Biplanar Superficial Musculoaponeurotic System Imbrication Rhytidectomy

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Abstract

Rhytidectomy techniques have evolved significantly since the procedure's introduction in the early 20th century. Significant advancements in rhytidectomy techniques occurred in the 1960s and 1970s with the description of the subfascial rhytidectomy, the identification of the superficial musculoaponeurotic system (SMAS), and development of the SMAS flap. The incorporation of fascial undermining and suspension techniques have significantly improved the longevity and natural appearance of the facelift operation. More aggressive techniques including subperiosteal, composite, and deep plane techniques have been developed in the pursuit of the perfect facelift procedure. On the basis of over 25 years of clinical and surgical experience, a biplane SMAS imbrication rhytidectomy provides a natural, unstretched, and refreshed appearance resulting in high patient satisfaction. This article will present a detailed description of the rationale, technique, and nuances of the biplanar SMAS imbrication rhytidectomy. While the management of the platysma may vary depending on individual patient characteristics, the extent of subcutaneous, sub-SMAS, and neck dissection employed using the biplanar SMAS imbrication rhytidectomy minimizes patient complications and allows a relatively rapid recovery.

Keywords

- rhytidectomy
- facelift
- SMAS
- biplanar facelift
- Superficial Musculoaponeurotic System Suspension Rhytidectomy

The ideal rhytidectomy approach is one which provides high patient satisfaction, minimal complications, a quick recovery time, and substantial long-term results. As more surgeons become involved in aesthetic surgery and aesthetic procedures become more culturally accepted, the quest for the ideal approach has resulted in significant advancements in the field over the last 40 to 50 years. With these advancements, numerous techniques have been developed and described in the literature ranging from the skin-only rhytidectomy to the subperiosteal rhytidectomy, and many variations in between. Simply stated, all of these approaches are based on the length of incision, dissection plane(s), and medial extent of dissection in the temple, cheek, and neck.

The original rhytidectomy approach was a skin-only rhytidectomy, which was introduced in the early 1900s. Unfortunately, this approach provided less than optimal results regarding patient satisfaction and longevity. Significant advancements in rhytidectomy techniques occurred in the 1960s and 1970s with the description of the subfascial rhytidectomy, the identification of the superficial musculoaponeurotic system (SMAS), and development of the SMAS flap.[1–3] While these approaches improved jowling, they failed to address the age-related changes observed in the midface and melolabial folds. To address these areas, Hamra described both the deep plane rhytidectomy and composite rhytidectomy.[4] In a deep plane rhytidectomy, the sub-SMAS dissection transitions to a supra-SMAS plane in the superomedial cheek. A subsequent modification to this technique involved elevation of the orbicularis oculi muscle creating the composite rhytidectomy. These modifications allow tightening in the midface and medial cheek.[5] Since this time, many variations of each of these techniques have been described in the literature. This includes the extended SMAS rhytidectomy, the lateral SMAS rhytidectomy, the subperiosteal

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rhytidectomy, bi- and tri-plane rhytidectomy, and the subperiosteal rhytidectomy.[5–9]

In a survey of members of the American Society of Plastic and Reconstructive Surgeons, 15% of respondents perform skin-only rhytidectomies, 9 % perform deep plane or composite rhytidectomies, 2 % perform subperiosteal rhytidectomies, and the remaining perform a variation of the SMAS rhytidectomy.[10] While many techniques have been described and are being performed, there is minimal data comparing surgical outcomes. A systematic review of published literature comparing various facelift techniques concluded that there was not enough quality data to show significant differences between facelift approaches regarding cosmetic results, patient satisfaction, and complication rate.[11]

Despite the approach used, the desired cosmetic outcome is to counteract the forces of age-related changes in the temple, cheek, and neck. The ideal neck can be defined as a neck with a sharp mandibular border that creates a shadowing effect, an acute cervicomental angle of 105 to 120 degrees, distinct sternocleidomastoid borders, a flat and taught submandibular triangle, a slight depression below hyoid, visible thyroid cartilage, and a strong well-contoured chin.[12,13] On the basis of over 25 years of clinical and surgical experience, a biplane SMAS imbrication rhytidectomy provides a natural, unstretched, and refreshed appearance resulting in high patient satisfaction. While the extent of dissection and management of the platysma ultimately depends on patient characteristics, the extent of subcutaneous, sub-SMAS, and neck dissection minimizes patient complications and allows a relatively rapid recovery.

