# Aesthetic Rejuvenation of the Face and Neck

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To Helmut G. Wagner, I would like to state my appreciation for your surgical help as surgical technician, translator during foreign charity clinics and surgeries, as well as assistant for 50 years which has made this publication possible.

*Bruce F. Connell, MD*

I would like to dedicate this book to the love of my life, my beautiful wife Toni, who has blessed my life from the moment she entered it. Thank you for your patience for the time away needed to bring this project to completion. To my daughters, Candace and Lauren, my beautiful flowers who light up my life daily. I hope that they will all be pleased with the results of this project. To Dr. Connell, my friend and mentor, whose teachings and vision are the foundation of this book and my practice.

*Michael J. Sundine, MD*

# Contents

# Preface

The purpose of our book is quite simple: to provide the knowledge necessary so that surgeons may provide the most optimal outcomes possible for patients who desire facial rejuvenation. It is hoped that the principles taught by Dr. Connell including careful preoperative analysis along with precision customization and execution of the operation to meet each individual patient's needs comes out into each chapter.

The textbook should transmit knowledge regarding treatment of the aging face. The scope of the book is comprehensive and includes chapters on anatomy relevant to facial aging, analysis of the aging patient, and surgical and non-surgical treatment methods used to treat the changes seen in the aging face.

The goal of the book is to transmit the latest and best surgical techniques available that will give the highest level of patient satisfaction in facial aesthetic surgery. The book will emphasize safe and long lasting results. The need for a textbook on thoughtful and quality techniques is especially important in the current environment of "light lifts," "lunchtime face lifts," and other very heavily marketed face lifts. These techniques produce dubious results with poor quality scarring, strange appearing outcomes, and little longevity. Clearly, more education is needed for surgeons who are not providing optimal results for their patients and we hope that this textbook will provide that knowledge.

The most unique feature of the book is the collection of authors who will be providing the chapters for the book. Traditionally many textbooks offer essentially an institutional perspective, in contrast, our textbook would have a collection of authors with wide ranging training and perspectives although many have had fellowships with the senior editor-Dr. Connell including the co-editor Dr. Sundine. The senior editor is recognized as one of the world experts in facial rejuvenation surgery-in fact, he has probably performed more face lifts on plastic surgeons who publish papers and textbooks on face lifting than anybody in the world. The book will utilize authors with 5 decades of experience producing quality results in aesthetic facial surgery. The authors are internationally recognized teachers of aesthetic plastic surgery. The patient results utilizing the techniques presented in this book demonstrate patients who appear to be 15 to 20 years younger and also continue to look like themselves. The techniques emphasize safety.

The textbook will be an important teaching aid to all surgeons who are providing aesthetic facial rejuvenation procedures as well as those performing reconstructive procedures. This will include practicing plastic surgeons, otolaryngologists, oral surgeons, ophthalmologists, dermatologists, trauma surgeons, and other ancillary practitioners who desire to minimize scars and deformities as well as improve the quality of their results. Those practitioners who are interested in beginning their practice in facial rejuvenation will also find this very useful. The book will also be useful to physician residents in training in all of the above specialties and medical students who are interested in aesthetic surgery. We hope the textbook will be enjoyed and found useful in your practices.

# Acknowledgments

The editors thank all the authors for their contributions and the time and sacrifice required to complete their contributions. We also thank the team from Thieme Publishing for their dedication and hard work: Timothy Hiscock, Elizabeth Palumbo, Haley Paskalides, and Mohammed Ibrar.

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# 1 Applied Anatomy for Safety in Facelifting

*Dino R. Elyassnia*

## 1.1 Introduction

Safety is paramount to achieving excellent results in rhytidectomy. Safety depends on the surgeon having a comprehensive knowledge of the anatomy of the face and neck in three dimensions. The fundamental goal in rhytidectomy dissection is to adequately release and mobilize the tissues the surgeon wishes to reposition and, in the process, preserve all vital structures. A prerequisite for accomplishing this safe release is a commanding knowledge of facial anatomy with respect to the key points of retention and their relationship to all vital structures. The first principle of anatomy in facelifting is that facial soft tissues are arranged in a series of concentric layers. This layered approach not only provides an excellent system for understanding and organizing facial anatomy, but also constitutes the practical method for performing a lamellar superficial musculoaponeurotic system (SMAS) facelift. A lamellar dissection offers the advantage that both skin and SMAS can be treated individually, which allows the excursion, vector, and tension of each layer to be adjusted differently, resulting in a natural, comprehensive rejuvenation while minimizing secondary deformities.

This chapter focuses on the step-by-step relevant anatomy the surgeon confronts while performing a high-SMAS lamellar dissection; all the information discussed here is essential knowledge for the surgeon planning to perform any type of facelift technique.

## 1.2 Anatomical Considerations in Skin-Flap Dissection

Although the general thickness of subcutaneous tissue varies from person to person based on age and weight, there is a proper thickness for skin-flap undermining, especially when performing a lamellar dissection. When beginning skin-flap undermining in the cheek, the flap must be relatively thin so as to avoid including SMAS fibers in the skin flap, which will render the SMAS flap too thin and therefore useless. If dissection is in the proper plane, the fat on the undersurface of the flap will have a rough, “cobblestone” appearance to it, which is more visible when the flap is transilluminated (▶ Fig. 1.1). When the dissection is too deep, the undersurface will look smooth and contain streaks of fine white tissue; when it is transilluminated, this flap will appear thicker and “cloudy.” When beginning skin-flap undermining in the postauricular area, it is important to understand that, superiorly and anteriorly, there is little subcutaneous fat between skin and fascia, which makes it difficult to establish the correct subcutaneous plane. Beginning the dissection more posterior and inferior, the surgeon will encounter more subcutaneous fat and establish the correct plane more easily, facilitating dissection of the postauricular flap and lateral neck. Unlike the cheek-skin flap, which should remain thin, the neck flap should be slightly thicker to help avoid an, overresected appearance in the neck.[1]

### 1.2.1 Great Auricular Nerve

As skin undermining progresses to the upper lateral neck, care must be taken to preserve the great auricular nerve (▶ Fig. 1.2). This sensory nerve is derived from the cervical plexus and provides sensation to the earlobe and lateral cheek. The great auricular nerve runs obliquely from the posterior belly of the sternocleidomastoid muscle to the earlobe. The classic external landmark for locating the nerve is at the midbelly of the sternocleidomastoid muscle, 6.5 cm inferior to the bony external auditory canal.[2] The most common area of injury to the nerve is where the nerve emerges from around the posterior border of the sternocleidomastoid muscle at the most peripheral aspect of the subcutaneous undermining. The key to preventing injury is to stay within the subcutaneous plane and not violate the superficial cervical fascia (an extension of the SMAS and platysma), which overlies the sternocleidomastoid muscle. Staying superficial to this fascia over the muscle and not exposing muscle fibers enables preservation of the nerve. In most cases, the nerve lies deep to the plane of skin-flap dissection and is not seen; however, in very thin faces or secondary facelifts, where little subcutaneous fat may be present, the nerve is at greater risk and extra caution is therefore advised.

**Fig. 1.1** Appearance of a transilluminated skin flap in the cheek. If dissection is in the proper plane, as in this case, the fat on the undersurface of the flap will have a rough, “cobblestone” appearance to it.

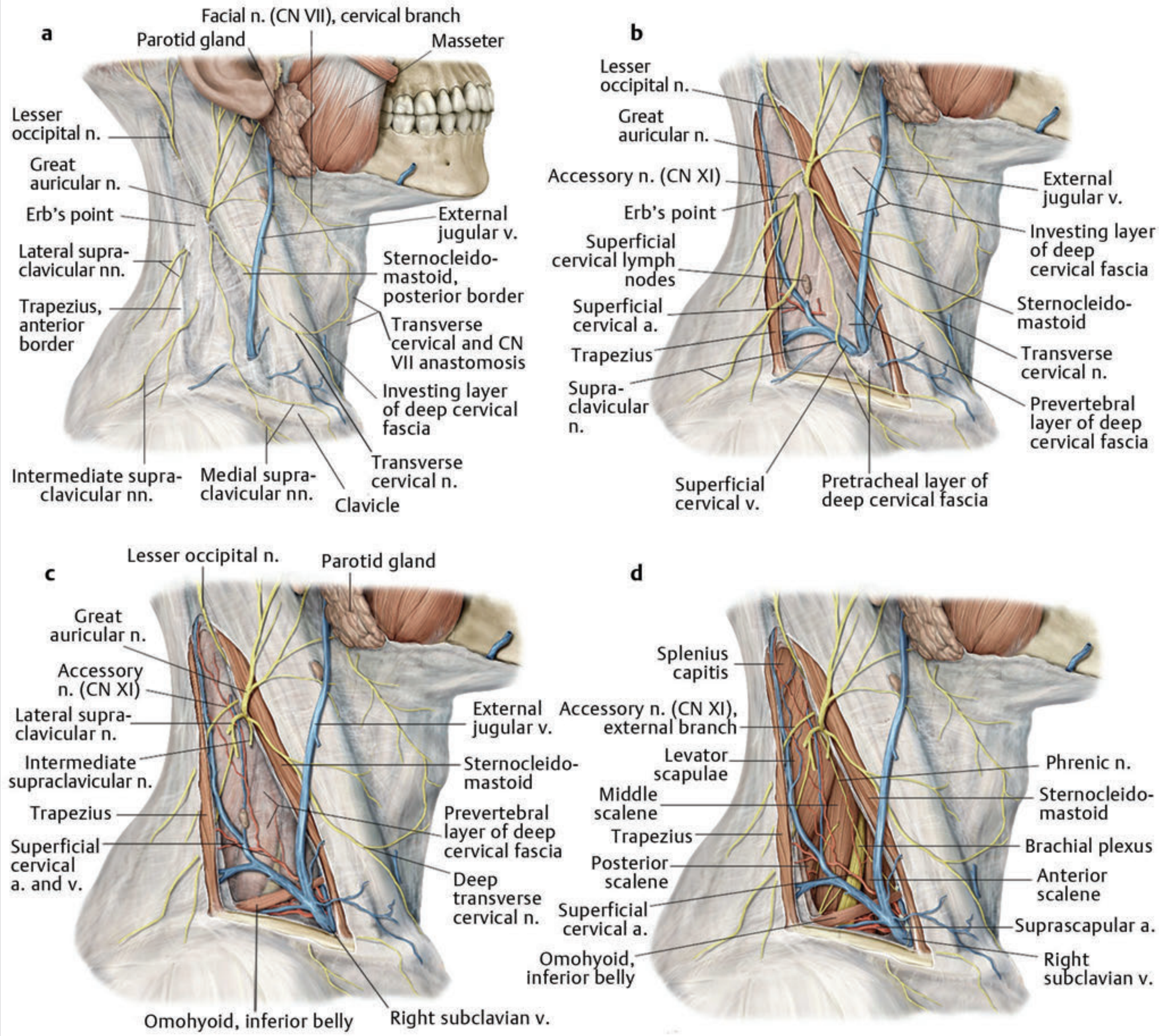


**Fig. 1.2 (a–d)** The great auricular nerve can be seen lying over the midbelly of the sternocleidomastoid muscle 6.5 cm below the external auditory canal. a, artery; CN, cranial nerve; n, nerve; nn, nerves; v, vein. (Reproduced from THIEME Atlas of Anatomy, 2nd ed., General Anatomy and Musculoskeletal System, © Thieme 2005, illustrations by Karl Wesker.)

