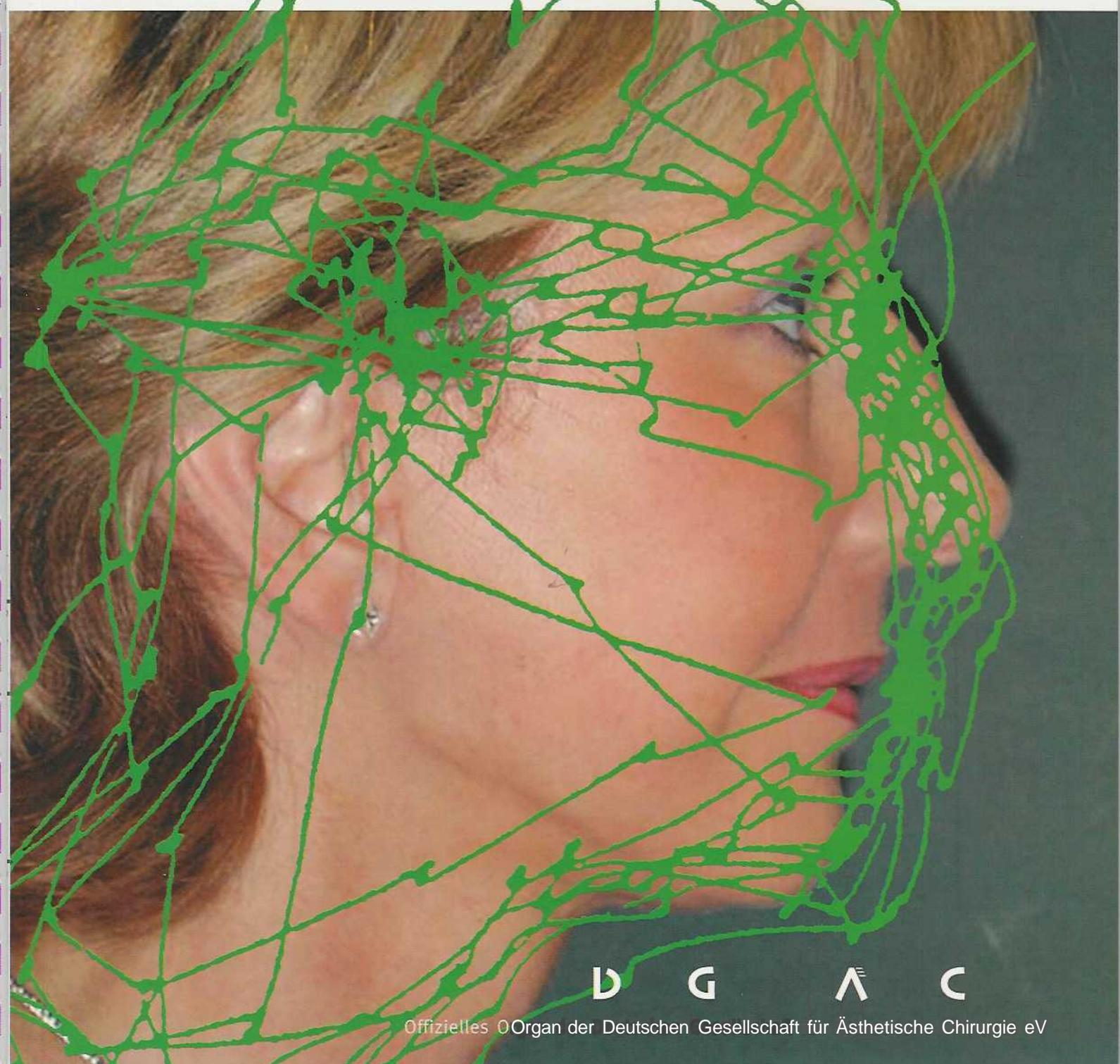


Magazin für **ÄS THETISCHE CHIRURGIE**
Magazine for **AE STHETIC SU, R GERY**



D G A C

Offizielles Organ der Deutschen Gesellschaft für Ästhetische Chirurgie eV

Frank Muggenthaler MD DMD
Department of Aesthetic-Plastic Surgery
Fontana Klinik an den Thermen
An den Heilquellen 8
79111 Freiburg

