0.7cm away from the point of injection, giving a total diameter of spread of nearly 1.5 cm (and consequently effect of the drug). If injections of BOTOX are given close to the eyebrow as in the technique I employ, then injecting larger volumes will lead to spread of the drug beyond the desired borders and perilously close to the levator muscle, which in turn results in ptosis.

This 0.05 ml volume in turn contains 2 units of BOTOX, which is sufficient to relax the intended muscle for 3–4 months. Using dilutions of less than 2.5 ml saline is preferable to using greater dilutions. However, the corresponding increase in longevity of the BOTOX effect is not commensurate with the increased cost to the surgeon or patient. Using greater dilutions is acceptable provided the volume injected is 0.05 ml at each point. The common mistake made when using higher dilutions is to inject a larger volume in order to increase the nett amount of BOTOX at each injection point. The greater volume required for this results in frequent complications as well as the infamous stiff and totally "paralysed" appearance that characterizes the amateur injector. For example, if a 5 ml dilution is used to inject 2 units of BOTOX, one has to discharge 0.1 ml, which now has a radius of spread of 1.5 cm and a total diameter of spread of nearly 3 cm. This is good for the forehead or masseter but bad for periorbital work.

72.5 The BOTOX Browlift

Frowning is a complex interaction of several muscles, namely the corrugators, depressor supercillii, procerus, superior orbicularis and the lateral depressors. The lateral orbital hooding that results from deep glabellar frowning is in fact caused by the superior orbicularis (Fig. 72.2). This is not eradicated by simply injecting the corrugator muscle between the brow. The glabellar frown lines may be diminished but the eyebrow remains flat owing to persistent superior orbicularis function. Add to this inappropriate BOTOX injections into the entire forehead region and there can never be sufficient elevation of the eyebrow to elicit a browlift effect.

I firstly inject five points in the lateral orbicularis (crow's-feet) region with the key points at the extreme tail of the eyebrow, the lateral canthus and the lowest leash of crow's-feet lines. The remaining two points are evenly spaced between these (Fig. 72.3). This not only softens the crow's-feet it also allows the tail of the eyebrow to float upwards.

Next I inject four points into the upper border of the eyebrow itself. The first corresponds to the head of the corrugator, the next to the tail of the corrugator, which corresponds to a dimple (the corrugator dim-

Fig. 72.2. The intense orbital hooding due to superior orbicularis action

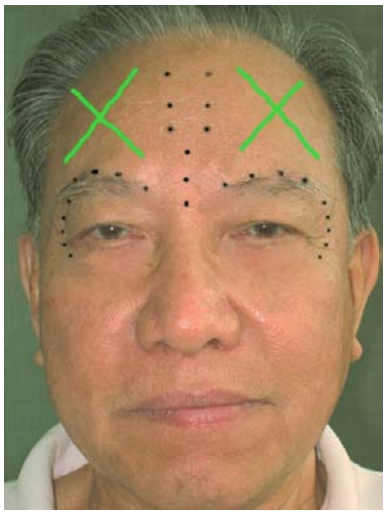

Fig. 72.3. Markings for a BOTOX browlift

ple) in the middle of the eyebrow on frowning. The third is into the body of the corrugator (midway between points 1 and 2) and the fourth is into the superior orbicularis, a little finger breadth away from point 3. I then inject the upper part of the procerus with one or two injections. Administration of the BOTOX too low in the procerus causes the interorbital width to increase, giving a slight leonine appearance which patients detest.

Then three to four pairs of BOTOX injections are given up the forehead on either side of the midline. It is crucial not to allow these injections to be more than a finger breadth apart as by the time the BOTOX has diffused laterally too much of the forehead (frontalis muscle) may be paralysed. This results in a flat medial brow as opposed to a gentle elevated eyebrow arch (Fig. 72.4). It also causes, in some cases, overelevation of the lateral brow, resulting in the devilish "Diablo brow", which again is unattractive.

72.6 The MicroBOTOX Technique (MesoBOTOX)

Lateral forehead frown lines may persist and these can be alleviated with the microBOTOX technique I pioneered in 2001. I initially called it the mesoBOTOX technique as the principle of administration is very similar to the way mesotherapy concoctions are delivered to the skin or underlying subcutaneous fat. This name has caught on and is currently popular around the world. However, the BOTOX is not actually given into the mesoderm at all as it currently is not known to have an effect there. I believe a better scientific name for my technique should be microBOTOX, a term I coined in 2002. It more accurately reflects the dose of BOTOX given and its distribution in the dermal–subdermal layer.

This involves giving tiny injections of BOTOX (approximately 0.01 ml or less each) diluted by a further factor of 4–5 times (Fig. 72.5). Typically I use 4–8 units of BOTOX in 1 ml saline. This is obtained by first withdrawing 0.1–0.2 ml of an already prepared standard (2.5 ml dilution) BOTOX vial into a 1-ml syringe and then filling the entire syringe with saline. I then inject small amounts of the solution into the dermis of the skin, creating superficial blebs. The microBOTOX technique works in two ways: firstly,

Fig. 72.4. **a** Before and **b** after BOTOX browlift and chin rejuvenation.

Fig. 72.5. 0.1, 0.05, 0.05 ml) divided into several droplets

Fig. 72.6. **a** Before and **b** after micro(meso)BOTOX to the infraorbital region and cheeks

to reduce the activity of the sebaceous and sweat glands, giving a smooth sheen to the forehead, and secondly, to relax the superficial fibres of the frontalis muscle. As it is the superficial fibres that are attached to the dermis, the fine forehead lines are diminished without eradicating all function of the deeper frontalis muscle fibres. Elevation of the brow can therefore still be achieved.

The microBOTOX technique is also used to improve facial and forehead sheen and luminosity. By reducing sebaceous (cholinergic receptors) and sweat gland (adrenergic receptors) activity, it is seen to reduce pore size and make the skin envelope appear tighter and smoother. Additional theories for the mechanism of action include modifying the microcirculation (via smooth muscle relaxation) and lymphatic circulation (causing oedema of the skin, plumping it up). two to four units are diluted into 1 ml saline and injected into the infraorbital area, cheeks, anterior hairline and even the jawline to smoothen and "tighten" the skin.

It is particularly useful in the infraorbital area as it reduces the fine lines which many patients are disturbed by without reducing deeper orbicularis oculi activity and giving the "hound-dog" baggy appearance that often happens if traditional BOTOX is administered here (Fig. 72.6).

72.7 BOTOX Chin Rejuvenation

As the face ages, activity of the mentalis muscle increases owing either to a reaction to ptosis of the chin pad or to sheer bad habit. The chin "frowns" as much as the glabellar region but is in most cases unrecognized and undertreated. The result of mentalis overactivity or "strain" is a popply chin. This gives a sour appearance to the lower face and also squares off the chin. It also synergizes with activity of the depressor angularis oris muscle to give a sad, bitter effect. Five to seven evenly spaced injections of BOTOX into the prominence of the chin relaxes the mentalis and creates a relaxed, sharp appearance which looks pleasant and youthful (Fig. 72.7).

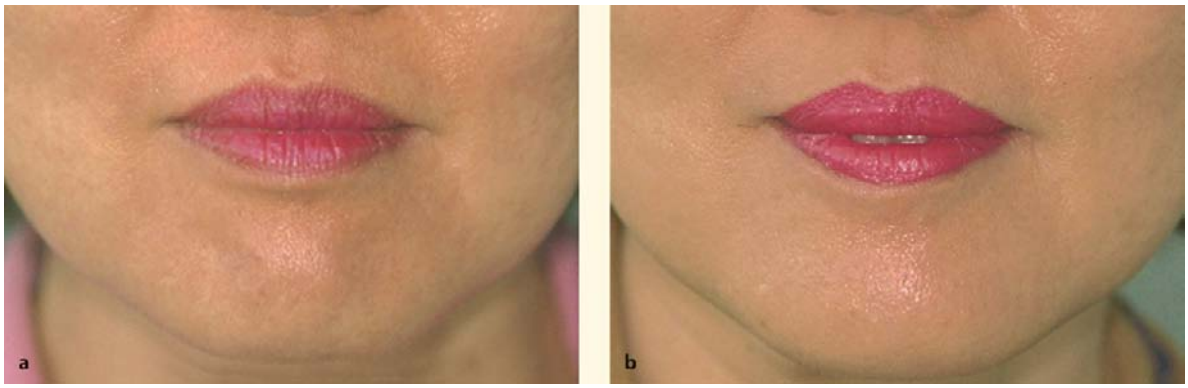

Fig. 72.7. **a** Before and **b** after BOTOX chin rejuvenation

72.8 BOTOX Facial Sculpting

In this technique, which I have been evolving since 1999, BOTOX is injected into the masseter muscles solely for cosmetic slimming or narrowing of the lower facial width. These are patients with a "square jaw" or increased lower facial width as a result of masseteric hypertrophy. They may also just be normal patients without masseteric hypertrophy but who desire a slimmer appearance with some aesthetically pleasing sculpting of the infrazygomatic region. The nett effect is a youthful triangulation of the face and the impression of weight loss.

The traditional techniques to treat this have involved mandibular angle ostectomy with or without some form of masseteric muscle debulking. Whilst this is an effective and predictable surgical procedure, there is significant downtime and pain and the occasional incidence of complications such as bleeding, fractures of the ascending ramus and difficult-to-treat asymmetries means that this is not an innocuous procedure and requires a high degree of operator skill. In addition, over time there is regrowth of the masseter muscle, with corresponding regrowth of the mandibular angle and even reformation of a mandibular spur.

This regrowth is consistent with Moss, Rankow and Enlow's theory of the bone–muscle matrix [9–12] in which the integrity of or the thickness of a bone depends very much on the state of the muscles attached to that bone. If the muscles attached to that bone are inactive, the bone will resorb and shrink in size as is what happens when the lower limb is placed in a plaster cast for many weeks after a closed fracture. The bone and muscles when they emerge from the plaster cast are significantly smaller owing to disuse atrophy than those on the contralateral side.

Conversely it therefore stands to reason that BOTOX can be used to relax and diminish the size of the masseter muscle and over time cause remodelling of the external aspect of the mandibular angle and ascending ramus. The masseter muscle itself is an evolutionary redundant muscle of the human face, only required for heavy chewing (such as thick steaks). Most masticatory movements depend only on the medial and lateral pterygoid muscles and the heavy movements have largely been replaced today by the action of the knife and fork.

The technique I have evolved and use today is a result of trials with various doses and frequencies of injection of BOTOX and is currently the most logical and efficient use of the drug. It must be stated that in most cases the goal of treatment is not mere facial width reduction, but reduction to a point of total eradication of movement of the masseters in order to allow the bone to presumably remodel with time. Most of my patients are those plagued by a square, manly lower face and who wish a more triangular, aesthetic look without having to undergo surgery. There are also those who just wish to have slight facial "slimming" and still retain some masseteric fullness and action. The only contraindication is if the patient feels that the facial slimming is excessive or where a hollowed-out appearance has resulted.

The actual technique involves first isolating the upper, lower, anterior and posterior borders of the masseter by getting the patient to clench firmly. This also delineates the three-dimensional nature of the muscles' three overlapping heads, where the central portion is the thickest, with another thick ridge at the anterior border, running obliquely downwards and backwards from the zygomatic arch to the mandibular border.

A line is drawn from the oral commissure to the tragus (Fig. 72.8). Most of the masseteric bulk is located below this line and for beginners, the injections of BOTOX should be directed to this region. This avoids diffusion of the drug through the coronoid notch (which lies above this line) and inadvertantly paralysing the pterygoids, which will result in difficulty in chewing.

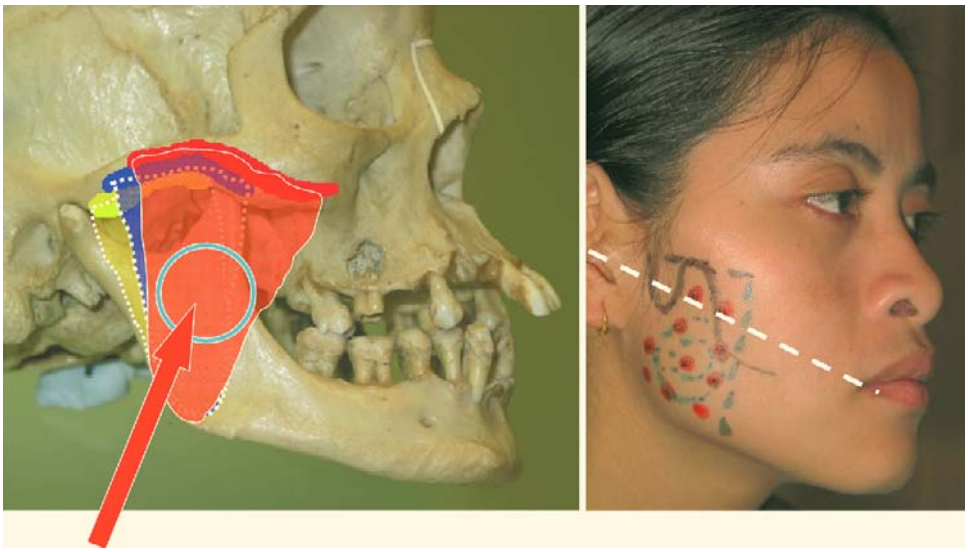

Fig. 72.8. Surface markings of the masseter bellies

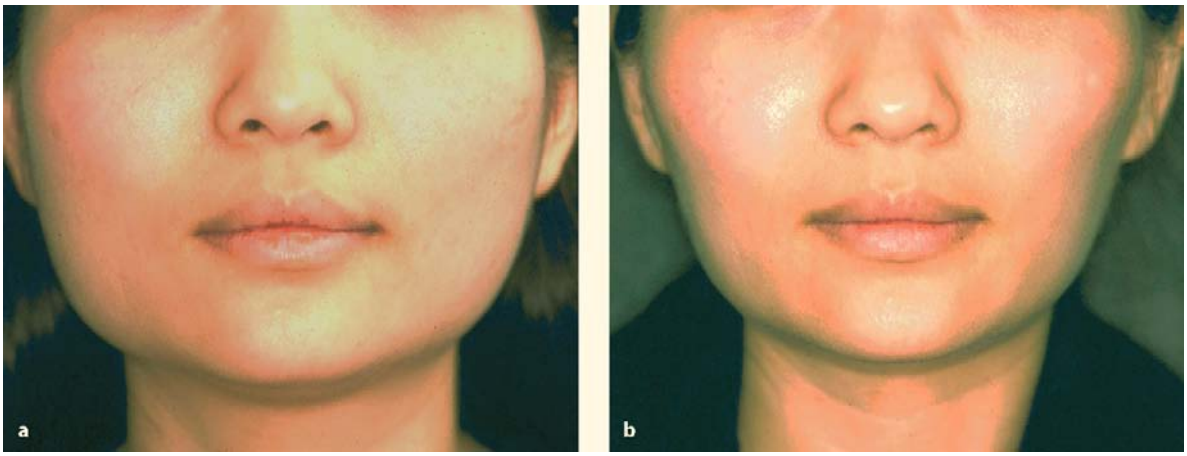

Fig. 72.9. **a** Before and **b** 6 wks after BOTOX facial slimming, 40 units per side

Twenty to 40 units is administered in eight to ten evenly spaced injections in this region, ensuring good diffusion of the drug within the muscle bulk. If 20 units is used (i.e., 0.5 ml) then a further 0.5 ml saline is drawn into the syringe to make up 1 ml. This makes it easier to control the injections and allow for even diffusion.

The first injection is given at the initial consultation. The usual starting dose is between 36 and 40 units per side (Figs. 72.9, 72.10). The patient is seen 1 month later and the second dose is given, usually another 36–40 units. Early review allows adequate time for atrophy to occur and for any asymmetries to become manifest. The doses are adjusted to correct asymmetries, to further reduce the muscle bulk, or just to refine the shape of the jaw. If an infrazygomatic hollowing is desired to give better definition to this area, then two or three injections can be given to the anterior border of the masseter above the oral commissure–tragus line.

These two sessions, 1 month apart, usually give adequate volume reduction and paralysis of the muscle for 4–5 months. Occasionally, exceptionally large masseter muscles are encountered, necessitating a loading dose of up to 52 units per side and a second dose of 40 units. Rarely is a third injection required another month later, but typically this would be in the range 20–28 units.

Follow-up injections every 3–6 months range from 20 to 32 units per side. This smaller dose is a result of reduction of muscle bulk.