## 1.2.2 Retaining Ligaments

Proper skin-flap redraping requires a thorough knowledge of the retaining ligaments of the face (▶ Fig. 1.3). These ligaments are vertically oriented fibers that penetrate the concentric horizontal layers of the face and function in a supportive role.[3,4] First described by Furnas, there are two types of retaining ligaments: (1) true osteocutaneous ligaments that run from the periosteum to the dermis and are made up of the zygomatic and mandibular ligaments and (2) retaining ligaments formed by a coalescence of superficial and deep facial fascia that form fibrous connections and vertically span from deep structures, such as the parotid gland and masseter muscle, to the overlying dermis; examples include parotid and masseteric cutaneous ligaments. The parotid cutaneous ligaments span the entire surface of the parotid gland, and the masseteric cutaneous ligaments are a series of fibrous bands found along the entire anterior border of the masseter muscle, starting in the malar region and extending down to the mandibular border.

Based on this understanding of the retaining ligament anatomy in the face, the plan for skin-flap elevation and ligament release is shown here (▶ Fig. 1.4). As skin-flap elevation progresses over the cheek, one first encounters fibrous, dense attachments over the parotid gland, where the dissection will be more difficult; these attachments represent the parotid cutaneous ligaments that must be released. Anterior to the parotid and inferior to the zygoma, once these ligaments are released, the dissection can proceed more easily. Superiorly, as the dissection approaches the malar eminence, one encounters the zygomatic ligaments. These stout bands of ligament attach the malar pad to the underlying malar eminence and must be released for proper skin-flap redraping; however, skin

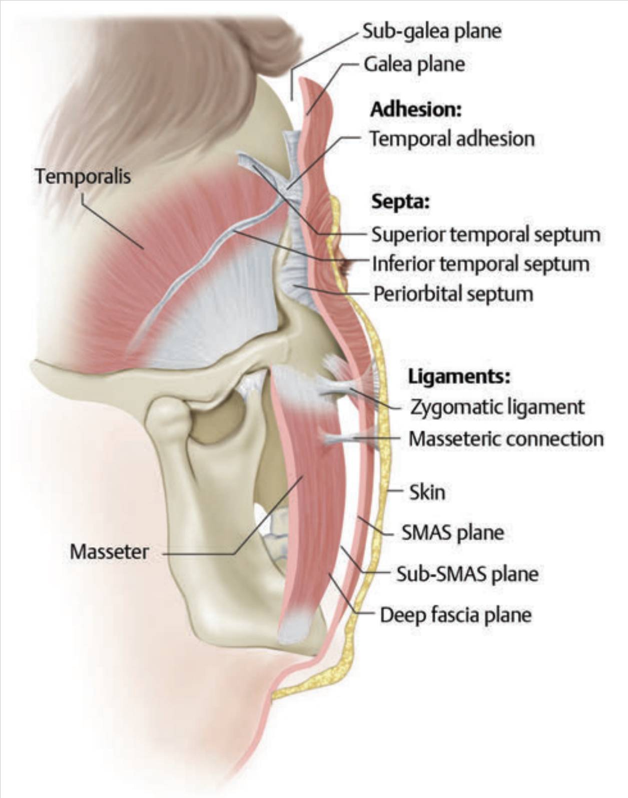


**Fig. 1.3** Three-dimensional illustration of the retaining ligaments. SMAS, superficial musculoaponeurotic system.

undermining does not arbitrarily include the entire face. In the performance of a lamellar SMAS flap, preserving the platysma cutaneous attachments in the perioral cheek and jowl area allows this tissue to be better elevated and supported via SMAS-flap elevation (▶ Fig. 1.5). This area of connection between skin and SMAS also preserves important perforating vessels to the cheek flap, thereby reducing the likelihood of flap compromise.[5]

Complete skin-flap elevation in the neck combines wide undermining from both the lateral approach and the submental incision. Proper skin redraping and smooth contour of the chin and jawline require release of the submental crease and mandibular ligaments (▶ Fig. 1.5). The mandibular ligaments are discrete fibrous bands that attach the parasymphyseal dermis to the mandible. Although some bleeding is usually encountered in completion of this step, it is not so great as to prevent release of these ligaments. If skin undermining has been carried out appropriately, at its completion, the skin redrapes smoothly and without tension as a result of the release of retaining ligaments where necessary, while preserving the important structures, including the great auricular nerve and the deeper SMAS layer, so that it can subsequently be released and repositioned for optimal rejuvenation.

## 1.3 Anatomical Considerations in SMAS-Flap Elevation

Unlike skin, the SMAS is an inelastic layer that is capable of providing sustained support for sagging deep-layer tissues. This is

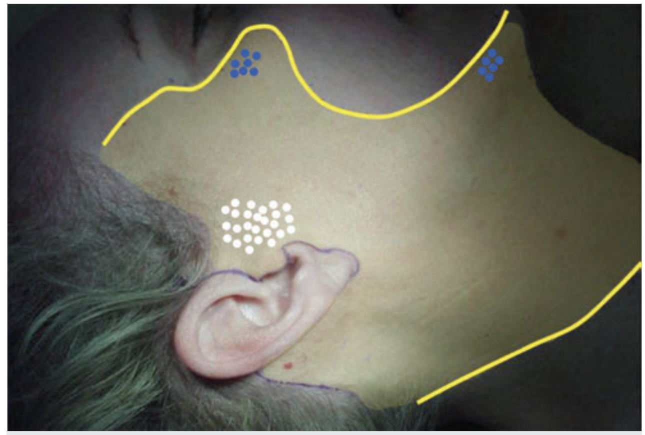

**Fig. 1.4** Skin-flap elevation with location of key retaining ligaments that must be released. The yellow shaded area represents the extent of skin-flap undermining. Blue dots represent the zygomatic and mandibular osteocutaneous ligaments. White dots represent the parotid cutaneous ligaments.

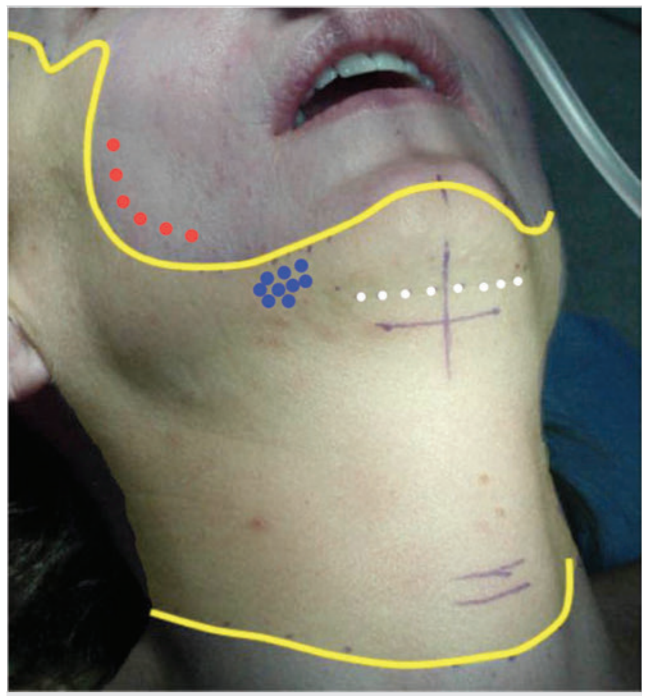

**Fig. 1.5** To obtain proper skin redraping and smooth contour of the chin and jawline, the submental crease *(white dots)* and mandibular ligaments *(blue dots)* must be released; however, preserving the platysma cutaneous attachments *(red dots)* in the perioral cheek and jowl area allows this tissue to be better elevated and supported via superficial musculoaponeurotic system (SMAS)–flap elevation.

the fundamental reason why a lamellar dissection is performed and why the SMAS layer must be separately released and repositioned. As in skin-flap elevation, the basic goal of SMAS-flap elevation is adequate release of the flap to obtain the desired effect while preserving vital anatomical structures, which requires a precise knowledge of the relationship of the SMAS layer to the retaining ligaments already discussed and to the deeper facial layers and vital structures, such as the facial nerve and parotid duct.

The SMAS represents the superficial fascia of the face and forms a continuous layer throughout the face and neck. The SMAS is contiguous with the superficial cervical fascia inferiorly in the neck. Superiorly past the zygomatic arch, it becomes the temporoparietal fascia in the temple and then the galea in the scalp.[6] The SMAS layer varies in thickness from one area of the face to another. It is dense and thick over the parotid gland, and it is this portion that is most commonly understood by surgeons as clinically representing the SMAS. As the SMAS is traced medially, it is thinner and less distinct over the masseter and buccal fat pad. In the malar region, the SMAS is also thin and ultimately blends into the epimysium of the upper lip elevators. The layer deep to the SMAS is the parotid–masseteric fascia (deep facial fascia). This layer in the cheek is made up of the parotid capsule over the parotid gland and continues anteriorly to form the fascial layer over the masseter muscle. The significance of this layer is that branches of the facial nerve always lie deep to this layer in the cheek. Recognizing the importance of this point and being able to identify this layer allow safe, extensive mobilization of the SMAS superficial to it.

## 1.3.1 Facial Nerve

The facial nerve emerges through the stylomastoid foramen and is immediately protected by the parotid gland. Within the parotid, it divides into an upper and lower trunk and then into its five major branches: temporal zygomatic, buccal, marginal mandibular, and cervical (▶ Fig. 1.6). The branches leave the parotid gland lying on the surface of the masseter immediately deep to the parotid–masseteric fascia. Medial to the masseter, the nerve branches lie on the buccal fat pad, at the same depth as the parotid duct and facial vessels. The nerve branches then proceed to innervate the mimetic muscles on their deep surface (except for the deep layer of muscles: the mentalis, levator anguli oris, and buccinator). This point is important because during elevation of a SMAS flap in the region of the malar eminence, the zygomaticus major and minor muscles are frequently encountered. When these landmarks are seen, the surgeon should maintain the dissection superficial to these muscles. This location is safe for dissection because it ensures protection of the nerve branches.

The facial nerve branches of greatest concern during a facelift are the temporal and marginal mandibular branches. Because the zygomatic and buccal branches have multiple interconnections and cross over, injury to these branches is not likely to cause a clinically noticeable deficit; however, this is not the case for the temporal and marginal mandibular branches. The temporal branch or collection of branches can be considered to travel along a line connecting the base of the tragus to a point 1.5 cm above the lateral eyebrow.[7] Another useful landmark is the point at which all temporal branches will cross the upper border of the zygomatic arch from 0.8 to 3.5 cm from the external acoustic meatus or tragus.[8] Unlike all other branches, which always lie deep to the deep facial fascia, the temporal branch penetrates the deep fascia just above the zygomatic arch and travels in the temporal region on the underside of the temporoparietal fascia. Thus, unlike SMAS elevation, which is always safe superficial to the parotid–masseteric fascia, elevation of the temporoparietal fascia across the location where the temporal branch traverses the deep fascia will result in temporal branch division. A SMAS flap can be elevated "high" at the upper border of the zygomatic arch, however, because the temporal branch is still deep to the SMAS at this level.[9,10] Because of this complex anatomy, any surgeon performing a facelift or temple lift must have a detailed, three-dimensional knowledge of the temporal branch to prevent injury.

