11.1

Facelift: Principles

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SYNOPSIS

- Age-related changes occur in all layers of the face, including skin, superficial fat, SMAS, deep fat, and bone.
- Patients presenting for facial rejuvenation surgery are usually middle aged or older, thus increasing the chance of underlying medical problems. Risk factors such as hypertension and smoking should be dealt with prior to facelift surgery.
- A careful preoperative assessment will provide the surgeon with an aesthetic diagnosis regarding the underlying facial shape, the age related issues which predominate and the appropriate surgical procedures for every individual patient.
- Almost all facelift techniques begin with a subcutaneous facelift flap. Careful incision placement, tissue handling, and flap repositioning are important in order to avoid the obvious stigmata of facelift surgery.
- Volume augmentation, and in some locations volume reduction, should be considered in all cases of facelift surgery.
- Facial aging is usually a pan-facial phenomenon. Therefore, in order to obtain a harmonious result, patients will often benefit from surgery to other components of their face.
- The most common complication of facelift surgery is hematoma. This problem should be dealt with promptly.

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Introduction

A complete discussion of facial rejuvenation would involve the periorbital region, forehead, cheek, neck, and perioral region. (The periorbital zone is reviewed in Chapter 8 and the forehead in Chapter 7.) In this chapter, we will be dealing with the middle and lower thirds of the face – the cheek and neck. Terminology for procedures which address these areas include rhytidectomy, rhytidoplasty, meloplasty and

facialplasty, although in this text, the more common term, "facelift" will be used.

Facelift surgery was originally conceived as a method of placing traction on the aging face by excising skin in the periphery of the face and closing the resulting defect under tension. Since that simple beginning over 100 years ago, the procedure has evolved to encompass a wide range of techniques which lift, augment, and rearrange facial tissues in an attempt to rejuvenate the aging face.

Despite the development of many less invasive technologies, nothing can match a facelift in its ability to globally treat the face, returning its basic architecture to a more youthful configuration.

Anatomy and patient presentation

The classic stigmata of the aging face include:
- Visible changes in skin, including folds, wrinkles, dyschromias, dryness and thinning
- Folds in the skin and subcutaneous tissue created by chronic muscle contraction: glabellar frown lines, transverse forehead lines, and crow's feet over the lateral orbital rim.
- Deepening folds between adjoining anatomic units: the nasojugular fold (tear trough), nasolabial folds, marionette lines and submental crease
- Ptosis of soft tissue, particularly in the lower cheek, jowls and neck
- Loss of volume in the upper two-thirds of the face which creates hollowing of the temple, the lateral cheek and the central cheek. The result is a more skeletal appearance in the temple, the periorbita and the malar region
- Expansion of volume in the neck and lateral jaw line which leads to the formation of jowls and fullness of the neck *(Fig. 11.1.1)*.

The driving force behind our ability to explain these many changes has been an improved understanding of facial anatomy and the way this anatomy changes over time. Aging

History

Facelift surgery dates from the early part of the 20th century. Its colorful history has been thoroughly reviewed by Stuzin,[1] whose summary is reproduced here.

In the past, the history of aesthetic facial surgery has been reported by a number of authors, including: Rogers,[2,3] Rees and Wood-Smith,[4] Gonzalez-Ulloa,[5] Rees[6] and Barton.[7,8]

There is still doubt as to who performed the first facelift, but most sources date it to the first decade of the 20th century.[3,9,10] According to Rogers,[3] Hollander[11] reported in a chapter entitled "Cosmetic Surgery" in *Handbuch der Kosmetik* that "as a victim of the art of feminine persuasion," he removed pieces of skin at the margins of the hairline and in the natural aging skinfolds of a woman to freshen up "her wrinkles and drooping cheeks". In this chapter, Hollander did not date the procedure, but in 1932 he stated that his original procedure had been performed in 1901 for a Polish aristocrat.[12] Lexer,[10] however, reported in 1931 that he had performed a facelift for an actress in 1906 and that he was unaware of any such operation before that date. Joseph[9] reported in 1921 that he had performed an operation in 1912 for correction of aging cheek tissues in a 48-year-old woman. By the time Hollander, Lexer, and Joseph reported their first procedures, a number of other prominent surgeons in Europe, such as Noel, Passot, Morestin, Bourguet, and Lagarde, were busy performing cosmetic surgical procedures. In the United States, Miller and Kolle had large cosmetic surgery practices. Passot[13] in 1919 published an illustrated article showing sites of elliptic skin excision of the hairline, the forehead, and the temporal and preauricular areas to tighten the skin and an elliptic excision of skin and fat to reduce submental fat deposits. Bourguet[14] reported elliptic skin excisions similar to those of Passot. He was the first to report fat excisions to correct herniated periorbital fat pads (1924)[15] and to publish preoperative and postoperative photographs of fat pad excision (1925).[16] Noel published a book in 1926,[17] *La Chirurgie Esthetique*: *Son Role Social*, describing facialplasty, blepharoplasty, forehead lifting, and correction of loose skin of the neck, burns, scars, protruding ears, and laxity of the upper arms. Although her procedures were not aggressive by modern standards, Noel was a true master of that era.

Miller[18] published the first book in medical history devoted entirely to the subject of cosmetic surgery. Miller was described by Rogers[3] as a "quack" on one hand and at the same time, "a surgical visionary years ahead of his academic colleagues … medicine's first truly cosmetic surgeon." Miller was a prolific writer. In 1906, he wrote the first article in the medical literature describing an attempt to remove excess skin from the eyelids.[19] In 1907, he published the first article with a photograph illustrating lower eyelid incisions,[20] and he also published three cosmetic surgery textbooks.[18,21,22] Kolle was born in Germany and practiced in New York. His book *Plastic and Cosmetic Surgery*[23] represented the second description of cosmetic surgery in medical history. The book was more than 500 pages in length and contained hundreds of illustrations, including preoperative and postoperative photographs of protruding ears; it took a rather aggressive surgical approach to the correction of excess skin of the eyelids. Bettman[24] was the first to publish preoperative and postoperative facelift photographs and to describe a continuous temporal scalp,

preauricular, postauricular, and mastoid area incision. With modifications, his incision is essentially that used for facialplasty today. Hunt[25] published a book, *Plastic Surgery of the Head, Face and Neck*, that included facelifting and forehead/browlifting operations.

All the early facialplasty procedures were limited to skin excision and wound closure without subcutaneous undermining. Bames[26] described subcutaneous face and neck undermining, skin redraping, and excision of excess skin. The continuous incision described by Bettman[24] and subcutaneous undermining recommended by Bames[26] essentially established the basic facelift procedure for the next 40 years. As discussed by Rees,[6] a great deal of secrecy surrounded early facelift procedures. Surgeons were reluctant to share their techniques because of professional jealousy and greed. The disdain for "vanity" surgery by both the medical profession and the public restricted most facelift procedures to private offices and small clinics. The extent of surgery in such settings was necessarily limited. Many prominent plastic surgeons in major medical centers were forced to perform their facelifts in small clinics or to hide their cases by misnaming the procedures on the operating schedule. Renowned plastic surgeons after the First and Second World Wars, such as Gillies, Blair, Davis, Pierce, McIndoe, Mowlem, Conway, and others, did a great deal of cosmetic surgery but were reluctant to publish on the subject.[6] The conventional facelift operation (skin dissection only) failed to address the effect of aging and the force of gravity on the structures (e.g. muscle, fat, and superficial fascia) deep to the skin. Likewise, the classic skin dissection facialplasty failed to account for the wide variation in facial, jaw line, and cervical deformities; in the location of fat deposits; in the asymmetry of anatomic structures; and in the genetically determined deformities, such as microgenia and the obtuse cervicomental angle.

Aufricht[27] discussed the limitations of the subcutaneous facelift, particularly its failure to correct submental fat deposits and platysma bands. Adamson and colleagues[28] discussed correction of the platysma bands in the submental area, and Millard and co-workers[29] recommended extensive submental defatting. Pennisi and Capozzi[30] and Baker and Gordon[31] described suture plication of the deep tissues of the cheek and lateral neck. Tipton[32] challenged the deep suture techniques in a study of 33 patients in whom he performed unilateral plication. Two years postoperatively, there was no obvious difference in the two sides of the face. Skoog[33,34] described a technique of dissection of the superficial fascial layer in the face, in continuity with the platysma muscle in the neck and advancement of the myofascial unit in a cephaloposterior direction. This was the beginning of the modern era in facelifting. Mitz and Peyronie[35] used cadaver dissections to define the limits of the superficial musculoaponeurotic system (SMAS) in the face and noted that tightening of this layer would be beneficial in facialplasty. SMAS-platysma facelifting, wide skin undermining, and extensive fat removal soon gained worldwide popularity. Surgery of the tissue layers deep to the skin of the face and neck is now established as an essential part of cervical and facialplasty operations. Many surgeons have described different SMAS-platysma techniques to improve the cervicofacial area and to remedy problems not corrected by conventional facialplasty.[36–44] Furnas,[45] in 1989, described the retaining ligaments of the midface, which led to a better understanding of anatomic areas where facial soft

tissue is supported and the involvement of these ligaments in leading to the anatomic changes that occur with aging. These ligaments were further defined by others[46,47] who thought that loss of the support from the retaining ligament system allowed facial fat to descend inferiorly in the face, deepening the nasolabial fold and forming facial jowls with aging. The importance and location of the retaining ligaments led to modifications in procedures involving retaining ligament release in sub-SMAS dissection,[47–56] the primary goal of these procedures being to reposition descended facial fat to the anatomic location of youth. Other surgeons, preferring sub-periosteal rather than sub-SMAS dissection to reposition fat, developed procedures whose similar goal is to resuspend descended malar fat to the malar eminences using the sub-periosteal plane.[57–59] A combination of subperiosteal and subcutaneous lifting has also been described.[60]
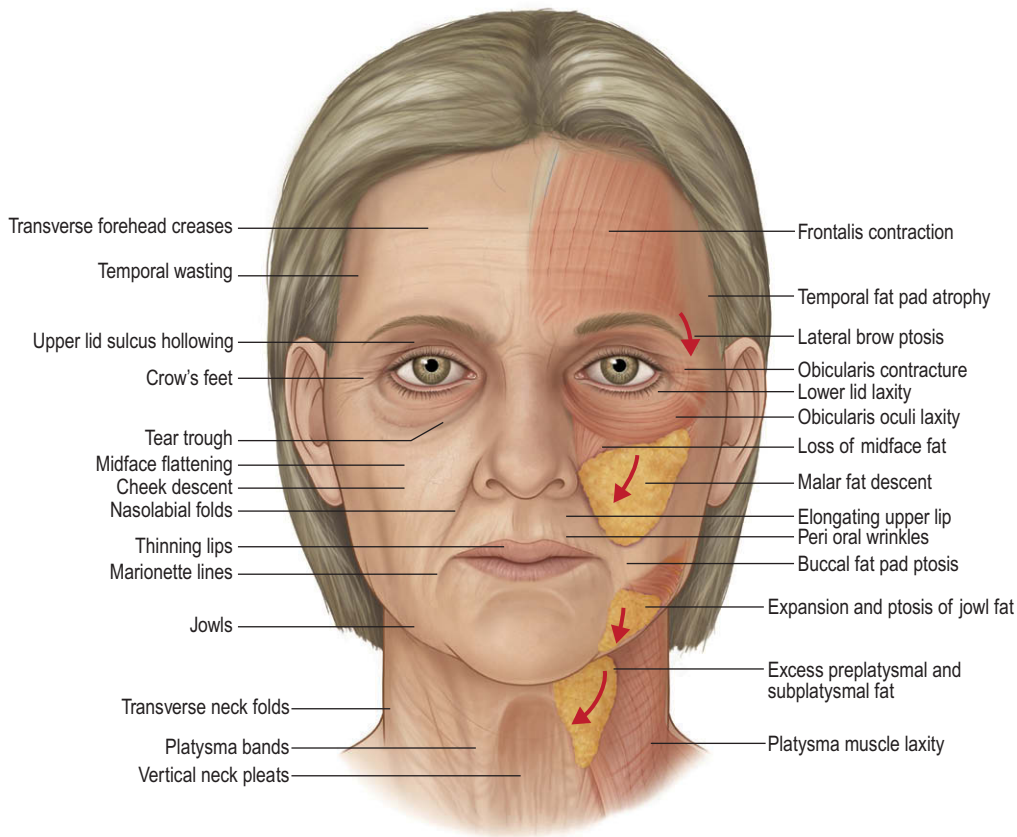
Transverse forehead creases
Temporal wasting
Upper lid sulcus hollowing
Crow's feet
Tear trough
Midface flattening
Cheek descent
Nasolabial folds
Thinning lips
Marionette lines
Jowls
Transverse neck folds
Platysma bands
Vertical neck pleats

Frontalis contraction
Temporal fat pad atrophy
Lateral brow ptosis
Obicularis contracture
Lower lid laxity
Obicularis oculi laxity
Loss of midface fat
Malar fat descent
Elongating upper lip
Peri oral wrinkles
Buccal fat pad ptosis
Expansion and ptosis of jowl fat
Excess preplatysmal and subplatysmal fat
Platysma muscle laxity

Figure 11.1.1 The aging face exhibits changes in the skin, superficial wrinkles, deeper folds, soft tissue ptosis, loss of volume in the upper third and middle third and increased volume in the lower third.

of the face occurs in all its layers, from skin down to bone; no tissue is spared. For the purposes of this discussion, the face will be viewed as a five-layer structure as described in Chapter 6: skin, subcutaneous fat, the superficial musculoaponeurotic system (SMAS) and muscles of facial expression, fascial spaces, and deep fascia. Underlying everything is bone, except over the oral cavity. The surgical significance of this concentric layer arrangement is that dissection can be done in the planes between the layers. Also, anatomical changes in each of the layers can be addressed independently, as required to treat the presenting problem.

Skin

Normal skin is directly adherent to underlying fat via the retinacular cutis system. In certain predictable areas the skin is tethered to bone or underlying muscle by condensed areas of connective tissue. In some places, these are string-like cutaneous ligaments, and in other areas, these are ribbon-like septae. Because nerves and vessels often reach the skin adjacent to these vertically running fibrous structures, dissection of skin is more difficult and bloody where the skin is tethered; McGregor's patch is such an area because of its association with the zygomatic cutaneous ligaments and a perforating

branch of the transverse facial artery. Changes in the skin of the face are some of the most obvious signs of aging. Skin aging over time is both intrinsic and extrinsic. Intrinsic aging is the result of genetically determined apoptosis. The skin becomes thinner; there is a decrease in melanocytes, a reduced number of fibroblasts and a loss of skin appendages. In the dermal matrix, there is fragmentation of the dermal collagen and impairment of fibroblast function.[61,62] As the skin weakens and thins, the underlying contraction of facial muscles creates permanent skin folds in predictable locations (see *Fig 11.1.5*).

Extrinsic forces include sun exposure, cigarette smoke, extreme temperatures and weight fluctuations. The net result is that facial skin loses its ability to recoil, a condition called elastosis. This has surgical implications, because firm tight skin is youthful, and to varying degrees, the tightening of loose facial skin is part of a good surgical result. However, a facelift does not appreciably improve the quality or texture of the skin. Therefore, patients with good quality skin are likely to enjoy a better result from facelift surgery than the patient with poor quality skin. Alternatively, when skin quality is poor, other options such as injectable fillers and skin resurfacing may be more important for rejuvenation than facelift surgery. In most cases of facial rejuvenation, medical and surgical therapies can work in concert for a more complete result.

(These complementary therapies are reviewed in Chapters 4 and 5.)