Timothy J. Marten MD
Marten Clinic of Plastic Surgery
450 Sutter Street, Suite 826
San Francisco, CA 94108, USA

The Art



Zusammenfassung

Die Faceliftchirurgie stellt eine große Herausforderung an den Ästhetisch-Plastischen Chirurgen dar, nicht zuletzt, da es kein Standard-Verfahren mit einer 100-prozentigen Erfolgsgarantie gibt. Gerade für den unerfahrenen mag die Vielfalt der propagierten Techniken verwirrend sein. Tatsächlich sind es sehr viele Schritte bei dieser Operation, die einen Einfluss auf das Endergebnis haben können und da diese einzelnen Massnahmen unterschiedlich miteinander kombiniert werden können, ist die Anzahl der

möglichen Techniken fast so groß wie die der sie anwendenden Chirurgen. So unterschiedlich all diese Vorgehensweisen aber sein mögen, so einfach ist letztlich ihre Bewertung. Die Ergebnisse sind das beste Kriterium für die Effizienz einer Technik, wobei allerdings auch der damit verbundene Aufwand und eventuelle Risiken berücksichtigt werden müssen. Im folgenden werden alle Schritte eines Faceliftings ausführlich beschrieben.

of Facelifting



Introduction

Traditional facelift techniques have relied upon thin flaps of aging skin to elevate and support ptotic, deeper facial tissue. Although initial results were sometimes good, early recurrence of the original deformity was common and poor scars and marginal flap slough frequently were seen due to unavoidable skin flap tension and obligatory wide flap undermining.

As surgeons have pursued an improved outcome our understanding of the aging process has grown and new facelift techniques have evolved. Experience has since confirmed that a superior result is not possible without some modification of the SMAS and platysma and other deep facial structures.

Although techniques vary and a consensus of opinion is unlikely to emerge, any surgeon able to identify the anatomic basis of his or her patient's problems can, through the application of logic and careful planning, select appropriate methods that are safe, effective and rational.

Recognizing the aging deformity

Recognizing the elements of the aging deformity and appreciating the underlying anatomic abnormalities are fundamental to planning any surgical repair. Careful analysis will reveal many, if not most, of these changes that represent primarily "deep layer" problems that will be corrected inadequately with traditional techniques.

Surgeons unfamiliar with deep layer techniques often resort to ancillary procedures to overcome the shortcomings of traditional methods. These include facial liposuction, malarplasty, submalarplasty, geniomandibular groove augmentation ("pre-jowl implant") and facial fat injections. Although sometimes indicated, these will be unnecessary in the majority of cases if deep layer rejuvenation is performed. It also must be remembered that skin is intended to serve a covering function, not a supporting one. Techniques that ignore this fact are flawed by design and are destined to produce unnatural appearances.

Preoperative Planning

It is not possible to design or use a "universal" facelift technique. Each patient will present with a unique set of problems that requires precise anatomic diagnosis and an appropriately planned and individualized surgical repair. Committed study and careful planning will maximize improvement, limit complications, and minimize secondary deformities.

Planning the Temple Incision

The temporal portion of the facelift incision traditionally has been placed arbitrarily within the temporal scalp in a well-intended but often counterproductive attempt to hide the resulting scar. When temporal skin shifts are small and abundant temple and sideburn hair is present, this plan can work well. Patients falling into this category are usually young and troubled by mild cheek deformity only. In many other cases, however, larger skin shifts or the presence of sparse temple hair can result in unnatural and tell-tale displacement of the temporal hairline and sideburn. Typically, patients disfigured in this way are advised to restyle their hair to hide this deformity as can be seen in many published photographs of facelift patients. This recommendation is, unfortunately, of little practical value to those who wear their hair short, up, or back and those who lead active lives in which wind, water, sport and outdoor activity can displace camouflaging wisps of remaining hair. Proper analysis, careful planning, and the use of an incision along the hairline, when indicated, can avert this problem without compromising the procedure. For aesthetic reasons, whenever the temporal hairline will be moved more than 4 cm away from the lateral orbit or the sideburn hair shifted above the junction of the ear with the scalp, consideration should be given to placing the incision along the hairline rather than within the temporal scalp. If it is made with care and sutured under no tension the resulting scar is usually unobtrusive and less objectionable than a displaced hairline.