Anatomical Considerations

A detailed knowledge of the anatomical landmarks of the face and neck is essential to provide successful results while minimizing the risks of morbidity associated with a rhytidectomy. The characteristics and attachments of the SMAS to the retaining ligaments and facial musculature make it a central component of many rhytidectomy approaches and allow a long-lasting and effective elevation of ptotic soft tissue of the face. One must be aware of structures such as the branches of the facial nerve and the greater auricular nerve to decrease the risk of morbidity resulting in postoperative deformities.

The SMAS is the fascial layer that is the key fundamental structure addressed in the biplane facelift approach, as well as many other rhytidectomy approaches. This fibro-fatty fascial layer consists of collagen, elastic fibers, and adipose tissue, and contains dermal fibrous filaments that are important in facial movement.[14] The SMAS envelopes the muscles of facial expression and is continuous with the platysma muscle of the neck inferiorly. Superiorly, the SMAS is continuous with the superficial temporal fascia of the temple and galeal layer of the scalp. In the cheek, the SMAS extends from the preauricular area medially where it thins and attaches to the muscles of facial expression.[14] The SMAS lays superficial to the superficial layer of the deep cervical fascia in the neck, the parotidomasseteric fascia in the cheek, and the superficial layer of the deep temporal fascia in the temple.

As the inferior extent of the SMAS, the platysma is frequently addressed in rejuvenation of the neck. This muscle is a broad thin sheet that extends from its attachments to the mandible, perioral muscles, and dermis of the cheek inferolaterally to the cervicopectoral fascia. With aging, there is a variable amount of diastases of the platysma muscle in the midline and platysma banding may develop from dynamic contraction of the medial fibers. In addition to the diastases of the platysma, herniation of the submental fat and ptosis of the submental portion of the platysma may occur.[13] Excess adipose tissue in the submentum and neck can be addressed with neck lipectomy using liposuction or direct excision. Ptosis and banding of the platysma muscle may be addressed with a platysmaplasty with or without midline plication.

The facial retaining ligaments include both true and false ligaments and are often encountered during flap elevation. The three true retaining ligaments connect the dermis to periosteum and include the mandibular ligament, orbicularis retaining ligament, and zygomatic ligaments (McGregor patch). The mandibular ligament extends from the periosteum medial to the depressor angularis oris attachment to the overlying skin and creates the labiomandibular fold. The false-retaining ligaments are diffuse condensations of the fibrous tissue that connect the superficial and deep fascia and consist of the masseteric and platysma-auricular ligaments.[14]

The motor branches of the facial nerve are at risk for injury resulting in temporary or permanent paralysis during a rhytidectomy. The most commonly injured branches of the facial nerve are the temporal and marginal mandibular branches.[15] The temporal branch leaves the parotid gland deep to the parotidomasseteric fascia and SMAS and travels over the middle third of the zygomatic arch as it traverses superiorly and superficially. It is at this point over the zygomatic arch that the nerve is at greatest risk for injury. The location of the nerve when crossing over the zygomatic arch is controversial, but is believed to be either between the periosteum and parotidomasseteric fascia or within the superficial temporoparietal fascia in the temple.[9,16] The nerve then inserts into the frontalis muscle approximately 1 cm above the supraorbital rim.[17] The course can be approximated by drawing a line spanning a point 0.5 cm anterior to the tragus and 1.5 cm lateral to the lateral taper of the brow.[17]

The marginal mandibular branch of the facial nerve is also at risk of injury during rejuvenation of the neck in a rhytidectomy. This branch of the facial nerve exits the parotid gland, travels deep to the deep investing fascia or masseteric fascia, then transitions superficially at the facial artery to course immediately deep to the platysma muscle and superficial layer of the deep cervical fascia.[9,16] In approximately 20% of individuals, the marginal mandibular branch lies 1 to 3 cm below the mandibular border before crossing over the facial vessels.[16] The areas of greatest risk to this nerve are at the lower anterior cheek as the buccal space is approached and at the inferior loop of the nerve in the neck.[16]

The zygomatic, buccal, and cervical branches are also at risk with extensive dissection. The area of greatest risk to the zygomatic branch is the anterior–cephalad edge of the parotid gland deep to the origin of the zygomaticus muscle at