The marginal mandibular branch exits the parotid approximately 4 cm beneath the base of the earlobe, near the angle of the mandible. In most cases, it courses above the inferior border of the mandible, and in all cases where it is anterior to the point where the facial vessels cross the mandibular border, it courses above the inferior border of the mandible. In 19% of cases, it lies up to 2 cm below the mandibular border posterior to the facial vessels.[11] In these cases, the nerve travels superiorly and will

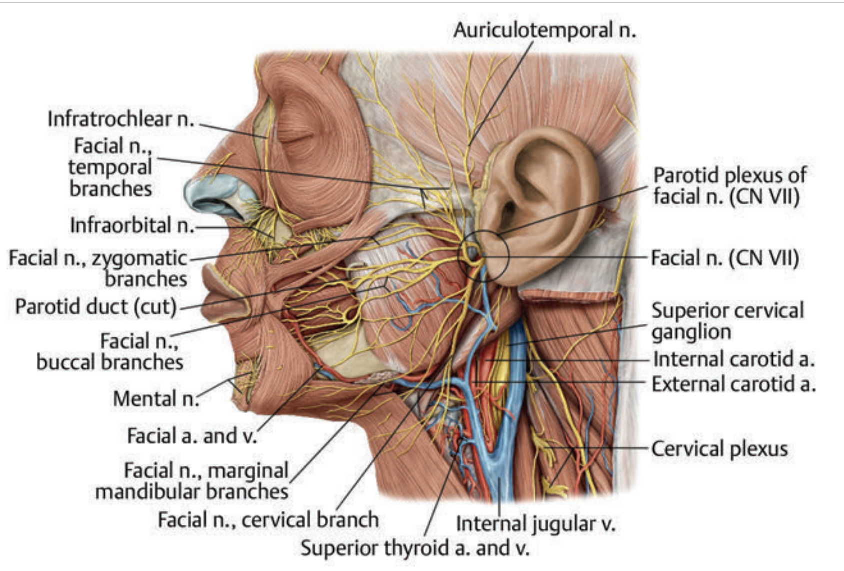


**Fig. 1.6** Facial nerve branches. a, artery; CN, cranial nerve; n, nerve; v, vein. (Reproduced from THIEME Atlas of Anatomy, 2nd ed., General Anatomy and Musculoskeletal System, © Thieme 2005, illustrations by Karl Wesker.)

cross over the facial vessels as it continues above the level of the mandibular border. These vessels are palpable at the anterior border of the masseter and serve as a useful landmark for locating the marginal mandibular branch. This location is also likely to be where the nerve is at greatest risk for injury because the covering platysma and superficial fascia are thinner and the nerve is more superficial crossing over the facial vessels. In general, any subplatysmal dissection should proceed cautiously over the region of the angle of the mandible to prevent marginal mandibular branch injury.

## 1.3.2 Retaining Ligament Release in SMAS Elevation

Surgeons often describe the SMAS as having two sections: the immobile and mobile portions. The immobile, or fixed, portion lies over the parotid gland and is firmly adherent to it as a result of the adhesions between the superficial and deep fascia that form the parotid cutaneous ligaments. The mobile SMAS lies anterior to the parotid gland, and it is only through mobilization and traction on this mobile SMAS that the desired clinical effect can be achieved. Thus, to be efficacious, an SMAS flap must be elevated until this mobile SMAS is reached. If SMAS plication or SMAS-ectomy is performed, sutures are placed in such a manner that the mobile SMAS is repositioned and anchored to the immobile SMAS.

In designing the incisions for a "high"-SMAS flap, the upper mark is made along a line from the infraorbital rim to a point approximately 1 cm anterior to the superior portion of the tragus, which will place the upper border of the flap over the zygomatic arch and provide an effect on not only the lower cheek and jowl but also the midface and infraorbital region (▶ Fig. 1.7). At this level, the frontal branch remains deep to the SMAS and is safe. The upper mark of the flap is then continued inferiorly over the preauricular portion of the parotid. Inferior to the earlobe, it curves posteriorly to the anterior border of the sternocleidomastoid muscle. Angling the incision posteriorly in this manner moves the incision away from the angle of the mandible and the marginal mandibular nerve, thereby creating a safety zone. Once the initial incisions are made, flap elevation begins over the parotid. In general, undermining should be limited in the lower cheek and more extensive over the zygoma and upper midface, primarily because of the location of retaining ligaments that must be released to obtain adequate traction on the flap. As a result of the dense adhesions between the SMAS and the parotid fascia, elevation of the SMAS over the parotid requires sharp knife or scissor dissection to release the deeper origin of the parotid cutaneous ligaments. These two layers of fascia are quite adherent, making the plane between them often indistinct. At times during SMAS elevation, a portion of the parotid fascia may be incidentally raised, with the SMAS flap exposing part of the lobular surface of the parotid gland. Violating the deep fascia at this point of the dissection is of no clinical significance, as the facial nerve lies safe below the superficial lobe of the gland; however, the surgeon should use this visual aid to adjust the dissection slightly more superficially to preserve the parotid fascia. Once the anterior border of the parotid is reached in the lower cheek, the dissection is past the parotid cutaneous ligaments, and a loose areolar plane is reached. Simple blunt dissection at this point can separate the SMAS–platysma flap above from the masseteric fascia below. Here the deep fascia is seen as a thin, shiny, transparent cover over the masseter muscle, and commonly facial nerve branches can be seen through this layer. Staying on top of this parotid–masseteric fascia is safe; however, great caution must be exercised not to violate this layer at any point because of the close proximity of the facial nerve branches and parotid duct just deep to this layer. As the clinically relevant retaining ligaments have been released at this point in the dissection in the lower cheek and the mobile SMAS is reached, further undermining, although quite simple, is not necessary. Traction on the lower flap easily raises the jowl and perioral tissues. If the dissection is continued anteriorly, no major restraint is encountered until the anterior border of the masseter, where the fibrous septa of the masseteric cutaneous ligaments are encountered. Release of these ligaments lower in the cheek has not seemed to make a significant difference clinically with regard to improved repositioning of the SMAS flap.

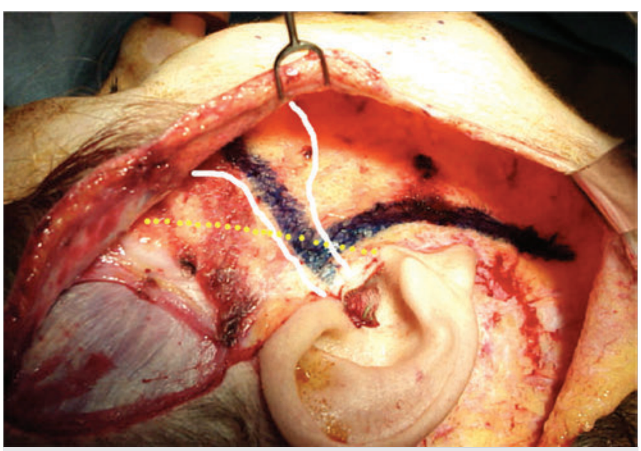

**Fig. 1.7** Design of a high–superficial musculoaponeurotic system (SMAS) flap. The upper border of the flap upper border of the drawn in methylene blue is located over the superior border of the zygomatic arch, which provides an effect on not only the lower cheek and jowl but also the midface and infraorbital region. At this level, the frontal branch *(yellow dots)* remains deep to the SMAS and is safe.

In the malar region, the SMAS is elevated in continuity with the SMAS of the lower cheek. As the dissection is carried medially over the upper parotid and its accessory lobe, the SMAS becomes thin and less apparent as it invests the lip elevators. As mentioned, the safe plane here is superficial to the superior portion of the zygomaticus major muscle because the zygomatic branches of the facial nerve lie deep to this muscle. In thin patients, the muscle fibers may be clearly seen and uncovered; otherwise, it is best to leave some sub-SMAS fat over the muscle. In addition, at the origin of this muscle, the zygomatic ligaments will be encountered. These osteocutaneous ligaments must be released for adequate mobilization of the flap. The lateral ligaments are quite firm and require sharp dissection, whereas the more medial ligaments can often be disrupted bluntly. Once the zygomatic ligaments are released, the dissection continues to the last key area where release is required to obtain proper mobilization. Directly inferior and medial to the origin of the zygomaticus major muscle lies the zone of transition between the zygomatic ligaments and the upper

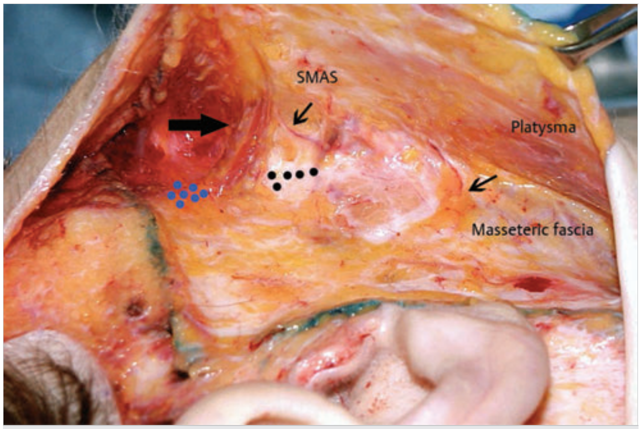


**Fig. 1.8** Completed superficial musculoaponeurotic system (SMAS)–flap elevation. The large arrow points to the zygomaticus major muscle; the small arrows identify facial nerve branches. The locations of released zygomatic ligaments *(blue dots)* and upper masseteric ligaments *(black dots)* are also depicted.

masseteric cutaneous ligaments. This area is also usually the most difficult and dangerous part of the SMAS dissection. There are two reasons for this difficulty: First, the flap is quite thin in this area, which makes it susceptible to perforation. Second, the SMAS is composed mostly of fat in this region, which makes it difficult to delineate a true layer because there is fat both above and below the dissection. As the surgeon is trying to stay deep enough to maintain substance to the flap and release the upper masseteric ligaments, he or she comes dangerously close to the zygomatic branches of the facial nerve. In this region, it can be difficult to determine the difference between masseteric ligaments and nerve branches; however, proper release of the SMAS flap requires at least partial division of the masseteric cutaneous ligaments in this area (▶ Fig. 1.8). Although mobilization requires a detailed knowledge of the defined anatomical retaining ligaments and proper release of these discrete areas of restraint, the end point of the dissection is clinical, not anatomical. The release of retaining ligaments is continued until gentle traction on the flap produces motion at the nasal ala, philtrum, and stomal angle and elevation of infraorbital and lower eyelid tissue. This "traction test" should guide the final portions of the dissection. If the proper clinical effect is not seen, the surgeon continues the dissection, incrementally releasing any tethering fibers of the zygomatic and masseteric ligaments. In summary, the goal of SMAS–flap elevation is to release completely all parotid cutaneous, zygomatic, and upper portions of masseteric ligaments while staying superficial to the parotid–masseteric fascia and superficial layer of mimetic muscles to preserve the facial nerve. Once this immobile SMAS is freed, traction on the flap will easily translate to the mobile SMAS and produce the desired clinical effect, which ultimately determines the end point of the dissection.