Facial fat: ptosis, volume loss and volume gain

The face is carpeted in a layer of superficial fat which lies immediately deep to the dermis. Between individuals, there is much variability in the thickness of the superficial fat layer. This has surgical implications, because a heavier patient will have thicker, heavier tissues to reposition, but the dissection of the facelift skin flap will be easier. Conversely in a thin patient, facial layers are packed closely together, like an onion, necessitating greater care if the surgeon wishes to separate skin from SMAS and SMAS from underlying structures. Superficial facial fat also varies in thickness depending on the area of the face. The most important area of thickened subcutaneous fat is the malar fat pad.[54] This is a triangular shaped mass of fat bordered by the nasolabial fold, the infraorbital arch and a diagonal line across the mid-cheek. Its apex is over the malar eminence. The malar fat pad is present throughout life *(Fig. 11.1.2)*.

One study looked at fat volume in the cheek area and found 56% of the fat superficial to the SMAS and 44% was deep to the SMAS and the muscles of facial expression.[63] The superficial fat is separated by vertical septae into five distinct compartments: nasolabial, medial cheek, middle cheek, lateral temporoparietal, and the inferior orbital fat *(Fig. 11.1.3A)*.[64]

The two central fat compartments (medial and middle) are the primary components of the Malar Fat Pad.

The deep fat is also divided into compartments *(Fig. 11.1.3B)*. The most significant is the deep medial fat compartment, which lies directly against bone and is bordered above by the orbicularis retaining ligament, laterally by the zygomaticus major and buccal fat pad and medially by the pyriform aperture[65] *(Fig. 11.1.3C)*.

The authors who identified this compartment propose that age related deflation of deep medial fat compartment leads to "pseudoptosis" of the overlying superficial fat and skin – ptosis which is real, but which is caused by lack of underlying support.[65]

This in turn is thought to cause deepening of the nasolabial fold and development of the "inverted V deformity" inferior to the infraorbital rim.[66] Adjacent and lateral to the deep medial fat is the suborbicularis oculi fat (SOOF), which itself is divided into a medial and lateral component.

Generally in youth, facial fat is tightly packed, creating surface contours which undulate smoothly from convexity to concavity. Cosmetic highlights rise above areas of depression. The malar fat pad which extends over the body of the zygoma creates the principle cosmetic highlight zone in the youthful face, immediately above the normal depression overlying the buccal recess. Make-up artists accentuate this zone by highlighting the apex and simulating a depression immediately below. In the aging face, fat is less tightly packed, and facial contours become more abrupt. In areas of tight ligamentous attachment, such as the preparotid area, the anterior jowl border and the zygomatic ligament insertions, there appears to be an acceleration of volume loss with indenting of the surface contour.[67] With more advanced aging, there is malar fat atrophy, leading to a more skeletal appearance of the
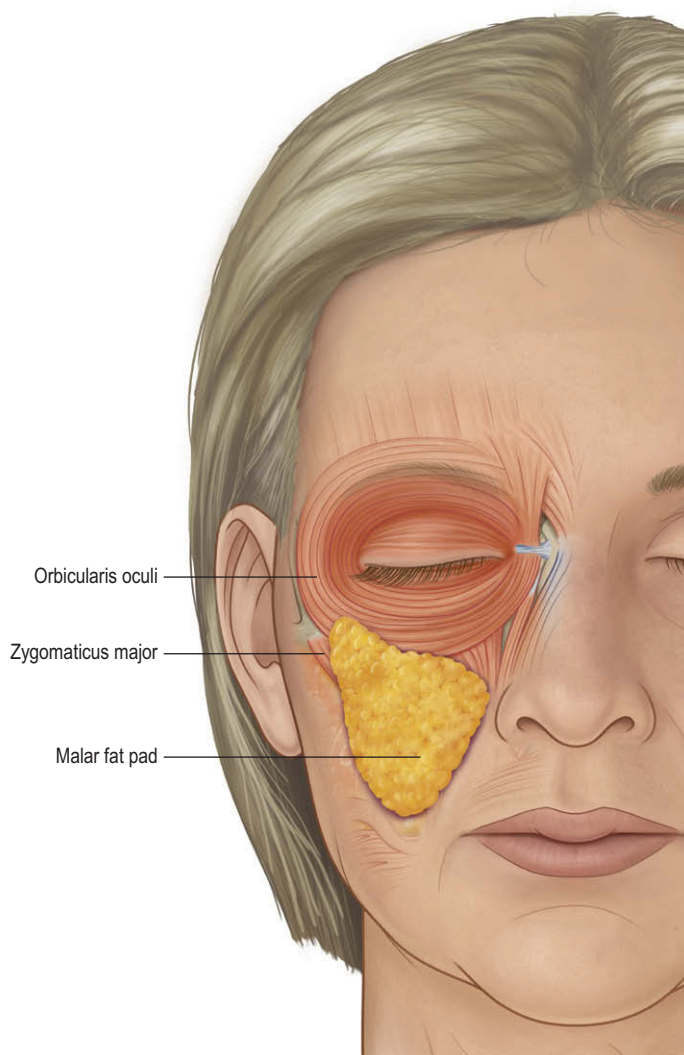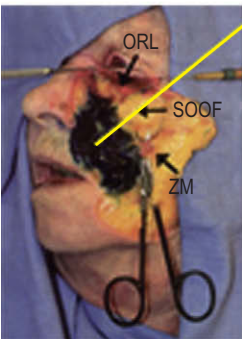

Orbicularis oculi
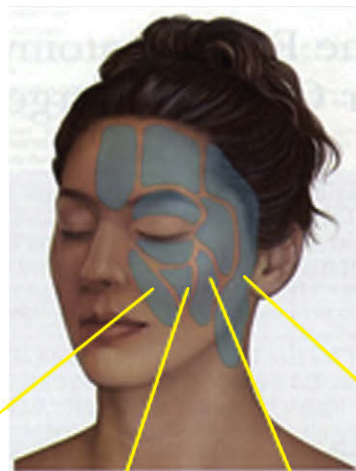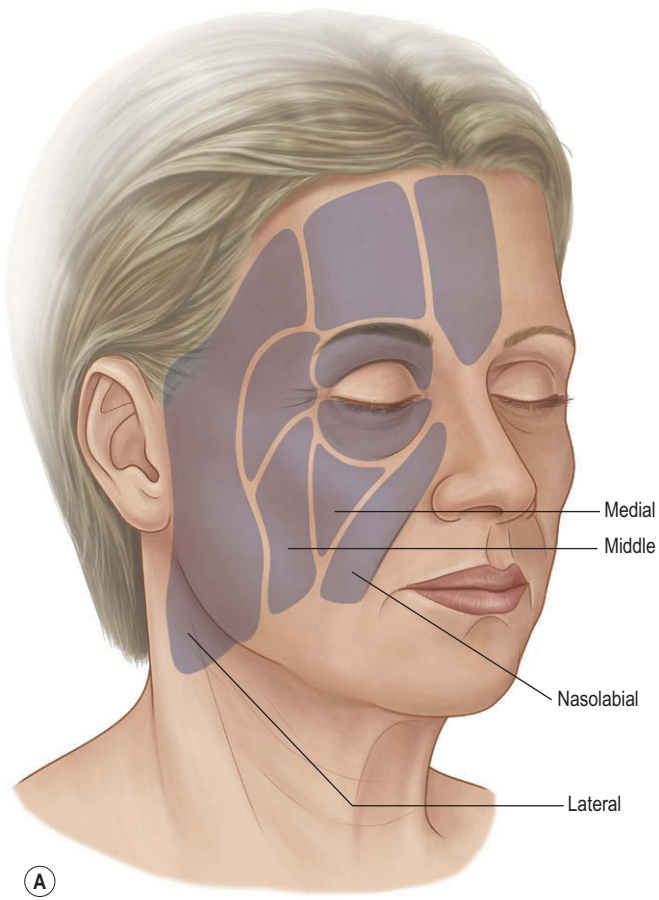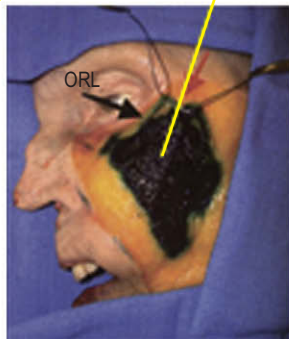
Zygomaticus major

Malar fat pad

Figure 11.1.2 The malar fat pad is a triangular area of thickened superficial fat with its base along the nasolabial fold, and its apex over the superolateral malar prominence.

zygoma. Simultaneously there is an apparent ptosis of the malar fat pad which causes bunching of fat and deepening of the nasolabial fold. Surgeons have traditionally viewed superficial fat in the cheeks as a ptotic layer which requires correction for facial rejuvenation to occur. In support of this theory, it has been demonstrated that the primary muscles of facial expression in the mid-cheek (zygomaticus major and minor) do not change in length, while the overlying fat appears to migrate inferiorly.[68] Another study, using CT scans, confirmed the presence of facial fat compartments and identified age related inferior migration of the midfacial fat compartments as well as inferior volume shift within the individual compartments.[68a]
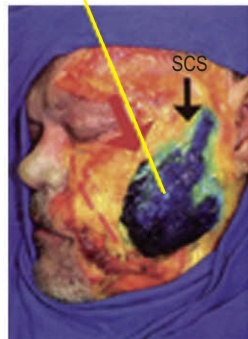
At the time of writing, it is unclear whether the cause of superficial fat ptosis is gravitational due to relaxed fixation, or if it relates to pseudoptosis caused by the loss of volume in the deep fat compartments. Also, it is uncertain whether volume of facial fat is lost equally from the deep and

Medial

Middle

Nasolabial

Lateral

(A)

Nasolabial

Medial

Middle

Lateral

Figure 11.1.3 (A) Superficial facial fat is compartmentalized by vertically running septae. In the mid-cheek, from medial to lateral, these compartments are the nasolabial, medial, middle, and lateral compartments.
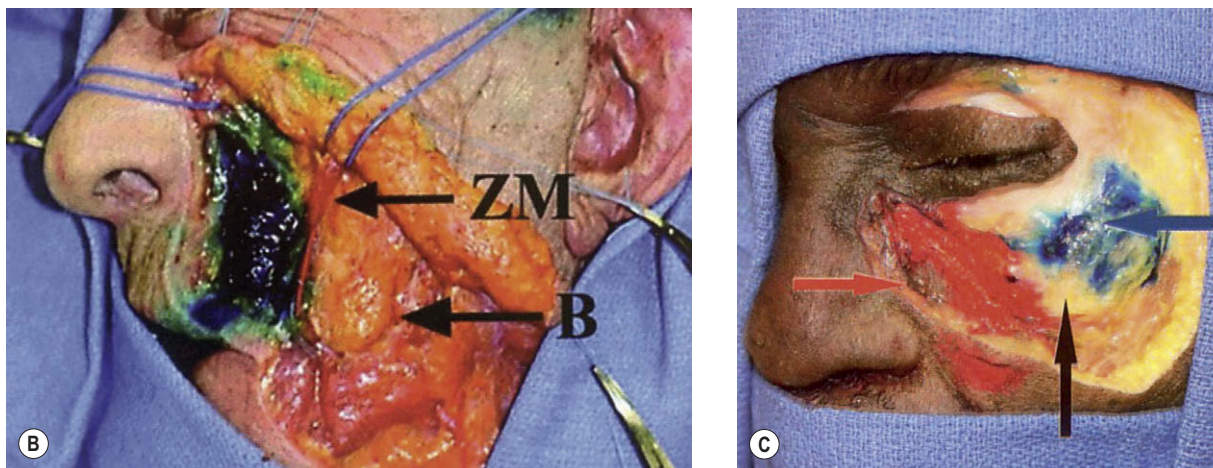
Fig. 11.1.3, cont'd The nasolabial and medial compartments make up the malar fat pad. **(B)** The deep facial fat is also compartmentalized by septae. The deep medial fat pad (here stained blue) is bounded above by the orbicularis retaining ligament, medially by the pyriform aperture, and laterally by the zygomaticus major (labeled ZM) muscle and the buccal fat pad (labeled B). **(C)** Over the body of the zygoma, the sub orbicularis oculi fat (SOOF) is deep fat. It is seen here with a medial portion (yellow) and a lateral portion (stained blue). It is bounded medially by deep medial fat pad (stained red). (A, Courtesy of Rohrich RJ, Pessa JE. The fat compartments of the face: anatomy and clinical implications for cosmetic surgery. Plast Reconstr Surg. 2007;119:2219–2227; B,C Courtesy of Rohrich RJ, Pessa JE, Ristow B. The youthful cheek and the deep medial fat compartment. Plast Reconstr Surg. 2008;121(6):2107–2112).
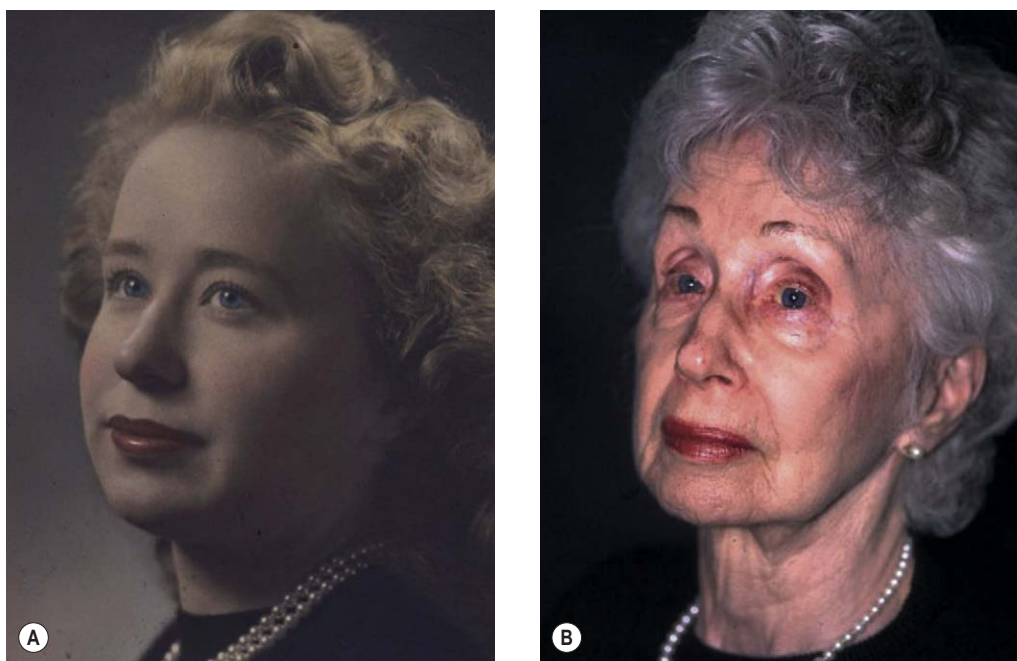

Figure 11.1.4 This healthy 72-year-old woman has never undergone facial surgery, has gained 10 pounds, but has aged 50 years. She appears to have lost fat in the periorbital region and middle third of her face, revealing underlying bone. The orbit seems to have enlarged. Overall volume has been lost in the middle third of the face. The soft tissues which remain appear to be ptotic, flattening her cheeks, and widening her jaw line. The heart-shaped face of youth has become more rectangular.

superficial fat layers, or if it lost equally or differentially from the various fat compartments which have been identified.[65]

In the lower face, the area of the jowl just posterior to the marionette lines appears to become thicker with age, making the mandible appear wider. This phenomenon has been called "radial expansion" (Lambros, pers. comm. 1999).[69] This may be due to fat accumulation, or it may be caused by soft tissue ptosis within the premasseteric space, a natural glide plane.[69a] Below the mandible, a similar expansion occurs in the neck as soft tissue falls away from deep tissue attachments and fat tends to accumulate.

Change in facial shape

The loss of facial volume is an important phenomenon which surgeons recognized much later than the more obvious ptosis of soft tissue. To arrive at this conclusion, astute observations were made about changes in surface contours which lead to inferences about internal volume loss.[65,67,70,71]

The combination of volume loss in some areas, volume gain in others, and soft tissue ptosis creates a cascade effect which results in the loss of natural youthful curves (*Fig. 11.1.4*).