McGregor patch. Because the zygomatic and buccal branches travel within the parotid tissue to the anterior border of the parotid gland, injury can be avoided by not elevating past the anterior border of the parotid when dissecting in the sub-SMAS plane. Because of this, there is increased risk of injury to these branches when performing a deep plane rhytidectomy compared with SMAS procedures with less extensive SMAS flaps. The cervical branch of the facial nerve passes deep into the neck at the level of the hyoid. In a subset of patients, damage to the cervical branch may contribute to unilateral weakness of the platysma and lower lip, known as "pseudo-paralysis of the marginal mandibular nerve." [16]

The most frequently injured nerve during a rhytidectomy is the greater auricular nerve, which derives from the second and third cervical nerves and provides sensory innervation to the skin overlying the parotid, auricle, and postauricular areas.[18] The greater auricular nerve crosses anteriorly and superiorly over the sternocleidomastoid muscle from Erb point, travels between the anterior border of the sternocleidomastoid muscle, and parotid fascia toward the infra-auricular and preauricular areas. The nerve divides into an anterior and posterior branch, and communicates with several cranial nerves.[18]

Patient Selection

Proper patient selection is critical in successful outcomes when performing a rhytidectomy. Many classification systems exist to characterize the aging neck.[6,9,19,20] The Dedo system is the most frequently referenced and is based on the anatomical characteristics affected.[19]

- Class I necks are youthful with minimal deformity. They are characterized by a well-defined cervicomental angle, excellent platysma muscle tone, and no submental fat.
- Class II necks have only skin laxity and with no submental fat or platysma muscle weakness.
- Class III necks have an accumulation of submental fat.
- Class IV necks have platysmal banding.
- Class V necks are characterized by retrognathia.
- Class VI necks have a low lying hyoid bone.

The ideal rhytidectomy candidate is a patient who has realistic expectations and no significant physical or psychological health issues that can interfere with the healing process. Medical conditions that can interfere with postoperative healing include diabetes, peripheral vascular disease, collagen vascular diseases, several autoimmune disorders, history of radiation treatment, and tobacco use. Regarding facial characteristics, the ideal candidate has good facial skeletal structure, normal or high hyoid bone, good skin elasticity, lack of deep rhytids and significant sun damage, and lack of excess adipose tissue.[21]

Poor candidates are those that have poor physical and psychological health, unrealistic expectations, and active nicotine use.[21] Patients should be encouraged to stop all use of nicotine products including cigarettes, patches, and gum at least 2 weeks before surgery. While tobacco use is not an absolute contraindication to surgery, modifications, such as use of a shortened flap, may be required. Patients exhibiting a low hyoid bone, microgenia, thick skin, excess adipose tissue, and ptotic submandibular glands must be aware that their surgical outcome may, or may not, provide significant improvements and a tuck-up procedure may be necessary in 1 to 2 years. Patients wanting significant improvement in deep nasolabial folds or cheek mounds are must be aware that these areas are not completely addressed with a biplane SMAS imbrication rhytidectomy and adjunctive procedures including SMAS augmentation and midface lifting should be considered.

Surgical Technique

Preoperative Evaluation

During the initial patient consultation, a thorough history and focused physical exam is performed. The patient's goals and expectations are extensively discussed. A medical history and surgical history is obtained, including a history of prolonged bleeding or easy bruising, medical disorders that may interfere with healing or require anticoagulant therapy, and facial surgery. The use of tobacco products is also noted and patients are highly recommended to abstain from tobacco use at least 2 weeks before and 2 weeks following surgery. All medication and supplements are documented in the medical record. On physical examination, facial skin laxity and ptosis are examined and recorded on a four-point Likert scale in the medical chart with 1+ indicating minimal rhytids and ptosis and 4+ indicating severe rhytids and ptosis. A full set of preoperative photographs are obtained, which includes frontal, oblique, lateral, and static and dynamic close-ups of the forehead, midface, and lower face. During the consultation, both the frontal and profile photographs are digitally enhanced to provide the patient with an idea of the projected postoperative results. An extensive discussion is held analyzing the postoperative results to ensure that the patient's expectations are within the limitations of what can be provided through surgical intervention.

Once the patient and surgeon decide that their goals and expectations are similar and surgery is scheduled, the preoperative workup is initiated. This consists of a medical clearance completed by the patient's primary care physician ensuring that there are no contraindications to surgery that were not obvious or disclosed during the preoperative consultation. In addition, a complete panel of preoperative laboratory studies is obtained, including a complete blood count, chemistry profile, coagulation studies, thyroid function tests, liver enzymes, HIV status, and a urinalysis. An electrocardiogram is obtained for all patients older than 40 years or patients with a history of cardiac disorders or cardiac symptoms.