## 1.4 Anatomical Considerations in Temple Dissection

During a facelift, the temple region can be managed by using an incision within the temporal scalp or along the sideburn and temple hairline. If a temporal scalp incision is indicated, it is usually carried down through the temporoparietal fascia to the deep temporal fascia overlying the temporalis muscle. This dissection is easy to perform bluntly toward the temporal line of fusion anteriorly and toward the frontal branch inferiorly. In addition, this method of dissection protects hair follicles in the temporal scalp by moving the dissection to a deeper plane. It will create a bridge of tissue called the mesotemporalis that separates the deep dissection in the temple from the subcutaneous dissection in the cheek (▶ Fig. 1.9**a**). Based on knowledge of frontal branch anatomy, it is clear that the mesotemporalis cannot be completely divided because the frontal nerve branches lie within it as they transition from the deep plane to the undersurface of the temporoparietal fascia; however, it can be partially divided up to the temporal hairline, as the course of the frontal branch always lies anterior to the temporal hairline (▶ Fig. 1.9**b**). Another useful landmark is the frontal branch of the superficial temporal artery. This vessel lies within the mesotemporalis, always superior and lateral to the frontal branches. When this vessel is encountered, it is safe to ligate, although further division of the mesotemporalis should stop because the frontal branch will be just anterior to it. Partial division of this

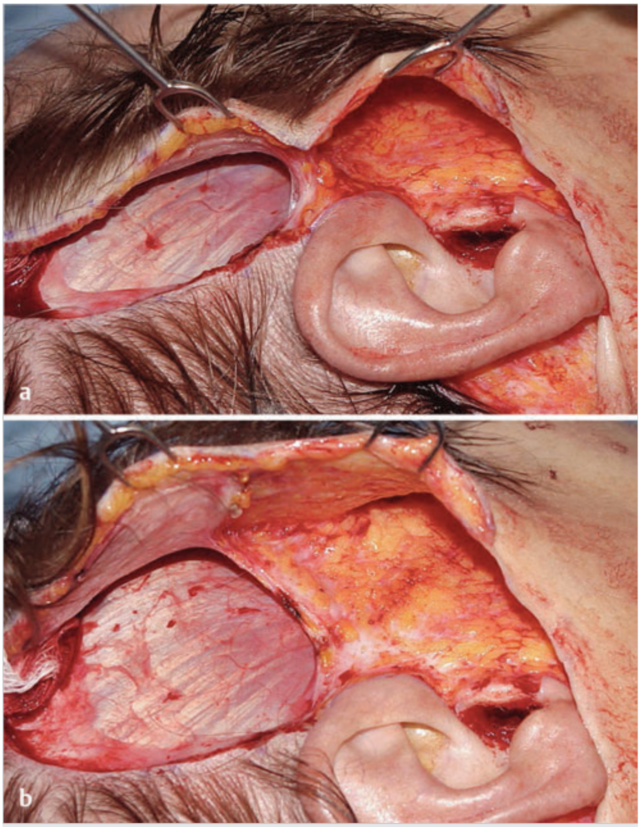


**Fig. 1.9** Mesotemporalis. **(a)** In this patient, one can see the bridge of tissue called the *mesotemporalis*, which separates the deep dissection in the temple from the subcutaneous dissection in the cheek. **(b)** After partial division of the mesotemporalis. On close inspection of the cut edge, one can see the cauterized ends of the anterior branch of the superficial temporal artery. The course of the temporal branch always lies medial and inferior to this vessel.

bridge of tissue allows the two different planes of dissection to be joined laterally, which facilitates exposure for SMAS dissection and redraping of the temporal portion of the facelift flap.

When an incision is planned along the temporal hairline instead of within the temporal scalp, the flap is elevated in the subcutaneous plane and join it with the subcutaneous dissection in the cheek. No transition plane is necessary, and the superficial temporal vessels and temporal branch are safe, below the superficial temporal fascia, deep to the plane of dissection.

## 1.4.1 Retaining Ligaments of the Temple

If a temple lift or lateral browlift is planned in addition to a facelift, one must understand the anatomy of a collection of temporal retaining ligaments (▶ Fig. 1.10). Whether one is planning an open coronal or a closed foreheadplasty, the goal is to raise the descended outer brow and temple while maintaining the position of the medial brow.[12] The lateral brow has multiple attachments that have been given different names and described as different types of structures by many authors.[13,14] These structures have been named *adhesions*, and not true ligaments, as they do not pass as a single structure from the bone or deep fascia to the skin; however, the ultimate effect produced is quite similar. The lateral third of the eyebrow is held in position by the temporal ligamentous adhesion, which extends posteriorly along the temporal crest as the temporal line of fusion, or superior temporal septum. Medially, this adhesion extends toward the supraorbital nerve and forms the supraorbital ligamentous adhesion. Laterally, from the supraorbital rim, the adhesions extend toward the posterior portion of the zygomatic arch in the form of the inferior temporal septum. More directly, at the supraorbital rim, the periorbital septum forms areas of more dense adhesions that assist in brow restraint. As the periorbital septum is traced from the superior to the lateral orbit, it forms an area of increased density called the *lateral brow thickening* of the periorbital septum. As it continues around the outer orbit just above the lateral canthus, it forms the lateral orbital thickening of the periorbital septum. Complete division of the adhesions at the lateral brow is necessary for successful repositioning of the lateral brow. Most important is division of the temporal line of fusion (superior temporal septum), the temporal ligamentous adhesion, the inferior temporal septum, and the periorbital septum of the superior lateral orbit. Care must be taken near the inferior temporal septum because the temporal branches of the facial nerve will be medial and inferior to this structure. This structure separates the temple into two areas. Superior to this septum, there are no vital structures and temple dissection can be carried out quickly and easily. Inferior to this division lie the temporal branches, which will travel parallel to the inferior temporal septum within the undersurface of the temporoparietal fascia. In addition, the sentinel vein and zygomaticotemporal sensory branches travel deep to superficially within the inferior zone. When medial-to-lateral dissection is done near the lateral orbital rim, it is useful to remember that there is a 2-cm "safe zone" lateral to the lateral orbital rim at the level of the zygomatic arch that curves superiorly toward the junction of the superior and lateral orbital rim (▶ Fig. 1.11). Ligaments around the orbit can be safely released in this safe zone without concern regarding injury to the temporal branches. Also, just medial to the temporal line of fusion (superior temporal septum), one must take care to preserve the deep branch of the supraorbital nerve, which lies between the galea and the periosteum and travels from the main trunk of the supraorbital nerve toward the temporal line of fusion. Past the midforehead, it is consistently found 0.5 to 1.5 cm medial to the temporal line of fusion.

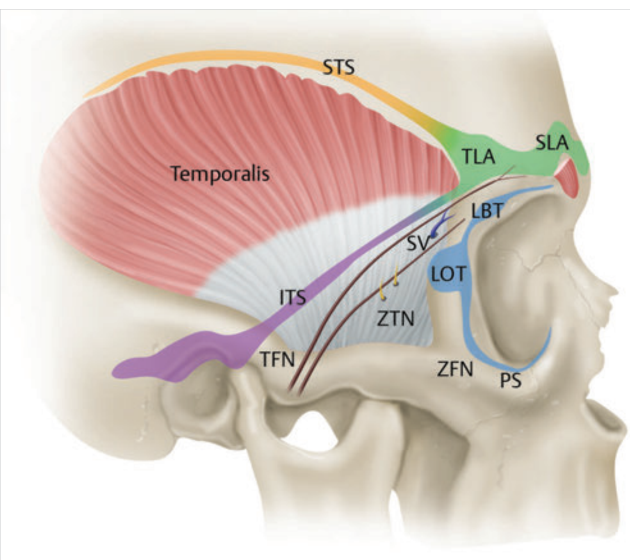


**Fig. 1.10** Illustration of temporal ligaments. ITS, inferior temporal septum; LBT, lateral brow thickening; LOT, lateral orbital thickening; PS, periorbital septum; SLA, supraorbital ligamentous adhesion; STS, superior temporal septum; TFN, temporal branches of the facial nerve; TLA, temporal ligamentous adhesion; ZFN, zygomaticofacial nerve; ZTN, zygomaticotemporal nerve.

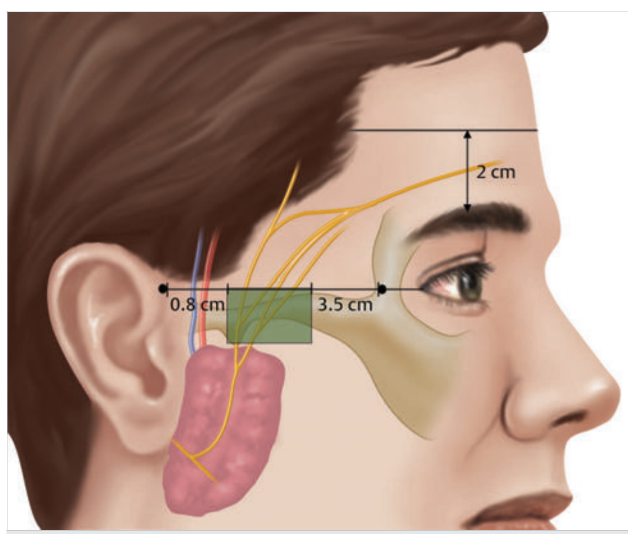


**Fig. 1.11** Safe zone for dissection near the lateral orbital rim.

## 1.5 Anatomical Considerations in Submental Dissection

Traditional neck-lift techniques do not adequately address many aspects of aging in the submental region. In most cases, simply performing preplatysmal lipectomy, with or without postauricular skin excision, is a suboptimal approach to neck rejuvenation. For many patients, subplatysmal fat accumulation, submandibular gland “ptosis,” and digastric muscle hypertrophy play a significant role in the aged appearance of the neck and require additional treatment.[15] The surgeon who intends to address these issues must have a thorough knowledge of the subplatysmal, or deep, plane of the neck. Specifically, this area is anatomically defined as the *submental* and *submandibular triangles* (▶ Fig. 1.12). The three sides of the submental triangle are the right and left anterior belly of the digastric muscle and the hyoid bone. This space contains the subplatysmal fat pad. The sides of the submandibular triangle are defined by the anterior and posterior belly of the digastric muscle and the mandibular border. This space contains the submandibular gland and facial vessels. Exploration of the subplatysmal space is indicated if preoperative assessment suggests the presence of a significant collection of subplatysmal fat, if large digastric muscles are noted, if large submandibular glands are identified, or if uncertainty exists as to the subplatysmal condition.