I prefer to administer follow-up injections at the third or fourth month, when muscle movement is just returning and before the muscle has grown back to a

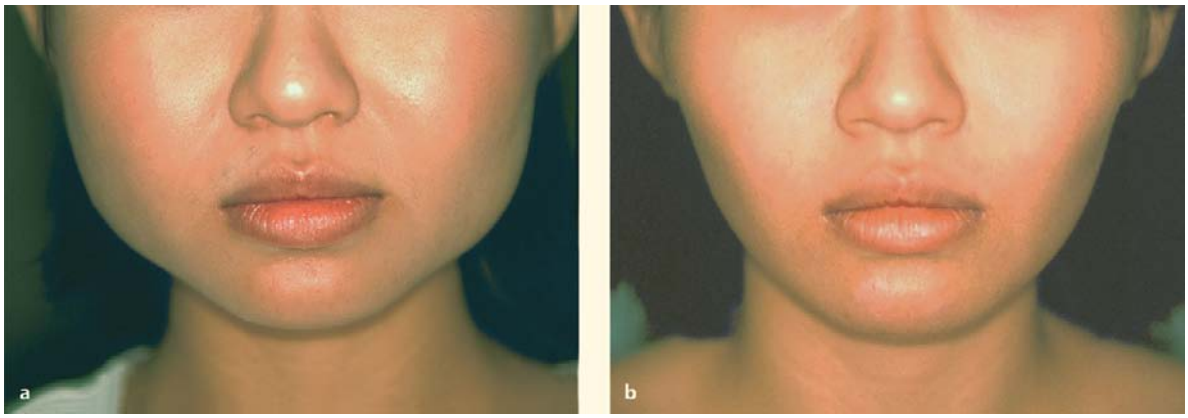

Fig. 72.10. **a** Before and **b** 6 weeks after BOTOX facial slimming, 40 units per side

third of its original volume. It is best not to allow the muscle to return to its original size before further BOTOX injections. This obviously is not aesthetically practical for the patient and also necessitates a larger dose to compensate for the larger muscle volume.

As experience is gained, the physician can control the shape of the face, achieving a triangulated or smooth, oval shape. A common mistake is to overreduce the upper half of the masseter, leading to a scalloped, hollowed-out appearance of the infrazygomatic region like that of a starvation victim.

72.9 Restore with Synthetic Fillers

There are a multitude of fillers commercially available and the purpose of this chapter is not to discuss these in detail but to give the reader a sense of the importance of fillers in the overall rejuvenation of the face. Volume restoration is vital to successful facial rejuvenation. Without it, it is impossible to regain the fullness of the infraorbital region, the midface, the temples, the lips and the nasolabial lines.

I employ a strategy of using resorbable hyaluronic acid based fillers for restoration of the infraorbital hollows, nasojugal grooves and lips using a multiplane technique that injects denser fillers deeper into the soft tissues and less dense fillers into the dermal/subdermal regions. This allows surface etchings to be adequately treated by a superficial filler and deeper hollows with a longer-lasting, hyaluronic acid filler. It essentially stacks fillers of different densities on top of each other to give a more complete result.

For noncritical areas such as the cheekbones, the temples and the chin, I may use a semipermanent filler. Such fillers typically have 60–70% of a hyaluronic acid or collagen component mixed with microparticles of a nonresorbable substance. Such fillers have the potential to form foreign body reactions and granulomas and therefore should not be employed under the eyes, nasolabial grooves, or in the lips. In the chin and cheeks, however, they act similar to solid implants and any complications here can be used to advantage. The effect of such fillers is of longer duration.

I feel that adequate filling of the nasojugal groove, infraorbital hollows and nasolabial lines has a powerful rejuvenative effect (Fig. 72.11). Building up the volume of the cheekbones also makes the face look stronger and more three-dimensional. Moreover it is easy to perform and the results are predictable.

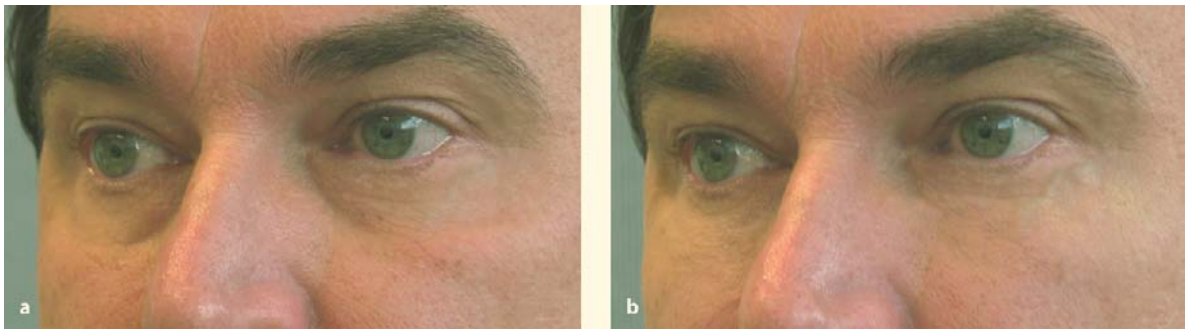

Fig. 72.11. **a** Infraorbital grooving and hollowing. **b** After injection of fillers into the grooves

72.10 Resurface with Nonablative Modalities

Again there are so many new modalities commercially available for resurfacing the facial skin and it can be a tremendous challenge to decide which of these machines are essential and which have limited applications. My personal strategies are to use a combination of intense pulsed light for reducing facial pigmentation and vascular blotchiness and either a nonablative laser or radiofrequency (e.g., Thermage) to tighten the skin envelope. Discussion of how to use each of these modalities is beyond the scope of this chapter.

72.11 Redrape with the Woffles Lift – Versions 1.0, 2.0 and 3.0X

The Woffles Lift is a quick, nonsurgical facelifting technique using unique, self-holding, barbed suture slings (Woffles Threads) made of polypropylene that elevate sagging facial tissues of the face, suspending them from the dense, immovable tissues of the scalp. This has previously been described in [8].

This technique was designed to address the lack of a nonsurgical technique that could adequately elevate sagging facial tissues and restore the ogee curve of the face, which itself is achieved by volumetric restoration of the midface and upward redraping of the lower face and jowl skin. The basic principle behind it is that the facelifting effect is achieved without delamination of any of the anatomical layers or disruption of the relationships of vital structures such as skin, muscle, nerves or blood vessels.

This significantly reduces the incidence of complications and minimizes downtime, allowing the patient to resume social or business activities within a day or two. It therefore belongs firmly in the nonsurgical, minimum-downtime category together with BOTOX, synthetic fillers and other nonablative skin resurfacing techniques such as intense pulsed light and radiofrequency treatments. It is an important component of my 4R principle concept of nonsurgical facial rejuvenation, namely relax, restore, resurface and redrape. In doing so it has challenged the way we think about and has helped us reevaluate our concepts of facelifts and facelifting mechanics.

The technique needs to be repeated every 1–2 years in order to maintain the facelift effect. Whilst this concept of a repeat facelift is foreign to most plastic surgeons who would prefer to see their results last for 5–10 years, the Woffles Lift must be placed in the same category as BOTOX or filler injections, which have a pleasant outcome for a short duration of time and need to be repeated.

Fig. 72.12. Orientation of threads in Woffles Lift version 1.0

The ideal facelift is a nonsurgical procedure which creates an effect similar to that from surgery and lasts for many years. Sadly this does not exist. The barbed sutures currently come closest to achieving any form of lifting result without surgery.

In the original iteration now designated as version 1.0, the Woffles Threads are inserted into the face via long hollow needle introducers to form "upright-V" slings where the apex of the V catches the soft tissue to be elevated and the limbs of the thread pull this suspension point up in the direction of the temporal scalp where the barbs in the thread engage in the soft tissues creating a secure elevation (Fig. 72.12). Originally the free ends of the thread were tied and knotted subcutaneously in the scalp, but this step has been shown to be unnecessary, causing discomfort and minor complications such as granuloma or stitch abscesses. The multiple barbs in the free ends of the thread are more than sufficient to give a stable fixation of the soft tissue.

This lift is particularly useful in those seeking elevation of the midface and jowls with a smooth, tight draping of the side of the face. As the entry points of the threads (apices of the upright Vs) are at the anterior hairline, the midface and lower face is passively stretched upwards towards the temporal scalp. There is no bunching up or pleating of skin below these points but rather above the point of insertion, necessitating further threads to be placed in succession above the initial point in order to smooth out the temporal skin (Fig. 72.13).

Ideal candidates are those with slack, thin skin and ptosis of the lateral brow as the vectors of pull automatically elevate the tail of the brow, the lateral canthal region as well as the midface. The jowls being

Fig. 72.13. **a** Before and **b** immediately after Woffles Lift version 1.0 to the lateral face

passively elevated and furthest from the point of pull are adequately effaced but are the earliest to recur. Additional threads can be inserted at yearly intervals to account for loss of effect and natural aging of the patient's face. It is not appropriate in those with thick, heavy jowls.

The procedure is performed under local anaesthesia in the upright position and takes approximately 20 min, making it quick and tolerable for the patient, who can leave immediately after the procedure.

72.11.1 The Woffles Lift Version 2.0

In version 2.0, the threads are now inserted into the face as "inverted-V" slings such that the apex of the V is up in the temporal scalp and the barbed, free limbs of the sling are aligned within the face such that each limb elevates one of the key suspension points (KSP) of the face to the temporal scalp. These KSP currently number six and they are (Fig. 72.14):

1. The upper nasolabial fold
2. The lower nasolabial fold
3. The marionette line and angle of the mouth
4. The anterior jowl
5. The posterior jowl
6. The angle of the mandible

Each of these KSP has a vector of elevation that is directed to the temporal scalp, lending itself to the application of the Woffles Threads as inverted-V slings.

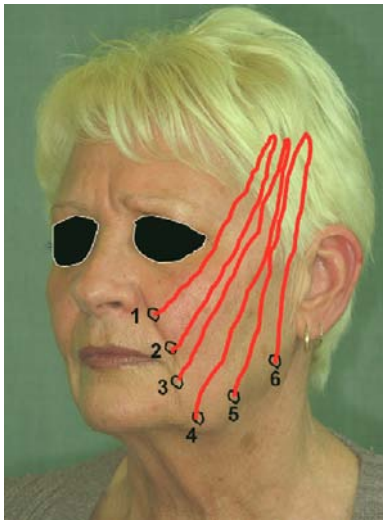

Fig. 72.14. Suspension of the key points

72.11.2 Version 2.0 – Insertion of Woffles Threads

The insertion of the Woffles Threads to form the inverted-V slings is similar to that in version 1.0 except that the direction of thread entry is reversed.

The technique is as follows. An 18G spinal needle is first inserted through one of the KSP and threaded upwards in the soft tissue of that particular vector until the needle tip penetrates the deep temporal fascia and then sharply emerges through the temporal scalp. A small stab incision using the tip of a no. 11 blade can be made over this point to facilitate the second pass of the needle. One end of the Woffles Thread is passed through the needle tip and advanced all the way in until the clear zone is encountered, upon which the advancement is stopped (Fig. 72.15a). The needle is then removed and reinserted through an adjacent KSP and again threaded upwards to emerge from the same exit (opening) as the previous one.

The remaining end of the Woffles Thread is then passed into the needle tip and the thread is advanced all the way until the central clear zone, whereupon the needle is removed and both ends of the

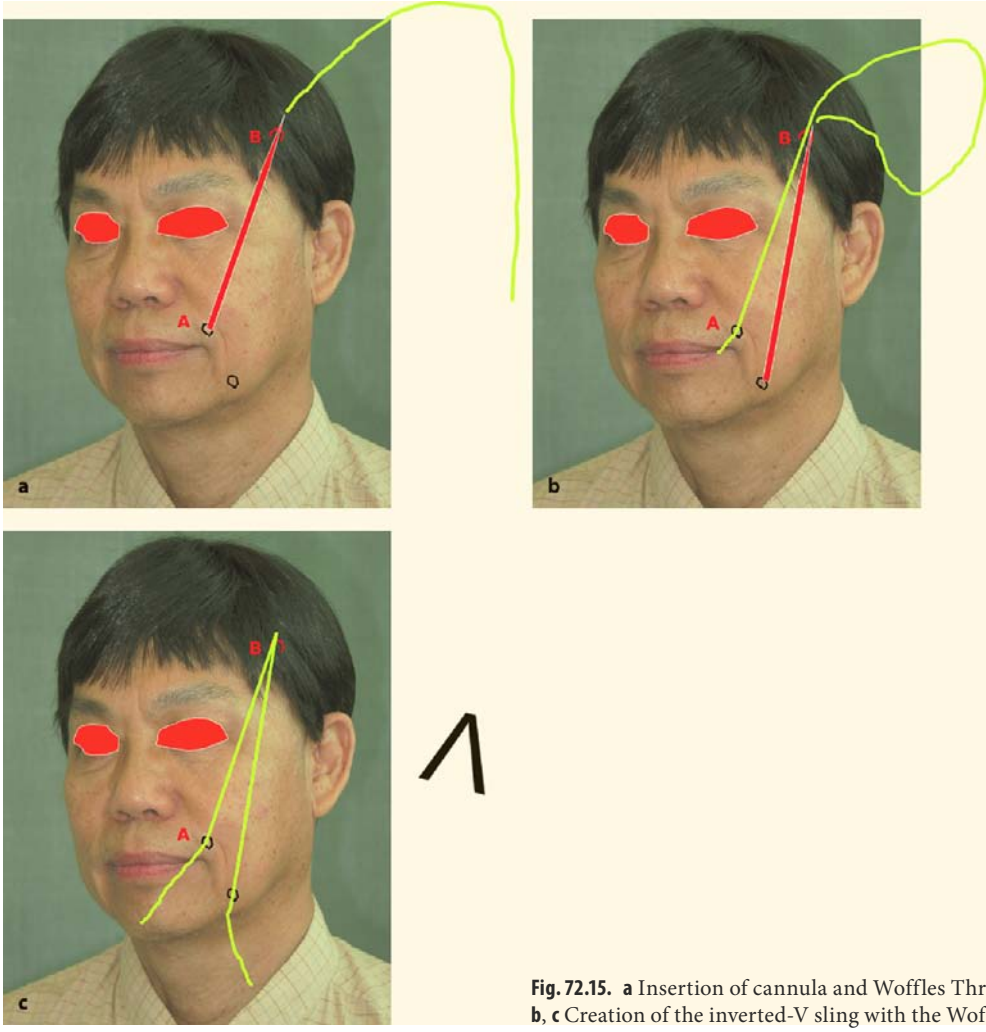

Fig. 72.15. **a** Insertion of cannula and Woffles Thread. **b**, **c** Creation of the inverted-V sling with the Woffles Thread

thread are pulled taut to create a sturdy inverted-V sling (Fig. 72.15b, c).

Any number of inverted-V slings can be inserted to suspend each of the KSP or any other part of the facial skin that requires elevation. It is preferable to choose separate exit points in the scalp for each thread to decrease the chance of it "cheese-cutting" through the soft tissues.

As the jowl is now being directly suspended rather than being passively stretched upwards, this is a more effective technique for those with heavy jowling and who desire a taut jawline. The barbs in the facial soft tissue are also much longer, leading to a more stable pull and longevity of the effect. Since the entry point is at a greater distance from the exit point in the scalp, the tissues in-between these two points are elevated by being subtly bunched up or cinched together creating a volumetric restoration of the cheeks and midface. It does not confer the same sleek, taut effect as in version 1.0. The pleating that logically should happen is more evenly distributed over a greater distance and thus is not obvious.

72.11.3 Depth of Thread Placement

I am always asked whether the threads should be placed more superficially or deeper in the soft tissues. The answer is somewhere in-between and over time one will develop a feel for when to place the threads superficially or deeply. The closer the thread is to the dermis, the greater the catch of the barbs and the more noticeable the pull. It is also easier to elicit dimpling of the skin or contour divots, which are often unaesthetic. If the thread is too deep in the soft tissues, there is less catching of the barbs, a greater chance of "cheese-cutting" and a tendency to lose the effect early. However it leads to a smoother outcome of the pulled segment and is a more logical vector for elevation of deeper structures such as the malar mound.

Fig. 72.16. Full face and neck lift with Woffles Lift version 2.0

Typically, a single needle pass will traverse several anatomical layers. In elevating the jowl KSP, the needle passes through the substance of the jowl and then passes upwards in the subcutaneous or superficial musculoaponeurotic system layer of the cheek before plunging deeper into the malar mound, then superficially into the temple skin before again going deeply into the deep temporal fascia and then emerging through the temporal scalp skin. I prefer the thread to be deeper rather than more superficial.

72.11.4 Treatment of the Neck

In the neck I use both versions 1.0 and 2.0 depending on how much skin laxity is encountered. If the neck is thin, crepey and loose, it is better to apply version 1.0. Here I mark the cervicomental angle and connect this with the mastoid process on either side. A stab incision is made in the midline at the level of the cervicomental line. The needle is inserted in the subcutaneous/platysmal plane all the way up to the dense tissue of the mastoid fascia where it emerges behind the ear. One half of the Woffles Thread is passed through such that the remaining end remains outside the entry point in the anterior neck. The needle is then passed from the mastoid fascia down to the initial entry point where the needle tip emerges and the remaining end of the thread is inserted and passed superiorly to complete an upright-V sling. I usually use two threads on either side. Occasionally, depending on the laxity of the neck, I may emerge through the dense Loré's fascia just under the ear lobe.

In heavier necks with a fatty component, I use version 2.0 reversing the direction of the sling such that it is an inverted V. Two such slings would be placed one on top of the other on either side, their apices in the mastoid fascia and their free limbs down in the anterior neck (Fig. 72.16).