Two weeks before surgery, the patient is instructed to stop all supplements that interfere with coagulation. This includes fish oil, vitamin E, ginseng, garlic, aspirin, and nonsteroidal anti-inflammatory medications. Warfarin, clopidogrel, and dabigatran etexilate are stopped at least 3 to 5 days before surgery, after obtaining clearance from the prescribing physician.

On the day of surgery, the history and physical exam are reviewed and a focused physical exam is completed. All planned incisions and projected areas of undermining are marked with the patient in the upright position. The hair is twisted and placed into numerous small ponytails around the planned incisions and secured in place with micropore tape. The patient's entire face is thoroughly cleansed with septisol solution and all cosmetics are removed before being taken to the operating room.

Anesthesia

While in the preoperative holding area, intravenous access is obtained and intravenous fluids are started. Oral sedation is given 30 minutes before transferring the patient to the operating room. Depending on the patient's habitus and experience with benzodiazepines, oral sedation consists of a mixture 10 to 20 mg of oral diazepam and dimenhydrinate. In the operating room, intravenous fentanyl and a propofol drip is started and titrated to achieve the desired amount of sedation.

Local anesthetics are then administered. The areas of the marked skin incisions of the facelift are injected with 2% lidocaine with 1:100,000 epinephrine. The outline of the area to be undermined on the cheek and neck are anesthetized with 1% lidocaine with 1:100,000 epinephrine. The areas to be undermined on the cheeks and neck are injected with 0.5% lidocaine with 1:200,000 epinephrine and 0.25% marcaine.

Operative Technique

The incisions are designed to minimize and camouflage scarring in the temporal, periauricular, and submandibular areas. The preauricular incision is placed in the natural crease just anterior to the helical root, curved posteriorly onto the posterior surface of the tragus, and brought inferiorly into the natural crease between the lobule and the preauricular skin (►**Fig. 1**). In the male patient, the incision is placed in a natural crease between the auricle and the posterior edge of the sideburn rather than retrotragal. A retrotragal incision in a male patient would transfer the beard onto the tragus postoperatively. However, in the male patient with scanty facial hair, the incision can be placed retrotragal (►**Fig. 2**). The incision is carried around the earlobe and posteriorly onto the posterior aspect of the auricle to a level approximately 1 cm superior to the external auditory canal. A gentle curve is made toward the postauricular hairline. The incision is then carried along the hairline beveling against the hair follicles to allow the hairs to grow through the resulting scar, thereby creating a trichophytic incision. The incision follows the postauricular hairline rather than extending deep into the hair to avoid the characteristic "step off" deformity associated with this approach. This also allows the surgeon to utilize the same incision in a subsequent "tuck up" procedure without further altering or distorting the postauricular hairline (►**Fig. 3**).

The location of the temporal incision depends on the location of the sideburn hair and the amount of desired lift in the midface region. In the majority of cases, it is carried posterior to the sideburn and into the temporal area of the scalp. In the case of an already high sideburn, a horizontal incision can be extended anteriorly from the temporal incision inferior to the sideburn. This allows a wedge excision of the skin inferior to the sideburn preventing abnormal elevation. In patients with a low sideburn in which elevation of the hair will not place it above the helical root, this incision is not necessary. To allow a better lift in the malar area, the incision can be carried inferior then anterior to the sideburn hair and then into the hair-bearing area of the temporal scalp (►**Fig. 4**). Despite the location of the temporal incision, the incision is created by beveling anteriorly, paralleling the hair, for maximal hair follicle preservation.

The procedure is begun by creating three 1 cm incisions located along the incision on the posterior surface of the auricle, bilaterally, and in the submental crease to gain access for the liposuction cannula. From these three incisions, the 4 mm spatulated liposuction cannula is used without suction to create multiple tunnels in an overlapping criss-crossing fashion over the jowls and submental area. Depending on the

Fig. 1 Typical rhytidectomy incision in patients with a relatively long sideburn.