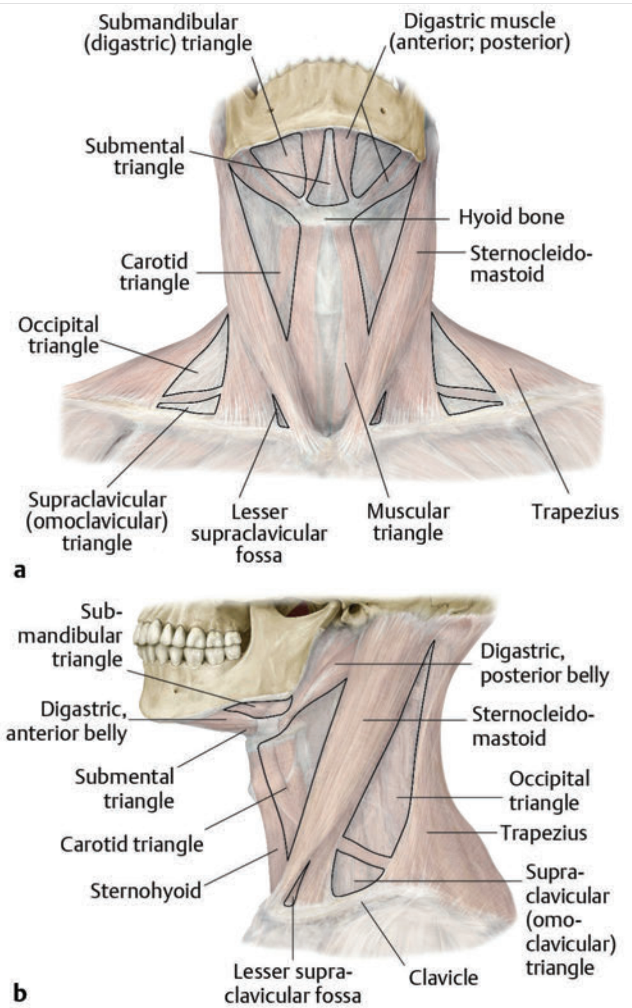


**Fig. 1.12 (a, b)** Submental and submandibular triangles. The three sides of the submental triangle are the right and left anterior belly of the digastric muscle and the hyoid bone. The sides of the submandibular triangle are defined by the anterior and posterior belly of the digastric muscle and the mandibular border. (Reproduced from THIEME Atlas of Anatomy, 2nd ed., General Anatomy and Musculoskeletal System, © Thieme 2005, illustrations by Karl Wesker.)

Cervical exploration begins with the submental skin incision. The skin flap is elevated in the subcutaneous plane, taking care to leave most of the preplatysmal fat on the platysma surface, which makes fat excision and sculpting easier later in the procedure, if required, and precludes the need for difficult and tedious excision of fat from the undersurface of the cervical skin flap. Unlike dissection of the cheek-skin flap, however, in which a conscious effort must be made to prevent the flap from becoming too thick, a slightly deeper dissection should be made in the neck to preserve a thicker layer of subcutaneous fat. Preservation of a thicker layer of fat on the skin flap helps to avoid a hard or overresected appearance in the cervicosubmental area and objectionable overexposure of underlying neck anatomy. Once skin–flap elevation is complete, the subplatysmal dissection is performed. The subplatysmal space is entered by incising the superficially situated fascia between the medial platysma muscle borders. This fascia is continuous with the superficial fascia in the face. A combination of blunt and sharp scissors technique is used to isolate each muscle edge. The muscle edge is then grasped and the dissection carried laterally, over the anterior belly of the digastric muscle hugging the underside of the platysma. If this dissection is carefully made, a well-defined, relatively avascular plane can usually be identified. Small communicating vessels are not infrequently encountered, however, especially near the medial muscle borders, and these should be carefully fulgurated and divided as required. Once the platysma has been raised, the deep space of the neck can be examined and modified as necessary.

### 1.5.1 Subplatysmal Fat

The key to obtaining an optimal result in the neck lies in understanding the specific distribution of fat in the submental region. Cervical fat is present in three distinct anatomical layers: preplatysmal, subplatysmal, and deep cervicosubmuscular (“interdigastric”). In almost all cases, cervical lipectomy should be limited to the two more superficially situated locations.

In most patients undergoing neck rejuvenation, most cervical fat accumulation is present in a subplatysmal location, and little, if any, fat needs to be removed from the preplatysmal layer. Experience has shown that as patients age, fat stores generally shift from a preplatysmal to a subplatysmal location. For the typical patient undergoing a neck lift, the small amount of subcutaneous fat present must be preserved to maintain a soft, youthful, and attractive appearance.

The plane tangent to the anterior bellies of the digastric muscles should be used as a landmark for submental fat removal. Theoretically, all fat lying superficial to this plane should be removed if optimal contour is to be obtained. As a practical

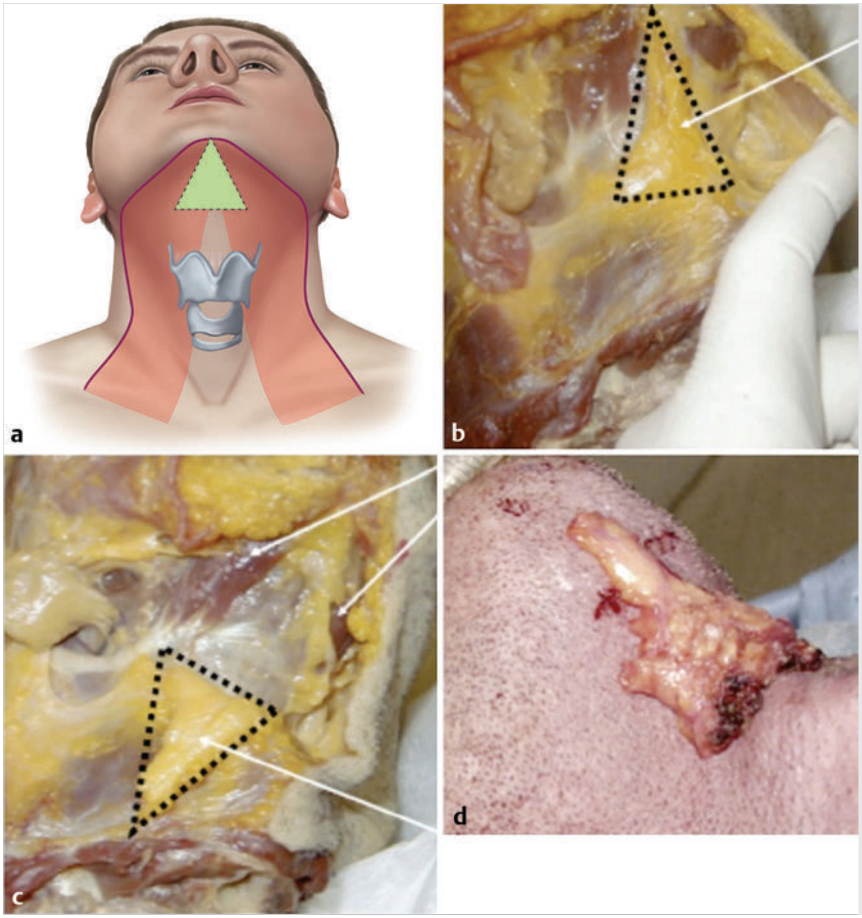


**Fig. 1.13** Submental fat. **(a)** Illustration of the triangle-shaped submental fat pad with its tip near the mentum and its base at the hyoid bone. **(b)** Cadaveric demonstration of the submental fat. The arrow is pointing to the submental fat, which is outlined by the dotted line. The platysma muscle has been removed on the right side and the intact platysma is being retracted on the left side by a gloved finger. **(c)** Cadaveric demonstration of the submental fat. The two upper arrows point to the anterior bellies of the digastric muscles. The lower arrow points to the submental fat that has been reflected inferiorly but is still attached to its base. The hyoid bone is now visible along the interdigastric space. There is still a small amount of deep cervical fat visible between the two upper arrows. **(d)** Intraoperative demonstration of the subplatysmal fat specimen lying over the submental space from which it was removed. The patient's chin is pointing superiorly with the neck to the right of the photo.

matter, however, overall neck contour must be considered because it is the curvilinear plane across the submental region tangent to the borders of the mandible and the anterior bellies of the digastric muscles that ultimately determine attractive neck contour. If large submandibular glands or anterior bellies of the digastric muscles are present but not addressed, submental fat removal should be more conservative if accentuation of these problems is to be avoided. Fibrous fat in the prehyoid region also should not be arbitrarily removed, especially in women, as accentuation and masculinization of the larynx can occur. If prominent submandibular glands and digastric muscles are appropriately treated, however, more aggressive resection of submental fat can be done.

Centrally situated subplatysmal fat will be evident as a triangle-shaped fat pad with its base lying at the hyoid, and tip near the mentum (▶ Fig. 1.13). Submental fat should be removed incrementally, as appropriate, and as determined by the position and size of the digastric muscles and the size of the submandibular glands. Fat removal should not be arbitrary, and close attention must be paid to the new contours that are created. Submental fat excision often results in division of tributaries of small pretracheal vessels; a long, shielded cautery forceps and good suction should be available to obtain adequate hemostasis when required. Fat situated deep to the plane tangent to the anterior bellies of the digastric muscles and beneath the deep cervical fascia (deep cervical or “interdigastric” fat) should rarely be removed.

## 1.5.2 Submandibular Glands

Preoperatively, it is important for the surgeon to evaluate the submandibular glands because these glands often contribute to the appearance of a full, “obtuse,” or “lumpy” neck. Submandibular glands are usually palpable as firm, well-circumscribed, mobile masses in the lateral submandibular triangle. They lie lateral to the anterior belly of the digastric muscle and medial to the ipsilateral mandibular border. Submandibular glands lying superior to a plane tangent to the inferior border of the mandible and the ipsilateral anterior belly of the digastric muscle do *not* disrupt neck contour and usually do *not* require treatment; however, glands that protrude *inferior* to this plane are likely to be problematic and warrant treatment if excess cervical fat is removed, the platysma muscle is tightened, and redundant skin is excised. The prominent submandibular gland is encountered as a subplatysmal dissection is carried lateral to the anterior belly of the digastric muscle (▶ Fig. 1.14). The prominent gland appears as a smooth pink to tan mass covered by a smooth capsule. Reduction begins with incision of the capsule overlying the gland inferomedially, just lateral to the anterior belly of the digastric muscle.