Planning the Preauricular Incision

Open to scrutiny, the preauricular region exists as a frequent point of reference for those seeking to identify a facelift patient.

Traditionally, incisions here are made well anterior to the crus of the helix and continued inferiorly, anterior to the tragus. This design however, works well only for the unusual patient with cheek and tragal skin of similar characteristics. For these reasons, and in all but the unusual case, the preauricular portion of the facelift incision should be placed precisely along the posterior margin of the tragus, rather than in the pretragal sulcus.

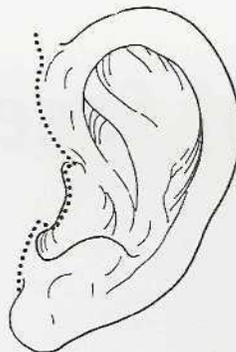


Figure 1

When the preauricular incision (dotted line) is placed along anatomic interfaces, differences in colour and texture are less obvious, and the scar will appear as a reflected highlight. Placing the incision along the posterior margin of the tragus (and not on its inner surface) does not produce tragal retraction or other irregularity if the tragal flap is suspended and trimmed appropriately. A small step in the incision at the inferior tragus is necessary to preserve a distinct inferior tragal border.

Planning the Postauricular Incision

Appropriate planning of the postauricular incision requires that consideration be given to the proper vector along which the postauricular flap should be shifted to produce maximum improvement on the neck, and how the incision location will influence this shift. Contrary to what is usually practiced both careful consideration and direct observation will reveal the proper direction of postauricular flap shift to be in a mostly posterior, slightly superior direction that roughly parallels the mandibular border if optimal result is to be achieved at both the neck and submental areas. As the flap is shifted along a more superiorly directed vector, tension will rise across the cervicomental angle, but a diminished effect will be seen over the anterior neck and submental regions. Keeping these facts in mind, the effect of the plan of the postauricular incision on the direction of flap shift is evident. If the incision is placed on the posterior surface of the concha or forced too high onto the mastoid in an attempt to conceal the scar there, a more superior component of flap shift must be added to close the resulting defect. This will compromise improvement over the anterior neck and submental areas as outlined previously and will result in incorrect excision of skin over the apex of the occipitomastoid incision. This inappropriate shortening of the postauricular flap along the long axis of the sternocleidomastoid muscle is the most common cause of a wide postauricular scar. The postauricular portion of the facelift incision should be marked directly in the existing auriculomastoid groove and the mark turned posteriorly at the level of the superior aspect of the auditory canal. Marking must be made with the ear resting in its natural position. If the ear is pulled forward while markings are made, mastoid skin will be pulled anteriorly over the posterior surface of the concha

and the incision will end up posterior to its intended location in the auriculomastoid groove. This is the most common cause of a misplaced postauricular scar.

Planning the Occipital Incision

Planning the location for the occipital portion of the facelift incision is conceptually similar to that of the temple region. Traditionally, this incision is placed arbitrarily transversely, high on the occipital scalp, in an well-intended but usually counterproductive attempt to hide the resultant scar. In patients in whom neck skin redundancy is small and occipital scalp shift will be minimal, such a plan can be used. Patients falling into this category are usually young and troubled by mild neck deformity only. In most patients however, larger skin shifts will result in the advancement of neck skin into the occipital scalp and "notching" of the occipital hairline. Although not all patients will recognize this deformity for what it is, most are understandably self-conscious of it, especially those who wear their hair up or back or who lead active lives outdoors. Proper analysis, careful planning and the use of an incision along the hairline, when indicated, can avert this problem without compromising the procedure.