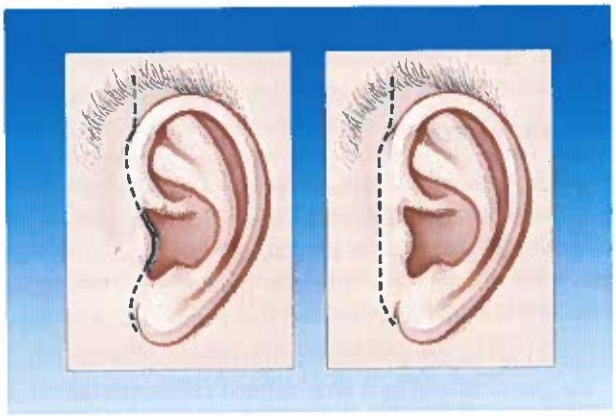

Fig. 2 Varying preauricular incisions retrotragal on left, pretragal on right. Retrotragal is most commonly utilized in women, pretragal in men.

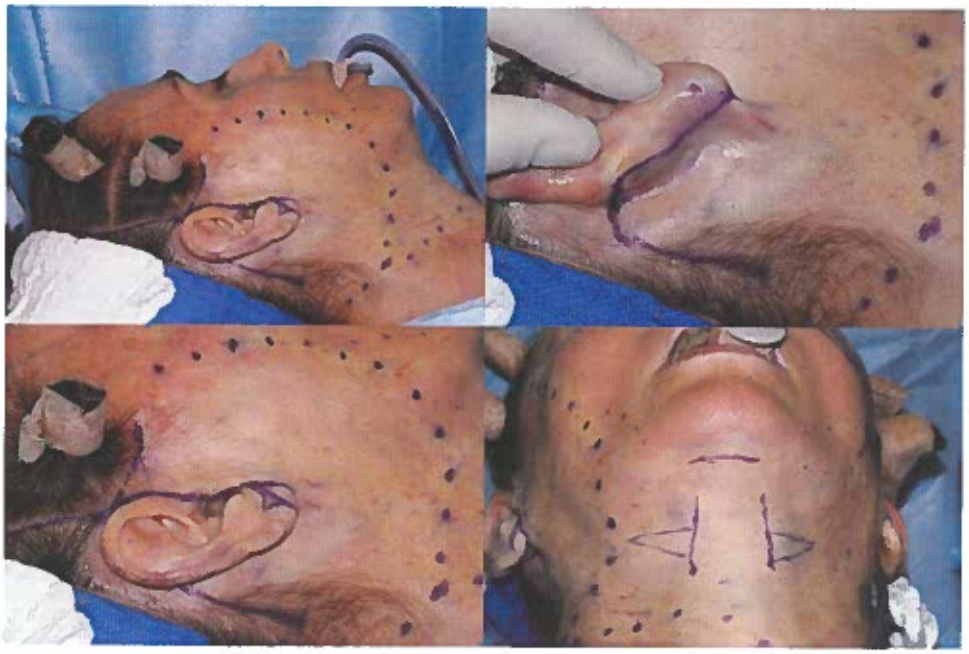

Fig. 3 Incisions are marked in the temple, cheek, and neck. The incision is carried from the temporal scalp inferiorly anterior the helical crus, posterior to the tragus, and in the crease between the lobule and cheek. The postauricular incision is carried on the posterior auricle to 1 cm above the external auditory canal and gently curved to follow the hairline. A 1.5 cm incision is made in the submental crease for access to the neck for liposuction and platysmaplasty. In this patient, an earlobe reduction was also performed.