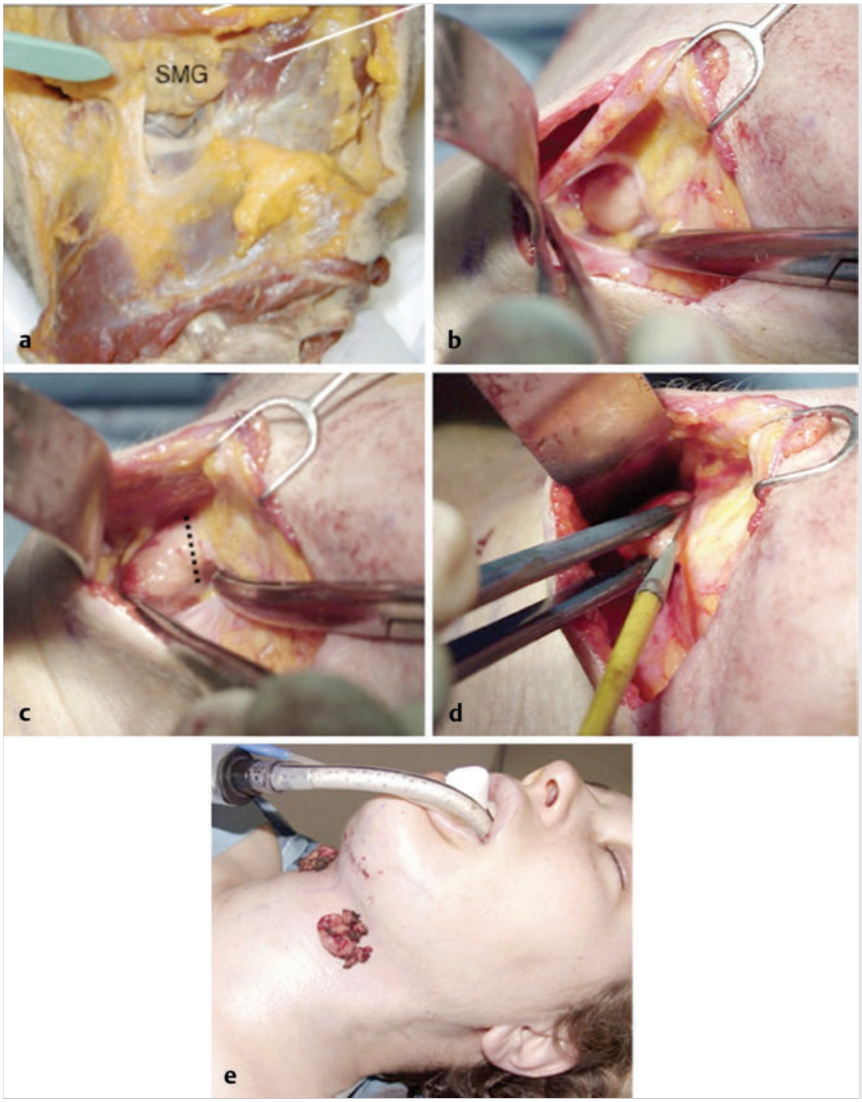


**Fig. 1.14** Surgical approach to submandibular gland reduction. **(a)** Cadaveric demonstration of submandibular triangle. The excessive portion of the submandibular gland (SMG) is found protruding inferiorly to a plane tangent to the digastric *(lower arrow)* and the mandibular border *(small upper arrow)*. **(b)** Intraoperative photo demonstrating exposure of the SMG. A submental incision has been made approximately 1 cm posterior to the submental crease, and the neck has been undermined subcutaneously. The right platysma muscle has been elevated and is retracted with a double-pronged skin hook and a malleable retractor. The gland will be seen as a distinct bulge just lateral to the ipsilateral anterior belly of the digastric (scissors tips rest on the digastric). The capsule has been incised inferiorly and medially, and the submandibular gland has been isolated using blunt dissection. **(c)** Intraoperative photo before resection of the excess portion of the gland. The gland has been mobilized and gently pulled inferiorly. The dotted line represents the level at which the inferior portion of the gland will be excised. **(d)** Intraoperative photo just before partial gland excision, which should be performed in such a manner that the portion protruding inferior to the plane tangent to the ipsilateral anterior belly of the digastric muscle and the ipsilateral mandibular border will be resected incrementally with electrocautery. **(e)** Intraoperative demonstration of submandibular gland specimens laying over the submandibular space from where they were removed.

The submandibular gland becomes evident once it is exposed in this manner because of its distinctive lobulated appearance. Its inferior portion can be grasped and easily separated from adjacent tissue inside its capsule using a gentle blunt-scissors spreading technique. Although all vital structures are outside the glandular capsule, care should be taken when mobilizing the gland superolaterally, as both the retromandibular vein and the marginal mandibular branch of the facial nerve are in close proximity in that area. Also, during excision of the excess portion of the gland, intraglandular vessels may be encountered; these can produce significant bleeding that must be controlled.

## 1.5.3 Digastric Muscles

A small subgroup of patients have an anterior belly of the digastric muscles that is large and bulky. This scenario is seen as linear paramedian submental fullness. Large anterior bellies of the digastric muscles are most easily seen in secondary facelift patients who have had prior aggressive cervicosubmental lipectomy. Excess submental fat or lax platysma muscle frequently hides large muscles in the patient undergoing primary procedures, and failure to identify these muscles may lead to unexpected and objectionable submental bulges postoperatively. In these patients, subtotal superficial digastric myectomy should be considered (▶ Fig. 1.15). The final decision as to whether to perform partial digastric muscle resection is best deferred until the day of surgery, when the improvement produced by other modifications of the submental region can be evaluated. A tangential excision of the anterior belly of the digastric muscle is performed under direct vision through the submental incision after the subplatysmal space has been opened, the platysma muscle mobilized, and subplatysmal fat and protruding portions of the submandibular gland resected, if indicated. The redundant portion of muscle is gauged and isolated on a tonsil forceps by pushing the tips of the instrument through the muscle belly. The isolated segment is then excised with scissors or cautery by dividing the muscle near the mandible and the hyoid. The neck is reexamined, and the maneuver should be repeated until an improved contour is obtained, usually entailing excision of the superficialmost half to three-quarters of each muscle.

**Fig. 1.15** Prominent anterior belly of the digastric muscle. The patient has had a prior facelift and neck lift. The anterior belly of the digastric muscle can be seen as objectionable linear paramedian fullness in the submental region that spoils an otherwise good result. Prominent digastric muscles often go unnoticed at the time of the primary procedure because they are frequently hidden by cervical fat and lax platysma muscle.

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# 2 Facial Analysis for Facelifting

*Michael J. Sundine and Bruce F. Connell*

It is a fundamental principle in surgery that surgeons must address the issues facing the patient before treatment. Therefore, in treating the patient who shows facial aging, a comprehensive analysis must be performed to ensure that as many of the patient's concerns as possible are addressed.

It is particularly important that the rejuvenation procedure be tailored to the individual needs of the patient. Many surgeons are interested in a "cookbook recipe" for a procedure rather than an individualized approach to each patient's particular needs. Such a "cookbook" approach will lead to suboptimal results in many cases.

Obviously, it is most important to listen to the patient's concerns about his or her appearance. Most commonly, these concerns center on the appearance of the eyes and neck. We ask patients to bring in photographs of themselves when they were 15 years younger and they felt they looked good. These photographs can serve as a goal for the rejuvenation procedure and also demonstrate nicely the aging changes the procedure will address.

A careful medical history, including a detailed surgical history, is essential. It is important to obtain a complete list of prescription medications as well as over-the-counter medications that can cause bleeding during a procedure. Ask the patient about the use of nonprescription herbal medications that might also cause bleeding or anesthesia issues and about any known allergies. The patient's history of smoking and of alcohol or illicit drug use is important because these substances could cause problems with flap viability or difficulties with anesthesia.

We begin first with a general assessment of the patient's facial features and then with a review of all the findings from the facial analysis with the patient so that he or she can gain a detailed understanding of the procedures and any possible limitations to the procedures based on the examination. Assessment of the patient's skin tone and the amount of actinic damage present in the skin is essential because patients who have significant actinic damage have reduced elasticity to their skin and are more prone to an earlier relapse of their aging changes because of this reduced elasticity; this susceptibility should be explained to the patient.[1] Other factors that lead to reduced elasticity of the skin include human immunodeficiency virus, or HIV, medications, corticosteroids, and a history of significant weight loss. Patients affected by any of these factors should understand that they may require an early secondary procedure.

The next assessment is that of the overall appearance of the face. In "attractive" faces, the facial thirds are generally balanced from menton to subnasale, subnasale to glabella, and glabella to hairline (trichion).[2] All patients have some degree of asymmetry to their faces: a wide side and a narrow side, one eye larger than the other eye, or the orbit on one side slightly higher. Other asymmetries may be present: eyebrow position, the nose, and the jaws (▶ Fig. 2.1). These differences should be pointed out to the patient, along with the fact that all attractive faces are asymmetrical. Some asymmetries may be improved upon by surgery, but attempts to make the face completely symmetrical may actually result in an unnatural, strange effect.

In the event the patient decides to have a secondary facelift, it is essential to note any scars, both their location and their quality. The hairline needs to be carefully assessed to determine whether it has been displaced. When the hairline has already been displaced, the temporal incision will need to be made at the hairline to prevent further cephalic displacement of the hairline and a distorted appearance.

Appraisal of the hairline begins with the height of the forehead from the top of the eyebrows to the hairline. This information is important in determining the site and configuration of the incision if an open browlift is being considered. The hairline is evaluated for temporal recessions. The temporal hairline is evaluated for the distance from the lateral canthus as well as

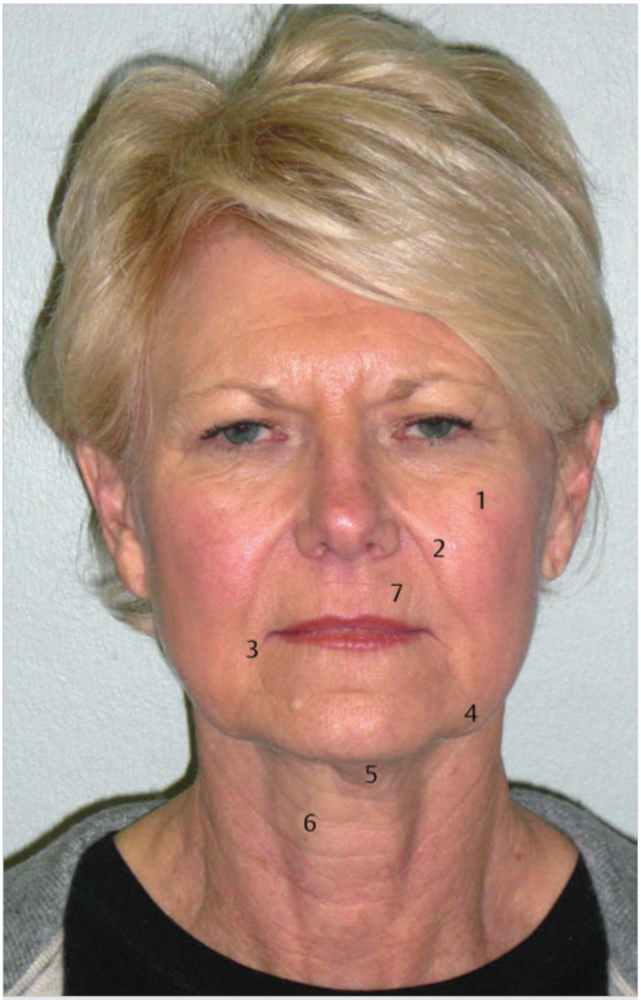


**Fig. 2.1** Patient with aging changes of her forehead, face, and neck. Note the asymmetries that are naturally present in the face. The left side of her face is narrow and longer and the right side is wide and shorter. Her right orbit is larger, and the right orbit is lower than that the left orbit. The right ear is lower than the left ear. Aging changes include (1) ptosis of the cheek pad, (2) deepening of the nasolabial crease with heaviness of the nasolabial fold, (3) marionette lines and fold, (4) jowl formation, (5) platysmal bands, and (6) cervical skin laxity.

the direction of hair growth. The distance of the temporal hairline in a youthful-appearing patient is typically about three fingerbreadths (4.5 cm) from the lateral canthus. The color of the scalp skin is compared with the color of the facial skin in the temple area. Patients who have different-colored temporal skin and scalp skin may see a color change at the junction of the scalp skin and temporal skin when an incision is placed at the temporal hairline. When the temporal hair grows anteriorly or downward, the junction will be hidden by the hair. Hair that grows posteriorly reveals the junction of the temporal and scalp skin. These patients may require a few hair transplants into the area of the scar to hide the junction.