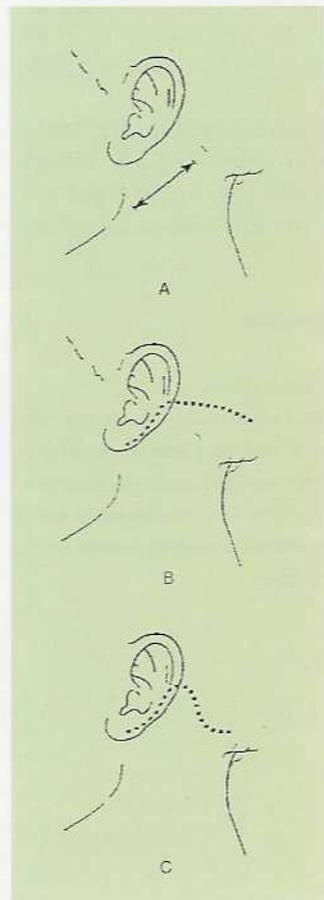


Figure 2

a, When planning the location of the occipital incision, it is important to estimate the skin redundancy on the neck in the predicted posterior-superior direction of flap shift. This is accomplished by pinching up redundant tissue and measuring it.

b, If less than 2 cm of excess skin is present over the upper lateral neck, a "traditional" incision extending posteriorly into the occipital scalp at the level of the middle ear in most cases does not result in objectionable displacement and notching of the occipital hairline.

c, if 2 cm or more of redundant skin is present over the upper lateral neck, consideration should be given to placing the occipital portion of the facelift incision along the occipital hairline in such a manner that no scar is present within the fine hair on the nape of the neck.

Planning Modification of the SMAS and Platysma

Almost all patients undergoing a primary facelift benefit from a posterosuperior advancement of the cheek SMAS. This maneuver serves as the fundamental step upon which all others are based. SMAS advancement provides a natural appearing, long-

lasting correction of laxity in cheek and jawl and will consolidate the lower face. The cervico-submental region of each patient must be examined carefully both at rest and during platysma activation if complete assessment of platysma deformity is to be made. Patients with distinct platysma bands generally require transverse myotomy as part of their treatment. The result is immediate, dramatic, long-lasting, and superior to any suture, suture suspension, or "plication" technique. The length of transection will vary, depending on the deformities present and thus will differ from patient to patient. Complete transection of the platysma is not performed in all patients, and in many necks a subtotal myotomy only is needed.

If submental support is poor or maximum improvement in the anterior neck is desired, anterior platysmaplasty is planned. Anterior platysmaplasty should always be performed after elevation of the cheek SMAS to prevent compromised improvement on the mid-face and jawl. When mild horizontal muscle redundancy is present in the neck, lateral platysmapexy is planned. This is usually effective only over the upper one fourth of the sternocleidomastoid muscle where its fascia is immobile. In thin necks the cut muscle edges can be imbricated (overlapped and sutured "vest over pants"). In fuller necks they usually are trimmed and sutured edge to edge. Suturing over the lower portion of the sternocleidomastoid muscle is unproductive and may lead to distortion and irregular contours.



Figure 3

Full-width platysma myotomy
a, plan For platysma myotomy when poor definition is present along the mandibular border or at the mandibular angle.

b, view after advancement and suture suspension of cheek SMAS and full-width platysma myotomy

Planning Rejuvenation of the Perioral Region

For many patients facial rejuvenation would not be complete without rejuvenation of the perioral region. Although advanced perioral aging generally is appreciated by most of those so afflicted, more subtle deformities may go unnoticed by others when viewed against a background of advanced aging deformity on other areas of the face. These patients must be counsel-

led carefully, as the facelift itself will produce little if any, improvement in these areas. In addition, surgery tends to unmask perioral deformities and to draw attention to them. Dermabrasion is very effective in treating perioral wrinkling. It remains the preferred treatment of perioral rhytids at this time and consistently produces a superior result to that which we have been able to obtain with laser resurfacing.



Figure 4
Patient before and three weeks after
Facelift and perioral dermabrasio

Pan-Facial Rejuvenation

Rarely does isolated aging occur only in the lower face and neck and nearly all our patients requesting facelift surgery undergo forehead and eyelid surgery as well. Many are confused, however, by the term "facelift" and take it to imply correction will be made in these areas. These patients must be counselled carefully as the facelift itself will produce little if any improvement in upper facial deformities and tends to unmask and draw attention to them. Many patients are oblivious to the changes that occur in their foreheads as they age and most are unaware that a procedure exists to correct them. A surgeon seeking the best result must help patients recognize these changes and explain their significance to them. Only then can they appreciate the importance of the procedure.