72.11.5 Relapse of Aging – Failure of Threads

Failure of threads can occur with overbending or snapping of the delicate barbs causing them to lose their grip on the tissues. "Cheese-cutting" of the clear central zone of the Woffles Thread through the soft tissues of face or scalp can also cause gradual descent of facial tissues again. To overcome this "cheese-cutting" effect, we have designed a sleeve of reinforcing material to be sheathed around the central clear zone or to flatten this zone into a "ribbon"-like configuration. Another simple technique to reduce "cheese-cutting" is to use a small strip of Surgicel inserted at the apex of the V loop before pulling it tight.

72.11.6 The Woffles Lift Version 3.0X (The X-Lift)

A recent easily achieved technique modification to effectively overcome the "cheese-cutting" effect is the development of version 3.0X.

In this version, version 2.0 is combined with version 1.0. Since the V loops point in opposite directions I decided to interlock the loops and let one loop support the other. First, the threads are inserted into the

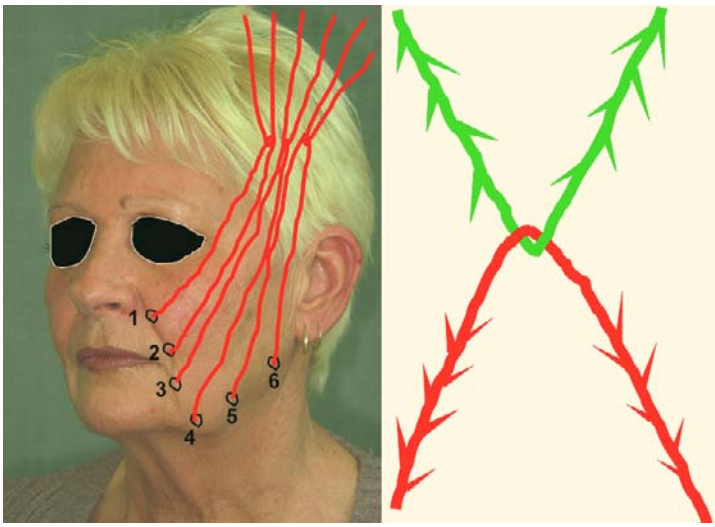

Fig. 72.17. Creation of the interlinked X sling

relevant KSP in an inverted fashion as in version 2.0. Before the ends of the threads are pulled tight and whilst the loop of the central clear zone still resides outside the scalp wound, the needle introducer is passed from the superior temporal scalp down to this scalp wound and another Woffles Thread is looped around the former and inserted into the scalp up to the vertex as in version 1.0.

Therefore, version 3.0 is a combination of versions 1.0 and 2.0 where the two thread slings are inserted in opposite directions having the apices of the V slings interlocked and thereby effectively reducing "cheese-cutting" since they now support each other (Fig. 72.17).

72.11.7 Technique of the Woffles Lift Version 3.0X (The X-Lift)

After completing one thread insertion of version 2.0 and with the loop of the central clear zone still protruding from the scalp wound, an additional Woffles Thread is passed under the loop and interlocked with the former one at its central clear zone and is then inserted into the scalp up to the vertex. This is achieved by inserting the 18G spinal needle from the most superior portion of the temporal scalp and emerging from the same lower temporal scalp incision as for the earlier placed version 2.0 sling. One end of another Woffles Thread is passed under the exposed loop and then inserted into the open end of the needle and then advanced all the way up in a caudal (superior) direction. The needle is then removed and reinserted via a different superior scalp puncture and the remaining end of the suture is similarly threaded through to complete the upright-V sling. The two ends of the thread (version 1.0) protruding from the superior temporal scalp are then pulled taut, whilst the two ends protruding from the two KSP in the lower face (version 2.0) are similarly pulled taut and the facial tissues are then massaged upwards into the barbs to create the facial elevation in the desired areas. Again this arrangement can be repeated several times to elevate different regions of the face and jowls.

The two interlocking loops effectively negate the "cheese-cutting" effect of either. As the jowls and

Fig. 72.18. **a** Before and **b** after Woffles Lift version 3.0

cheeks are massaged upwards, volumetric restoration of the malar mound is achieved, giving support to the lower eyelids as well as effacing the nasolabal folds. The most significant improvement is in the creation of a well-defined ogee line (Fig. 72.18).

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73 Injectable Dermal Fillers – Resorbable or Permanent?

Gottfried Lemperle

73.1 Introduction

The aging of a face, e.g., the loosening of the skin, is often combined with a volume loss of the subcutaneous fat [53]. Interestingly, the thickness of the dermis diminishes at the extremities, however, in the face it thickens with aging [25]. Most facelift techniques that have been described take care of the surplus of facial skin. Critical surgeons know, however, that even the stretching of the nasolabial folds during a facelift persists for a few months, only. Then, a wrinkle filler is indicated. The wrinkles in the perioral and glabellar region cannot be flattened by the tension on the cheek or forehead skin but will need an injectable filler substance (Table 73.1). Superficial perioral and periorbital wrinkles can be treated effectively with laser (see Chap. 70), chemical peel (see Chap. 69), or around the mouth with dermabrasion.

An increasing number of soft-tissue filler substances have been introduced to the European beauty market which lack experimental and clinical data in support of their claim. Therefore, 10 commercially available filler substances were examined for biocompatibility and persistence : 0.1 ml of each substance was injected subdermally into the volar forearm of the author and observed for clinical reaction and permanence [34]. At 1, 3, 6, and 9 months the test sites were excised, histologically examined, and graded according to a foreign body reactions classification [34].

Table 73.1. Classification of injectables

	Source
Autologous fat grafts	Liposculpture
	Preadipocytes? (Fidia Advanced Biopolymers, Albano Therme, Italy)
	Stem cells from adipose tissue? (Cytori Therapeutics, San Diego, CA, USA)
Bovine collagen	Zyderm I, II and Zyplast (Allergan/Inamed Aesthetics, Santa Barbara, CA, USA). FDA-approved
	Koken Atelocollagen (Koken Co., Tokyo, Japan) Resoplast (Rofil Medical International, Breda, The Netherlands)
Porcine collagen	Permacol (Tissue Science Labs., UK)
	Fibroquel (Aspid, Mexico)
	Evolence (ColBar LifeScience, Herzliya, Israel)
Human collagen	Cosmoderm, Cosmoplast (Allergan/Inamed Aesthetics, Santa Barbara, CA, USA). FDA-approved
	Isolagen (Isolagen Technologies, Houston, TX, USA) collagen from patient's own cultured fibroblasts
	Fascian (Fascia Biosystems, Beverly Hills, CA, USA) from human fascia. FDA-approved
	Cymetra (Lifecell, Branchburg, NJ, USA) FDA-approved

Table 73.1. *Continued*

	Source
Hyaluronic acid gels	Hylaform (from rooster combs), Hylaform Plus, Hylaform Fineline (Allergan/Inamed Aesthetics, St. Barbara, CA, USA). FDA-approved
	Restylane, Perlane, Restylane Fine Line SubQ, Macrolane (Q-Med, Uppsala, Sweden, and Medicis, Scottsdale, AZ, USA) produced by *Streptococcus equi*. FDA-approved
	Juvederm 18, 24, 30 from *S. equi* (Leaderm, Paris, France, and Allergan/Inamed Aesthetics, Santa Barbara, CA, USA). FDA-approved
	AcHyal (Tedec-Meiji Farma, Spain)
	Matridur (BioPolymer, Siershahn, Germany) Hyal-System (Merz Pharma, Frankfurt Germany)
PMMA microspheres	Artecoll, 30–40 µm microspheres suspended in bovine collagen (Rofil Medical International, Breda, The Netherlands)
	ArteFill, pure 30–50 µm microspheres suspended in US bovine collagen (Artes Medical, San Diego, CA, USA)
	Metacrill (Nutricel Laboratorios, Rio de Janeiro, Brazil) PMMA beads of all sizes with impurities similar to former Arteplast, suspended in magnesium carboxygluconate gel
Silicone gels	Silikon 1000 (1,000 cSt; water has a viscosity of 100 cSt). FDA-approved for retinal reattachment
	SilSkin, 1,000 cSt (Richard-James Development Corp., Peabody, MA, USA). In clinical trials, but not FDA-approved
	PMS 350 (Vicomed, Germany) fluid silicone of 350 cSt viscosity
	Bioplastique (Uroplasty, The Netherlands) polymerized silicone particles of 100–600 µm suspended in PVP
Polyacrylamide gels	Aquamid (Ferrosan, Copenhagen, Denmark) 2.5% polyacrylamide gel in water
	Interfall (Interfall, Kiev, Ukraine)
	Bio-Alcamid (Polymekon, Milan, Italy) 4% polyalcrylamide cross-linked with polyalkylimide
	Outline (ProCytech, Bordeaux, France) is temporary and is absorbed within 1–2 years
	Amazing Gel (FuHua, ShenZhen, China)
	Formacryl (Bioform, Moscow, Russia)
	Argiform (Bioform, Moscow, Russia) with silver ions as antibiotic
Other injectables	Radiesse (Bioform, San Mateo, CA, USA) calcium hydroxylapatite (constituent of bone and teeth) microspheres of 40 µm suspended in caboxymethylcellulose gel
	Dermalive and Dermadeep (Dermatech, Paris, France) HEMA/EMA particles suspended in hyaluronic acid
	New-Fill/Sculptra (Aventis and Dermik Labs) microspheres from polylactic acid to be suspended in methylcellulose gel
	Matridex (BioPolymer, Siershahn, Germany) dextran beads of 40 µm in hyaluronic acid (to be distributed in the US by AART, Reno, NV, USA)
	Reviderm (Rofil Medical International, Breda, The Netherlands) dextran beads of 40 µm diameter suspended in hyaluronic acid
	Evolution (ProCytech Labs., Bordeaux, France) polyvinyl microspheres suspended in slow absorbable polyacrylamide gel

Since the 1970s, dermal filler substances consisting of highly viscous fluids [31, 38, 49] or polymer particle suspensions [19, 35] have been injected beneath wrinkles and acne scars [8, 29]. These substances are useful for the correction of congenital or traumatic facial, bony, and soft-tissue defects [9], and in patients suffering from scleroderma, Romberg's disease, facial wasting, or lipodystrophy following AIDS treatment [2, 10]. Additional indications are unilateral paralysis of vocal cords [11, 22, 26], augmentation of the lip and soft palate in cleft lip patients, anophthalmic orbits [9], or enophthalmus. Other potential applications as bulking agents are lower esophageal sphincter in gastroesophageal reflux patients [20, 45], and bladder neck or anal sphincter in patients suffering from urinary [5] or fecal incontinence [59]. The injection of a permanent filler substance into damaged vertebral discs with an intact annulus might even release the pain caused by the narrowing of the discs [52].

Animal studies [36] and clinical trials [14, 17] have shown good acceptance and short- and long-term efficacy in accordance with the chemical structure and surface characteristics of the microparticles [4]. Resorbable materials such as collagen, hyaluronic acid [17, 34, 46], poly(methyl acrylate) (PMA) [6], dextran [18], or polylactic acid (PLA) [2] are removed by phagocytosis over a period of 3–24 months depending on the type of bulking agent implanted. Permanent fillers such as paraffin [31], fluid silicone [10, 15], Teflon [32], or silicone particles [19] have an irregular surface and a size that cannot be phagocytized and may eventually form foreign body granulomas owing to the memory of so-called frustrated macrophages [18]. Microspheres below the size of 15 μm [41, 57] are generally phagocytized and can be transported to local lymph nodes. Larger microspheres from nonresorbable polymers with a smooth surface [33, 47] are encapsulated with fibrous tissue and escape phagocytosis.

Clinically, all injected fluids [42, 55] and particles [50] have been shown to cause foreign body granulomas in a small percentage of patients [36]. Until the mechanism of granuloma formation is fully understood, the chance of its late development is not predictable.

Fig. 73.1. Cystic granuloma with persistent edema of the whole cheek 1 year after Zyderm injection into the upper radial lip lines. The therapy of choice is systemic corticosteroids. (Courtesy of R. Moscona, Haifa, Israel)

73.2 Zyderm and Zyplast (Collagen Implants)

Zyplast, a suspension of 3.5% cross-linked bovine collagen, is the "gold standard" for all other newly introduced injectables. The dermis of animals and humans consists of 18% collagen; Zyderm and Zyplast consist of suspended fibrils of bovine dermis. Zyplast is cross-linked with glutaraldehyde, in addition. Zyderm and Zyplast have been FDA-approved dermal fillers in the USA for more than 20 years. The limited longevity of Zyderm and Zyplast, ease of use, low incidence of allergic reactions (2–3%), and relative safety are well established [30]. Late granuloma formation (Fig. 73.1) is a less serious event (cystic inflammation) [24, 36, 42] than with slowly resorbable gels and particulate materials.

Human collagen Cosmoderm and Cosmoplast, produced by fibroblasts of a human foreskin is FDA-approved and is slowly replacing Zyderm/Zyplast. However, both do not last longer than 3–4 months and cost 50% more than bovine collagen. No allergy test is required.

Isolagen is made from the patient's own fibroblasts, which are grown in Petri dishes for 8 weeks from a punch biopsy of the skin behind the ear. The resulting 1 ml of living fibroblasts is very expensive – and there are no convincing data on its persistence, yet.

Cymetra is an injectable made from human dermis (micronized Alloderm) but does not last longer than Cosmoderm: 3–6 months. It is rather difficult to inject through a large needle.

Fig. 73.2. Cystic granuloma (open sterile abscess) in both nasolabial folds 7 months after Restylane injections. Evacuation of all implanted material and intralesional triamcinolone solved the granuloma within 3 months

73.3 Restylane and Other Hyaluronic Acid Products

Restylane, Restylane Fine Line, and Perlane are suspensions of different 1.0% cross-linked hyaluronic acid gel particles in 2.0% hyaluronic acid gel from *Streptococcus equi* [34, 46] that have been on the European market through Q-Med since 1996. In North America, it is distributed by Medicis, Scottsdale, AZ, USA. The persistence of all three substances is about 3–6 months.

The dermis contains about 0.01% hyaluronic acid, which binds intercellular water, e.g., a human body contains about 15 g hyaluronic acid. Human hyaluronic acid, a polysaccharide of 4–5 kDa has a half-life of only 1–2 days. It forms the cellular interstitium of the dermis and creates volume by binding water.

To avoid an early breakdown, injectable hyaluronic acids have to be cross-linked. The hylan B in Restylane has a molecular weight of 8×10^5, but 0.5% or every 200th amino acid of the molecule is cross-linked ("stabilized") with a neighboring molecule. Furthermore, it contains a suspension of 1×10^5 hylan B particles of 40–60 µm size – ground from dried hylan B sheet – in hyaluronic acid fluid. A similar product, Perlane, contains 8×10^3 gel particles/ml of approximately 100 µm in diameter, and Fine Line contains approximately 2×10^5 gel particles/ml of 20–30 µm in diameter. These gel particles, however, cannot been seen under the microscope.

Residues from the process of fermentation of *S. equi* (more than 107 µg/ml) [39] may induce allergies to this bacterial protein in certain patients. Acute and late inflammatory skin reactions have been reported [12, 23, 37, 39] as with all other fillers (Fig. 73.2).

Hylaform is cross-linked hyaluronic acid from rooster combs, produced by Genzyme, Boston, MA, USA. It got FDA approval in April 2004 but does not last as long as Restylane.

Juvederm 18, 24, and 30 (Leaderm, Paris, France) has been on the European market since 2001 and is distributed by Inamed in the USA. It is a similar hyaluronic acid from *S. equi* and comes in 1.8, 2.4, and 3.0% solutions. Inamed received FDA approval for Juvederm in 2005.

73.4 New-Fill/Sculptra (Polylactic Acid Microspheres in Methylcellulose)

Sculptra (in Europe, New-Fill) consists of resorbable microspheres from PLA (crystal L-PLA) to be suspended in methylcellulose. It comes as a powder of L-PLA microspheres (1–60 µm) to prepare a 4.5% suspension in 2.7% methylcellulose [2] PLAs do not occur naturally, but were synthesized by French chemists in 1954 [3]. PLA and polyglycolic acid (PGA) have been used safely in suture materials (Vicryl, Dexon), in resorbable plates and screws, in guided bone regeneration, in orthopedic, neuro-, and craniofacial surgery, and as drug delivery devices [56]. PLA does not stimulate the natural production of collagen [2], but causes a foreign body reaction, characterized by macrophages, giant cells, and some elastic fibers [34]. The PLA polymer New-Fill disappears within 6–9 months beneath moving wrinkles; however, it may last up to 2 years (Fig. 73.3), especially when injected in quantities of 10–20 ml into facial lipoatrophy cheeks and temples of HIV patients who are under highly active antiretroviral therapy (HAART). For this latter indication, only, Sculptra was FDA-approved in 2004.

In the forearm of the author, the microspheres in living tissue were still recognizable as being round with an irregular surface 6 months after injection. Nine months after implantation, no polymer residue or remnant cicatricial fibrosis was found histologically, confirming the good biocompatibility of PLA microspheres. Since PLAs contain no animal proteins, allergies are not expected; however, late granuloma have been reported as with any other filler substance [36].