Gradually, there is a reversal of facial shape as the cheek prominence of youth gives way to the jowl prominence of age. Effectively, in youth, the cheeks are full, but with age, the jowls and neck become full. The face changes from a heart shape to a more rectangular shape, or from an egg sitting on its narrow end to an egg resting on its broad end. This change has been called losing the "inverted cone of youth", and has been likened to a reversal of the "Ogee" curve, a natural S-shaped curve seen in architecture.[60,72]

Superficial musculoaponeurotic system

Immediately deep to the subcutaneous fat is the superficial musculoaponeurotic system (SMAS), described by Mitz and Peyronie in 1976.[73] The SMAS, or its analogues can be thought of as a continuous fascial sheath which encompasses the entire face and neck. Superiorly, it continues into the temple as the superficial temporal fascia (temporoparietal fascia) and then into the scalp as the galea aponeurotica.[74] Inferiorly, into the neck, the SMAS becomes the superficial cervical fascia which envelopes the platysma muscle. Clinically, the thickness and strength of the SMAS varies between patients, and also varies in every individual face, being thicker and adherent over the parotid, and thinner anteriorly. The SMAS is most tenuous under the malar fat pad where it splits to encompass the zygomaticus major and the orbicularis oculi.[53,75] The SMAS has important surgical implications because its fibrous attachments to skin allow it to act as a carrier for overlying subcutaneous fat; also it has been shown to be much more resistant to stretch than skin.[76] Furthermore, below the zygomatic arch, all branches of the facial nerve are deep to the SMAS.

The relationship of the SMAS (superficial fascia of the face) to the deep fascial structures of the face, involves areas of mobility interspersed between areas of attachment. The superficial fascia is tethered to the deep fascia by retaining ligaments in the following locations: over the parotid gland, at the inferior border of the zygomatic body, and along the anterior edge of the masseter. (These ligaments are described in Chapter 6 and are reviewed later in this chapter.) Between areas of fixation the SMAS is free to move over the underlying deep fascia. These are the suprazygomatic zone where superficial temporal fascia slides over the deep temporal fascia, the mid-cheek, where SMAS rides over the parotid masseteric fascia (premasseteric space), and the neck where the platysma overlies the underlying strap muscles.

Facial muscles

The muscles of facial expression are found in a superficial layer and a deep layer. The superficial muscles are orbicularis oculi, orbicularis oris, zygomaticus major, zygomaticus minor, levator labii superioris, risorius, and depressor anguli oris. All of these muscles are innervated on their deep surface by branches of the facial nerve (VII). Consequently, surgical dissection on the superficial surface of these muscles will not endanger their innervation. The only facial muscles innervated on their superficial surface are the muscles in the deep layer: levator anguli oris, mentalis and buccinator. The three facial muscles which are most important to surgeons are orbicularis oculi and platysma, because they are often manipulated during facelift surgery, and zygomaticus major

because it is used as a landmark in certain facelift techniques (*Fig. 11.1.5*).

Most muscles of facial expression take their origins from bone and insert into the dermis thus allowing for voluntary and involuntary movement of facial soft tissues. The platysma is a purely subcutaneous muscle which takes its origin from the fascia of the pectoralis, and inserts into soft tissue of the face, with a small bony insertion on the anterior mandible. The platysma interdigitates with the depressor labii inferioris which in some individuals, gives it some effect on the depression of the lower lip. In the neck the platysma is thicker, forming visible bands; superiorly the platysma thins dramatically as it crosses the mandibular border, but continues superiorly, often visible during surgical dissection well into the mid-cheek, at times approaching the lower fibers of the orbicularis oculi.

While most muscles of facial expression do not change appreciably with age, the orbicularis oculi and the platysma are thought to undergo age-related changes. Both of these muscles have a large surface area but are relatively thin – a configuration which lends them to potential redundancy if they lose tone or if there is attenuation of their deep tissue attachment. For example, in some individuals redundancy develops in the lower half of the orbicularis, a condition which has been speculated to cause lower eyelid festoons.[77] Some have suggested that it is the loss of support of the orbicularis through attenuation of the orbicularis retaining ligament (orbitomalar ligament), which contributes to deformities of the lower eyelid/cheek junction.[66] Similarly, the paired platysma muscles, which are encased by SMAS, appear to gradually fall away from their deep cervical attachment carrying the overlying fat and skin. The net result is a more obtuse cervico-mental angle and the development of visible platysma bands at the anterior platysmal border. Another issue common to orbicularis oculi and platysma is that these are the only facial muscles which are undermined during certain surgical procedures, thus imperiling some of their motor innervation. Fortunately, the orbicularis has multiple motor nerve branches which provide a level of collateral innervation.[78] There is a less elaborate innervation to the platysma; two or three cervical branches can be identified just inferior and anterior to the angle of the mandible in the plane between the deep cervical fascia and the undersurface of the platysma. Preservation of these branches is potentially important because the platysma acts as a support structure and also influences lower lip depression, especially in those individuals with a "full dentition" smile.[79]

Retaining ligaments

Facial soft tissue and skin is held in place by retaining ligaments which run from underlying fixed structures through facial fat, inserting into the dermis.[45,48,80] Effectively, these ligaments attach the superficial fascia (SMAS) and the overlying skin to the underlying deep fascia and bone *(Fig. 11.1.6)*.

There are two ligament systems. The first group is true osteocutaneous ligaments, which tether skin to bone: the orbital, zygomatic and the mandibular ligaments. The orbital ligament is found at the junction of the superior and lateral orbital rims and constitutes the inferior thickening of the temporal crest line zone of fixation (zone of adhesion). (This area
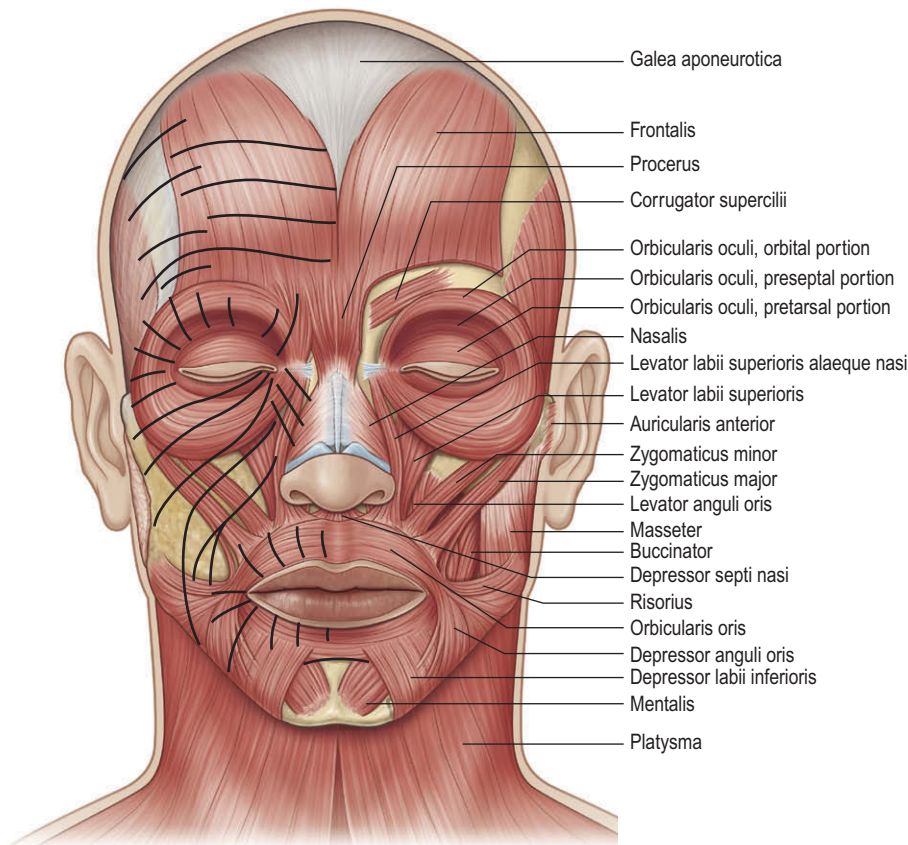
Galea aponeurotica
Frontalis
Procerus
Corrugator supercilii
Orbicularis oculi, orbital portion
Orbicularis oculi, preseptal portion
Orbicularis oculi, pretarsal portion
Nasalis
Levator labii superioris alaeque nasi
Levator labii superioris
Auricularis anterior
Zygomaticus minor
Zygomaticus major
Levator anguli oris
Masseter
Buccinator
Depressor septi nasi
Risorius
Orbicularis oris
Depressor anguli oris
Depressor labii inferioris
Mentalis
Platysma

Figure 11.1.5 Muscles of facial expression. The solid lines demonstrate overlying skin creases caused by repeated contraction of the underlying muscles. (Netter illustration from www.netterimages.com. © Elsevier Inc. All rights reserved.)

is reviewed in Chapter 7.) The zygomatic ligament is actually a group of ligaments which originate from the lower half of the zygomatic body where it joins the zygomatic arch. The zygomaticus major inserts into bone at this location. These ligaments stabilize the overlying malar fat pad, going through this structure to the overlying skin. In this area, a perforating branch of the transverse facial artery courses from deep to superficial, contributing to the clinical bleeding seen when the zygomatic ligaments are released in this area during superficial skin flap dissection (McGregor's patch). A branch of the zygomaticofacial nerve also accompanies the ligaments in this area, coursing directly from bone to skin providing sensation to the skin of the malar cheek prominence. As described in Chapter 6, the zygomatic ligaments constitute the lower border of the prezygomatic space and must be released if the malar fat pad is to be fully mobilized and elevated. The mandibular ligament is a short but strong structure originating from the parasymphysial mandible, which tethers the overlying skin and contributes to formation of the marionette lines.

The second ligament system involves tethering structures which do not originate from bone, but rather, tether the superficial fascia (SMAS) to the deep fascia. Along the anterior border of the masseter, the masseteric ligaments extend in a line from the zygoma down to the lower cheek.[80] These ligaments support the anterior cheek and are more clinically significant superiorly, where they intermingle with the zygomatic ligaments. The most superior fibers of the platysma can also be seen terminating in the most superior masseteric ligaments. Over the parotid gland with an extension down along

the posterior border of the platysma, the superficial fascia is firmly attached to the deep fascia. A number of authors have identified the importance of this area, and with some subtle differences, a number of different names have been applied to the same soft tissue attachment: platysma-auricular fasica,[81] platysma-auricular ligament,[45] parotid cutaneous ligament,[80] and a localized area called Lore's fascia.[82,83] In this zone, the SMAS and the overlying skin are tethered to such a degree that soft tissue in this area does not become ptotic with age. A prime surgical significance is that the "fixed SMAS" of the posterior cheek can be used to support the surgically mobilized portion of the more anterior "mobile SMAS". A number of facelift techniques depend on this concept (*Fig. 11.1.7*).

The importance of retaining ligaments in the aging process is potentially two-fold. One theory holds that with age, ligaments relax, leading to a gravitational shift of overlying superficial fat and skin. In youth, the superficial fat and skin appear to be firmly adherent to underlying bone and deep fascia, while with age the same soft tissue appears to become ptotic. One area where this has been proposed is along the infraorbital rim, where the orbicularis retaining ligament may relax, leading to the V-deformity at the lid cheek junction.[66,84–86] Over the malar highlight area, the ligament relaxation theory suggests that the zygomatic ligaments become attenuated and the malar fad pad becomes ptotic, causing a migration of fat medially and inferiorly, deepening the nasolabial fold.

The second way that retaining ligaments become an issue with aging is through their tethering effects. The concept of "pseudoptosis" holds that it is primarily the loss of facial fat
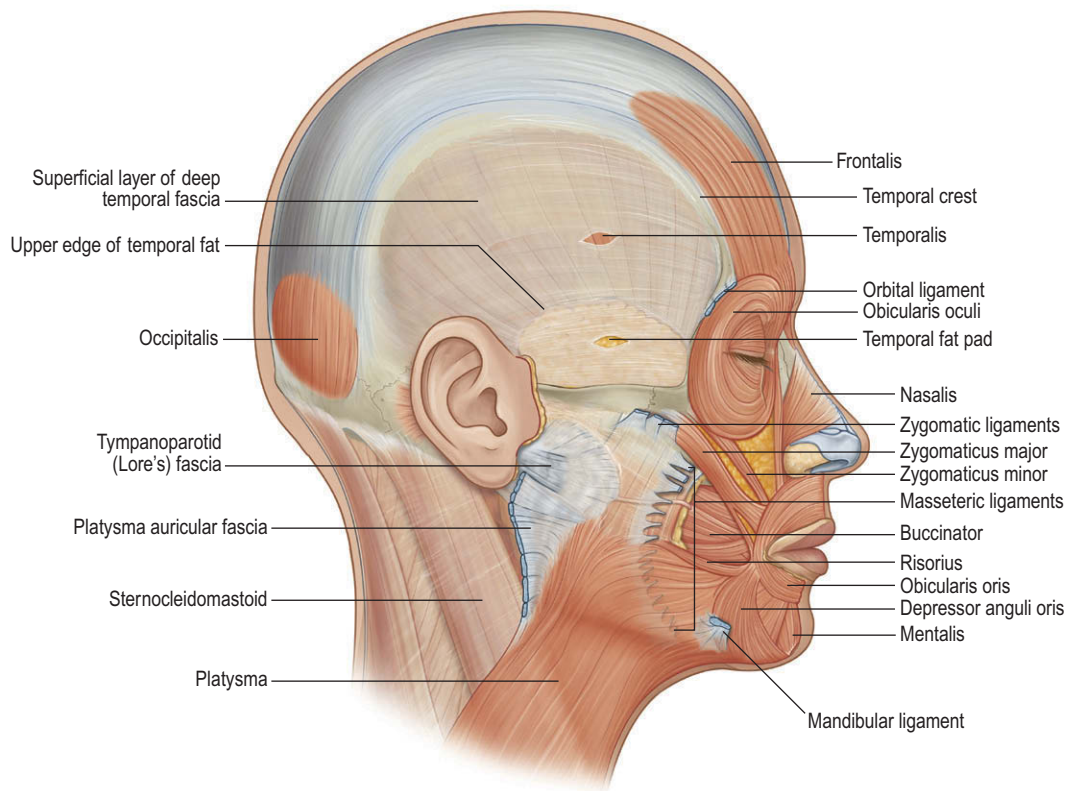
Figure 11.1.6 Facial soft tissue is tethered to underlying bone by the orbital, zygomatic and mandibular ligaments. Soft tissue is tethered to underlying deep fascia by the masseteric cutaneous ligaments and by an area of attachment anterior and inferior to the earlobe, known by a number of different terms: platysma auricular ligament (Furnas), platysma auricular ligament (Mendelson), parotid cutaneous ligament (Stuzin), and a distinct area anterior to the earlobe known as Lore's fascia.
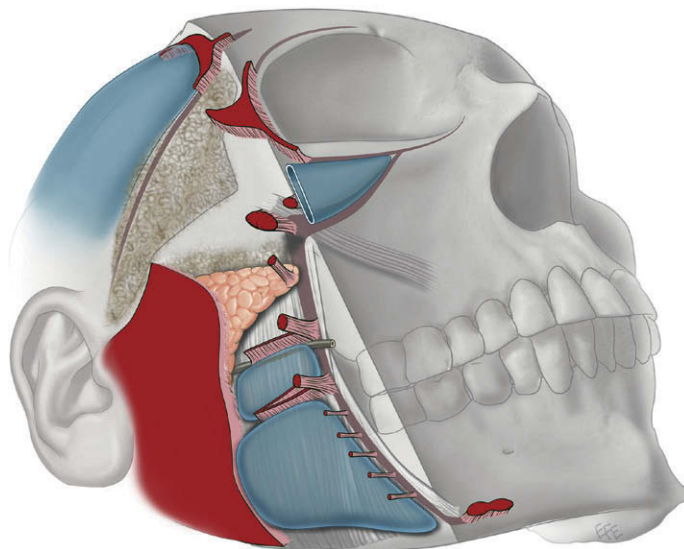

Figure 11.1.7 Mendelson's interpretation of soft tissue attachments (Ch. 6). The fixed posterior soft tissue is held in place by the platysma auricular fascia (large red area). The anterior face is fixed by a vertical column of attachments: orbital ligament, lateral orbital thickening (superficial canthal tendon), zygomatic ligaments, masseteric ligaments, mandibular ligament). In the mid-cheek, there is some mobility of these ligaments, while there is limited mobility over the platysma auricular fascia. The so-called "fixed SMAS" is that portion attached to the parotid and the posterior border of the platysma. Anterior to this, is the "mobile SMAS". (Courtesy of Dr Levent Efe, CMI.)

volume which leads to ptosis, but the ligaments tether the skin, leading to depressions and grooves in the surface contour of the face. Examples of tethering include: the mid-cheek groove, caused by the zygomatic ligaments, the nasojugular groove, partly caused by the orbicularis retaining ligament (orbitomalar ligament) and the jowl/marionette line caused by the mandibular ligament.[81–83,85]

It is likely that both of these theories are in play – ptosis and deflation, although conclusive proof of how face age is not available at the time of this writing. Either way, the tethering structures play an important role in determining the way a face will age. Furthermore, these same tethering structures can be manipulated during facelift surgery, depending on the specific indication.