Preoperative Preparations

All patients undergo a preoperative physical evaluation and any patient with significant medical problems must be cleared by his or her internist or personal physician before surgery. Each patient is asked to avoid agents known to cause platelet dysfunction for 2 weeks prior to surgery, including vitamin E. All patients who smoke are asked to quit and are informed that their risk of serious complications, including flap necrosis and skin slough, is significantly higher than in nonsmokers. It generally should be assumed, however, that most will not, and extra care should be taken to be sure the informed consent is complete in this regard. Fortunately, flap necrosis is dependent upon a variety of factors other than smoking that are under the surgeon's control or are minimized by deep layer design. These include tissue trauma and skin tension. Because deep layer techniques limit skin undermining, preserve important cheek perforators, and avoid excessive tension on delicate cervicofacial skin flaps, a careful surgeon can operate safely on smokers. Indeed, some surgeons allow patients who smoke to do so in the perioperative period and have observed no increase in complications.

Anesthesia

Facelifts can be safely performed in analgesedation or general anesthesia. Both techniques differ nowadays only in the depth of the desired sedation. Local anesthesia is equally administered to eliminate pain and prevent the transfer of pain stimulation to higher central nervous regions. For shorter surgical procedures the analgesedation is well suited. The sedation is realized with intravenous application of Midazolam (DORMICUM, i.v. bolus) or Propofol (DISOPRIVAN, i.v. perfusor). Analgesia can be achieved with Pirtramid (DIPIDOLOR, i.v. bolus) or low concentrations of Fentanyl/Remifentanyl. While spontaneous breathing will be preserved a low flow of oxygen through a nasal catheter will further improve oxygen saturation. Long surgical procedures benefit from an intubation, excluding annoying coughing and airway obstruction by secretion or collapse of epipharyngeal structures.

The Total Intra-Venous Anesthesia (TIVA) is the preferred technique. After oral or nasal intubation the depth of narcosis is individually controlled by perfusor-administered Propofol and an analgetic agent (Alfentanil, Fentanil or Remifentanil). Due to the local anesthesia a very light sedation is possible and spontaneous ventilation is preserved.

The administration of local anesthesia should be the same in both ways. Each side of the face is infiltrated with 30 to 50 ml of an anesthetic solution containing 0,2 % Lidocaine and Adrenaline (1 : 800 000).

The total dose of lidocaine should not exceed 7 mg/kg. Maintenance of the local block is achieved by systematically re-infiltrating the key areas (pre- and postauricular regions) and re-administering nerve blocks before the local anesthetic effect wears off.

Surgical Technique - Skin Flap Elevation



Figure 5, 6, 7
Skin dissection performed in the "closed" technique with indirect vision provides even skin-flaps, less compromised flap-vascularization and a comfortable working position for the surgeon



Skin flaps always should be elevated sharply under direct vision or using the "blind" closed dissection technique with a no 15 blade. This maneuver helps to obtain very even skin-flaps and provides better vascularization. The surgeon benefits from a more comfortable working position.

Subcutaneous undermining, although usually necessary in most necks, should not arbitrarily include the entire face. If a SMAS dissection is planned, preservation of the anterior platysma-cutaneous ligaments will produce a pleasing effect on the cheek that cannot be obtained by other methods. These ligaments anchor the SMAS and upper platysma to the dermis of the perioral cheek and provide a means of lifting this area without over-tightening the upper-lateral face. Women frequently apply make-up in a manner to simulate this look and enhance this appearance. Preservation of these ligaments also preserves important accompanying perforating vessels to the cheek flap. This reduces the incidence of slough, swelling, and flap compromise.



Figure 10
Extent of SMAS undermining



Figure 11
After completion of the skin dissection the outline of the SMAS/platysma complex to be incised is marked

Platysma Transection



Figure 12,13
Platysma transection
The platysma is transected with scissors. As the transection curves over the external [ugular vein, this has to be done with great care and patience



Figure 13



Figure 14
The SMAS/Platysma flap is transposed posteriorly and fixed to the fascia of the sternocleidomastoid muscle



Figure 8
Extent of subcutaneous undermining. Preservation of the platysma-cutaneous ligaments (black dots) allows a natural repositioning of lateral perioral tissue and tightening of the lower cheek because structures in these regions are pulled up with the SMAS. Extended undermining is necessary, however, over the temple (1), zygoma (2), jowl (3), chin (4), and lower neck (5), if correction of crow's feet, ptotic malar fat, marionette lines, and double chin is planned or if platysma muscle transection is to be performed.