The next area to be examined is the eyebrows and forehead. The forehead is inspected for transverse rhytids related to frontalis muscle action. The glabella is inspected for vertical creases related to corrugator superciliaris muscle action, and the nasofrontal angle is examined for transverse nasal creases related to procerus and depressor superciliaris muscle action.

The aesthetic relationships of the brow are described by Westmore.[3] In women, the medial aspect of the brow begins in a line perpendicular to the lateral aspect of the nasal ala. The brow forms a gentle arch above the supraorbital rim peaking at the junction of the medial two-thirds with the lateral one-third. The lateral eyebrow ends on an oblique line extending from the lateral aspect of the nasal ala through the lateral canthus. The lateral aspect of the brow ends at approximately the same level as the medial brow. The apex of the eyebrow lies perpendicular to the lateral limbus. In men, the eyebrow has less of an arch and lies at the level of the supraorbital rim. When the lateral part of the eyebrow is depressed, it causes a sad and tired look in the patient. If the medial end of the eyebrow is depressed relative to the lateral brow, the result is an annoyed or angry look.

We begin with the patient sitting in the upright position. Using an eyebrow pencil, the position of the eyebrow at rest is marked in the medial, central, and lateral brow relative to the orbital rim. The patient is given a mirror, and the eyebrow is then placed into a position that is pleasing to the patient; marks are made again in the medial, central, and lateral brow relative to the orbital rim. The distances between the points are then measured and recorded.

Attention is next directed to the upper eyelids. The eyebrow is elevated to the previously marked position that creates a pleasing appearance. The upper eyelids are then inspected for excess sagging skin and the presence of herniated fat in the medial and central compartments. The position of the lower edge or margin of the upper eyelid relative to the upper edge of the iris reveals the presence of any upper eyelid ptosis.

Next the lower eyelids are assessed for tone using a snapback test or lower lid distraction test.[4] The superficial musculoaponeurotic system (SMAS) will give support to the lower eyelid. If a lower eyelid blepharoplasty is planned at the same time as the facelift procedure, consideration should be given to a lower eyelid tightening procedure for patients with poor lower eyelid tone. The amount of the herniation of the lower eyelid fat pads should be assessed.

Evaluation of crow's feet is made along with that of the upper and lower eyelids. Crow's feet can be released and improved at the time of the facelift procedure by undermining the skin over the orbicularis oculi muscles up to the lateral canthus. Use a finger to stabilize the lateral brow, and ask the patient to smile. A muscle band may be seen running inferiorly from the lateral brow down along the lateral orbital rim (▶ Fig. 2.2). Connell and Marten describe this muscle band as the depressor orbicularis lateralis.[5] The muscle segment is a powerful depressor of the brow and may lead to recurrent lateral eyebrow ptosis if it is not addressed at the time of the facelift. If a muscle band occurs with animation, it is important to divide the muscle obliquely along the lines of the crow's feet creases.

**Fig. 2.2** Patient with strong crow's feet. The vertical band showing the depressor orbicularis lateralis has been marked. Failure to address this muscle at the time of the facelift and neck lift will result in recurrent ptosis of the lateral brow.

The amount of skin excess of the face is then measured in several locations. The amount of skin laxity is crucial in determining the placement of the incisions, especially in the temporal area. To measure skin laxity, an amount of skin is pinched together that re-creates the effect desired with the facelift, and the amount of skin between the fingers is measured. Then the skin is allowed to relax, and the amount is measured. The pinched skin measurement is then subtracted from the relaxed skin measurement, which determines the amount of skin excess.

The amount of skin excess in the face is measured in the temporal area (▶ Fig. 2.3), anterior to the tragus (▶ Fig. 2.4), and anterior to the earlobe (▶ Fig. 2.5). A similar measurement is made in the vertical dimension in the cheeks (▶ Fig. 2.6). Finally, skin pinches are made on one-half of the side of the neck and then in the midline to assess laxity across the entire neck (▶ Fig. 2.7).

The use of skin pinches is crucial in determining the appropriate placement of the skin incisions. Patients who have a low sideburn and those with little skin laxity in the temple area and the upper cheek are good candidates for the temporal component of the facelift incision placed into the temporal hair.

Patients who naturally have a high sideburn or those with significant laxity in the temporal skin are better candidates for an incision placed at the temporal hairline. Another group of patients who frequently require an incision at the temporal

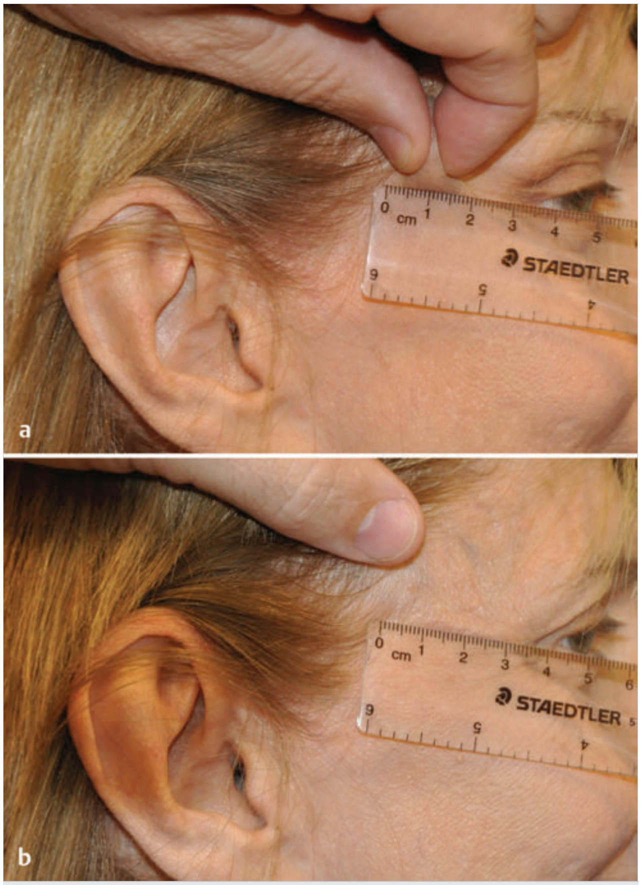


**Fig. 2.3** Assessment of skin laxity in the temporal area. **(a)** The skin is pinched together, and the amount of skin within the pinched area is measured. **(b)** The skin is then allowed to relax, and the amount of skin is measured. The pinched amount is then subtracted from the relaxed amount to determine the amount of skin laxity.

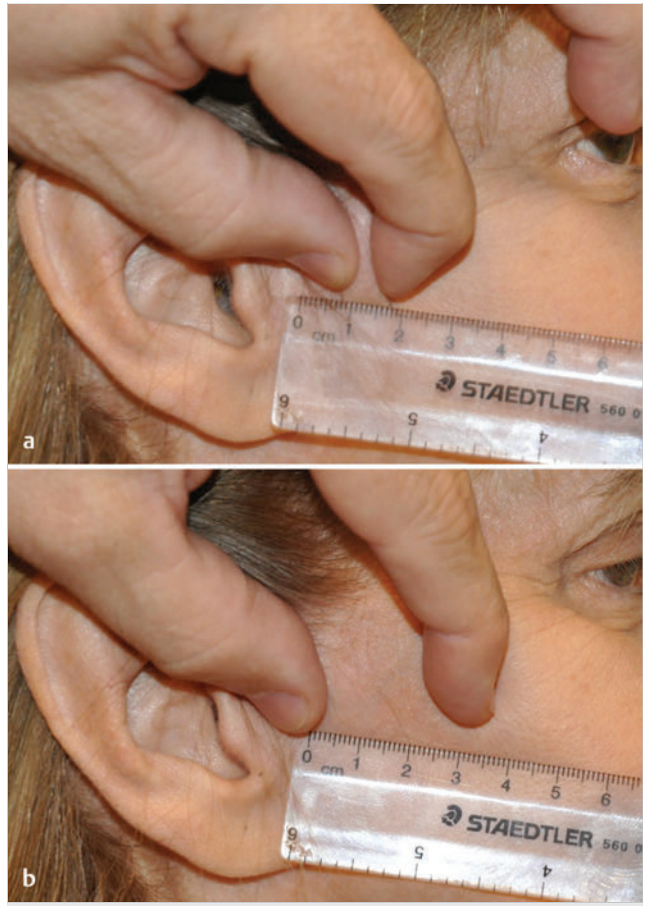


**Fig. 2.4** Assessment of skin laxity anterior to the tragus. **(a)** The skin is in the pinched position. **(b)** The skin is in the relaxed position.

hairline are those who need a secondary facelift. Secondary facelift patients frequently already have an elevated sideburn and widened distance between the lateral canthus and the temporal hairline. If the temporal element of the facelift incision is made into the hair in these patients, the distance of the hairline from the lateral canthus will be widened even more, and the sideburn will be elevated further. The result is the patient having a very unnatural and aged appearance. Instead of looking younger from the procedure, the patients actually look older.

The amount of skin available in the preauricular area is important, especially in the secondary facelift patient, whose skin shift is much more vertical than posterior. Thus, a patient who has had a previous facelift performed using a preauricular incision may not have enough skin laxity to allow for the scars being placed more posteriorly along the margin of the tragus.

Similarly, the amount of skin laxity and skin shift in the neck is critically important in planning the incision in the occipital area. When there is significant neck skin laxity and the incision is made into the occipital hair, there will be a shift of non-hair-bearing skin into the occipital and postauricular scalp because hair-bearing skin will be discarded to take up the laxity of the neck skin. It is for this reason that we typically place the incision in an S-shaped fashion along the occipital hairline.

The central face is then inspected. The main vector of aging is directed anteriorly and inferiorly.[6] The results are the characteristic changes seen in the aging face. In the malar areas, there is ptosis of the soft tissues off of the malar eminences. There is characteristically an edematous area over the malar eminences above the orbital septum. This area is pointed out to the patient and measured. The area may be improved with a facelift, but some residual fullness may remain after the surgery, and it is important to document this for the patient.