Deep fascia

The deepest layer of the face is the deep fascia, which covers deep muscles and overlies the oral cavity (Ch. 6). In the face, this fascia is a continuation of the deep cervical fascia in the neck which covers the superficial surface of the strap muscles and the sternocleidomastoid. The equivalent layer in the temple is the deep temporal fascia covering the temporalis. In the cheek, this fascia is found covering the masseter muscle, where it is called masseteric fascia, and covering the parotid

gland, where it is called the parotid fascia or capsule; the combined complex is called the parotid masseteric fascia (parotidomasseteric fascia). When the SMAS is raised surgically, just anterior to the parotid gland in the premasseteric space, the parotid masseteric fascia can be seen as a thin shiny membrane – an important landmark, because in the cheek (unlike the neck and temple), all branches of the facial nerve are deep to this deep fascial layer. Superficial to this layer, but deep to the SMAS, there is often an additional thin layer of fat, the sub – SMAS fat, which adds further protection to the underlying nerves when the SMAS is raised. In the neck along the posterior border of the platysma, the SMAS becomes fused with the deep cervical fascia where the deep fascia covers the sternocleidomastoid muscle. This is important, because a surgeon planning to mobilize a platysma flap to address the neck, will have to release the platysma's attachment to the deep cervical fascia in this area.[87]

Bone

The bony skeleton of the face was once thought to be quite stable in volume and shape as the body aged. However, there is ample evidence that atrophy in certain portions of the facial skeleton is a significant factor in facial aging.[88–93]

Computed tomography of young and old skulls has shown a retrusion of the infraorbital rim as well as recession of the maxillary face below the infraorbital rim (*Fig. 11.1.8*).[90]

This has been confirmed by others who have demonstrated an enlarging orbital aperture (*Fig. 11.1.9*).[94]

The loss of bone has surgical implications because it contributes to an overall loss of volume, and more specifically, to loss of soft tissue support in critical areas such as the infraorbital rim. This contributes to development of the tear trough deformity and age related flattening of the anterior midface. Following the principle of replacing like with like, bone loss can be replaced with solid objects such as facial implants (Ch. 15), or with soft tissue volume enhancement such as with fat grafting (Ch. 14).

Nerve anatomy

Facial nerve

The facial nerve exits the stylomastoid foramen, and separates into an upper and lower division within the parotid glad. Classically, there are five branches which arise and exit the cover of the superficial lobe of the parotid: temporal, zygomatic, buccal, marginal mandibular, and cervical. There are typically 2–3 temporal branches; 4–5 zygomatic branches; 3 buccal branches; 2–3 mandibular branches, and 2–3 cervical branches.

In fact, there is considerable variation in the anatomy of facial nerve branches. One study identified up to eight branches exiting the parotid, with multiple connections between these branches.[95–97]

The temporal branches exit the parotid superiorly, coursing obliquely and superiorly across the middle-third of the zygomatic arch. Like all other facial nerve branches, the temporal branches start out deep to the deep fascia of the mid-cheek (parotid masseteric fascia), but unlike all other facial nerve branches in the cheek, they become more superficial. At
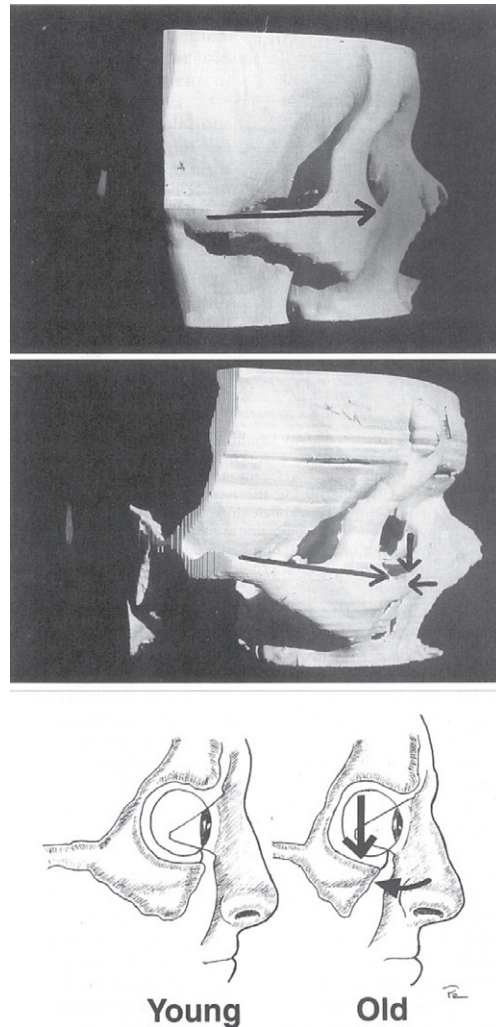

Figure 11.1.8 Computed tomography of young and old skulls has demonstrated a retrusion of the infraorbital rim. (Courtesy of Pessa JE. An algorithm of facial aging: verification of Lambros's theory by three-dimensional stereolithography, with reference to the pathogenesis of midfacial aging, scleral show, and the lateral suborbital trough deformity. Plast Reconstr Surg. 2000;106:479.)

a point 1.5–3.0 cm superior to the zygomatic arch, the temporal branches transition from deep to superficial, travelling at first on the undersurface and then within the superficial temporal fascia (temporoparietal fascia), staying there until they terminate in the frontalis muscle, upper orbicularis and frown musculature. The surgical implication is that a SMAS flap can be safely raised from a point just superior to the zygomatic arch providing that surgical dissection does not extend superiorly to the level where the temporal branch transitions superficially.[98]

A classic external landmark for the course of the temporal branch has been along a line drawn from a point 0.5 cm below the tragus to a point 1.5 cm lateral to the lateral eyebrow.[99]

More recent studies have found that the temporal branch actually consists of 2–5 individual branches which do not adhere completely to this landmark. One study found that these branches cross the middle-third of the zygomatic arch, with a posterior safe zone 1 cm anterior to the acoustic meatus, and an anterior safe zone 2 cm posterior to the lateral orbital rim. Once above the zygomatic arch, these branches were
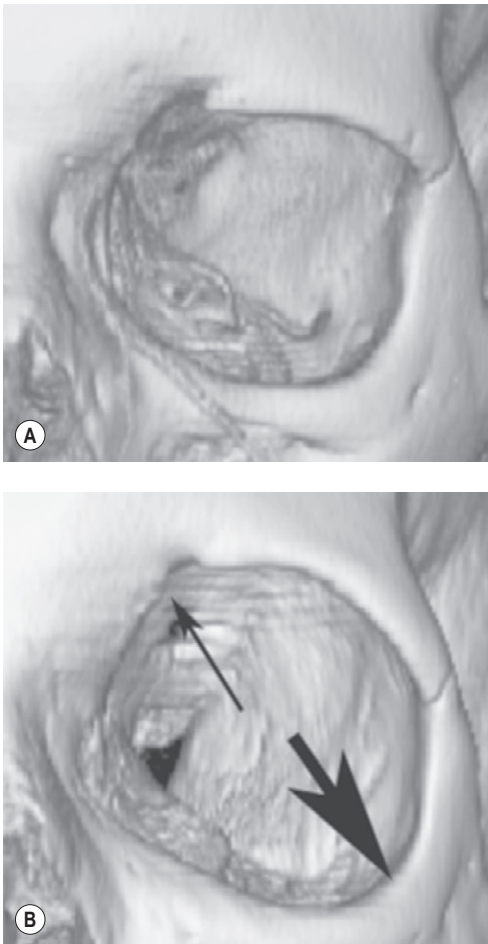
more superiorly. In Chapter 6, facial spaces are described, with the mandibular branches coursing at the lower border of the premasseteric space, which displaces inferiorly with age. Consequently, in elderly patients in the supine position, they have been found coursing well inferior to the mandibular border.[102]

The cervical branches are the most inferior, exiting the parotid at its inferior border and always coursing below the mandibular border. The cervical branches innervate the platysma. There are usually two or three branches with considerable variation in branching patterns. A contribution from the sensory transverse cervical nerve has also been described.[79]

Because the buccal and zygomatic branches are multiple and interconnected, there is a reserve capacity in the event of a single branch injury; therefore, permanent injury is uncommon. However, the temporal and marginal mandibular branches enjoy less collateral innervation making permanent loss much more likely if these branches are injured. Damage to the cervical branches can lead to a "pseudo paralysis" of the lower lip because in some patients the platysma contributes to depression of the corner of the mouth (*Fig. 11.1.10*).[103]

Sensory nerves

The great auricular nerve, a branch of the cervical plexus, is sensory to the earlobe and lateral portion of the pinna. This nerve wraps around the posterior border of the sternocleidomastoid, and courses obliquely across the muscle in a superior direction. The classic landmark for this nerve is at the mid portion of the sternocleidomastoid, 6.5 cm. below the external auditory canal (*Fig. 11.1.11*).

It runs parallel and about 1 cm posterior to the external jugular vein which also crosses the sternocleidomastoid roughly along the same vector. The nerve is deep to the superficial cervical fascia, but the platysma is usually absent over the posterior sternocleidomastoid. Hence, the nerve is at risk of injury during surgical dissection along the posterior border of the sternocleidomastoid, because with lack of fascial cover, it is technically subcutaneous.[104,105]

The auriculotemporal nerve, a branch of the trigeminal is sensory to the preauricular skin and the lesser occipital nerve is sensory to the retroauricular scalp. The zygomaticofacial nerve exits through its foramen in the body of the zygoma, piercing the malar fat pad to provide sensation to the skin of the malar prominence; this nerve is often transected when the malar fat pad is surgically mobilized (*Fig. 11.1.12*).

Patient selection

Like any elective surgical procedure, a prerequisite is to confirm that a patient's physical status and mental status are appropriate to withstand the rigors of surgery, the recovery phase and any potential complications. The patient's expectations must be explored to determine if they are realistic, and if they are technically achievable. The quality of surgical result will be affected by many patient related factors including the facial skeleton, the weight of facial soft tissue, the depth and location of folds, and the quality of the skin.

Figure 11.1.9 Computed tomography scan of (A) a male patient in the young age group and (B) a male patient in the older age group. The image from the older age groups shows significant bony remodeling (arrows) both superomedially and inferolaterally. (Courtesy of Kahn DM, Shaw RB. Aging of the bony orbit: a three-dimensional computed tomographic study. Aesthetic Surg J. 2008;28:258.)

consistently found anterior and inferior to the anterior branch of the temporal artery, a palpable landmark in the temple.[100]

The zygomatic and buccal branches, all exit the parotid gland deep to the parotid masseteric fascia. As they travel anteriorly, they often arborize with each other. Zygomatic branches course parallel to the transverse facial artery. When they reach the area of the zygomatic retaining ligament, they travel to the undersurface of the muscles which they innervate: zygomaticus major, zygomaticus minor, and orbicularis oculi. Deep to the parotid masseteric fascia, within the premasseteric space, the parotid duct courses anteriorly along an imaginary line from the tragus to the corner of the mouth. Accompanying the duct is normally a buccal branch. Beyond the anterior border of the masseter, a buccal branch can normally be seen crossing the buccal fat pad (fat pad of Bichat). At this level, the portion of buccal fat seen is the buccal extension, which is the most inferior portion of the buccal fat pad.[101]

The mandibular branches exit the parotid approximately near the angle of the mandible. They then travel anteriorly near the border of the mandible, until they encounter the facial artery and vein, crossing those vessels and then turning
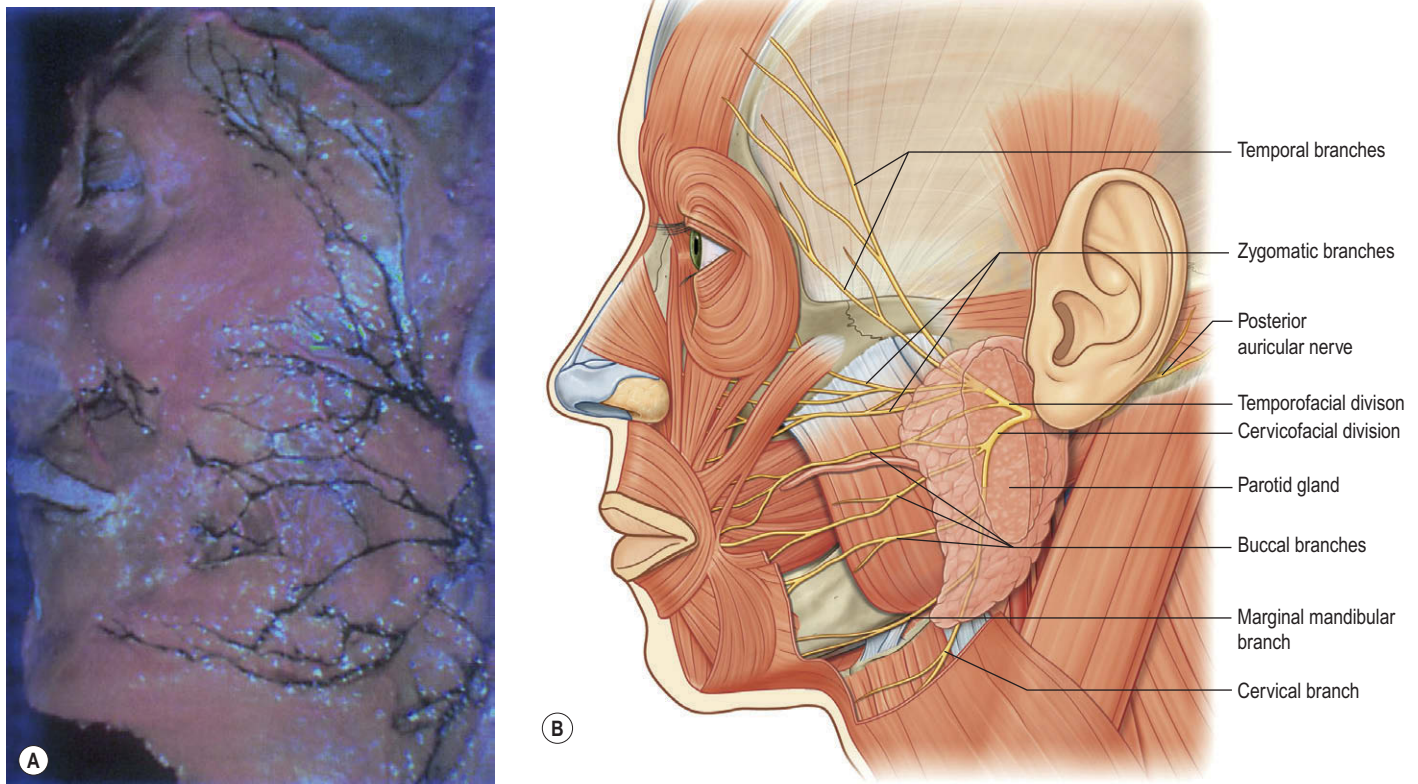
Figure 11.1.10 (A) A cadaveric dissection of the facial nerve. Note three temporal branches crossing the middle third of the zygoma, the arborization between zygomatic and buccal branches, the marginal mandibular branch running along the mandibular border, and two cervical branches innervating the platysma. (Courtesy of Dr Julia Terzis). (B) Diagram of the facial nerve. The facial nerve exits the stylomastoid foramen and normally divides within the parotid gland into a superior and inferior division. Classically, five groups of branches are seen: temporal, zygomatic, buccal, mandibular, and cervical. There is arborization between branches, particularly between the zygomatic and buccal branches.