Fig. 73.3. Lasting result 4 years after New-Fill injections. (Courtesy of N. Gauthier, Paris, France)

73.5 Radiesse (Calcium Hydroxylapatite Microspheres in Carboxymethylcellulose)

Radiesse consists of calcium hydroxylapatite microspheres, the form in which calcium is found in our bones and teeth. It was first produced as Coaptite with 75–125 µm microspheres for urinary incontinence; Coaptite did not receive FDA approval but can be used outside the USA. Since 2003, Radiesse has been distributed in smaller microspheres of 40 µm diameter as Radiance FN for vocal cord augmentation and as a tissue marker. It received FDA approval for use in oral-maxillofacial defects, which includes implantation on facial bones but is widely used "off-label" in the USA for wrinkles and dermal defects (Fig. 73.4). The carrier methylcellulose dissipates soon after injection and leaves the microspheres clumped, appearing as white hard calcium nodules in about 50% of the injected lips [60]. While Radiesse is well tolerated beneath wrinkles, it should not be recommended for lip augmentation anymore (Fig. 73.5). The concomitant movement of the orbicularis oris muscle in women during chewing compresses every injected strand to a lump!

Fig. 73.4. HIV patient with highly active antiretroviral therapy (*HAART*) related facial lipodystrophy after multiple Radiance injections. (Courtesy of Bioform Medical, San Mateo, CA, USA)

Fig. 73.5. Nodules after lip augmentation with Radiance. Surgical excision is the treatment of choice since corticosteroids do not affect calcium microspheres

Radiesse is highly biocompatible, causes little tissue reaction, is well defined at the injection site, radio-opaque, and can therefore be used as a tissue marker (Radiance FN). In the skin and especially in the lip, it does not "remain soft" but exhibits a clear hardening of the implant, which resolves over time (in 1–2 years). Since it disappeared from the skin within 12 months [34], Bioform states now that "Radiesse is a temporary implant and resorbs within a period of 6–9 months," – like many others (Aquamid, Dermalive, New-Fill, Reviderm) – and that it is not a "permanent solution."

Histologically, the calcium hydroxylapatite microspheres do not "provide a scaffold for tissue infiltration consistent with the form of the surrounding tissue." Because of little tissue ingrowth [34] and absence of granulation tissue, triamcinolone (Kenalog) injections into Radiance lumps will be ineffective and should be omitted. In some patients, however, Radiance microspheres may induce a kind of foreign body reaction – as demonstrated by one histological picture in the company's leaflet–which of course will react to intralesional corticosteroids.

73.6 Reviderm and Matridex (Dextran Microspheres in Hyaluronic Acid)

Reviderm intra is a suspension of 2.5% dextran microspheres (40 µm Sephadex) [18] in 2.0% hyaluronic acid (2.5 kDa) of bacterial origin (Rofilan). Histologically, dextran causes a strong foreign body reaction and redness at the beginning – but probably causes only few late foreign body granulomas. Matridex is of similar composition, is distributed worldwide, and supplied in Canada and Mexico by AART, Reno, NV, USA, but is not FDA-approved yet. No clinical studies exist so far.

Dextrans are the substrate of chromatography columns (Sephadex) used for the separation of proteins. Dextran molecules of 40,000 and 80,000 Da are used as plasma expanders, since dextran molecules smaller than 20,000 Da will be filtered by the kidney. Dextran beads of 100 µm in diameter were found intact 2 years after implantation in the back skin of rats. Eppley et al. [18] emphasized that the positive surface charges of dextran beads apparently attracted macrophages. The macrophages in turn release transforming growth factor beta and interleukins, which stimulate fibroblasts to produce collagen fibers.

After extensive resorption of the dextran beads at 9 months, however, little or no cicatricial residue could be detected at the implantation sites in other studies [34]. Dextran beads of 100 µm in diameter (Deflux, Q-Med, Uppsala, Sweden) are currently used in clinical trials for the treatment of stress urinary incontinence.

73.7 Dermalive (Hydroxyethyl Methacrylate Fragments in Hyaluronic Acid)

Dermalive is a 20% suspension of hydroxyethyl methacrylate (HEMA) and ethyl methacrylate (EMA) fragments (10–130 µm) in 1.14% cross-linked hyaluronic acid of bacteriological origin [6]. Dermalive is a by-product of the manufacture of intraocular lenses and was introduced to the European market in 1998. Because of a rather high incidence of granuloma formation (Fig. 73.6), it is now used mainly in the form of

Fig. 73.6. Dermalive granuloma after too superficial injection. Intralesional injections of triamcinolone healed the overreaction within 2 months. (Courtesy of C. de Gourzac, Paris, France)

Dermadeep with HEMA/EMA fragments of 80–110 µm in size for deep dermal and epiperiosteal implantation. Inside the injected implant, the HEMA/EMA particles are packed closely, probably owing to diminished viscosity of the carrier medium hyaluronic acid. This carrier dissipates from the particles just after implantation of Dermalive and can be found outside of the clusters of HEMA/EMA particles.

The great advantage of collagen as a suspension medium for filler substances is its high viscosity, which keeps the particles or microspheres apart weeks after implantation. Since little host tissue formation is stimulated, more Dermalive has to be injected compared with other fillers. On the other hand, HEMA has a free OH group, which should stimulate macrophage activity. Endogenous esterases in serum and liver break down HEMA and EMA.

Interestingly, the amount of tissue reaction is not an indication for the rate of granuloma formation. In the studies described [34], Dermalive evoked the least new tissue formation but clinically causes a rather high rate of granuloma formation [36]. It has damaged the reputation of "permanent" – what Dermalive claims to be, but is not!–fillers and cannot be recommended.

73.8 Artecoll/ArteFill (Poly(methyl methacrylate) Microspheres in Bovine Collagen)

ArteFill is the future FDA-approved version of Artecoll, which was distributed worldwide between 1994 and 2006. ArteFill consists of 20% poly(methyl methacrylate) (PMMA) microspheres of 30–50 µm in diameter and a has less than 1% of smaller PMMA particles determined on the basis of the number of microspheres. They are suspended in a 3.5 % solution of bovine collagen, derived from calf skin of a closed herd in the USA. So far, Artecoll has been used in more than 400,000 patients worldwide (Fig. 73.7) with a reported rate of serious complications (granulomas) of 0.02% [36]. Since a clear relation between small particles and granulomas could be found [35], the increased purity of the PMMA microspheres should reduce this rate even more.

After injection of Artecoll into the human skin [34], each individual microsphere was separated from adjacent microspheres by macrophages, fibroblasts and a thin layer of collagen fibers 1 month afterwards. The implants were discrete and well circumscribed within the soft tissue. The peripheral regions of these foci had infiltrated to a depth of two to three microspheres and contained macrophages (one per approximately 15 beads) and a few multinucleated giant cells.

Fig. 73.7. Tear troughs 2 years after treatment with 0.5 ml Artecoll strictly epiperiosteally

Fig. 73.8. Deep nasolabial folds filled with 3.5 ml Artecoll (*left*) and 5 years later (*right*) [14]

Fig. 73.9. Marionette lines are filled by crisscrossing the Artecoll. One year later (*right*)

The centers of the lesions were cell-free and separated through fibrin fibers only. At 3 and 6 months, macrophages and isolated giant cells extended deeper into the lesions [34].

These microspheres showed the most stable appearance throughout the experiment. Once injected, the PMMA microspheres cannot be broken down by enzymes, since a methyl group in the α-position stabilizes the molecule. Interestingly, the volume of the injected collagen (80%) remained stable in the implant over the years (Fig. 73.8). The microspheres act merely as a scaffold and a stimulus for constant connective tissue production. Here, the implant carrier is truly "replaced" by the body's own tissue. In contrast to other inert permanent filler substances like silicone and polyacrylamide, ArteFill is the only particulate material to create a "living" implant.

ArteFill gives predictable results (Fig. 73.9); however, at the same time it is "nonforgiving" when mistakenly implanted in an incorrect plane. To avoid technical mistakes, introductory courses and a careful learning curve are required. It may induce granuloma formation in very rare instances [36], as all other substances will do in certain patients. Indications and injection technique (Fig. 73.10) are outlined extensively in a recent article [35].

The Brazilian Metacrill consists of PMMA microspheres of all sizes with many small PMMA particles

Fig. 73.10. Filling the vermilion border in an elderly lip gives pouting back and erases radial lip lines up to 5 mm. After 3.5 years (*right*)

Fig. 73.11. A reduction rhinoplasty is contraindicated in this big face; instead 2 ml Metacrill was injected in the tip of the nose and beneath the medial crura of the alar cartilages. (Courtesy of S. Passy, Rio de Janeiro, Brazil)

being suspended in methylcellulose [47]. It is a cheap product similar to the former Arteplast, made in Brazil, but sold in Mexico, eastern Europe, and Miami as well. The physicians often use the name "Artecoll" in front of the patients. It clumps and causes a high rate of granuloma; however, exciting results have been achieved in nose (Fig. 73.11) and chin augmentation, tear trough deformity, and HIV-induced facial lipodystrophy [47].

73.9 Silikon 1000 and SilSkin (High-Viscosity Silicone Fluids)

Silicone fluid is FDA-approved for the treatment of retinal detachment (Silikon 1000, Vitresil 1000). Fluid silicone has been banned for cosmetic use since 1967 because of migration and late granuloma formation, but is receiving a revival as SilSkin, a gel with 1,000 cSt viscosity for facial wrinkles, which should be injected using the microdroplet technique. Clinical trials are under way in the USA. It is ideal for lip augmentation and may receive FDA approval.

As we know from ruptured breast implants, silicone gel causes the rarest foreign body reaction among the filler materials. In most patients, silicone gel remains very soft and is encapsulated by only a very thin layer of fibroblasts. The lack of fibrous capsule formation may lead to the displacement of larger quantities, aided by gravity. In patients with very loose connective tissue, it may migrate downwards from the glabella to the cheeks and from the nasolabial folds to beneath the chin. In time, the implant can harden through ingrowth of connective tissue, and it may form a granuloma [49] when macrophages and foreign body giant cells are stimulated by a systemic infection [36]

The reputation of "medical grade" *fluid silicone* has been damaged by five facts:

1. The use of large quantities, e.g., in breast augmentation or facial dystrophies [15, 16], has led to deformation.
2. The possibility of gravity induced "migration" in patients with very lax skin and subcutaneous tissue.
3. The possibility of late (5–20 years) granuloma (siliconoma) formatio.n
4. The substitution of cheaper, non-medical-grade silicone fluids by nonprofessionals.
5. The lack of experience of most physicians in the treatment of rare cases of late siliconoma [36].

Though difficult to remove surgically, true siliconomas respond favorably to multiple injections of corticosteroid [7] or antimitotic agents [54]. The wrinkles and lips of thousands of patients in Europe and Asia have been treated successfully with the microdroplet technique with small amounts of medical-grade silicone fluid. On the other hand, hundreds of women required total mastectomy owing to chronic inflammation of large amounts of silicone fluid injected directly into the breast. As so often in medicine, success depends on the right dosage, volume, injection technique, and knowledge of side effects.

73.10 Aquamid and Bio-Alcamid (Low-Viscosity Polyacrylamide Gels)

Polyacrylamide gels (Argiform, Aquamid, Interfall, Bio-Alcamid, Outline) have been injected for breast and buttock augmentation in Ukraine since 1983. Polyacrylamide (Formacryl) was the Russian answer to the American silicone fluid. Histologically, it causes little encapsulation and therefore can "migrate" from the breasts to the groins or from the buttocks to the hollows of the knee. In addition, it causes a high rate of late granuloma. The monomer acrylamide is cancerogenic in rats [36].

Aquamid is a clear 5% cross-linked gel of polyacrylamide (PAAG) [40]. Bio-Alcamid is a polyacrylamide gel like many others, however, cross-linked differently with alkylimides. The manufacturer of Bio-Alcamid reveals the chemical formula as polyalkylimide but this is a plastic substitute for metal and stone, not a gel.

Like dextran beads, polyacrylamide is used mainly for protein separation by molecular biologists. The use of polyacrylamides as injectable filler materials was initiated in 1983, and they were used clinically in the Ukraine and China as Interfall [13] or Amazing Gel in thousands of patients. However, to date few clinical and scientific data have been published in Western literature [21]. Since the patent for Interfall expired in 1995, at least five European companies have been marketing polyacrylamide gels as dermal filler substances (Argiform, Aquamid, OutLine, Evolution, Kosmogel). So far, they have been injected in large quantities for breast, buttock, and calf augmentation, in facial lipodystrophy (Fig. 73.12), and congenital malformations [13], and have been called "endoprotheses" [40]. If overcorrection occurs, the fluid can be withdrawn from large implants even after a few years.

Reportedly, polyacrylamide has a half-life in the human body of more than 20 years. This may be true for large quantities; however, the injection of 0.1 ml Aquamid was absorbed in human skin within 9 months [34]. The concentration of acrylamide monomers that can be toxic was reported to be less than 10 ppm or 0.04%. Side effects were enlarged lymph nodes in 10% of patients, migration of gel in 3% of patients, and edema in 2% of patients. The US Environmental Protection Agency classifies acrylamide as a medium-hazard probable human carcinogen. Even if there are few published reports [28], granuloma formation after Interfall implantation has been well known in China since 1997 [13] and has to be expected in certain patients as with all other injectables. Recently, the use of injectable polyacrylamides was banned in Russia and Bulgaria.

Fig. 73.12. Facial lipodystrophy in an HIV patient was treated with 10 ml Bio-Alcamid in each cheek. (Courtesy of L. Casavantes, Tijuana, Mexico)

73.11 Evolution (Nonresorbable Microspheres in Resorbable Polyacrylamide Gel)

Clinically, the implant made of poly(vinyl hydroxide) microspheres suspended in polyacrylamide gel resembles Artecoll. It was not painful during injection as was Aquamid. Because of evaporation through the polyethylene syringe, the water content of the material was already diminished at the time of purchase. The implants were well visible and diminished palpable over the whole course of 9 months. Histological examination showed the beads, most of them 30–40 µm in diameter within the clear polyacrylamide gel, surrounded by an almost invisible fibrous capsule. Each droplet, 1–3 mm in size, was encapsulated with a very fine layer of fibroblast and fibers without ingrowth into the implant. No foreign body reaction was detectable. A few single microspheres outside the implant site were covered with a fibrin layer or had attached macrophages and fibroblasts. At 6 and 9 months, most of the carrier gel had been absorbed and was replaced at the outer layers by granulation tissue. At 9 months, the implant was totally infiltrated by macrophages, fibroblasts, and giant cells, which resembled the tissue ingrowth of PLA at 3 months. The surface of the microspheres was still intact after 9 months.

73.12 Complications – Late Foreign Body Granuloma

All injectable filler materials cause normal foreign-body-type reactions that may develop into a foreign body granuloma in selected patients. Its cause is still unknown and no predictions can be made. Some of the patients reported a severe generalized viral or bacterial infection [35, 39, 49], vaccination, or local trauma some months before the appearance of the granuloma [36]. Granuloma (Fig. 73.13) occur in patients at a rate of 0.01–1.0% according to the chemical composition, shape, and surface structure of the particles [36]. They occur significantly less often after implantation of microspheres with a smooth surface (Artecoll, New-Fill, Evolution) [35, 36] than after implantation of particles with irregular surface (Bioplastique, Dermalive) [6, 50]. They also occur less severely and shorter lasting after injection of resorbable implants (collagen [27, 42], hyaluronic acid [12, 23, 37–39, 55]) compared with injection of long-lasting implants [49, 50].

Besides well-known allergies, displacement, and granuloma formation, another potential complication of dermal filler substances was documented only recently [58]. Localized fat atrophies in the cheeks, similar to those seen in facial lipodystrophy after HIV treatment [10], occurred 2–3 months after the implantation of Restylane or New-Fill in the nasolabial folds of healthy patients. At 9 months, the implants could still be identified and were interspersed with giant cells and granulomatous tissue. The residues were encapsulated and surrounded by fat necroses and vacuoles. No explanation has been found for this side effect since there is no obvious link between the chemical structures of these two filler substances and that of HIV protease inhibitors.

Fig. 73.13. Arteplast granuloma occurring 1 year after injection of both marionette lines. One intralesional injection of 40 mg triamcinolone took care of the body's overreaction within 4 weeks

73.13 Legal Aspects

In contrast to the FDA, notified bodies of the European Union do not require animal or clinical studies for the registration and approval of injectable filler substances or surgically introduced artificial implants. The European product quality control systems classify injectable dermal fillers as Medical Devices class IIa (resorbable substances), and class IIb (substances that cannot be reabsorbed). The FDA has determined that collagen is a class III.A device and injected particles are a class III.B device.

In November 1997, a new provision was added to the Federal Food, Drug, and Cosmetic Act to allow any legally marketed, FDA-approved product to be administered for any condition within a doctor–patient relationship. This is called "off-label" use of an FDA-approved product.

The CE mark controls only good manufacturing practice (GMP) of an injectable agent but does not guarantee a maximum of biological safety; therefore, a central office similar to the FDA should be established in Europe to which all severe clinical side effects have to be reported. Some manufacturers report the complication rates as a percentage of treatments calculated from syringes sold (Restylane, Hylaform, Dermalive), whereas other manufacturers report the side effects as a percentage of patients treated [33]. Only a careful statistical analysis of these data will shed some light on the true incidence of the side effects for each dermal filler substance [36].