The inferior and anterior vectors of aging also lead to a deepening of the nasolabial creases. Traction on the SMAS in a posterior and superior direction will result in a flattening of the nasolabial fold and lessening in the depth of the nasolabial crease.[7] Additional techniques that may improve the nasolabial creases include fat transfer directly under the crease; in rare circumstances, a direct excision of the nasolabial crease may be indicated.

Patients may also develop downturned corners of their mouths. Women may complain that their lipstick will run out of the corners of the mouth and feel that they constantly have to dab at the corners with a tissue. Elevation and fixation of the SMAS in a posterior and superior direction can elevate the corners of the mouth without having to excise a triangle of skin, as described by Weston and colleagues.[8]

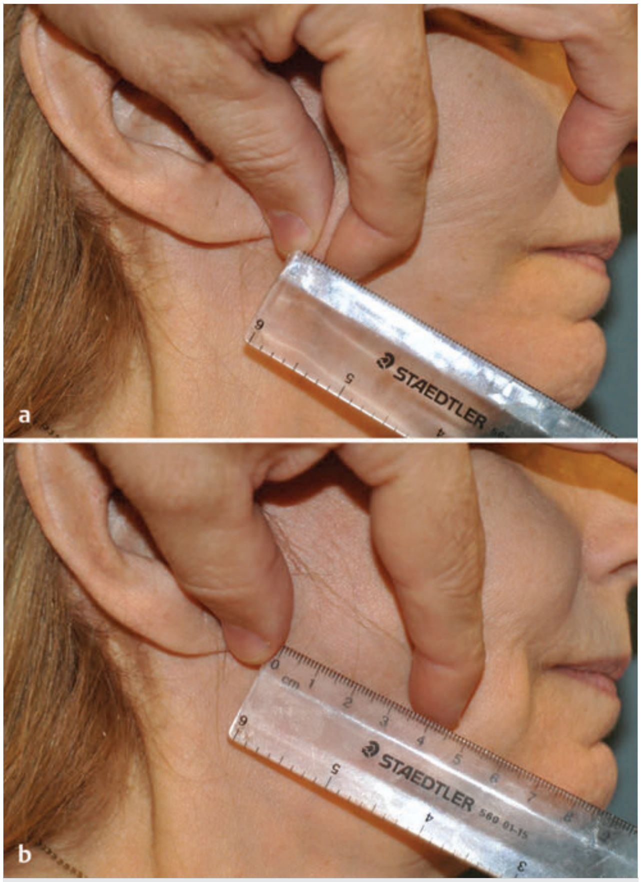


**Fig. 2.5** Assessment of skin laxity anterior to ear lobule. **(a)** The skin is in the pinched position. **(b)** The skin in the relaxed position.

Further inspection of the central face may demonstrate the presence of "marionette lines" and the presence of jowls. Just as the nasolabial fold can be flattened with elevation of the SMAS, the fold of skin and fat creating the marionette lines can be flattened, with resulting effacement of the marionette lines. The jowl can also be improved by releasing the mandibular ligaments along with traction on the SMAS to place the jowl back up into the cheek.

The mouth and chin areas are then examined for the presence of smoker's lines around the lips. The lips are also inspected for lip ptosis, which may require a lip lift. Finally, the red lip is inspected for atrophy and thinning that may require some sort of augmentation.

Attention is next directed to the neck. The overall shape of the neck is observed. The cervicomental angle is analyzed to determine whether the neckline is defined or obtuse. There are many potential causes of the obtuse neck. The hyoid position may be low, which may result in a poorly defined cervicomental angle. There may be an abundance of adipose tissue in the neck, leading to poor definition of the neck. It is important to determine the location of this fat, whether it is supraplatysmal or subplatysmal. Finally, the platysma muscle may be tight and tenting from the mandible down to the base of the neck, which leads to a poorly defined cervicomental angle.

When the general skin tone is observed, the presence of transverse skin creases with dermal and platysmal muscle

**Fig. 2.6** Vertical skin laxity assessment.

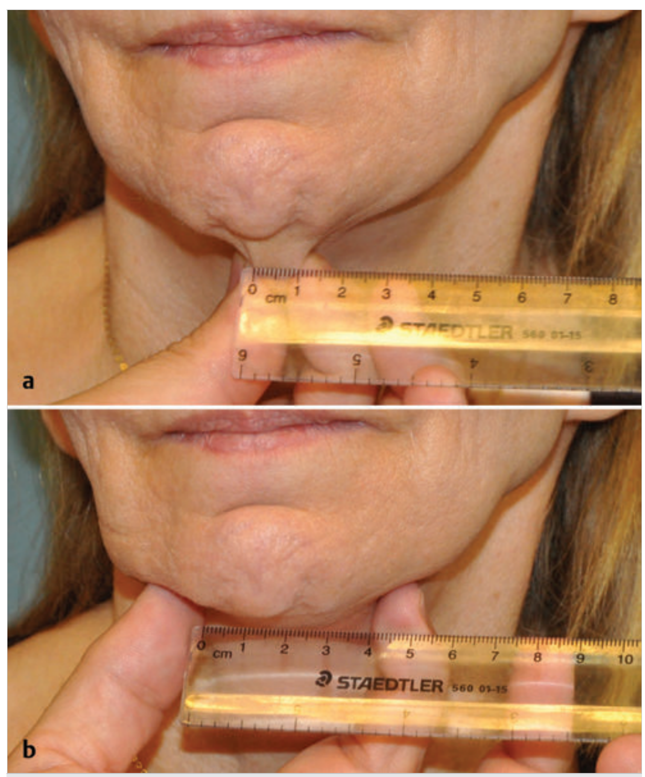


**Fig. 2.7** Assessment of full neck skin laxity. **(a)** The skin is in the pinched position. **(b)** The skin is in the relaxed position.

defects is noted. Generally, the level of undermining of the skin in the neck is below the lowest dermal–deficiency crease. If loose, crepe paper like skin is noted in the central neck, it is measured. This area generally improves with the facelift and neck lift, but this problem can return over time, and the patient needs to be advised of this possibility.

Further examination of the neck notes the presence and location of platysmal bands, including an assessment of the tone of the bands, which helps to determine the need (or not) for transection of the platysma. The patient is asked to grimace while the neck is inspected, a maneuver that helps to determine whether the fat is above or below the platysma muscle.

Palpation of the neck is then performed, including the position of the hyoid bone, and the position is noted. The size and position of the submandibular glands and the position of the cricoid cartilage are then recorded. An assessment is made regarding the size of the digastric muscles. In a thin neck, the muscle can be observed on the lateral view defining the lower border of the submandibular triangle. In the obtuse neck, the digastric muscle may contribute to the poorly defined neck, and a tangential excision may be necessary, along with supraplatysmal and subplatysmal lipectomies, to achieve a refined neckline.

Using a comprehensive checklist makes it possible to achieve excellent results in facial rejuvenation procedures.

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# 3 Analysis of the Neck

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## 3.1 Introduction

Proper assessment is the first step and one of the most important steps in the planning of any plastic surgery procedure. The desired cosmetic outcome can be achieved only if a proper history is taken and a physical examination is performed before undertaking any treatment. Lack of understanding and appreciation of the issues faced is a frequent cause of complications and undesirable results.[1]

## 3.2 Patient's Concerns

The first step is always to inquire about the patient's concerns, needs, and desires. The neck can relay an image of youth, fitness, strength, and vitality or one of age, obesity, weakness, or illness. These perceptions affect how we see ourselves and how we view others. It is important to explore the patient's motivation for seeking surgery, as well as the anticipated cosmetic and emotional outcomes. The patient's concerns should be the priority, and these concerns must be specifically addressed. The surgeon should discuss additional related problems and explain their relevance to the patient. Educating the patient and allowing him or her to participate in the process is empowering and allows the treatment plan to suit the patient's needs. This approach is most likely to lead to the best outcome for that individual patient.

Evaluating photographs of the patient at a younger age may help reveal relevant anatomy camouflaged by the signs of aging and can also help establish a goal for the anticipated rejuvenation procedure. Photographs of others whose features are considered desirable by the patient can also serve as a great communication tool, giving the surgeon better insight into the patient's sense of aesthetics and expectations from the contemplated procedure.

## 3.3 Medical History

A thorough medical history should be taken, including the patient's general health and an assessment of anesthetic risk. A history of risk factors for intraoperative bleeding, as well as difficulties healing after any surgical procedure, may influence the treatment choice significantly. History of hypertrophic scars or keloids should be noted. Smoking may lead to major healing problems, especially in a neck lift, and accurate history should be emphasized to the patient.

Prior surgical cosmetic procedures to the face and neck, such as mandibular surgery, chin augmentation, submental liposuction, plication of the platysma, or neck lift, may influence the procedure choice and technique. A history of head and neck tumors, radiation, or skin cancers is also of great importance and should not be overlooked.

## 3.4 Congenital Disorders of the Skin

The surgeon needs to be aware of certain rare congenital disorders of the skin. Cutis hyperelastica (Ehlers-Danlos syndrome) is characterized by very thin, friable skin that can be stretched an inordinate amount but retracts to normal thereafter. Hypermobile joints and subcutaneous hemorrhages may be seen in patients with this disorder. Because of the high risk for poor wound healing, as well as bleeding, most procedures of the neck are to be avoided. In cutis laxa, the skin lacks elasticity and does not recoil; however, it heals normally. Rhytidectomy can be rather beneficial to these patients, without a significant risk. Pseudoxanthoma elasticum is quite similar to cutis laxa and is differentiated by skin biopsy; rhytidectomy is also frequently beneficial for patients with this condition. Progeria (Hutchinson-Gilford syndrome) patients have multiple severe problems and a short life expectancy; therefore, plastic surgery is not a consideration. Adult progeria (Werner's syndrome) is extremely rare and is characterized by scleroderma-like scattered patches, baldness, skin pigment irregularities, and facial aging. Patients may have short stature, a high-pitched voice, cataracts, muscle atrophy, atherosclerosis, diabetes mellitus, and various tumors. Elective surgery is not recommended.

## 3.5 Aesthetic Evaluation of the Neck

The first impression of examination should always be remembered and should be an important factor in developing a treatment plan. The features that distort the harmony of the face and neck and stand out should always receive the most attention. Balance and harmony of the face and neck must be a priority over minor imperfections. Whatever distracts and is noticed by the surgeon before the detailed evaluation is likely to evoke the same response in most other people.

The neck should never be evaluated in isolation; rather, its relationship to the shoulders, and especially to the face, needs to be considered. It is crucial to maintain, or create if necessary, appropriate proportions between the neck and the face. They are seen together and influence each other's appearance tremendously. The level of rejuvenation planned for the face and the neck should also match, and they should look like they belong together and to the same body.

### 3.5.1 What Is a Youthful Neck?

Before looking at the specific features and details during examination, it is important to define what is generally considered a youthful and attractive neck. These features were well described by Ellenbogen and Karlin (▶ Fig. 3.1)[2]:

1. Well-defined inferior mandibular border
2. Subhyoid depression