Figure 9
Skin-flap dissection in the anterior neck is performed with scissors on top of the platysma muscle

SMAS Dissection

The extent of SMAS undermining is not arbitrary and must include specific areas to ensure release of restraining ligaments. Most of these tethering attachments lie anterior to the malar origin of the zygomatic major muscle and anterior to the parotid gland. Failure to dissect these areas results in inadequate SMAS release and a minimal SMAS effect. Correct SMAS undermining does not require an extended dissection across the lower cheek or neck because few attachments are present in these regions.

SMAS Suspension

Management of the superior flap margin and the technique of flap suspension will vary depending on the deformity present. In many cases, no trimming of the superior margin of the flap is performed, as the overlapping tissue segments add volume to and restore lost projection over the zygomatic arch and body. This effect may not be desired in patients with wide faces and a small mandible. In such cases, the superior flap margin may be trimmed to fit. The cut edges are approximated to the preauricular remnant with multiple interrupted half-buried vertical mattress sutures of 4-0 nylon. These sutures consolidate the cheek and help support the superior suture line. To obtain a good definition in the anterior neck and submental region the SMAS-platysma flap is tightened in a posterior direction and fixed to the mastoid fascia with several interrupted sutures.

Cervical lipectomy

Cervical lipectomy is a technically demanding procedure that requires patience, perseverance and artistic sensitivity. It should always be performed after shifting and suturing of the SMAS and platysma. This prevents excision of fat from regions of the neck that will be advanced onto the face and avoids the inadvertent creation of a harsh or irregular mandibular contour.



Figure 15
Lipectomy can be performed very precisely with scissors when all the fat has been lifted off the platysma during skin dissection.

Skin Flap Repositioning and Suspension Suture Placement

In general, skin flaps are shifted in a slightly more posterior, less superior direction than that of the SMAS. In the cheek, this corresponds to a vector roughly perpendicular to the nasolabial fold, and in the neck, to a vector parallel to the mandibular border. Close observation of the effect produced should guide one in shifting facelift flaps; however, it is not a rigid formula.



Figure 16
Suspension suture placement. Location of primary points of suspension (1-5), when hairline incisions are used.

There are six points of skin flap suspension that set the stage for the remainder of the closure. The first of these is located just above the ear where its most anterosuperior part joins the scalp. The flap is anchored with half-buried vertical mattress sutures of 4-0 nylon. No deep sutures are used, and suspension should

be made at just greater-than-normal skin tension. Other key-fixation-sutures are placed behind the ear, at the temporal and occipital region.



Figure 17, 13
Fixation sutures are placed in a regular order: The first suture anchors the skin-flap just above the ear where its most anterosuperior joins the scalp. The second key-sutures is placed in the retroauricular sulcus



Flap Trimming and Closure

Once skin flaps have been repositioned and suspension sutures placed, excess skin can be excised and incisions closed. An important principle in wound closure is that of "differential tension". In this scheme, tension is placed at a few key points only and all points between are closed under minimal or no tension. In contrast to traditional techniques, in which tension is spread uniformly along the incision, widening, it is to occur, will be at suspension points only. These are chosen to be on inconspicuous or easily concealed areas and can be revised readily at a later date, if necessary. If flap trimming has been done carefully, wound edges will abut under no tension and no gaps will be present. The incision then is closed in one layer with a combination of half-buried vertical mattress sutures of 4-0 nylon with the knots on the scalp side, and multiple simple interrupted sutures of 5-0 and 6-0 nylon.



Figure 19
After insertion of a drain and skin-closure

Dressings

A simple "turban" dressing of loosely wrapped rolled gauze is applied about the forehead and occiput. No dressing is placed over the face or neck.

There are many compelling arguments against the use of a facelift dressing; however, the most obvious of which is the very real danger of compromising circulation in delicate cervicofacial skin flaps. Dressings also limit direct observation of the face and neck and may conceal an evolving or even established problem. In addition, little about a facelift dressing is comfortable. Most are tight, confining, obstruct hearing, complicate hygiene, and needlessly attract unwanted attention.