73.14 Results

All the fillers mentioned show good results and satisfied patients for a few months after the injection. The question of persistence is difficult to answer by patients and their physicians. Objective results can only be attained from clinical trials with blinded observers [14]. Therefore, all the fillers mentioned have been injected in quantities of 0.1 ml subdermally into the skin of a human forearm [34] for observation and histology over a 9-month period.

Collagen (Zyplast) and hyaluronic acid (Restylane) disappeared clinically at 4 months and were absorbed and phagocytized at 6 months. PLA microspheres (New-Fill/Sculptra) induced a mild inflammatory response and had disappeared clinically at 4 months. Calcium hydroxylapatite microspheres (Radiesse) appeared white beneath thin skin, induced almost no foreign body reaction, but were absorbed at 12 months. Dextran microspheres (Reviderm intra) induced a pronounced foreign body reaction and had disappeared at 6 months. HEMA particles (Dermalive) induced the lowest cellular reaction but had disappeared clinically at 6 months. PMMA microspheres (Artecoll) remained unchanged and were encapsulated with connective tissue, macrophages, and sporadic giant cells. Silicone oil (PMS 350) was clinically inconspicuous but dissipated into the tissue, causing a chronic foreign body reaction. Polyacrylamide gel (Aquamid) was well tolerated but slowly absorbed and remained palpable to a lessening degree over the entire testing period. Histologically, it dissipated more slowly than silicone oil and was kept in place through fine fibrous capsules. Polyvinyl microspheres suspended in poly-

acrylamide (Evolution) were well tolerated, clinically and histologically slowly diminished over 9 months.

The clinical persistence of an injectable and its effect on wrinkles depends on the amount, depth, and shape of the implant: A thin strand applied beneath a constantly moving wrinkle is absorbed faster than a round depot in the skin of the forearm. The carrier substance, whether fast or slowly resorbable, may play an important role in persistence as well. None of the implants – with the exception of Artecoll – was palpable in the forearm longer than 6 and 9 months, respectively.

Host defense mechanisms react differently to the various filler materials, but all substances – resorbable or nonresorbable – appeared to be clinically and histologically safe, although all may exhibit undesirable clinical side effects [36]. Since the mechanism of late inflammation or granuloma formation is still unknown, early histological findings are not useful in predicting possible late reactions to filler substances. These can be verified in exact clinical long-term-studies and in a centralized European or/and US independent implant registry.

73.15 Conclusions

The effect of most of the filler materials–resorbable and slowly resorbable–mentioned here does not last longer than 6 months, when injected beneath moving folds and wrinkles. All companies claim longer persistence because they rely on a few anecdotal cases and animal experiments, where residue of relatively huge injected amounts have still been found after 2–7 years near the urethra or in the cheeks of facial lipodystrophy patients. Unfortunately, most physicians are not critical enough and repeat these obvious false reports.

The differences in histological reactions and in persistence lead to a classification of injectable filler substances into five types:

1. Autologous fat rarely is permanent and its fate is unpredictable. The clue for long-term survival of fat, preadipocytes, or stem cells has yet to be found.
2. Natural fillers such as collagen and hyaluronic acids are broken down by enzymes, absorbed, or phagocytized slowly with minimal histological reaction.
3. Fluid fillers, such as fluid silicone and polyacrylamides, cause little fibrosis but larger volumes can be dislocated through muscle movement and gravity. They are considered "inert implants."
4. Particulate materials like HEMA particles and PLA or Calcium microspheres are packed and induce minimal foreign body reaction and fibrosis. They are pure fillers and are slowly absorbed and phagocytized.
5. Microspheres from nonresorbable PMMA or resorbable dextran are stimulants for encapsulation and scaffolds of permanent or temporary connective tissue formation, considered "living implants."

Host defense mechanisms reacted differently to each filler material; however, all substances – resorbable or nonresorbable – appeared to be clinically and histologically safe. None of the substances tested was without undesirable effects [1, 43, 48, 51]. Since the cause of late inflammation or granuloma formation is not yet known, predictions cannot be made from early histological results for possible late reactions of the host to an individual filler substance.

Therefore, materials must be selected according to the needs of the individual patient. The patient should be informed and involved in the choice of resorbable or long-lasting filler substance. Hyaluronic acid and new collagen products such as Cymetra, Fascian, or CosmoDerm could not be demonstrated to last much longer than bovine collagen. The development of a possibly disease- and allergy-free human recombinant collagen from yeast (Fibrogen, San Francisco, CA, USA) or cow milk (Cohesion Technologies, Palo Alto, CA, USA) has a long way to go. The search for the perfect permanent injectable material with maximum safety is ongoing. Time and a centralized registry of adverse events – similar to the registries for silicone breast implants – may bring improvement in efficacy and safety of new-generation filler substances.

73.16 Summary

Patients who are thinking for the first time of a wrinkle treatment should try collagen or hyaluronic acids in order to experience its effect. Restylane, Juvederm, and all other hyaluronic acids have been shown to last not longer than Zyderm or Zyplast, all about 4–6 months. If the patients are satisfied but do not want to repeat the treatment every 6 months, they should consider a long-lasting injectable like ArteFill. Arteplast's and Artecoll's side effects from the early 1990s have been abolished significantly by purification of the microspheres [35].

The effect of silicone oils and polyacrylamide gels on wrinkles has not been tested thoroughly. In larger quantities, both are followed by a high incidence of late complications. New-Fill/Sculptra and Radiesse appear to be safe and effective in larger quantities in

facial defects like facial lipodystrophy or chin and malar augmentation, but do not last longer than 6–9 months beneath wrinkles.

Most side effects occur after lip augmentation in the form of palpable or even visible nodules; therefore, lip augmentation should be approached very carefully by filling first the vermilion border and then adding volume to the posterior lip, preferably with the microdroplet technique.

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Botox Treatment

74

Darryl James Hodgkinson

74.1 Introduction

Botulinum neurotoxin injections have been used for cosmetic purposes for 10 years. The exponential growth of practitioner use and the number of injections is expected to expand from two million treatments in 2003 to five million treatments in 2008 in the USA. I have been using Botox for 8 years and am still impressed by the patients' level of satisfaction and the lack of problems associated with the use of this product.

Initially used for blepharospasm and trismus, botulinum toxin injections are used cosmetically to modulate facial expressions, reduce periorbital and glabella wrinkling and, by selectively paralysing portions of the mimetic musculature, recruit other muscles to lift and volumetrically enhance the ageing face.

Botulinum toxin is marketed in two forms: Botox and Dysport. My experience only extends to Botox. I will refer to all drug concentrations of Botox in Botox units.

74.2 Mode of Action

Botulinum neurotoxin inhibits acetylcholine release at the neuromuscular junction preventing the muscle contracting in response to neuron stimulation. This is not permanent as the neuron end plates sprout new release branches which then overcome the effectiveness of Botox. Of the eight known botulinum toxins, type A alone is used for cosmetic purposes.

74.3 Dose

Botulinum toxin type A Botox, is packaged in a glass storage bottle, containing 100 units of material. To reconstitute this, saline is added in volumes 1–4, giving varying concentrations from 10 to 2.5 units per 0.1 ml of injections.

74.4 Facial Expression and Ageing

When activated, mimetic muscularity is coordinated and human expression occurs. Human expression evolved from primitive muscularity, acting as sphincters around the mouth and eyes protecting the eye and allowing for opening of the jaw and closing of the mouth. The way various facial muscles contribute to facial expression, was investigated scientifically by Delpech, Bell, Darwin and Duchenne. Duchenne utilized electrical stimulation to observe and photographically document the individual muscle groups and recorded their activity in contraction. The previous investigators mentioned studied comparative anatomy specimens and animals in zoos to delineate the expression produced by the individual facial muscles – the muscles of facial expression.

To understand the effect of botulinum toxin injections on various muscle groups, we need to have an appreciation of the anatomy of these muscles, their function and the subsequent physiognomatic influence on the facial appearance. Merely paralysing a muscle may obliterate movement, diminish wrinkles, but also does it improve appearance? Does a paralysed face look better? – Obviously not!

Physiognomy remains in the domain of figurative artists from whom we can learn a great deal. The subtlety of expression conveys the depth of our emotions. An appreciation of other artists' ability to represent complex thought and emotion will help a practitioner in assessing what muscles they will deal with and what muscles they must not weaken in order to produce a natural appearance and preserve facial expression. We want a positive outcome for the patient, not just a change. Botox injections will change facial shape, but will they improve the appearance?

74.5 Ageing Concept

Ageing is a multifunctional process involving skin damage, fatty accumulation, bony erosion, loss of hair, loss of teeth and sagging of various structures and repeated facial expression.

74.6 Facial Reshaping

It is helpful to think of the face as a whole and then to divide it into three sections:

1. The upper face incorporating the forehead and periorbital regions
2. The middle face incorporating the cheeks, the mouth and the nasolabial folds
3. The lower face incorporating the jaw and the neck

74.6.1 Botulinum Toxin Injections in the Upper Face

Upper face ageing is accompanied by brow ptosis and loss of the arch of the eyebrow. Wrinkles across the forehead and crow's-feet around the eyes, caused by excessive activity of the orbicularis oculi muscle and the frontalis muscle, cause the skin of the eyelids to descend and the orbicularis oculi also to droop and descend onto the cheeks. Hence, the lid/cheek junction lengthens. The aim of the use of Botox is to raise the descended brow. The brow depressors medially and laterally are selectively injected to raise the eyebrow and reestablish the lateral sweep of the eyebrow, slightly higher than the medial brow. In the glabellar region, the activity of the corrugator and procerus muscles causes medial migration and descent of the brow, leading to vertical and horizontal rhytids. Botox here will widen the medially descended brow and raise the medial brow. Excessive raising leads to a bizarre appearance and must be avoided. An added advantage is recruitment of the lateral frontalis, which will then raise the lateral eyebrow tail without necessarily selectively reducing the activity of the depressor orbicularis oculi, which acts laterally on the brow. Horizontal rhytids can be softened by Botox injections between the rhytids.

An excessive dose may raise the medial or lateral brow excessively. A too wide medial brow and the paralysed forehead gives a "blank" or "startled" expression. To avoid this unwanted appearance, dose concentration, dose volume and muscular activity of the patient must be individualized to achieve the brow shaping, reduction of rhytids, and a pleasant not over-injected appearance. Doses in the forehead vary from 20 to 40 units.

74.6.2 The Periorbital Region

Crow's-feet and rhytids in the lower lid are injected to soften wrinkles. Skin here is very thin and bruising is a risk here. The injections must be selectively quite superficial. Doses vary from 15 to 20 units.

74.6.3 Cheek Region

Cheek elevation can be achieved by selectively weakening the lateral cheek orbicularis muscle. The medial muscle is then recruited, giving elevation to the malar fat pad.

74.6.4 Nasal Area

"Bunny rabbit" lines are indicative of overactivity of the procerus and the depressor supercilii muscles. Overactivity of these muscles gives a turned-up nose or disdainful appearance. The nasal tip might be able to be raised by injecting the depressor septi muscle. Doses of 4–6 units are used in this region.

74.6.5 Mouth

Vertical perioral rhytids (smokers' lines) are reduced by injecting 1–2 units of Botox between the contracting lines of the orbicularis oris. The downturn of the mouth responds to injection of 6–8 units into the depressor angular oris muscle. This raises the corner of the mouth, reducing the downturned look.

74.6.6 Technique

The area needs to be anaesthetized. I use topical Emla cream or Numb-Gel. This is applied for at least 10–20 min to get some effect. I also use topical ice or a cooling device.

Using a 30 gauge needle and a 0.5–1-ml tuberculin syringe, I rapidly injected the product into the areas of overactivity, after mapping the area with an eyeliner pencil. The injection process takes no more than 3–5 min. Ice is applied to the area to reduce the amount of swelling and to avoid bruising. Topical makeup can be applied 1 h later. The patients are seen approximately 2 weeks later and a top-up might be necessary. Patients are scheduled to see the injector at 3–4 months when secondary injections are then carried out. There is a degree of permanency to the result, in that the intensity of the rhytids is reduced because of the lack of activity over the previous 3–4

months. Botox is often combined with injectables such as hylauronic acid, e.g. Restylane, in order to reduce rhytids.

74.6.7 Complications

Very few complications other than "lid lag" have been reported. "Lid lag" is due to effusion of the botulinum neurotoxin into the levator muscle which lifts the eyelids. The levator elevates the upper eyelid. This usually resolves spontaneously in 2–3 weeks. Dysphonia has been reported owing to diffusion of the product into the muscles of the larynx, and again this resolves itself spontaneously in several weeks. Other than bruising, very few initial problems or long-term problems have been noted.

74.7 The Future

Botulinum toxin integrates well into cosmetic surgery practice, maintaining results of traditional procedures, such as browlift, eyelids and facelifts. Botulinum toxin can be regarded as preventative and a maintenance treatment in a cosmetic surgery practice.

Part IV
Conclusions

Final Philosophy

75

Dimitrije E. Panfilov

When I was starting this publishing project more then 2 years ago I modestly asked my publisher Springer if they would accept publishing work by 10, 12, or perhaps even 15 world-renowned celebrities in this field of surgery, if they agreed to write their guest chapters. Gabriele Schroeder from Springer said "You may try". From the 15 I started to dream of, all 36 co-authors made their efforts in this very busy world and submitted their contributions motivated by the wish to help the young plastic surgeon to whom this book is addressed, because they are all inspired by the spirit of love, humanity, harmony, beauty, and friendship. I am looking at this wonderful necklace of 36 pearls shining not only with excellent ideas but also with profound wisdom. They spread their knowledge for the sake of aesthetic plastic surgery, its patients and our younger colleagues who will mostly benefit from it – not only are excellent techniques described and "prescribed", but also very wise advice on how to make our surgeries as safe as possible. Touched by deep admiring for my co-authors, I bow low before them and say: Thank you, thank you so much.

When I was starting my office in Bonn, Germany, I had a patient from Luxembourg who is a writer and painter. He had an ugly, deep-impressed scar in the lower half of his nose. In another clinic somebody had excised this and sutured the edges together. Soon afterwards the scar was depressed and as obtrusive as before. The patient asked me, "Could you do it so that this scar will not be so striking, so conspicuous?" I thought of multiple Z-plasty and answered, "Yes, but it is a more complicated and demanding technique." He agreed.

Even when the nose did not become perfect by far, the patient was satisfied, because a decent job had been done. He came to us and asked for blepharoplasty, forehead lift, facelift, and liposuction of the trunk. But he did not suffer from body dysmorphic disorder. After the fourth surgery, he tried to convince his wife, without success, to have liposuction in our clinic. He

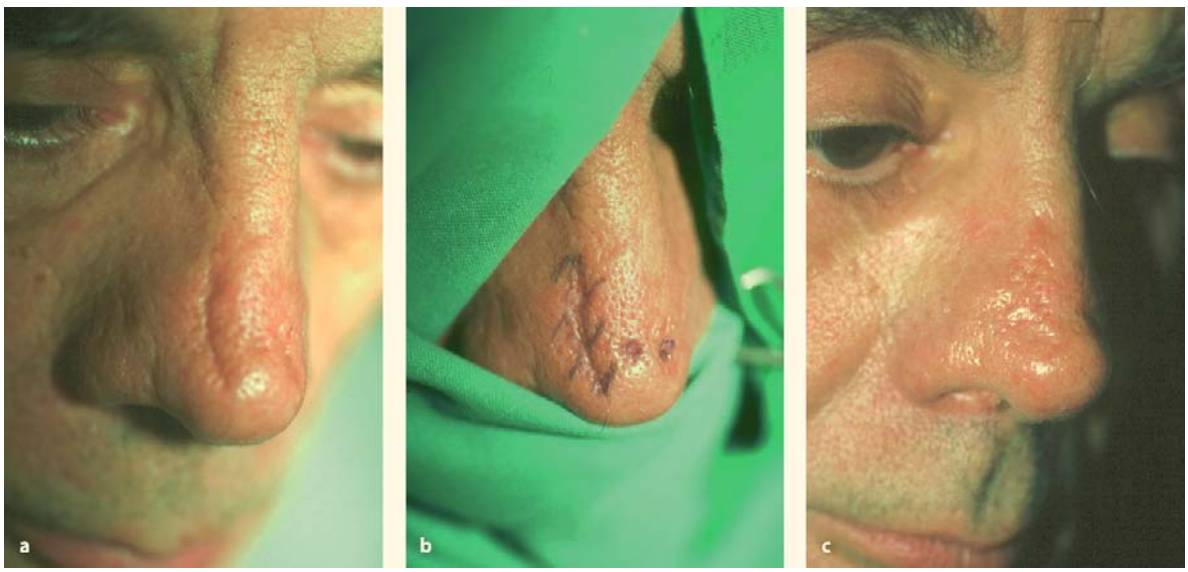

Fig. 75.1. **a** Very striking, impressed scar in the lower half of the nose. **b** Multiple Z-plasty planned. **c** Three months later the scar became unobtrusive

then made a present for my wife, who serves as the "good spirit" of our clinic: ten self-recorded audio cassettes with country music – they are both very fond of it. He became a good friend of our clinic. And the story started with a simple scar. One of Solomon's sentences in the Bible says: "Who wins a friend, gains riches."