Some issues can be reversed, others attenuated, and some may not be correctable at all.

The patient presenting for facial rejuvenation will usually be middle age or older, thus increasing the chances of underlying medical problems. In an otherwise apparently healthy individual, specific issues which must be addressed are blood pressure, smoking history and the use of medications or supplements which can promote surgical bleeding.

Incipient hypertension is common in the general population and can promote postoperative hematomas if it is not identified prior to surgery. Hematoma is by far the commonest complication in facelift surgery. Uncontrolled hypertension is a contraindication for surgery, while controlled hypertension is not a contraindication. The labile hypertensive can be the most insidious situation; if possible it should be identified preoperatively and controlled. If patients have intermittent hypertension (the white coat syndrome), or they are simply type A individuals who are easily excitable, perioperative treatment with medications such as Clonidine should be considered

Smokers have been shown to exhibit delayed wound healing due to microvasoconstriction and abnormal cell function.[106] One study reported a 12.5 times greater chance of having skin flap necrosis in a smoking patient compared with a non-smoker.[107] Long-term smokers have a reduction in arteriole function, which may never return to normal. Nevertheless, there are significant short-term effects which can be reversed by abstaining from tobacco use for 2–3 weeks prior to surgery. Tests for the metabolites of nicotine in the blood are available to confirm abstinence from smoking.

Commonly used non-steroidal anti-inflammatory medications (NSAIDs) and the consumption of certain dietary supplements may promote intraoperative and postoperative bleeding based on platelet function inhibition. Patients should avoid these medications for 3 weeks prior to surgery.

Female patients in the facelift age group may be on hormone replacement and are therefore at increased risk for developing postoperative deep vein thrombosis (DVT) and a potentially lethal pulmonary embolism. For these patients, in addition to all recognized preventative measures, consideration should be given to stopping hormonal replacement 3 weeks prior to surgery.

With respect to the surgical objectives in facelift surgery, aging causes fundamental anatomical changes in all parts and in all tissues of the face. However, patients will typically present with specific concerns about specific areas – often the ptosis of soft tissue in the neck or jowls, or the visible wrinkles and folds in the cheek and neck. Patients are usually unaware of the underlying anatomic changes which are causing the problems they can see in the mirror. Nevertheless,
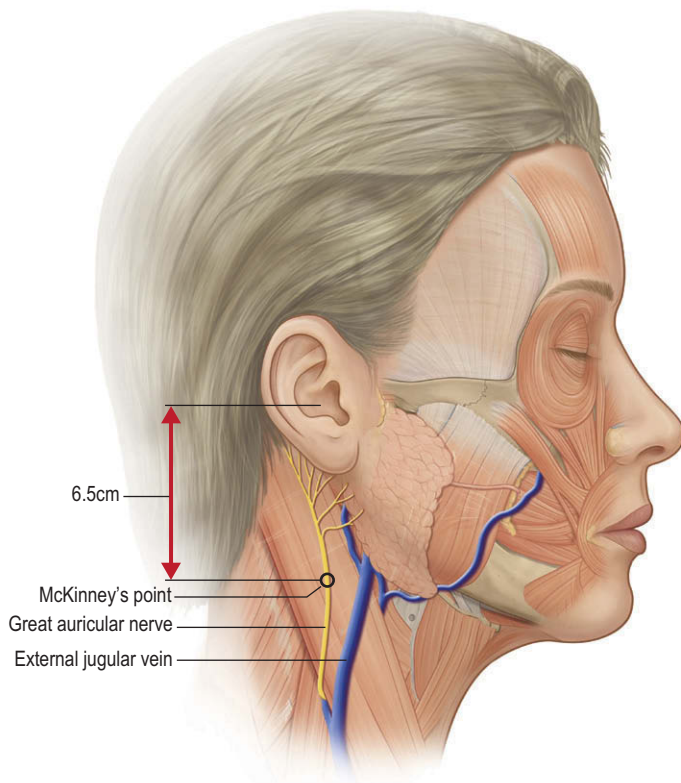
Figure 11.1.11 The great auricular nerve crosses the midportion of the sternocleidomastoid at McKinney's point, which is 6.5 cm inferior to the external auditory canal. It usually travels about 1 cm posterior to the external jugular vein. Anterior to McKinney's point, the nerve is covered by the superficial cervical fascia and the platysma (SMAS), but at the posterior border of the sternocleidomastoid, the nerve is effectively subcutaneous. The most common point of injury is at the posterior border of the sternocleidomastoid muscle.

it is important to recognize what the patient can see is the patient's primary concern. To help focus the discussion, old photographs are very useful in determining which aging changes predominated and what features the patient would most like corrected. This will help improve patients' understanding of exactly how they have aged, and what, if any, rejuvenation they would like to undergo. They will also gain a better understand of the magnitude of surgery which may be required to accomplish what they desire.

Prior to surgery, the entire face should be properly assessed. This examination is conducted in a well lit room with the patient sitting vertically in a comfortable position. Examination should proceed in an orderly fashion so that nothing is missed. The face is examined with the patient in repose as well as in animation. In doing so, facial nerve function is clinically assessed. The face should be assessed as a whole – looking for the equality of facial thirds, the degree of symmetry, and the overall shape (round, thin, wide). Underlying skeletal form will potentially influence the choice of surgical procedure; for example, a wide full face will not be as amenable to malar fat pad repositioning as a narrow, long face. Conversely, a thin face will require the preservation of all soft tissue, overlapping it rather than excising it, and potentially adding

additional volume. Any asymmetry should be pointed out to the patient because facelift surgery will make some asymmetries more obvious.

Surgeons should develop an organized way to examine all the zones of the face: forehead, eyelids, cheeks, the perioral area, and the neck. In certain individuals, the appropriate procedure will be a correction of only one of these areas, but more commonly, all or most or the zones should be addressed in order to achieve a harmonious result. Assessment of the forehead and orbital area are discussed in Chapters 7 and 8. In the cheeks, the surgeon should assess the shape and prominence of the underlying skeleton, the volume and distribution of facial fat, the degree of soft tissue atrophy and ptosis and the relative mobility of the subcutaneous (superficial) fat. Any significant hollowing or flattening should be noted, and conversely, any radial expansion in the jowl and neck should be noted. With the diversity of surgical techniques available, a surgeon should think like a sculptor – considering the face in three dimensions with a view to adding tissue in some areas, removing tissue in other areas, and repositioning tissue where indicated. In the perioral area, the plumpness of the lips should be assessed, and any elongation of the upper lip should be noted. On smiling, the amount of dental show is observed. The skin should be assessed, with its quality noted, along with the depth of wrinkles and folds, including the nasolabial fold and the marionette lines.

Assessment of the neck is discussed in Chapter 13, but in general, the neck should be examined in various positions: neutral, flexion, and turning side-to-side. The patient is asked to contract the platysma by clenching the teeth and grimacing. This will help identify the degree of platysma laxity, the strength of platysma bands and the amount of subcutaneous fat superficial to the platysma. The amount of subplatysma fat is also estimated. Ptosis of the submandibular gland should be noted and pointed out to the patient preoperatively; this condition, if untreated, will be more obvious after facelift surgery than before.

The ear should be examined with a thought to the potential placement of incisions. Important factors include the size and orientation of the earlobe, the angle of attachment of the tragus, the difference in character of the cheek skin and tragal skin, and the size of the tragus. Also influencing the choice of incisions are the density of the hair surrounding the ear and the location of the hairline in the temple, the sideburn, and posterior to the ear.

A careful assessment of the overlying skin is also important to determine if anything of a non-surgical nature is indicated either before, during or after facelift surgery. Assessment will include skin type, skin quality, skin excess, the depth of folds, the degree of fine wrinkling and the amount of photo-aging. In particular, perioral rhytides should be examined as they are often a significant concern for the patient. Issues with the skin should be pointed out to the patient, and options discussed because facelift surgery itself will not improve the texture and quality of the skin – a common misconception.

Excellent photographic documentation of the preoperative face is very important, and should include frontal, oblique, and profile views. Other optional views include the smile and close up views of the neck in repose and with platysma contracture. Changes in the face from facelift surgery may be more subtle than other aesthetic procedures, so a reliable record of the surgical starting point is imperative.
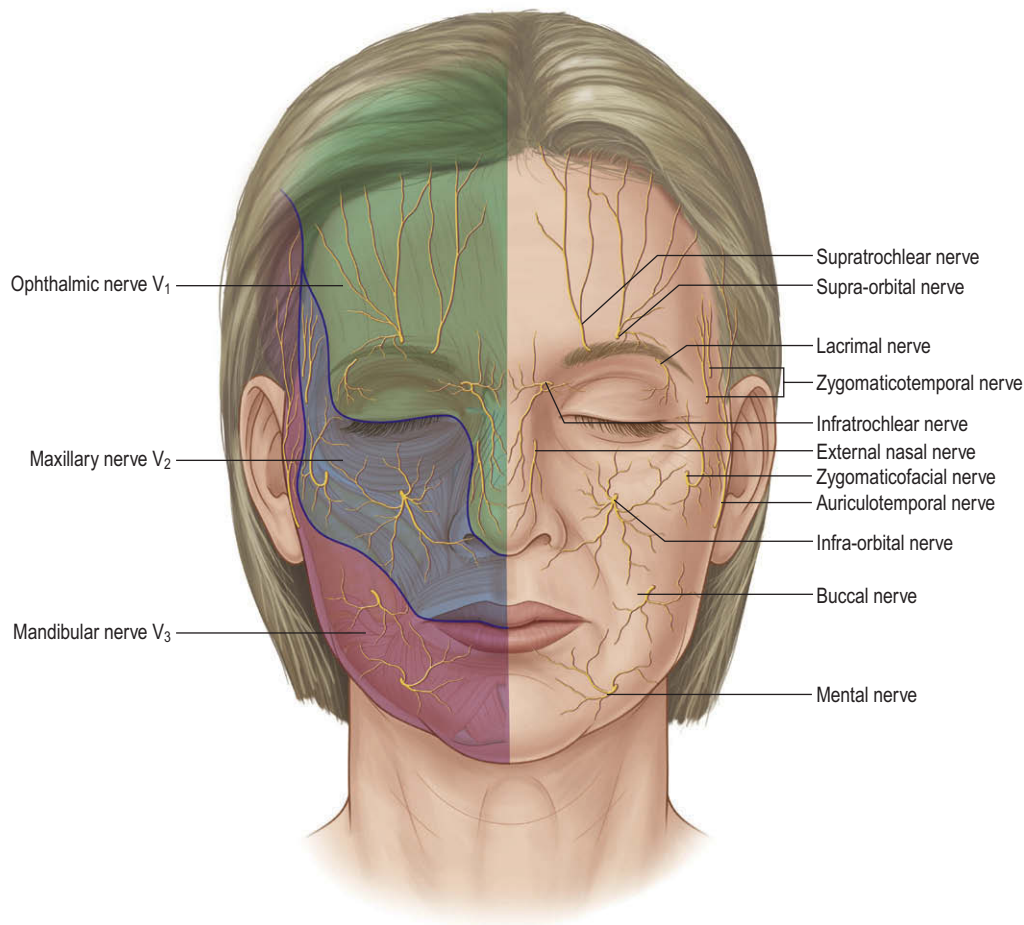
Figure 11.1.12 Major sensory nerves of the face.

Ophthalmic nerve V$_1$

Maxillary nerve V$_2$

Mandibular nerve V$_3$

Supratrochlear nerve
Supra-orbital nerve
Lacrimal nerve
Zygomaticotemporal nerve
Infratrochlear nerve
External nasal nerve
Zygomaticofacial nerve
Auriculotemporal nerve
Infra-orbital nerve
Buccal nerve
Mental nerve

Surgery

A facelift is a significant operation. It should be done under excellent conditions with appropriate medical staff, appropriate equipment and adequate back up. Anesthesia can be safely done with many different approaches, including local anesthetic with different levels of intravenous sedation and with varying levels in the spectrum of general anesthesia. An anesthesiologist, if involved, can decide in consultation with the surgeon what form of anesthesia is preferred for an individual patient. There should be proper intraoperative patient positioning, intraoperative monitoring, intraoperative warming, and intraoperative DVT prophylaxis.

Technique

Historically, surgeons have been guided by the empirical finding that people look younger when soft tissue of the lower cheek is shifted into the middle and upper cheek. Patients see the same thing in a mirror when they manually lift their cheek or if they lie on their back. Effectively, by shifting lower facial fat superiorly, volume is restored to the midface while simultaneously, ptotic tissue is lifted. As we have seen, changes in volume are a significant part of facial aging. Surgeons have been able to improve the lower third of the face and neck by removing excess volume, and in recent years, surgeons have demonstrated that people may look younger with volume augmentation alone.[108,109] By combining these approaches – adding volume in some areas, subtracting volume in others, and by repositioning ptotic tissue, the surgeon has the ability to sculpt facial shape and more accurately restore the contours of youth.

The repositioning of ptotic tissue is the principle objective which has interested surgeons since facelift surgery began. Many methods have been described. The choice of technique will depend on the individual patient's aesthetic diagnosis, the patient's desires, and the surgeon's comfort level with a certain procedure. While differences between surgical techniques can be significant, many commonalities exist. In this section, the classic subcutaneous facelift will be described and

the fundamental issues which pertain to all facelift techniques will be reviewed. (The various methods specifically designed to manipulate the deep tissues of the face will be described later, in Chapters 11.2–11.8.)

Subcutaneous facelift

The first facelift, which dates from the early 20th century, was a simple skin incision at the temporal hairline and anterior to the ear; several authors lay claim to this innovation.[9–11] This method soon evolved into a subcutaneous dissection of a large random pattern skin flap which was shifted in a superior-lateral direction.[24,26] Still used today, this classic procedure tightens excess skin, and relies completely on skin tension to shift underlying facial soft tissue against the force of gravity. The advantages of the subcutaneous facelift are that it is relatively safe, it is easy to do, and patient recovery is rapid. For the thin patient with excess skin, and minimal ptosis of deep soft tissue, this procedure is effective. However, the reverse, namely a heavier patient with significant ptosis of deep tissue, is a poor candidate. The inherent disadvantage of the "skin-only" facelift is that skin placed under tension to support heavy underlying soft tissue will stretch, leading to a loss of surgical effect. An attempt to overcome this problem with excess skin tension may lead to distortion of facial shape, abnormal re-orientation of wrinkles, and local problems at the incision line including stretched scars and distorted earlobes.

Facelift incisions

The purpose of a facelift incision is two-fold. First, the incision allows elevation of a flap which provides access for surgical manipulation of the deep tissues of the face. Second, the resulting skin flap can be repositioned with excess skin being removed along the incision line; this is the primary goal of a skin-only subcutaneous facelift. Generally, the incision is hidden by the hair and by contours of the ear.

In the temple area, the incision can be placed in the hair, at the anterior hairline, or a hybrid of the two, with an incision in the hair plus a transverse extension at the base of the sideburn (*Fig. 11.1.13A,B*).