Suture removal

Sutures generally are removed in two to three visits over a period of 7 to 10 days. Fine sutures are removed on the first visit 3 to 5 days after surgery. Staples and the majority of half-buried vertical mattress sutures are removed on the second visit approximately 7 days after surgery. Sutures in higher tension areas and the sutures in the retroauricular sulcus are removed at a third visit. •

Results

20



Figure 20
53 year old patient with ptosis of deep facial tissues, double chin deformity and contracture of platysma muscle. Descent of jowls below margin of mandible. Loss of cervico-mandible definition,
Four weeks after facelift including platysma-transection, repositioning of SMAS/platysma complex, submental lipectomy and dissection of submental crease



Figure 21
61 years old patient with severe ptosis of facial tissues giving the face a "square" look.
Three weeks after facelift, including platysma-transection, SMAS-Platysma elevation and submental platysmaplasty. Restoration of cervico-mandible Definition and "oval" appearance of lower face



Figure 22
50 years old patient with excessive accumulation of subcutaneous fat in the neck region and ptosis of cheek-tissue.
Six weeks after facelift, including extensive Lipectomy



Figure 23
59 years old patient with extreme loss of skin elasticity due to extensive sunexposure, sagging of deep tissues and contracture of platysma muscle. Patient two months after facelift, including platysma-transsection, submental platysmaplasty and dermabrasion



Figure 24
59 years old patient with skin and deep tissue ptosis of the face, submental fat accumulation and obvious platysma banding. Three months after lifting of eyebrows, face and neck, including platysma trasection and submental platysmaplasty

Photos: Courtesy of Frank Muggenthaler MD DMD, Freiburg
Drawings: Courtesy of Timothy J. Marter, MD, San Francisco, CA

Referenc.es

1. Connell BF; Facial rejuvenation. In Brent B (ed): *The Artistry of Reconstructive Surgery*. St Louis, CV Mosby, 1987
2. Connell BF: Neck contour deformities: The art, engineering, anatomic diagnosis, architectural planning and aesthetics of surgical correction. *Clin Plast Surg*; 14:4, 1987
3. Connell BF, Marten TJ: Deep layer techniques in cervico-facial rejuvenation. In Psillakis J (ed): *Deep Facelifting Techniques*. New York, Thieme Medical Publishers, 1994
4. Connell BF, Marten TJ: Facelift. In Cohen M (ed): *Mastery of Plastic and Reconstructive Surgery*. Boston, Little Brown, 1994, pp 1873-1902
5. Connell BF, Marten TJ: The forehead-plasty: Recognizing and treating aging in the upper face. *Clin Plast Surg* 18:4, 1991
6. Connell BF, Marten TJ: Orbicularis oculi myoplasty: Surgical treatment of the crow's feet deformity. *Operative Techniques in Plastic Surgery* 10:3, 1990
7. Connell BF, Marten TJ: Submental crease: Elimination of the double chin deformity at rhytidectomy. *Aesthetic Surgery* 10:3, 1990
8. Connell BF, Marten TJ: Surgical correction of the crow's feet deformity. *Clin Plast Surg* 20:2, 1993
9. Furnas D: The retaining ligaments of the cheek. *Plast Reconstr Surg* 83:1, 1989
10. Lambros V: Fat contouring: in the face and neck. *Clin Plast Surg* 19:2, 1992
11. Marten TJ: Office anesthesia. *Clin Plast Surg* 18:4, 1991
12. Marten TJ: Facelift: Planning and Technique. *Clin Plast Surg*, April 1997
13. Muggenthaler F: The Knife Lift, lecture at the annual meeting of the German Society for Aesthetic Surgery, Sept. 2001
14. Randall P, Skiles MS: The "SMAS sling"; An additional Fixation in face lift surgery. *Ann Plast Surg* 12:1, 1984
15. Stuzin JM, Baker TJ, Gordon HI.: The relationship of the superficial and deep facial fascias: Relevance to rhytidectomy and aging. *Plast Reconstr Surg* 89:3, 1992