I learned the following lesson in 1995 in Yokohama.

Joseph E. Murray (Harvard Medical School, USA) is the only Nobel Prize winner among plastic surgeons. He was awarded the Nobel Prize in 1990 for, among other things, successfully conducting the first kidney transplantation on twins in 1959. After this, almost one million patients could profit from his method. Murray conducted much research on the physiology of kidney transplantation, he became founder and president of many medical societies. For many years he was president of the American Association of Plastic Surgeons.

At the opening of the 11th World Congress for Plastic, Reconstructive, and Aesthetic Surgery in Yokohama, on 16 April 1995, he delivered the following ceremonial speech: "Plastic surgeons in surgical progress: skin grafts, transplantation, microsurgery and craniofacial surgery"

He started off with a 5-cm-wide circular burn on the back of a female patient's foot. He continued with further slides: the surgically cleansed defect, transplanted skin taken from the patient's body covering the defect at 1 day, 1 week, 1 month, 1 year.... Some of the 1,400 plastic surgeons gathering there from all over the world are stunned: "Why does the Nobel Prize winner start off this key lecture with such simple surgical procedures which even beginners in our profession are able to conduct?" The answer came with the following slide: "This is what the wounded foot looks like 20 years on. This Jewish woman has become my office's best friend. She referred more patients to my practice than all public relations activities were able to attract. My dear colleagues, if you manage to win many friends in your offices, then you are on the right track."

That set the tone. He had started off very low-key, very modest. After that he presented his numerous highlights–he did even this without pretension but with a philosophical undertone. Meanwhile he defined the qualities of a good scientist. He counted three:

1. Curiosity
2. Fantasy
3. Endurance

Apparently, these three qualities are sufficient.

After the 45 min talk I could not help myself, I had to congratulate this noble man. With his initial drumbeat he expressed my sentiments exactly. I will never forget the moment when I felt his hand in my hand: it was like touching the divine kindness itself. A rather extraterrestrial feeling.

I wanted to invite him to our symposiums which take place every second year. I therefore asked him for his business card. "I don't have one", he said without any fuss and started writing down his address and telephone number on my business card. "Do you not have business cards as a principle?" I asked, not very smartly. "I don't have any principles either", he replied. I must have screwed up my face into the shape of a question mark. He smiled and went on: "You know, principles are often just patterns of behaviour which come into use when stimulated from outside. I prefer to react with my complete nervous system – as I was somebody else yesterday, am somebody else today, and will be somebody else tomorrow. As humans we are constantly changing...." Within 5 min of small talk, this unusual person managed to convey to me a kind of knowledge which some teachers have failed to achieve in 5 years.

Paracelsus said: "The true ground of medicine is love." But the love cannot be taught. It is immanent – one has it or not. Illustrative of this is Fred's sentence from the anthology *Children's Letters to God*: "Dear God I would like to become a physician, but not for the reason, you would imagine."

From my first teacher, the late Peter Rudolf Zellner, I learned the importance of photographic documentation. While on duty during night I had an unusual injury of the hand to operate on and found an interesting and original operative solution. At the morning conference I explained what I had done. My chief asked, "Did you take photos?" "No, I was so excited with new idea", I answered. "Then you have operated in vain, nobody will believe you." Since that time I have taken over 60,000 photographs, documenting every step. The photographic documentation in this book would not exist if I had not learned this lesson.

My last teacher, Gottfried Lemperle in Frankfurt, now living in San Diego, also became my friend. His chapter in this book is extremely important. He did not teach me only the surgical technique, but also the scientific work and how to think over all medical rules and dogmas critically again. It was very important for me, so I am proud to have written some chapters for his books. For the journal *Aesthetic News* we did not dare write "ten commandments" but we wrote "ten don'ts" together, which I am allowed to reproduce here by permission of the *Aesthetic News* editor.

What an aesthetic-surgically active physician must never do:

10 Dont's

1. Do not risk a "beauty surgery procedure" without having received thorough training in this particular field beforehand – best become a plastic surgery specialist (after all, one does not steer an airplane without having finished pilot training).
2. Do not start consultations, operations or visitations under time pressure. Patients need your full concentration: Your relaxation provides a pillar of confidence.
3. Do not recommend a surgical procedure which you would not also, in the same way, conduct on your wife or daughter. Never take an operation lightly – even if you are well-experienced.
4. Do not make promises about an aesthetic operation which cannot possibly be kept by surgical methods. Do not keep back any information on particular difficulties and do not play down any possible complications.
5. Do not call a consultation finished before every single inquiry by the patient has been talked about appropriately. You do not want to satisfy yourself but your patients: they often have a different idea of what they want. Never agree to an aesthetic operation unless there is a real chance of improvement.
6. Do not agree to make an operation on just any patient. An obscure motivation and unrealistic expectations will lead to frustration on both sides.
7. Do not conduct surgery on a patient without thorough examination preceding the operation. You must not agree to, or make a statement about an operation on the telephone or based on a photograph. Find out about the patient's mental condition, look inside a nose that supposedly needs to be operated, test the state of the skin, examine a breast for possible lumps, do the "pinch test" preceding liposuction.
8. Never attempt to break new time records during the operation. If you were your own patient you surely would not want to be operated in record time. Maximum concentration is necessary during the operation: a talkative surgeon is as dangerous as a talkative taxi driver.
9. Never be unavailable for your patients after the operation. This is the duty of a conscientious surgeon.
10. Do not believe you did not come across complications, do not believe you had no unsatisfied patients. They are part of our medical field; even the best experienced surgeon has them. Look at them with the eyes of your colleagues.

Fig. 75.2. Ulrich Hinderer and his beautiful "complication" at the ESPRAS congress in Rome 2001

One really should not try to lift all faces definitely and for ever. After older plastic surgeons come younger ones and they shall have the chance to do or redo some good job. We should remember what the French surgeon Ambroise Paré said in 1575:"I am only dressing (bandaging) you, God will cure (heal, recover) you." Udo Fiege, a plastic surgeon from Düsseldorf and a friend of mine, expressed it more cynically: "Plastic surgery is the only handicraft where the material itself repairs the failure in its work out."

Still, no plastic surgeon in the world can say they have not had *any* complication. Well-educated and experienced surgeons very seldom have complications, and these are mostly minor complications, which we are able to treat successfully. Ulrich Hinderer, co-author of this book, was secretary-general of the International Confederation for Plastic Surgery for 8 years. He is not only an excellent surgeon and very productive scientist, but also a great lecturer and friend–"everybody's darling" so to say. He, however, had a unique complication. Finishing his key lecture

in Kloster Seeon at the National German Congress 1999, he spoke about facelifts and possible pitfalls. At the end he showed a perfect pair of female faces: before and after lifting and said, with a quiet undertone: "This is my greatest facelift complication; after the treatment finished, I married her."

You have now a book in your hands with many proven reliable techniques but also some new ideas and suggested solutions. Alone in the first half of the book there are 363 counted and (listed) registered "ideas, tips and tricks" as well as 39 chapters of my own and 36 guest chapters. We tried to demonstrate the new understanding of the face. Special attention was paid to different "mosaic stones" of the face including the third and fourth dimension, demonstrating also the combined procedures with decreased aggressiveness, risks, and complication rate. It is the basic substructure. The 36 chapters by world-renowned celebrities are like cream and chocolate over the "gateau".

I did not ask from my co-authors to incorporate their chapters into a prescribed concept. Some of them are real "guru's" – how could I dare? I left all the freedom to my co-authors. That is why there will be some repeated statements, techniques, and graphic images. But these are all original texts and pictures. I just recommend accepting these chapters as a bunch of mottled flowers. And they are very fragrant.

But, we encourage our readers not only to read and learn from this book. It could serve also as inspiration for the next steps: the young plastic surgeon should think further, producing new ideas and solutions. Perhaps until the cyberfuture reaches us and genetics take the place of aesthetic plastic surgery. Will our kind of surgery become superfluous (unnecessary) when we are able to order eyes, noses, lips, breasts, and even our descendants in some sort of gene shop. At the end of my presentation "Anthropo-design: aesthetic surgery is becoming a human applied art" in New York's Museum of Arts and Design, 2004, I was asked about the future of beauty. I answered: "It lies in the ugliness. With aesthetic surgery, as you have seen, today a lot is possible and tomorrow in a genetic beauty boutique everything will be available. Everybody will become beautiful and it will be very boring. Then, only people like Sammy Davis Jr., Woody Allen, or me will be interesting...." It was said self-ironically, but could become true. I would like not to be here if this future comes.

Although not officially documented but according to some references Gaspare Tagliacozzi, the father of European plastic surgery, was born on 19 January 1545 in Bologna. Exactly 400 years later, I was born. His book *De Curtorum Chirurgia per Institionem* was the first European book of plastic surgery. Let me end my text with a sentence by our great predecessor:

> Sed, ut neque in universa medicina, imo in omni actionum genere, cuncta firma sunt et aeterna, ita neque hic, quod iam diximus, perpetuum est (But, as in the whole of medicine, and in everything we do, nothing is unchangeable and eternal, so is this, what we were talking about, not established forever).

The last word I give to a patient of our clinic who is a board-certified psychologist. I think her decision making and experiences before and after her surgeries are very interesting also for us plastic surgeons.

Psychologist and her Facelift

I have done it–Bingo!

> I was most annoyed by the traces of time in my face, especially on photographs. Narrowing lips, tense features around mouth and nose, an obvious tendency to pudgy cheeks, a tired look, flabby facial skin.
>
> Such realistic photographs quickly disappeared into my drawer ... so that nobody would get to see them ... the photographs looked terrible ... that was me?
>
> Wrinkles might be the old people's medal for bravery – although I believe not every trace of a tough life needs to be visible to everybody at first sight. So I decided to change things.
>
> Rather coincidentally I stumbled upon an article about the possibility of soothing out nasolabial wrinkles – one of my greatest annoyances–by injecting hyaluronic acid. I consulted a dermatologist who confirmed that the risks were low and that wrinkles in the nose area would be filled up from the inside; I made a decision for surgery. About 3 months later, the barely visible changes had vanished, my nose was back to normal.
>
> In the following time I searched the Internet for private clinics that offer aesthetic plastic surgery; I was especially fascinated by pre- and postsurgery photographs of patients who underwent eye lid corrections. My determination was growing that I would make a start with upper and lower eye lid lifting. Of course I had to confront myself with the risks as well.
>
> My friend could not share my "wrinkle problem" at all. Instead she mentioned something about personality and inner values ... and that she found me attractive ... I should look around, who else at my age could compete with my proportions ... and my face ... no ... by no means any changes ... I would look so good ... I should accept my wrinkles ... they were an essential part of my personality ... and, being a psychologist, I should think about what I am

Fig. 75.3. Psychologist **a** before and **b** after her facelift and autologous fat transfer

trying to compensate for by undergoing surgery ... what my real problems were... etc.

When I told my husband, who is a psychiatrist, that I was seriously considering facial beauty surgery, his reaction was very unenthusiastic, even disconcerted. In our discussions he repeatedly expressed his worries about irreversible, fundamental complications that might result from surgery. He often stressed he loved me the way I am.

In summary I may say that my plan was initially met by rejection and lack of understanding ... except for my brother who is very close to me. He listened to my "wrinkle worries" carefully ... and to my own surprise ... he could understand my problems; he also agreed to accompany me to my first consultancy meeting.

I singled out three clinics (carefully looking at their qualifications) in my area. Yet after the first consultation, I felt so reassured that I refrained from further consultations. My brother shared my impression that we had found an experienced, competent, and apparently even friendly surgeon.

Two weeks after our conversation I went for an upper and lower eye lid correction. My husband accompanied me on the morning of my surgery, which was conducted as an outpatient treatment. I could barely wait for it, I was very excited.

In the afternoon of the same day, I was allowed to return home with my husband. I did not feel pain; it was more like a slight tension around the eye. My first encounter with the mirror did not startle me since I was prepared for it: Bloodshots beneath my eyes, the cheek regions were swollen. My doctor told me it would get better with every day.

And it happened accordingly. A week after my operation the protection bandages were removed and the threads were taken out. I was overwhelmed by the results. Although a slight swelling of my face could not be overlooked, two big, radiant eyes were looking at me from the mirror. The tired expression was gone, the eyes seemed much fresher. I could hardly believe it ... I was happy. Finally being able to put make-up on without the eye shadow being wiped away by a sagging lid fold. On the tenth day after my operation I went back to work.

My husband was visibly relieved that my surgery went without complications. My friends and acquaintances said I looked so relaxed and fresh, just like returning from holiday.

Meanwhile I grew more and more annoyed by the remaining "facial deficiencies" I mentioned earlier. The nasolabial wrinkles seemed to be even deeper now with regard to the eyes; and anyway ... the "rest of my face" did not match those amazing radiant eyes. I decided on having a facelift.

My husband accompanied me to a consultation 5 weeks after my lid correction. I was glad, even relieved, that my husband lost his initial scepticism after this intense and informative discussion about my facelifting operation, and that he insisted I should, if I was still determined at all, carefully choose an experienced surgeon (in theory he still opposed the decision).

One week later I underwent facelifting surgery in combination with a body fat transfer treatment (filling up the wrinkles between nostrils and the corner of the mouth, cheek bone augmentation, and liposuction). I chose to take a handlifting treatment by body fat transfer at the same time.

Again I was optimistic ... I completely trusted my surgeon. My first surgery was successful ... why should it be different this time?

And so it happened.

As I was feeling rather well after the operation, except that I felt a bit tired, my husband could take me home only half an hour later. The following day I returned to the clinic accompanied by my brother

to have my head bandages removed. My face was seriously swollen and haematoma, so-called bruises, appeared around my eye lids, around my cheeks, and in the throat region. I could only sleep on my back, which gave me a hard time; I had to keep my head calm and could hardly talk; the first 2 days my diet was limited to liquid food as my lips were swollen as well. To my own surprise I did not feel pain (as I had previously expected); there was only this tension, and occasionally a slight twinge behind my ear.

I felt better every day. The first stitches were taken out only 8 days after the operation ... and the first postsurgery photographs were taken. Although my face still showed some bruises and slight swellings, the result was more than satisfying when comparing the "before/ after" photographs.

Finally I was allowed to wash my hair again ... I relished this otherwise perfectly natural routine. I felt a different person after that.

Three days later the last stitches were taken out. The remaining bruises were covered, I had put on some light make-up around the eyes, my lips were brought out by lipstick ... I felt good.

More photographs were taken immediately after that ... this time I was completely stunned by the before/after comparison. I could hardly believe what I saw. Yes, that was me!!! Gone was that stern expression, my mouth had much softer contours, my eyes were bright and radiant ... the deep nasolabial wrinkles had disappeared ... It was like a miracle to me, it was a surgical miracle.

It was not a new nor a strange face, it was *my* face. That was what I felt like inside, that was who I was and who I am.

My brother was quite literally kicked out of his boots ... he could not help but keep looking at me and was amazed by what he saw. He said he would now have to rethink his family relationships: while he had always had an elder sister, he now had to get used to a much younger sister.

My husband has kept his reserved attitude ... he finds me beautiful but he also found me beautiful before. I noticed, however, he paid more attention to his weight after my facelifting

After the last stitches were taking out, I went back to my usual work, went shopping, got petrol for my car ... I ran into the people I knew from before my operation. The reactions I received were quite diverse.

My father immediately said: "What have you done to your face? You look like years ago, like a young woman, a girl ... your lips look fuller ... what have you done?" Apparently, and to my astonishment, he has kept a detailed picture of me at a younger age; he could hardly believe that I was actually matching his memorised image again.

My friend's three daughters, 3, 5 and 7 years of age, insisted on a good-bye kiss when I left which took me and their mother by surprise. The 7-year-old scrutinized my face ... and said it looked so different; she could not say in what way it looked different except that the lips were "thicker". The youngest girl was keen to touch my face.

My friend herself was amazed by the changes; she said my facial expression was much "clearer and more open".

Wherever I went, whoever I met, I perceived predominantly positive reactions, verbal and nonverbal. Admiring looks and compliments have become part of my daily life.

I would not describe myself as having been an uncertain or unhappy person. Yet I feel much more assured and happier after the operation and I feel more self-confident with other people. My happiness and my positive attitude towards life are now reflected in my face. I feel in line with my looks.

I feel harmony with myself, everything seems to fit together: my spirit, my body and, since only recently, my face. That was not always the case ... preceding the facelift operation and before the eye lid correction these components were in disarray.

In scientific discourse this feeling of coherence is considered a managing resource which increases people's resistance against stress factors and serves as a condition for better and permanent health. Plastic surgery "lifted me up", not only from the outside but also from the inside.