The advantage of the incision in the hair is that it is hidden, but when the flap is drawn up, the anterior hairline and sideburn will shift, the degree of this depending on skin laxity. If the incision is placed at the anterior hairline, the scar is potentially more visible, but there will be no shift of the hairline. A transverse incision at the base of the sideburn is a compromise solution, which ameliorates much of the hairline shift, while preserving a largely hidden scar. Other compromises have been described.[110] Several factors should be assessed before committing to an incision within the temple hair. First, a preoperative estimate of skin redundancy will give the surgeon some sense of how far the skin flap will move. The distance between the lateral orbital rim and the temporal hairline should be assessed. In youth, this distance is generally <4–5 cm, while in older patients, the distance increases.[111] If the distance is already excessive, or if the expected movement of the temporal hairline will create a distance over 5 cm, then an incision in the hair should be avoided (*Fig. 11.1.13C*). On the other hand, patients must be

informed that the alternative incision along their temporal hairline may result in a more visible scar. Because of this problem a number of solutions have been devised along the temple hairline including beveling the incision to encourage growth of hair through the scar and the use of zig-zag incisions.[112,113] In any circumstance, the anterior hairline incision should be meticulously sutured under minimal tension. Also, the patient's wishes should be taken into consideration prior to surgery, because the location of the incision in the temple is inevitably a compromise and the patient may have preferences which will influence the surgeon's choice.

Anterior to the ear, the incision can be pre-tragal, or along the tragal edge (*Fig. 11.1.13D,E*). The advantage of the tragal edge incision is that it is hidden, but care must be taken to thin the flap covering the tragus in order to simulate a normal tragal appearance. Furthermore, as pointed out by Connell,[111,114] the tragus looks like a rectangle, with a top and a bottom, and to preserve a distinct lower border, a short transverse cut at the inferior end of the tragus (the incisura) should be done. Before committing to a tragal edge incision, the quality of tragal skin and that of facial skin must be compared; if the difference is too great, drawing thick cheek skin onto the tragus may be problematic because the skin covering the tragus will not be anatomically appropriate. Therefore, in certain cases, a pretragal incision is preferred. For example, in men, the pretragal approach may be beneficial if it appears that thick-bearded skin will be drawn up onto the tragus and the surgeon is concerned that removing hair follicles and thinning the flap will not ameliorate the appearance of cheek skin on the tragus. Elsewhere in front of the ear, the superior portion of the incision should follow a curved line along the helix, and a slightly straighter curve along the anterior attachment of the earlobe; a long, straight line incision in front of the ear should be avoided.

Around the earlobe, the incision can be place either in the cleft of earlobe attachment or 1–2 mm distal to the cleft, leaving a cuff of skin along the earlobe. This cuff will ease the process of insetting the earlobe on skin closure.

In the retroauricular sulcus, the incision can be placed directly in the conchal groove as it courses superiorly. Various landmarks have been described to determine how high to carry this incision. These include the level of the external auditory canal, or slightly higher, at the level of the antihelix.

A significant surgical decision is whether to extend the postauricular incision across the non hair baring skin into the occipital region. Generally speaking, the occipital incision should be made when there is a need to remove excess redundant neck skin. A "short scar" facelift is one which avoids the occipital incision, and will suffice for many patients.[115] If the incision is kept short, the lateral neck is accessed from the earlobe and retroauricular incision, and any bunching of skin is redistributed within the retroauricular sulcus. Disadvantages of the short scar technique are that access to deep tissues is somewhat limited, there is a tendency to draw the skin flap in a more superior direction possibly requiring a pre-hairline incision in the temple, and the fact that excess neck skin, if there is any, must be gathered up in the retroauricular sulcus, often creating pleats.

If the decision has been made to extend the incision beyond the retroauricular sulcus, many variations are described, ranging from an incision which goes vertically into the scalp[116] to an incision which courses inferiorly along the hairline of
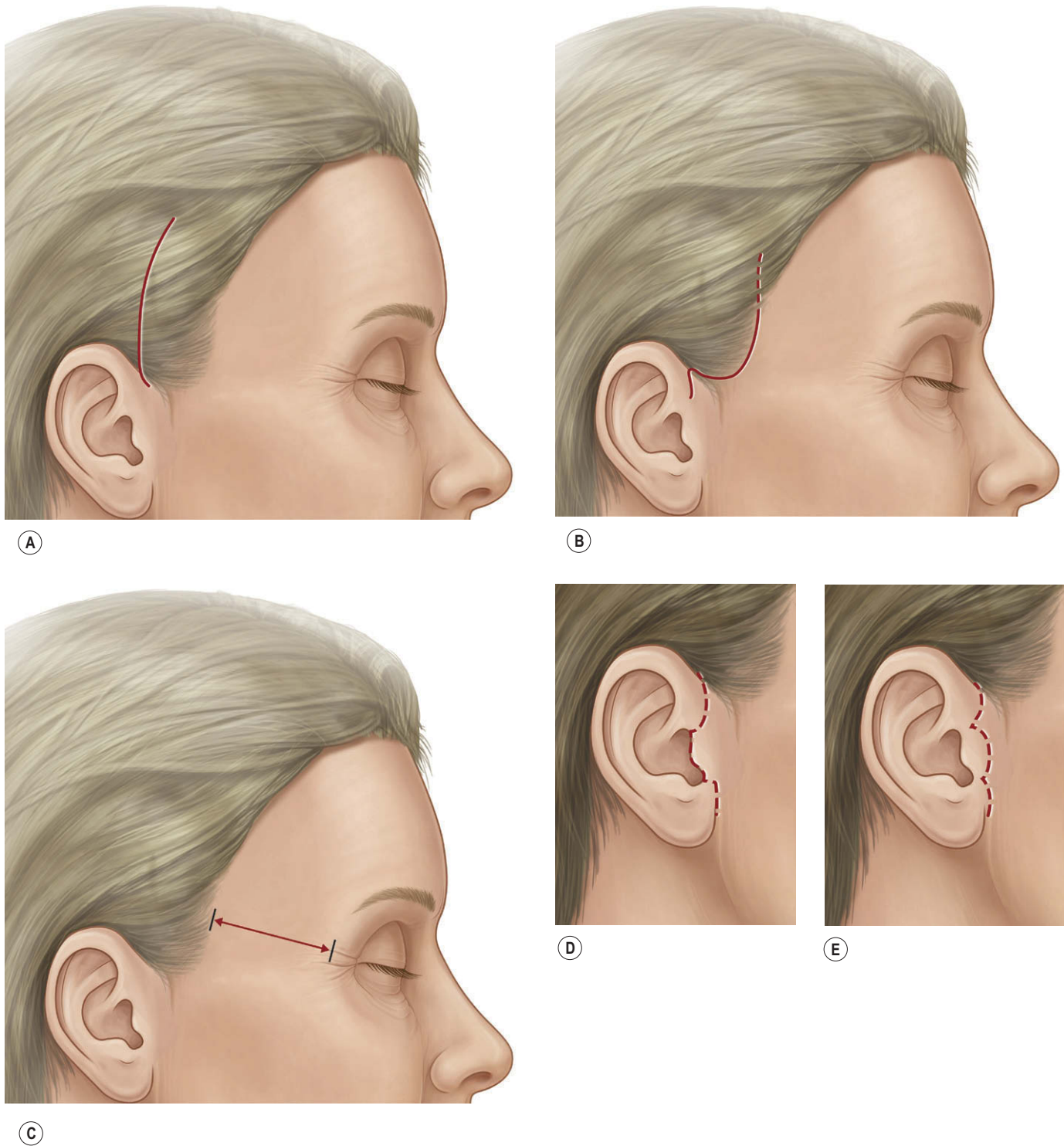
Figure 11.1.13 (A) The traditional hidden incision in the temple hair is appropriate when the temporal hairline will not be shifted adversely. (B) A temple incision along the hairline is used if a hidden incision will adversely shift the hairline. (C) The distance from the lateral orbital rim to the temporal hairline should not exceed 5 cm (D) The retrotragal incision follows the edge of the tragus. (E) The pretragal incision is placed in the pretragal sulcus.

the neck. Most commonly, surgeons use an incision which is between these two extremes. The principle objectives for the occipital incision are to gain access to the neck in order to take up redundant neck skin, while making the incision as invisible as possible with little or no distortion of the occipital hairline. If a small amount of skin is going to be removed, the retroauricular incision can curve posteriorly into the occipital hair from the retroauricular sulcus. If more skin from the neck is going to be removed, this approach could create a notch in the posterior hairline, so a called "lazy S" pattern can be used, where the incision follows the occipital hairline for 1–2 cm, before angling more posteriorly into the scalp. A

Figure 11.1.14 When there is minimal skin shift expected, the incision is limited to the retro-auricular sulcus only ("short scar" technique). When more skin shift is expected, especially from the neck, the incision is extended across nonhair-baring skin into the occipital hair. A wide range of patterns for this extension have been described, ranging from a vertical incision down to an incision that follows the hairline. Most surgeons follow a course somewhere in between, as in this photo where a "lazy S" follows the occipital hairline for 1 or 2 cm before entering the occipital hair.
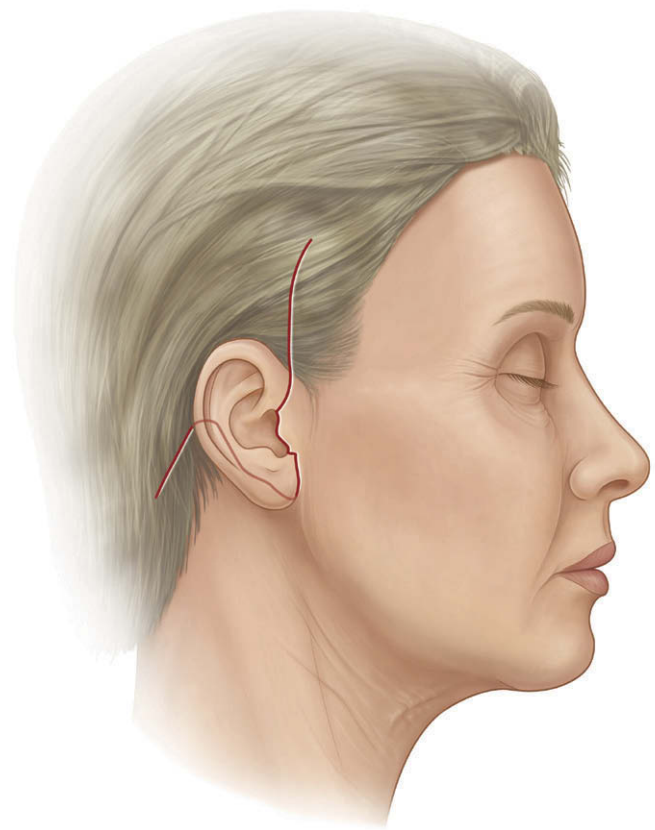

Figure 11.1.15 The traditional incision for a facelift flap curves vertically or slightly anteriorly in the temple, follows the contours of the ear, both anteriorly and posteriorly, and then angles into the posterior scalp.

rough guide is to use the lazy S approach if 2 cm or more of neck skin is to be removed at the incision line.[117] This approach allows an adequate excision of skin without a stair-step deformity, while hiding the lower, potentially most visible part of the scar in the wispy hair of the lower occipital scalp *(Figs 11.1.14, 11.1.15)*.

Either the temple dissection or the post-auricular dissection can be done first, depending on surgeon preference. The dissection is usually begun with a scalpel, for the first 1–2 cm, at which point many surgeons switch to scissors. In the post-auricular area, the flap is firmly attached to the deep cervical fascia of the sternocleidomastoid and the mastoid. Also, this is the most common location to see skin flap necrosis, so the flap should be raised sharply under direct vision, keeping the dissection against the underlying deep fascia in order to maintain flap thickness. As the dissection continues inferior to the earlobe level, the surgeon must be cognizant of the great auricular nerve, where it is most at risk over the posterior border of the sternocleidomastoid. By keeping the dissection in the subcutaneous plane, the great auricular nerve will be protected.

In the temple, if the incision has been made along the anterior hairline, dissection is begun directly in the subcutaneous plane. If the incision has been made in the hair baring scalp of the temple, dissection can be carried out in one of two planes: superficial to the superficial temporal (temporoparietal fascia) which will continue directly into the subcutaneous facelift plane, or between the superficial temporal fascia and the deep temporal fascia. If the deeper approach is used, the dissection proceeds quickly against deep fascia, but at the

anterior hairline, the dissection plane must transition into the subcutaneous facelift plane. This change of plane results in a narrow ribbon of superficial temporal fascia which will contain the superficial temporal artery and vein and branches of the auriculotemporal nerve. This is known as the "meso-temporalis", and must be divided, often requiring ligation of the superficial temporal vessels. The argument in favor of the deeper dissection is to protect temporal hair follicles, although vessels and a nerve must be sacrificed *(Fig. 11.1.16A)*. The superficial plane has the reverse attributes: vessels and nerves within the superficial temporal fascia are preserved, but the hair follicles can be injured during the dissection unless care is taken *(Fig. 11.1.16B)*.

Anterior to the anterior hairline, the subcutaneous plane is then developed. Commonly referred to as the "facelift plane", the level of dissection normally leaves about 2 mm of fat on the dermis. This results in a large random pattern skin flap the survival of which will entirely depend on the subdermal plexus. In the upper face, this dissection continues anteriorly until the orbicularis oculi is encountered where it encircles the lateral orbital rim. Depending on the type of deep plane surgery planned, the mid-cheek dissection may stop short of the malar fat pad (see Ch. 11.7), or alternatively, carry on over the fat pad, freeing it from the overlying skin in the temple and cheek (see Ch. 11.6). Lower in the cheek, immediately anterior to the ear and the earlobe, the skin is tethered to underlying structures by secure fascial attachments (variously named: platysma auricular fascia, parotid cutaneous ligament, and Lore's fascia). Beyond this area, the subcutaneous
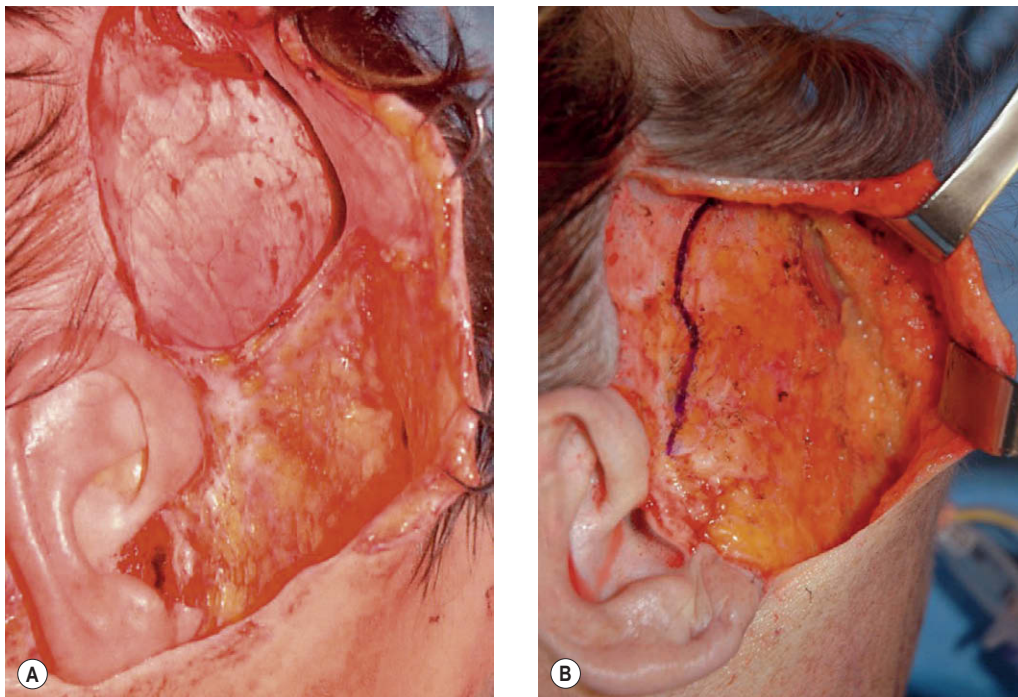
Figure 11.1.16 (A) Facelift flap has been raised in two different planes, initially deep to the superficial temporal fascia, against the deep temporal fascia (seen as an oval window), with a change of planes near the anterior temporal hairline into the subcutaneous plane. The "mesotemporalis" is a bridge of tissue which develops between these two planes. In order to unify the planes, it has been divided with ligation of the superficial temporal artery. (B) Facelift flap has been raised in a single subcutaneous plane, with dissection directly on the superficial temporal fascia and deep to the hair follicles of the scalp. The purple line outlines the course of the anterior branch of the superficial temporal artery.

dissection proceeds relatively easily. Once the skin flaps anterior and posterior to the ear have been raised, the two dissections are joined. The extent of the facelift flap dissection into the cheek and neck will depend on the type of deep tissue technique being employed (see Ch. 11.2). When a submental incision is done with midline platysma muscle plication (Ch. 13), there will be traction on the cervical skin toward the midline of the neck. In that circumstance it is important to widely mobilize the cervical skin from the underlying platysma in order to allow the cervical skin to be redraped along a vector opposite to that in which the platysma is being moved. If, on the other hand, there is no submental incision, the neck dissection can be more limited (*Figs 11.1.17, 11.1.18*).