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Kaleidoscope of 363 Ideas, Tips and Tricks

1. Fascinating 3D mosaic work of the face; we act today in five levels and four layers of depth
2. Combi-surgeries reduce risks and complications
3. Prosopoplasty – face styling, analogue to blepharoplasty, mastoplasty, or phalloplasty
4. Patients want to look better, not like somebody else
5. Facelift as outpatient surgery
6. The worst risk of any surgery – the surgeon himself/herself
7. Experience of over 100,000 facelifts
8. The idea of lifting came first from a patient, not from a surgeon
9. Deeper layer of the face: superficial musculo-aponeurotic system (SMAS)
10. Third dimension to be corrected
11. Microinvasive surgery with videoendoscopy
12. Facial evolution in just 1 year
13. Stretched faces in animals do not reflect their age
14. Shrinkage of the human face in evolution
15. Six basic emotional expressions
16. Nonverbal, paralingual communication – "facial Esperanto"
17. Paul Ekman's 44 anatomical action units of the face
18. Facial gender recognition of the face and its makeover
19. Gender-specific unification of faces mixed by computer
20. Prototype of "hyperwoman"
21. Psychic suffering as indication for facial cosmetic surgery
22. The most common questions we ask our patients
23. Sex distribution among our patients
24. Different emotional index in female and male groups of patients
25. Typical patient according to psychoanalytic probing
26. Improved emotional index after aesthetic surgery
27. Increased self-esteem of patients and their concentration and success at work
28. Warning signals to exercise caution or to refuse the surgery
29. Different success evaluation of patients and of surgeons
30. Sharp decrease of female fertility with advancing age
31. Humans are biologically programmed to live about 30 years
32. Drooping of the nose by 1 cm till the age of 70 years
33. The most beautiful sexual ornaments in women at 24.8 years owing to the highest oestrogen level
34. Strategies for Engineered Negligible Senescence from Cambridge could soon extend life expectation dramatically
35. Vitality means attractiveness
36. Female and male features converge before puberty and in old age
37. Fermental and hormonal "lifting"
38. Ageing alterations of the face
39. The ultimate absolute shape is symmetry
40. The nose is the key to facial symmetry
41. Aesthetic surgery can release patients from their complexes
42. Every cosmetic surgeon has to possess to some degree the forming talent of an artist
43. Five pillars of aesthetic surgery: science, psychology, handicraft, art, and business
44. Sculptors and painters are our teachers of anthropometric harmony
45. Religious values and family importance are diminishing – the reason for body cult
46. Cosmetic surgery treats those body areas which are visible to everybody – we are thus obliged to enter into dialogue with public opinion
47. To look good is a psychological, physiological, and instinctive need of human beings
48. Charles Darwin's theory: beauty is also the principle of sexual choice
49. Anthropo design: aesthetic surgery is becoming human applied art
50. Is the creature trying to become its own creator?
51. Every face is unique
52. Facial Esperanto: expressions are universally equally produced and understood

53. Facial expressiveness is more intensive in women than in men
54. A smile is the shortest distance between two human beings
55. There would be no cosmetic surgery without a mirror
56. Baby face phenomenon: big eyes and lips, small nose, full cheeks, smooth skin
57. An unbelievable number (10^{200}) of various facial expressions is theoretically possible
58. For partners for life, people prefer the average, not extreme attractiveness
59. The outer appearance increasingly becomes a factor for professional success
60. It seems reasonable to take attractiveness into account during the hiring process
61. Cosmetic measurements increase feelings of wellness, and body's defences, and decrease levels of the stress hormone cortisol
62. Plato's definition of three supreme principles of our civilisation: goodness, truth, and beauty
63. Phenomenology of inner and outer beauty
64. Anatomy is the key and the helm of the whole of medicine (Falopio)
65. Mm. orbicularis oculi et oris have attachments only to the skin
66. Six sensory and two motor nerves of the face
67. Botanic comparison of retaining ligaments
68. Three retaining ligaments to be divided, three not obligatory
69. Intraoperative demonstration of topographic details of facelift-related anatomy: McGregor's malar patch, SMAS flap, buccal branches, Bichat's fat pad, Loré's fascia, n. auricularis magnus
70. Cadaveric studies of the neck, supra-SMAS and sub-SMAS layers of the cheek, facial nerve branches, periosteal plane, temple, and septum orbitale
71. Extended procedures bring more serious complications and prolonged recovery time
72. Incisions should not cross the mimetic lines
73. Looking into the eyes, we can see into the thoughts of each other
74. R. Henns: It can be reasonable to take attractiveness in account during the hiring process
75. The ideal candidate suffers psychically, has inner motivation, no unrealistic expectations, precise idea of the result, longer incubation
76. Prerequisites of the ideal surgeon: passion, fantasy, precision, patience, love, artistic talent, luck
77. The operating theatre is the "temple of our surgical religion"
78. The importance of telephone communication with our office
79. The questionnaire to be completed before the patient enters our consultation room
80. We should "scope" the patient's indication/motivation/expectation/incubation
81. The sacred trust between patient and surgeon
82. Analysing the patient's problem in front of a mirror and by photograph
83. Dermographic markings with felt pens of incision lines, vectors of traction, topographic structures, nerve branches, areas of liposuction, or lipofilling
84. Marking of the midline on the neck to check the symmetry of our work
85. Illumination, air-conditioning and music in the operating theatre
86. High-tech tools: cold light, electrocautery, vacuum suctioning, endoscopy, radiosurgery
87. Endoscopy: the surgeon does not look not around the tips of his/her fingers, but at the monitor
88. Lasers need well-defined indication, well-chosen device, well-trained surgeon
89. Radiofrequency surgery of 4 MHz: cutting without bleeding
90. Endoscopic forehead lift: three to five incisions of 1–3 cm
91. Lopez (New York) found nn. supratracheolares arise 17 mm and nn. supraorbitales arise 27 mm from the side of the midline
92. Nonscrewing fixation of forehead lift possible: fibrin glue from inside and adhesive bandages from outside stapled at the parieto-occipital line
93. T-V plasty for skin advancement in endoscopic forehead lift
94. Endo-forehead lift without an endoscope
95. Correction of diabolic eyebrows through partial grasping of frontalis muscle
96. Harmonizing of eyebrows through procerus and corrugator grasping
97. Equalizing of asymmertric eyebrows through unilateral T-V plasty
98. Eyebrow elevation by supra-supercilliar skin excision
99. Browlifting through Graziosi's thread suspension
100. The eyelids have the thinnest skin of the human body
101. Preoperative markings of incisions in an upright position prevents skin overresection
102. Blepharoplasty is the most frequent outpatient surgery, also among plastic surgeons themselves
103. Check of skin extent for skin resection with T-forceps
104. Indications for blepharoplasty: ptotic "baggy" upper eyelids, puffy lower eyelids, crow's-feet
105. Prerequisites of aesthetically pleasing eyes
106. Preserving orbicularis oculi fibres regularly in lower and sometimes in upper eyelids

107. Rule for lower blepharoplasty: enough is better than too much–overresection is unforgiving
108. "No touch" technique for lower eyelids
109. Controlled comparison of removed skin and fat pads
110. Negative vector of lower eyelid
111. Vertical suspension of the orbicularis oculi muscle loop of the lower eyelid
112. Contraindications for eyelid surgery: significant orbital pathology, exophtalmos, dry eye, unrealistic expectations
113. Fat repositioning and septum orbitale suture–Hamra method for lower eyelids
114. Lateral skin triangle resection to prevent ectropion
115. Mostly: two fat pad compartments of the upper eyelid and three of the lower eyelid
116. Never: the prolonged incision to the root of the nose
117. Interpalpebral fixation for 4–7 days to prevent reactive conjunctivitis and ectropion
118. Caution: 23 different complications are possible after blepharoplasty
119. Every patient should have a Betadine shower in the morning prior to the surgery
120. Extent of skin undermining and mobilization
121. Combination of intravenous sedation and local anaesthesia
122. Taking care of perforant vessels which provide blood supply to the skin flap
123. Preferable incision lines
124. Radiofrequency incisions without bleeding
125. Temporal terrace prehair incisions and unobtrusive scars
126. Zigzag supraauricular incisions
127. Excision of supraauricular skin triangle
128. Pretragal incisions in men
129. Pretragal dimple suture (subdermo-perichondrial) for better tragus projection in female retrotragal suture
130. Supra- and retroauricular main points of tension
131. *No* tension on the earlobe at all!
132. Retrotragal incision should "jump" onto the back side of the concha to fit the upcoming scar into the retroauricular sulcus
133. Retroauricular hair margin scar
134. Skin flap preparation with 2 mm of underlying fat tissue
135. Technique of "spreading scissors" allows stretching of nerve branches but not cutting of them
136. Finger-assisted malar elevation
137. Blunt dissection does not provoke bleeding
138. McGregor's malar patch causes the midbuccal dimple in elderly patients
139. Detail illumination through cold light hook or head light
140. Subcutaneous adhesion detachment by "grasping forceps"
141. Transillumination to check the irrigation of the skin flap
142. Different SMAS variations
143. Method to be chosen depends on check of SMAS and platysma mobility
144. SMAS plication
145. Correction of hollow cheeks by SMAS plication
146. Advancement of Bichat's fat pad
147. Comparison *in tabula*: right side done; left not yet
148. Advancement of jowl miniflap
149. SMAS flap elevation with "spreading scissors" or by radiosurgery
150. High SMAS flap elevation
151. SMAS resection in full cheeks of "heavy faces"
152. Horizontal snail SMAS flap for "contouroplasty"
153. Vertical single snail SMAS flap for "contouroplasty"
154. Vertical double snail SMAS flap for more "contouroplasty"
155. Tricuspidal SMAS flap to triple the malar prominence for maximal "contouroplasty"
156. Paraoral K-point release to avoid dynamic "facelift stigma"
157. Platysma "back-cut" to deepen the mento-cervical angle
158. Submental liposuction enables better skin retraction
159. Direct removal of supraplatysmal fat of the neck
160. Preauricular Loré fascia is very suitable for SMAS flap fixation
161. No need for drainage anymore; often we use fibrin glue instead
162. Maximal tension onto skin flap to be released by 2–3 mm to avoid mask-like look of wind-tunnel faces
163. When the ear can be hidden by skin flaps, the preparation is finished
164. Skin closure with intradermal 3-0 or 4-0 monofilament nylon or staples in the hair-covered temple
165. Nicotine prohibition 3 weeks preoperatively and 3 weeks postoperatively
166. In smokers we elevate en bloc the SMAS and the skin flap or leave an undetached subcutaneous "island" at the mandibular angle; monovectoral facelift
167. SMAS elevation with the longest rhino-speculum
168. Mini facelift in younger patients – the signs of getting old will appear later
169. Not too much skin to be resected in front of the ear in mini facelift

170. Mini facelift, preventing ageing look, means prophylactic rejuvenation (preservation of youth)
171. Facelift effectiveness lasts forever – skin and SMAS do not regenerate
172. We can put back the biological clock, but we cannot stop it
173. MIDI facelift – prophylactic rejuvenation
174. Two half Z-plasties enable an equal length of wound edges, which results in very fine, unobtrusive scarring
175. MIDI: minimal, invasive, deep intensive
176. Secondary facelift can be indicated 15–20 years after the first one, if it was well done
177. Reasons for early secondary facelift: insufficient effect with laxity of both SMAS and skin
178. Pessimistic "tired look" with descendent "sagging" facial structures soon after initial surgery
179. Irregular jaw line
180. Improper scars
181. Displaced hair line
182. Distorted or "amputated" earlobe
183. Cervical deformities
184. Unnatural pattern of wrinkles – "static facelift stigma"
185. Dimpled paraoral K-point (junction of different vectors of traction) with mimetic "dynamic facelift stigma"
186. Permanent nerve damage
187. We should hide the expression of shuddering if we see the poor result of a facelift done by another surgeon
188. We should try to look at our own suboptimal results with the eyes of our colleagues
189. "Corseting" of platysma bands in lower neck
190. Notching of platysma bands in upper neck
191. Platysmoraphy through submental access
192. Digastricus detachment for better mento-cervical definition
193. Double-chin correction through submental skin excision
194. "Turkey neck" and hypognathy correction through bone graft taken from the iliac crest
195. "Star excision" of the middle neck with a zigzag "Zorro" scar
196. A small chin is female hormonal ornament and a big chin is a male hormonal ornament
197. Different methods to correct the so-called witch's chin
198. Chin asymmetry to be corrected by autologous fat transfer (AFT)
199. Chin asymmetry correction by liposuction
200. "Horseshoe" silicone chin implantation through the lower lip
201. Chin rejuvenation through chin implant
202. Chin dimple flattened with transplanted crushed cartilage from the alar wing
203. Supramental chin dimple flattened through excision and elevating sutures
204. Intravestibular interior reductive labioplasty – in men
205. Lip enlargement with autologous microlipofilling
206. Lip enlargement with a strip of the SMAS
207. Lip enlargement with muscle stripes
208. Lip enlargement with the "bull's-horn" method
209. Elongating frenuloplasty of upper lip to correct "teeth-show"
210. Mechanical, chemical, laser, or radiofrequency peeling to correct "lemon wrinkles" of the upper lip
211. Filtropexy of the vermilion border
212. "Optimistic sutures" to elevate descendent lip commissures
213. Upper preoral vestibulectomy with transosseal nostril suspension to correct "gingival-show" of an "unpleasant horse smile"
214. Microlipofilling: 60–80% of autologous transferred fat can survive if harvesting, preparation, and implantation have been done properly
215. Micro fat cylinders with a diameter of 1 mm can survive through capillary sprouting
216. The best recipient of fat cells is between muscle fibres because of good irrigation
217. We can achieve spherical harmony of the face through contouroplasty done by microlipofilling (AFT)
218. Slight overcorrection of AFT of 115%
219. After 6 months 60–80% of fat cells survive; resorption rate by AFT 20–40%
220. Storage of fat syringes at _34°C in a freezer; re-microlipofilling possible within 6 months
221. Each stored packet should have a sticker with the patient's name, date of surgery, and number of syringes available inside
222. Through volumetric thinking and acting and thanks to AFT, the plastic surgeon became a "sculptor in vivo"
223. Müller–Lyer optical trick is applicable in volumetric facial shaping
224. Not too much underpressure: we harvest fat cells with 10-ml syringes
225. Inner (inside) upper thigh is the best donor site; these fat cells have the most oestrogen receptors
226. All actions to be done gently: "do lipofilling, not lipokilling"
227. Fat harvesting easier in women than in men
228. Very difficult harvesting in HIV-positive patients treated by protease inhibitors; they have almost no subcutaneous fat, so we have to harvest in many locations

229. We gently centrifuge 10-ml syringes for 3 min at 3,000 rpm
230. Segregation by centrifuging gives three fractions: oil, pure fat, and water–serum
231. We put 1-mm microincisions into preexisting skin folds – such scars will not be recognizable later
232. Tangential illumination by microlipofilling is useful to recognize changing contours better
233. Uninterrupted taking of oral contraceptives or oestrogen produces prolonged haematomas
234. Personal upper limit of AFT into the face in the first session is 40 ml
235. Upper limits of fat per region: upper lip 6 ml, lower lip 4 ml, nasolabial fold 4 ml, marionette groove 1 ml, malar region 8 ml, cheek 6 ml
236. After fat grafting we apply modest digital dispersion of fat grafts – very gently!
237. Cooling of grafted areas for 4–6 h reduces swelling and bruising
238. Manual squeezing with well-dosed digital compression is possible to reduce overcorrected areas (if the patient insists) within the first 2–3 weeks
239. "Elixir" phenomenon after AFT – skin is becoming shiny and smoother
240. More and more patients are undergoing both facelift and AFT together
241. Wrinkled hands are obvious betrayers of well-performed facelifts
242. Handlifting by AFT with up to 20 ml purified fat per hand is possible
243. We have abandoned ulnar skin excision to "lift" hands because of the scarless AFT method
244. Increasing popularity of facelift plus AFT into both face and hands
245. Thanks to AFT we can act as real "biosculptors"
246. Since 1972, when a vacuum device was connected to a cannula for the first time, we have been able to remove fat tissue by liposuction
247. Small calibre of cannulas in face and neck region: 3, 2, and 1.6 mm
248. Tumescent solution with local anaesthesia; fluid to fat 2:1
249. No ultrasound in face and neck liposuction
250. Never act against resistance
251. Incisions of 3 mm each: submental, behind both earlobes and sometimes above the ear, at the hair border
252. "Pinch" test with thumb and index finger to check removal of fat
253. Half profile has to have a convex–concave-line – "ogee line" of contouroplasty
254. Unilateral fat hypertrophy to be corrected by unilateral liposuction
255. Supraplatysmal fat to be removed by liposuction, and subplatysmal to be removed under visual control
256. Special head–neck garments to be worn for 3 weeks
257. Different localization of fat hypertrophy; lower face, submental, submandibular, lower neck
258. Liposuctions of face and neck can be combined with liposuction of other parts of the body, or with other surgeries
259. Autoultrasonolipocontouring – when the surgeon operates on himself/herself
260. Head and neck net bandage for 1 day is sufficient in most cases
261. We administrate prophylactic antibiotics only when inserting a chin silicone implant through the lower lip
262. Only 25% of our patients after facial surgeries ask for analgesics
263. We mostly perform facial surgeries on an outpatient basis, keeping them for 6–8 h in the day clinic
264. When we perform combined surgeries, we suggest patients stay in our clinic for 1–2 nights
265. Psychologically,-patients agree more easily with ambulatory surgeries than if they have to stay a longer time in the clinic
266. We remove bandages 24 h after surgery; we do not leave drains anymore (only in special cases)
267. We remove the intradermal sutures after 6–7 days and the anchorage sutures after 10–12 days
268. Make-up is allowed after 10 days
269. Great individual differences in the healing process
270. We advise our patients not to smoke 3 weeks preoperatively and 3 weeks postoperatively, not to take oestrogen hormones for the same time, and to avoid aspirins and alcohol for 10 week before and after the surgery
271. Permanent nerve injuries and skin necrosis are major complications after facelift surgery; tips to avoid them
272. Rare complications: salivary cyst, forgotten swab of gauze below the skin, real keloid scars (to be resected under administration of *N*-acetyl-L-hydroxyproline)
273. Facelift stigma of "operated faces"; German saying: "Enough is better than too much" is good for prophylaxis
274. We need patience to hear all justified complaints of our patients
275. When complaints are not justified, or less justified, just show them their pictures before and after: then all doubts are removed