Deep tissue surgery

The subcutaneous facelift flap does two things – it allows for reposition and removal of excess facial skin, and it provides access to the deep tissues of the face. Techniques to address the deep tissues of the face will be reviewed in Chapters 11.2–11.8. These will include: SMAS plication, loop sutures (MACS lift), SMASectomy, subSMAS with skin attached, sub SMAS with separate skin flap, and subperiosteal.

Skin flap mobilization and closure

Video 4

Once the deep tissues have been managed, skin flap mobilization and closure must be done accurately and with care. Despite masterful deep tissue surgery, errors made on skin closure can create some of the most obvious of facelift deformities. At all times, the skin should be considered a covering layer, not a structural one. Therefore, skin flap repositioning should be seen as a removal of redundancy rather than a method to hold up ptotic soft tissue. Most techniques advance
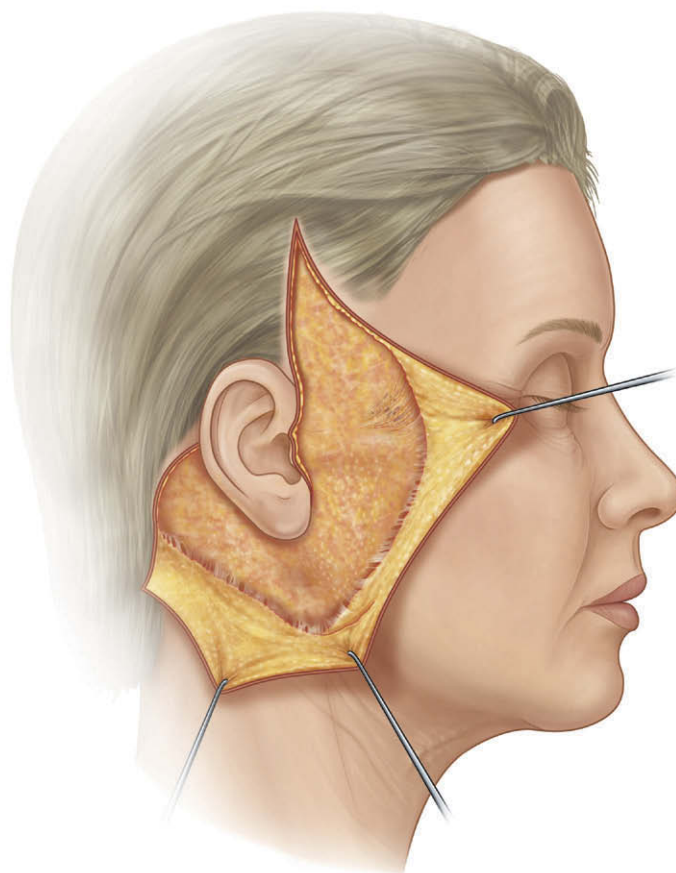

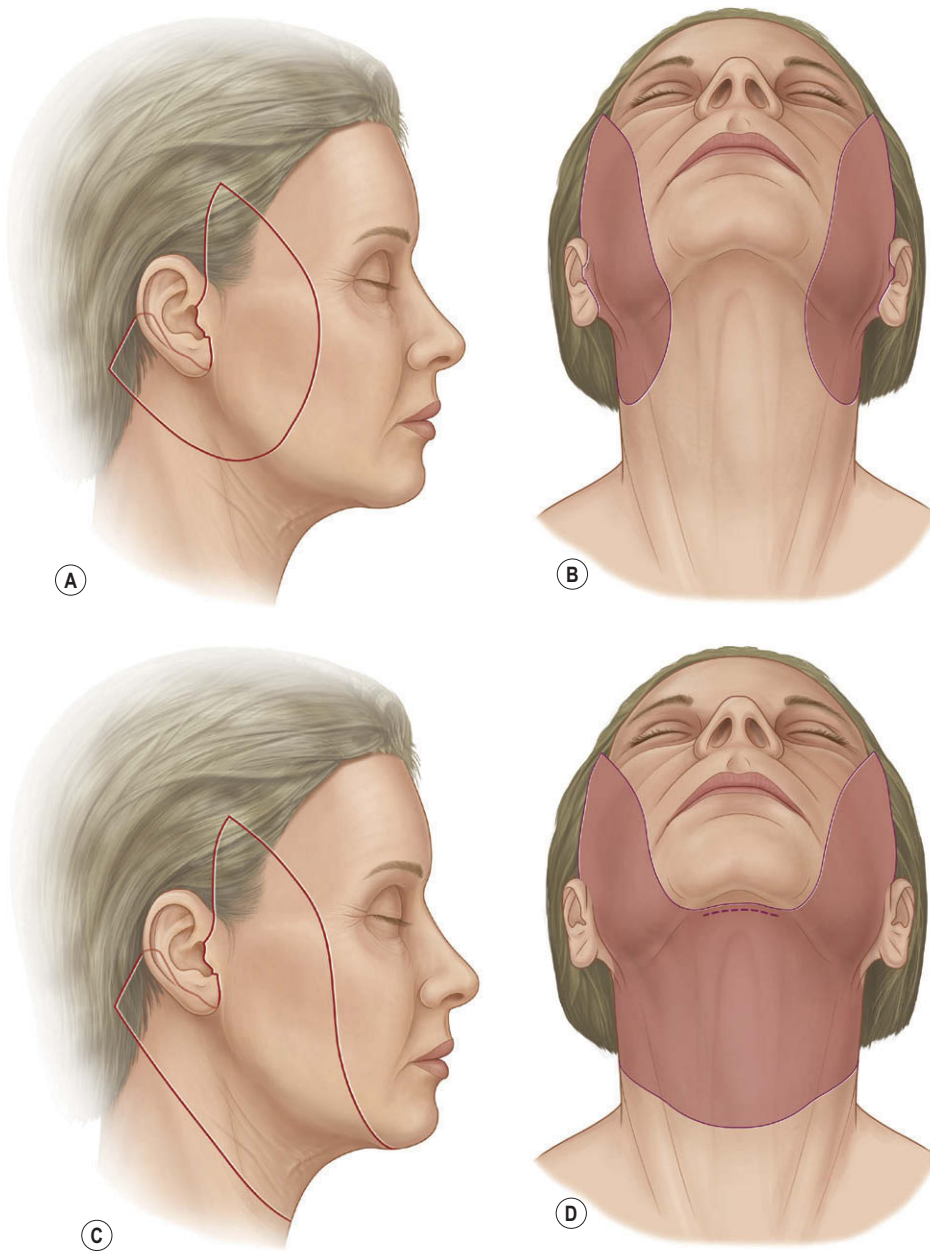**Figure 11.1.17** Subcutaneous facelift flap has been raised.

Figure 11.1.18 (A) Traditional subcutaneous flap dissection with no submental incision. (B) Traditional subcutaneous flap dissection with submental incision.

the skin flap along an oblique vector which is slightly less vertical than the vector for repositioning deep tissues. In certain techniques, surgeons employ a nearly vertical vector to the skin flap (Ch. 11.4). One concept is to place the skin flap "where it lies", using the vector which facial skin naturally assumes when the patient is lying in the supine position. This is based on the theory that we all look better lying on our back with facial skin redraping itself in a natural direction (Fogli, pers. comm.). A common guide is to advance the skin flap toward the temple along a vector which is perpendicular to the nasolabial fold. This is also approximately along the line of the zygomaticus major muscle. A skin flap marker can be very useful in determining where the skin should be incised. The anterior anchor point is immediately adjacent to helix of the ear at the junction of the hair baring scalp. This will be the

first of two anchor points; it can be held in place with a half buried mattress suture in order to minimize the chance of a visible suture mark (*Fig. 11.1.19*).

Posteriorly, the skin flap should be drawn along a vector which roughly parallels the body of the mandible. The second anchor point will be at the superior most extent of the postauricular sulcus at the point where the incision starts to transition posteriorly. Once again, a half buried mattress suture can be used. At this point, trimming of the overlapping flap and suturing can be done in the temple and in the occipital region; the order is based on surgeon's preference. During this process, the facelift flap is redraped in the desired direction with gentle tension. Attention is then turned to trimming excess skin around the ear, with absolutely no tension on the closure. If a tragal edge incision is used, the tragal flap is
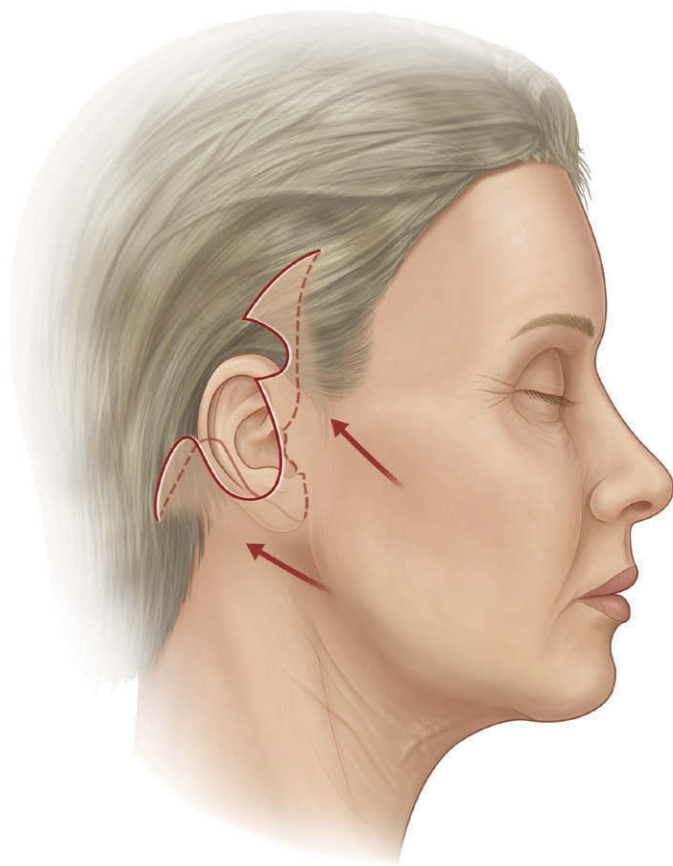
Figure 11.1.19

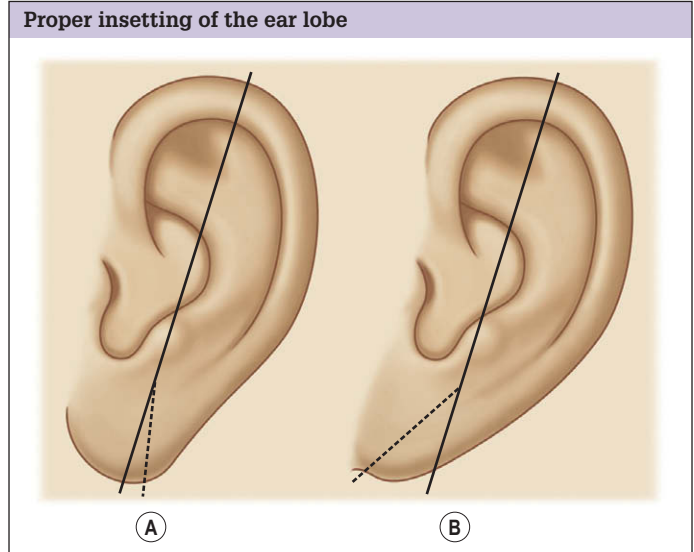**Proper insetting of the ear lobe**

Ⓐ   Ⓑ

Figure 11.1.20 The earlobe should be inset with the long axis of the earlobe (dotted line) about 15° posterior to the long axis of the ear itself. If the earlobe is pulled forward, an unnatural appearance results.

Figure 11.1.19 Diagram shows typical skin flap redraping along an oblique direction which is slightly less vertical than the vector along which deep tissues are moved. There is considerable variation in this however; some techniques involve a more horizontal vector (dual plane extended SMAS, see Ch. 11.6), while other techniques utilize a nearly vertical vector (MACS, see Ch. 11.4).

thinned and hair follicles are removed. In the retroauricular sulcus, there is normally little or no skin to be trimmed if the posterior flap has been correctly positioned. Earlobe inset is done last and is designed to angle 15° posterior to the long access of the ear *(Fig. 11.1.20)*.[114,117]

Skin trimming around the ear should be guided by having no tension on the sutures when the wound is closed. Tension on the earlobe can lead to distortions such as the pixy ear deformity and the malpositioned earlobe, both of which are difficult to correct (see Ch. 12).

Neck surgery

The basic principles of neck surgery will be covered here. (Surgical rejuvenation of the neck is reviewed in Chapter 13.) Like the face, the layers of the aging neck must be assessed independently in order to devise an appropriate surgical plan.

Superficially, the skin of the neck is typically thinner and less elastic than facial skin. With age, further skin laxity develops, causing vertical wrinkles and pleats. These can be corrected by tightening the skin in a posterior oblique direction. Some surgeons believe that such a correction should be accompanied by superior oblique repositioning of the underlying platysma.[118,119] With age, subcutaneous fat usually

accumulates in the anterior neck, although this is highly variable; in some thin individuals, there may be little or no subcutaneous fat in the neck. If subcutaneous fat is the only problem, and the skin is firm, or will be surgically tightened, the fat can be simply removed with closed liposuction.[120]

Deep to the fat, the paired platysma muscles have well recognized variations in their anatomy. The majority (roughly 75%) of necks exhibit interdigitation of the platysma muscles in the submental region for the first 1–2 cm behind the chin.[121,122] The remaining 25% either overlap extensively, or do not overlap at all *(Fig. 11.1.21)*.