276. The first known plastic surgery in history was the nose reconstruction done by Sushruta in ancient India in about 600 BC
277. The first aesthetic surgery in history was a closed nose correction conducted by John Orlando Roe in New York in 1887
278. Misshapen noses draw remarks from others which are often very offensive
279. The nose is a very strange organ: the root is at the top, the back is at the front, the tip is at the bottom
280. The nose "droops" by a whole centimetre till 70 years of age; shortening of the nose in advanced age has been recognized as a rejuvenative procedure
281. The nose is the key to facial harmony
282. External rhinometry should be done and documented before, during, and after the surgery
283. Rhinplasty done in untreated psychotics can have disastrous consequences: 20 surgeons were killed by nose patients in the twentieth century
284. Checklist of planned corrections and patient's photographs to be taken into the operating theatre
285. After palpation of nose structures we make demographic markings of planned corrections
286. Prior to the rhinoplasty we judge the endonasal situation and accomplish functional correction too, if needed
287. Dynamic stripping septorhinoplasty
288. "Frankfurt line" and "Leonardo's quadrilateral"
289. "Cherry tip" deformity to be corrected by partial extirpation of alar cartilage
290. Depending on whether the person is large or small, male or female, the length of the nose is between 48 and 58 mm
291. The most frequent nose deformities: hump nose deformity, a too long nose, saddle nose, laterally displaced nose, bulbous nose, boxy nose, cherry tip, rhinophyme, combined forms
292. Caution: inverted-V deformity–"Citroën sign"
293. Bony-cartilaginous hump can be removed by chisel, saw, or rasp
294. Macrorhinokyphosis and hypognathy could be corrected by "autobiorecycling" as the complete skeletal hump removed by profiloplasty could be transferred into the chin
295. I had to reoperate on 5% of my own rhinoplasty patients, mostly because of supratip deformity
296. Secondary rhinoplasties account for 34% and primary rhinoplasties for 66% of my workload
297. After hump removal, the "open roof deformity" is to be corrected through lateral basal osteotomies and medialization of nasal bones
298. Infundibulatomy with a long rhino-speculum to widen the nasal airways
299. Splint of warmed thermoplasties can be digitally modelled – after 3 min, it becomes hard
300. Thermoplastic splint fixed over the skin with sticking plaster
301. Rubber finger-like tampons for 1–3 days; their removal is painless
302. If the facial skeleton has reached maturity, we can operate from the age of 16 years
303. Upper age limit of 40 years has been abandoned
304. The incisions are placed in the inside of the nostrils in "closed rhinoplasty", which was the most frequent cosmetic surgery in the twentieth century
305. First remodelling of the splint 2–4 days after surgery, second remodelling 6–8 days after surgery; so we can influence the nasal shape while the swelling is reduced
306. We remove the splint after 10–12 days; during the next 10 days the patient sticks it over the nose at home for 10–12 h per day
307. Lateral deviated noses should be slightly overcorrected; nasal skeleton has "anatomic memory" – it tends to get back into its initial position
308. Too broad alar wings can be narrowed through basal bialar sutures
309. Too large nostrils may be made smaller through Y–V plasty and basal alar excision
310. To correct saddle noses, we prefer auricular cartilage grafts, chopped, wrapped into Surgicel, inserted into the saddle nose and modelled digitally to the desired shape
311. In lateral displacement of the septal cartilage, we make scarifications on the concave side of the cartilage
312. We apply different techniques and access when operating: female or male noses, young or old patients, primary or secondary procedure, or ethnic noses
313. Delivery rhinoplasty with suprarim and intercartilaginous incisions and outward luxation of alar cartilage and dome region
314. "On top" dome sutures to increase the tip projection
315. Dome sutures to correct "bulbous tip" and "split tip"
316. Prolongation of too short a nose by intraoperative urinary catheter ballooning for 15 min
317. Shortening of tip projection through partial dome resection and resuturing
318. "Open method" with columella approach for "difficult tips" (like split noses)
319. Very useful sterilizable plastic "open method model" of Ron Gruber
320. Correction of "boxy tip" by interdomal sutures through "open method"

321. Reduction of tip projection through transection, overlapping, and suturing of the medical crus on both sides but at different levels
322. Cartilaginous dome asymmetries to be corrected by "open method"
323. Correction of "drooping nose" through dome sutures and basal alar excisions
324. Secondary nose correction with almost amputated lateral crus through asymmetric umbrella graft created from the helix tail
325. Often there is distortion of compact cartilage grafts
326. Postoperative care: soft food, sleep with slightly elevated head; no sport for 4 weeks
327. Preoperative patient selection depends on indication, motivation, expectation, and incubation
328. The ectomorphs often have prominent ears
329. The earliest age for correction is 6 years, when the children are conscious of their deformity and have developed positive motivation for surgery
330. Otapostasis can be lateral or unilateral
331. Between skin and cartilage from front and back side, enough local anaesthetics with suprarenin should be injected (4–6 ml per ear)
332. At the back of the auricle a spindle-shaped strip of skin over the helix tail (lower third of the auricle) should be excised
333. We enter with fine Stevens scissors below the helix tail and prepare a subcutaneous tunnel over the antihelix till the top of the superior crus of the antihelix
334. We have to break the anterior layer of cartilage of the antihelix either with Panfilov's file or with Joseph's file, which is not curved, or with Adson–Brown forceps
335. Next step of otopexy: the helix tail should be shortened by 2–3 mm, turned backwards everting the lower third of the auricle, and sutured with 4-0 nylon to the posterior surface of the concha
336. Two or three three-stitch mattresses sutured with colourless nonabsorbable 4-0 nylon suture
337. Skin sutures with absorbable 4-0 sutures
338. If the earlobes are found to be too large they could be shortened; the front incision should be higher than the back incision – then the scar stays invisible
339. Axial rotation of the ear is possible through upper pole fixation forward and lower pole fixation backward
340. Two types of wrinkles in the human face: lines of facial expression and gravity lines
341. Thinner skin in women and in the Caucasian race
342. Faster wrinkling and ageing of the skin is provoked through UV rays and nicotine
343. Removing the epidermis by mechanical, chemical, radiosurgical, or laser peeling, we renew collagen and elastic fibres of the skin
344. Exoderm peel of Yoram Fintsi has a liquid and a powder formula
345. Liquid formula is based on phenol and croton oil and "works" under occlusive stitching plasters for 20–24 h
346. Powder formula with bismuth subgallate as antiseptic protection of the skin
347. Indications for Exoderm peel: ageing wrinkles, sun-damaged skin, nicotine lines, acne scars, scars of security-glass particles, porous skin, pigmented and keratoacanthotic lesions
348. Histological changes under Exoderm peel: elastosis of capillary bodies, evening of epidermal layer, multiplication of collagen and elastic fibres, increase of vascularization
349. Contraindications for Exoderm peel: acute herpes labialis and kidney insufficiency
350. Not advisable in Fitzpatrick skin types V and VI and Addison's disease
351. Gold threads of 24-carat gold coated with polyglycolic acid implanted under the facial skin produce stretching of the skin beneath for 3 months
352. "Gilding the cheeks" is very popular among Russian patients, but has rather modest effectiveness
353. Humans have 100,000–150,000 hairs
354. Dark-haired persons have more hairs than light-haired (blond) ones
355. Some patients, mostly women, ask for hair removal from upper lip, cheeks, chin, neck, shoulders, axillae, breasts, bikini-line, buttocks, and calves
356. P. Bjerring from Denmark acknowledges the ruby laser has the highest efficiency in hair removal known today. Long pulse ruby laser of 694nm
357. Ideal combination is dark hair and light skin
358. With a spectrometer we decide which energy, from 12 to 20 J, to apply
359. Roots of hairs are deeper in women (4.5 mm) than in men (3.5 mm)
360. We can eradicate hair follicles only in the anagen phase of active growth
361. For facial epilation we need two to three sessions
362. We do not recommend more than 150 shots per session
363. Twenty percent of our patients develop pigment marks; these crusts disappear after 5–6 days

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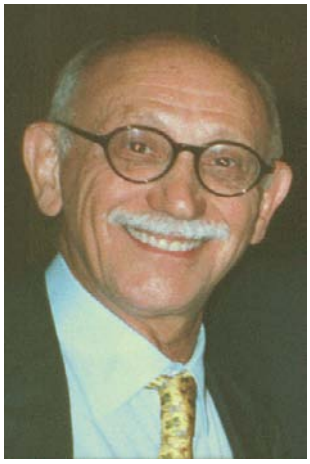

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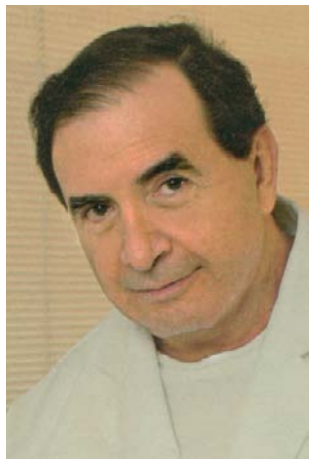

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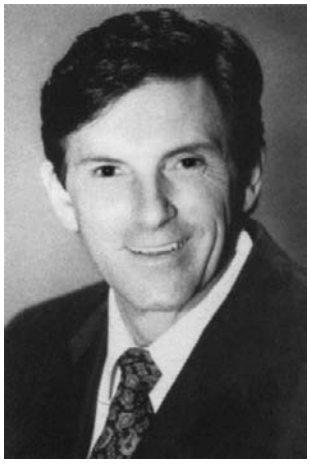

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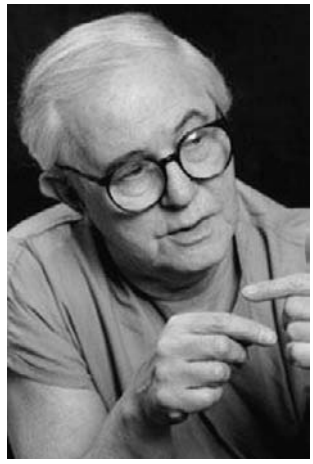

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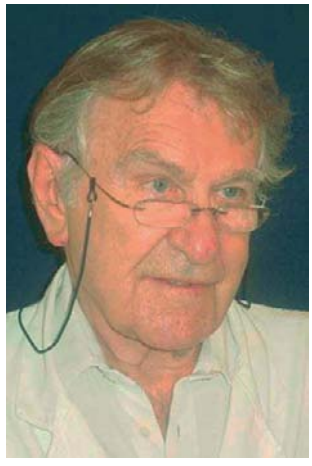

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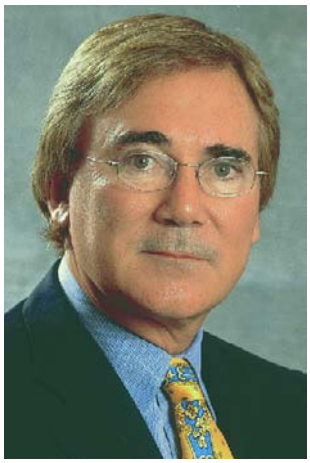

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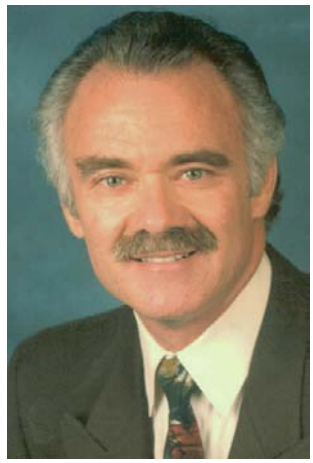

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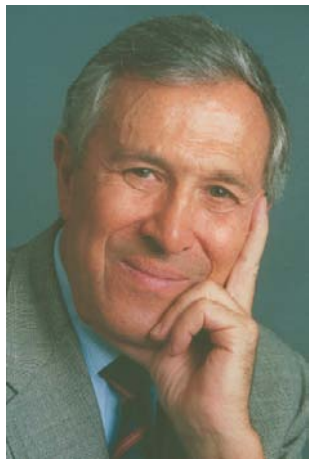

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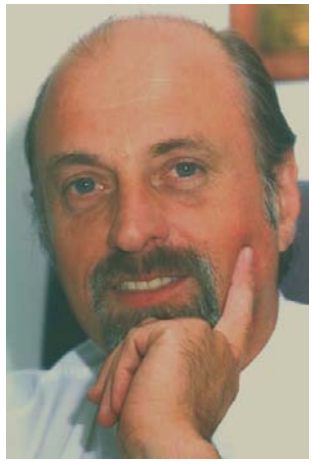

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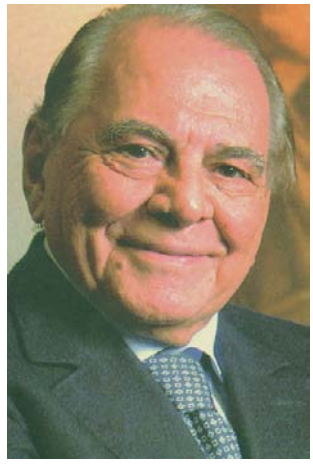

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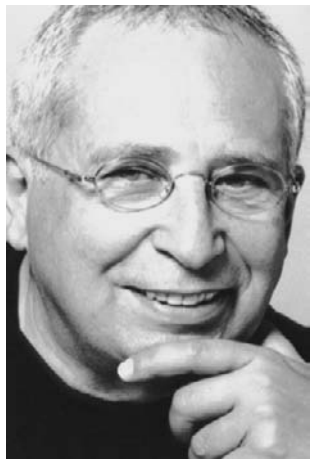
Chapter 43



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Chapter 64

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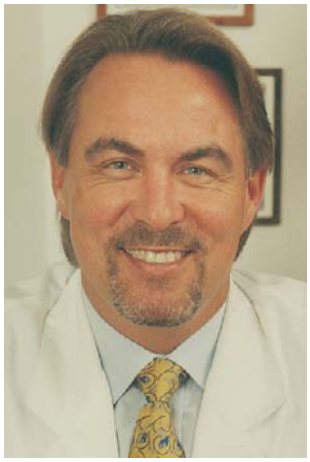
Minimal Access Cranial Suspension Lift"
Chapter 49



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Chapter 46

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Chapter 44

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Chapter 72a

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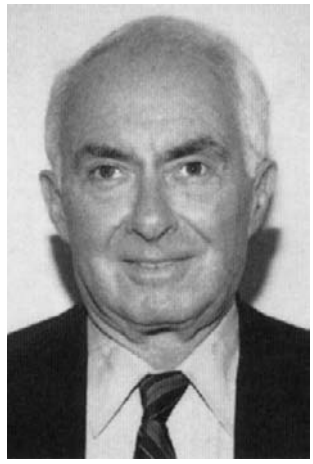

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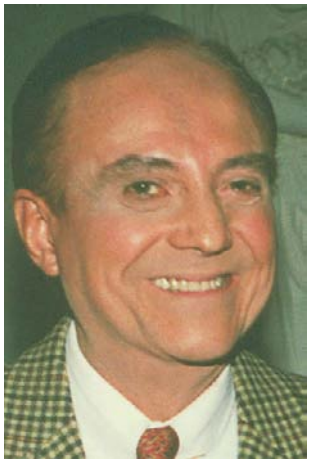

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Subject Index

B

C

D

G

H

M

S

T

U

V

W

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Biography

Dimitrije E. Panfilov was born in Županja, Croatia. He completed his medical study in Belgrade, Serbia, and his specialization in general surgery in Düsseldorf and plastic surgery in Frankfurt, both in Germany.

He is founder and Surgeon-in-Chief (head surgeon) of the Clinic "Olymp", Novi Sad, Serbia, and permanent consulting plastic surgeon of the Private Clinic "Nofretete" in Bonn, Germany.

Besides being a member and an honorary member of many national and international societies, he is founder of Global Expert Service for Aesthetic Plastic Surgery (GESAPS) and Editor-in-Chief of its journal *Aesthetic News*. He has been appointed as President and Visiting Professor of the International Academy for Aesthetic Plastic Surgery (IAAPS).

He has published many scientific works, four books, has produced six video–TV films, and has organized ten international meetings in the field of plastic and aesthetic surgery.

He was awarded the Golden Medal of Seoul National University Hospital in South Korea for humanitarian work in 1988, and the Sushruta Medal of the Association of Plastic Surgeons of India for his international engagement in aesthetic plastic surgery in 2004.