With age, there appears to be a loss of tethering of the platysma muscles to the deep cervical fascia, analogous to the loss of tethering of the orbicularis oculi along the infraorbital rim. As a result, the platysma seems to fall away from the cervical mandibular angle and the sharp angle of youth gives way to the obtuse angle of age. The visible bands, which develop with age, are normally the leading edge of the paired platysma muscles, but clinical experience has demonstrated these visible bands may also represent pleats in the redundant muscle just posterior to their leading edge. Bands are considered either static (present at rest), or active (only present on animation). There are two different surgical options to deal with platysma bands in the anterior neck. One approach involves mobilizing the posterior borders of the paired platysma muscles, drawing them in a superior oblique direction and fixating the muscle to firm fascia (platysma auricular fascia, or the Lore's fascia component).[83,118]

Alternatively, the paired platysma muscle can be drawn medially, and approximated in the midline of the neck.[28,123] Access for this is through a 2–3 cm incision placed adjacent to or in the submental fold. Through this submental incision, several anatomical structures can be addressed directly: subcutaneous fat, subplatysma fat, the platysma muscles, digastric muscles, and the submandibular glands. A common approach is to remove excess subcutaneous and subplatysma fat, to approximate the anterior platysma muscle edges
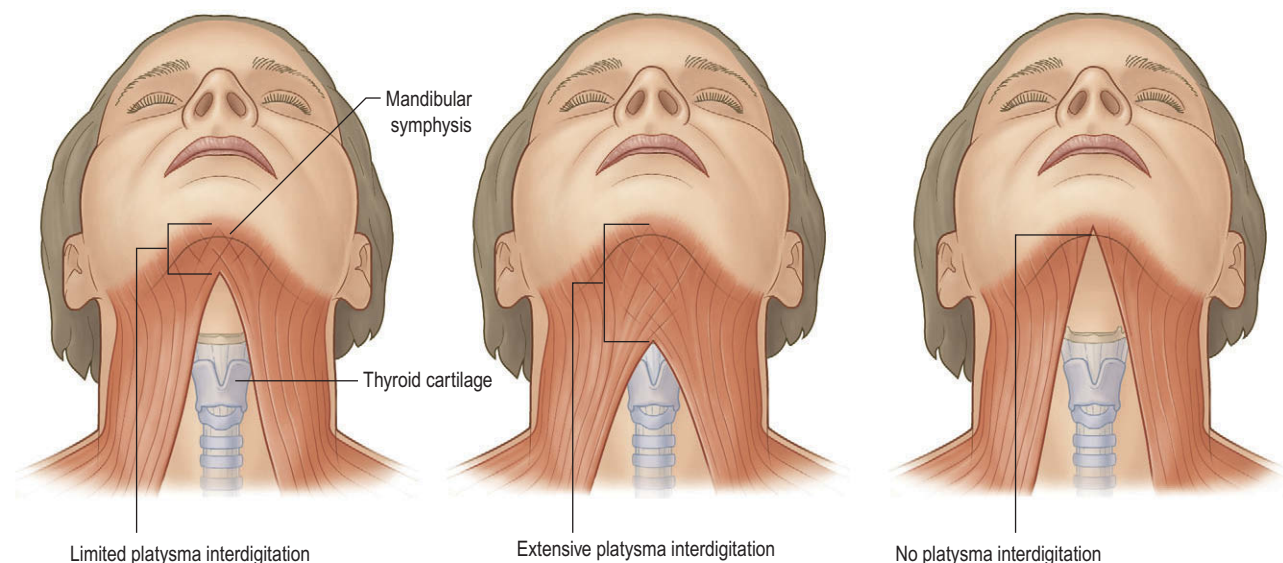
Figure 11.1.21 Three types of platysma anatomy.

centrally and to do a partial transection of the muscle inferiorly. Some surgeons advocate multiple rows of sutures to aggressively advance the platysma muscles medially: the corset platysmaplasty.[124] Deep to the platysma, excess subplatysmal fat may be removed, hypertrophic digastric muscles can be thinned and ptotic submandibular glands can be corrected by repositioning or by partial excision.[125,126]

In some facelift cases, only minimal correction of the neck is required and a facelift with deep tissue advancement will supply adequate correction. Conversely, in patients concerned only with the neck, this can be treated as an isolated procedure utilizing a number of different techniques: isolated liposuction, liposuction plus platysma plication and transection, or a retroauricular approach to tighten the platysma posteriorly.[127] If after submental surgery, there is skin laxity, it can be tightened with an isolated retroauricular incision, or with a full subcutaneous facelift.

In some older males, the preferred procedure may be a direct neck excision of excess skin, leaving a scar in the midline. This can be done with a zig-zag pattern or with a vertical ellipse broken up with two or more Z-plasties.[128]

In the typical case of the aging neck, there is usually a combination of factors (skin laxity, excess fat, and lax platysma muscle). In such a scenario, there is controversy as to how aggressive to be with surgical treatment. While most surgeons agree that a youthful neck contour is one of the principle objectives of facelift surgery, many fear the possibility of creating the "overdone" neck. And while some surgeons feel that any platysma banding warrants open surgery, others virtually never do an open neck procedure, relying instead on liposuction and posterior-superior platysma traction. Some surgeons feel that ptotic submandibular glands should always be addressed while others feel it need never be done. The implication of these opposing opinions is that a perfect, universal procedure for the neck probably does not exist, and surgeons must individualize their approach to variations in anatomy and patient expectations.

Ancillary techniques

Browlift surgery and blepharoplasty

Facial aging rarely occurs in a regional fashion, and is typically a pan-facial phenomenon. Therefore, a comprehensive approach to facial rejuvenation is normally required to achieve a harmonious result. For many patients, surgery for the brow (Ch. 7) and the eyelids (Ch. 8) are critical components of a global approach for which a facelift would be only part of the solution.

Volume removal

With radial expansion of the lower third of the face, many patients require fat removal. Subcutaneous fat can be removed either by direct excision or with liposuction. In the cheek, this is often done on a limited basis for the jowls, especially in cases where jowls cannot be corrected by soft tissue elevation alone. Removal of deep fat can be done by partially removing the buccal fat pad, which can be approached through a facelift dissection or through an incision in the upper buccal sulcus. In the neck, superficial fat can be removed using liposuction or by direct excision through a submental or a facelift incision. Fat deep to the platysma can be removed using direct excision through the submental approach. In all cases of fat removal, caution is advised because of the potential defects which can be produced when too much fat is removed.

Volume augmentation

Long-term experience with elevating deep facial tissues has shown this approach to add some fullness to the middle third of the face (see Chs 11.2–11.8). However, a more complete result can be obtained if specific volume augmentation is done. The addition of volume can be accomplished with a number of different methods including: synthetic implants

(cheek implants, submalar implants, orbital rim implants), injectable synthetic fillers, hydroxy appetite granules or injected fat (all of which are reviewed in Chs, 4, 14, and 15). In particular, the harvesting, processing and injection of micro-droplet fat grafts (lipofilling) have undergone great technical improvements.[70,129]

This technology is now reproducible, and for many surgeons is a major component of their facelift technique.[130,131] There is a high rate of fat graft take after fat injection in the middle third and upper third of the face; in fact significant over-grafting should be avoided in the periorbital area because of the propensity for visible ridges and lumps if excess fat grafting has been done. Fat grafting is less reliable around the vascular, mobile lips. Specific areas which are commonly grafted in conjunction with facelift surgery fat are the periorbita (orbital rim, upper lid sulcus, and the tear trough), the mid-facial groove, and the malar prominence. The depth of injection can be in the superficial fat layer (superficial to SMAS), or in the deep fat layer. As mentioned above, it has been proposed that the deep medial fat compartment may play a unique role in support of soft tissue in the mid face, suggesting the benefits of fat grafting this zone.[64] Fat injection can be done independently, or in combination with facelift surgery. When done in conjunction with facelifting, it is usually done first, before the facelift flap has been raised.

Video 5

Midfacelift (blepharoplasty approach)

In an attempt to lift the tissue immediately inferior to the infraorbital rim (the midface), an approach through the lower lid was developed.[132] This involves a subciliary or a transconjunctival blepharoplasty type incision followed by a dissection down over the face of the maxilla. This procedure can be done in the subperiosteal plane, which requires an inferior periosteal release, or it can be done in a supraperiosteal plane.[133] After mobilization of the cheek mass the soft tissue is fixated superiorly, either laterally along the lateral orbital rim,[132] or more vertically with anchoring to the bone of the infraorbital rim.[134] Disadvantages have included the learning curve necessary for surgeons to feel comfortable with this approach and a significant incidence of revisions for malposition of the lower eyelid.[135] An alternative approach to the midface is endoscopically through the temple. This procedure is described in detail in Ch. 11.2.

Lip procedures

The aging face often develops changes in the perioral region, but a facelift will not affect the perioral region to any appreciable degree. Common changes include elongation of the upper lip as measured from Cupid's bow to the base of the columella, a thinning of the vermillion, and the development of perioral rhytides.

Elongation of the upper lip is highly variable, but if present, tends to hide the upper teeth, in some cases almost eliminating the normal upper dental show on smiling. It has been estimated that the ideal distance from Cupid's bow to the base of the columella is 15 mm.[136,137]

The upper lip can be shortened by performing a skin excision along the contours of the base of the nose (bull horn pattern). Skin is excised, with the direct approximation of skin acting as a subcutaneous lift. Disadvantages include a

Figure 11.1.22 Pre- and postoperative photographs of a lip-shortening procedure using a bullhorn-shaped incision along the nostril sill.

potentially visible scar and a certain degree of relapse making revisions common *(Fig. 11.1.22)*.

Alternatively, a strip of skin can be removed along the vermillion border, advancing the vermillion superiorly. This has the advantage of immediately increasing the apparent width of the vermillion lip, but the disadvantages that the white roll is eliminated and a permanent scar will be left along the vermilion border. Women can deal with this by using lipstick, but this is usually a life-long commitment when the scar is visible.

Lip augmentation can be done with many different techniques. Commonly used methods include: injectable fillers (Ch. 4), injected fat, dermal fat graft, acellular dermis and SMAS grafts. Many different human tissues, and many synthetic materials have been used to thicken lips. Depending on the technique used, problems have included resorption and loss of effect, permanently over filled lips, distorted shaped lips, immobile lips, and in some cases tissue necrosis from vascular compromise. Attempts to augment the lip along the vermillion border lead to a duck like appearance, while augmentation along the wet dry junction is more likely to achieve a normal appearing lip.

Perioral rhytides are a common finding in the facelift age group. They can be effectively treated at the time of surgery

with resurfacing procedures. Options include chemical peel, surgical dermabrasion or laser treatment. (These techniques are discussed in Chapter 5.) The most common problem is permanent depigmentation when the resurfacing has been overly aggressive.

Dressings

Some surgeons feel that dressings after facelift surgery are not necessary, but most surgeons use light dressings to protect the incisions and to act as an absorbent for wound drainage. Dressings should not be tight or constrictive, but rather soft and comfortable. The initial dressing is normally removed on the first postoperative day.

Postoperative care

In the initial postoperative period, the patient is kept still and blood pressure is monitored closely. Any signs of blood pressure increase should be taken very seriously; the patient is examined for possible causes (pain, anxiety, urinary retention) and appropriate measures taken. If the increase in blood pressure is endogenous, it should be treated pharmacologically. If the surgical procedure has been long (>3 h), sequential compression devices are kept on the legs in recovery room until the patient can ambulate normally. The patient is then encouraged to get out of the bed with assistance, in order to walk to the bathroom. The patient's positioning involves keeping the head of the bed elevated, but avoiding flexion of the neck. Avoiding the use of a pillow for 10–14 days will help keep the patient's head in a neutral, non-flexed position. Cool packs to the face will increase comfort and help decrease swelling. Analgesics and antinauseants are used as necessary. In some jurisdictions, patients are discharged home, but in other settings, patients are kept under the care of a medically trained individual for the first night after surgery. On the first postoperative day, the patient is reviewed, paying particular attention to the possibility of a hematoma, the dressings are changed or removed, and drains are removed. After the first day, options include another light dressing, a commercially available "chin strap", or no dressing at all. Patients are usually permitted to have a shower and wash their hair when the incisions are sealed from the environment – usually 2–4 days postoperatively. Subsequently, patients are seen for dressing changes, suture remove and wound inspection, at intervals up to 7–9 days when the final sutures are removed. Typically, there is a return visit at 2–3 weeks and then again between 6 and 8 weeks. Photographic documentation of the surgical result should be deferred for at least 6 months to allow for all postoperative swelling to settle completely.

Surgical complications

Hematoma

Postoperative hematoma is the most common facelift complication, and has a reported incidence of 2–3% in women. The incidence in men has been reported up to 8%, although this can be decreased to 4% through meticulous surgery and postoperative blood pressure control.[138,139] Numerous variables

Figure 11.1.23 Postoperative hematoma in a hypertensive male. Note the ineffective suction drain.

have been explored, including dressings, drains, fibrin glue, and platelet gel. A positive association has been found when simultaneous open neck surgery is done, with patients taking platelet inhibitors such as Aspirin and anti-inflammatories, with hypertension in the postoperative period, and with the rebound effect when the epinephrine wears off postoperatively.[140,141] Hematoma prevention involves avoiding these variables as much as possible. Hematomas typically develop in the first 12 h after surgery. If an expanding hematoma is identified it should be promptly drained. If skin flap compromise is suspected and there is a delay in returning to the operating, a temporary solution can be the removal of sutures in order to relieve pressure *(Fig. 11.1.23)*.

Sensory nerve injury

The terminal branches of sensory nerves to a facelift flap are routinely divided when the flap is raised. The consequence is a self-limiting paresthesia which usually recovers completely in 6–12 months. The great auricular nerve is the major sensory nerve at greatest risk for damage during facelift surgery. Transection will lead to numbness of the lateral portion of the external ear as well as skin anterior and posterior to the ear. A painful neuroma can also develop. If knowingly transected during facelift surgery, either partial or complete, it should be repaired intraoperatively. A portion of the zygomaticofacial nerve is often transected when the malar fat pad is lifted; this will lead to numbness of the lateral cheek, which will continue to improve for over a year. In this area, some permanent numbness is possible.

Motor nerve injury

Damage to a facial nerve branch can easily go unnoticed by the surgeon until muscle paralysis is identified postoperatively. Immediately after surgery, in the recovery room setting, facial nerve paresthesias are extremely common and are usually caused by the lingering effects of local anesthetic. Once the temporary anesthetic effects are gone (approx. 12 h for bupivacaine), persisting dysfunction may be due to

surgical traction or the effect of cautery near a nerve branch; these issues can be expected to resolve spontaneously over days or weeks. If a facial nerve branch has been transected or wrapped in a suture, complete functional recovery may still be possible if the target muscle receives collateral innervation. The anatomic issues were discussed earlier. The most commonly injured branches are thought to be the buccal branches, although long-term sequelae are rare due to multiple interconnections between nerve branches. Damaged temporal or marginal mandibular branches are less likely to recover because they are terminal branches with less collateral support. Fortunately, permanent paralysis of any degree is a rare event, and has been reported as being less than 1%.[142]

Unsatisfactory scars

Depending on the incision chosen, scars can potentially be obvious and deforming. Improper placement of incisions can lead to distortion of the ear and unnatural shifting of the hairline. Excessive tension can lead to loss of hair, depigmentation and widened scars. Some scars can be improved with scar revision at a later date. Hypertrophic scars can be dealt with by steroid injection, and scar revision if necessary. (These issues are discussed in Chapter 12.)

Alopecia

Loss of hair can occur along the incision line or within the hair baring scalp which has been raised as a flap. The usual cause is excess tension at the incision line. However, if a flap of hair baring skin is raised, follicles can also be damaged by the dissection itself, by cautery, or by traction on the flap. Permanent hair loss can be treated in some cases by mobilization of an adjacent flap of hair baring scalp. However, for significant alopecia, achieving adequate coverage with hair growth in the proper direction is best achieved with micro-hair-grafting (Ch. 23).

Skin loss

Facelift dissection creates a large relatively thin random pattern skin flap which is then placed under tension; it has a remarkable ability to survive. Factors which can contribute to the avascular loss of skin include excessive tension, an overly thin flap, hematoma, constrictive dressings, and perhaps the most damaging of all – smoking. Established skin necrosis should be dealt with conservatively; the majority of such cases will eventually heal spontaneously. Scar revision can be done at a later date.

Figure 11.1.24 Abscess under cervical portion of facelift flap, 1 week after a facelift. This was treated with drainage and antibiotics.

Infection

Infection is reported to be rare in facelift surgery, with various series indicating an incidence of less than 1%.[143–145]

However, most authors with published series have only counted cases requiring surgical drainage or hospitalization. Minor cases of cellulitis and stitch abscesses are likely more common. Should an infection occur, treatment is with surgical drainage, antibiotics and appropriate wound care (*Fig. 11.1.24*).

Conclusion

Facelift surgery has evolved in parallel with our more advanced understanding of the anatomy of facial aging. For over a century, innovative surgeons have developed a wide variety of approaches to treat age related changes. In this chapter we have reviewed surgical anatomy as it relates to facial aging. We have introduced the classic skin-only facelift along with the issues which pertain to preoperative and postoperative patient care. In the coming chapters, various methods of handling the deep facial tissues will be discussed.

Access the complete references list online at **http://www.expertconsult.com**

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