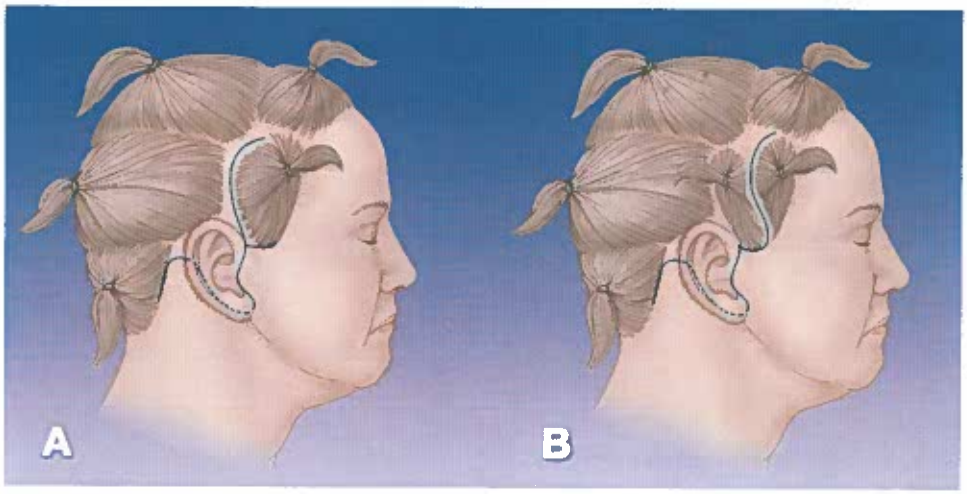

Fig. 4 Alternate incisions. (A) A horizontal incision is made inferior to the sideburn to avoid postoperative elevation of the sideburn hair. (B) The incision is carried inferior and anterior to the sideburn to avoid excessive elevation of the sideburn in patients that have an elevated sideburn postoperatively. The superior portion of the incision is camouflaged within the temporal hair.

amount of adipose tissue, the cannula is then attached to the suction and suction-assisted lipectomy is performed. In selected patients, no liposuction is necessary or a direct lipectomy is required (►**Fig. 5**).

At this point, the platysmaplasty is performed in patients with significant platysmal banding or ptosis. From the submental incision, the submental flap is elevated and excess fat that was not addressed by liposuction is directly excised using Kahn beveled facelift scissors. The medial edges of the platysma muscle diastases are identified. A wedge of muscle is excised using suction electrocautery at the cervicomental angle. In the case of a weakened and ptotic platysma muscle in the submental area, the muscle is plicated using several interrupted sutures of 2–0 Ethibond (Ethicon, San Angelo, TX) (►**Fig. 6**).

The remaining temple, cheek, and neck incision are then created as discussed earlier (►**Fig. 3**). The incision superior to the zygomatic arch is carried through the dermis and subcutaneous tissue until the superficial layer of the deep temporal fascia is identified. At the level of the zygoma, the dissection plane transitions to a subcutaneous plane. This leaves a band of superficial temporal fascia immediately over the zygomatic arch that contains the frontal branch of the facial nerve. The band is carefully divided no further anterior than the anterior

Fig. 5 Liposuction is first performed from the bilateral postauricular incisions and the submental incision using a 4 mm liposuction cannula.

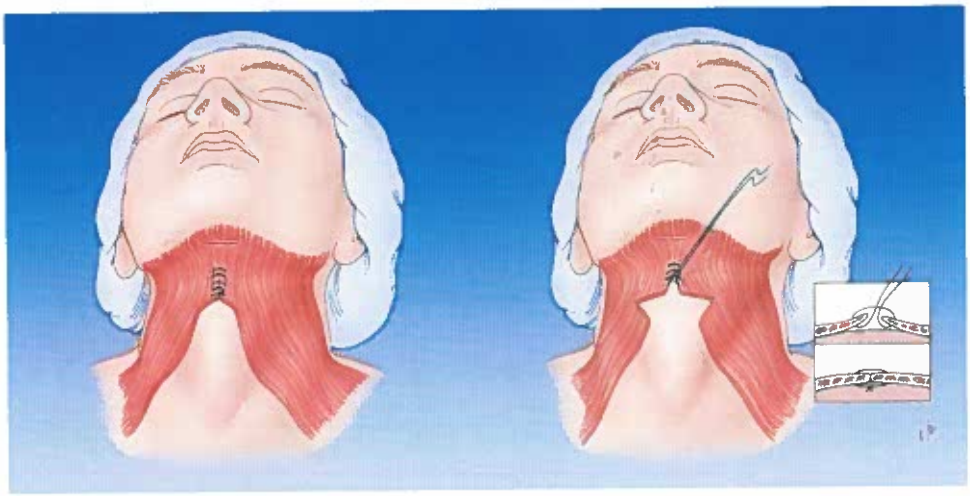

Fig. 6 A platysmaplasty may be performed if deemed necessary.

margin of the sideburn hair to preserve the facial nerve. Careful hemostasis must be obtained with bipolar cautery to divide a branch of the superficial temporal vessels which also lie in this band (►**Fig. 7**).

The mid and lower facial flaps are elevated with blunt and sharp dissection using Kahn beveled facelift scissors. The dissection is carried in a radial fashion from the ear for approximately 5 to 7 cm extending anteriorly and inferiorly from the origin of the temporal incision to the occipital incision. Care is taken to keep this dissection in the subcutaneous plane (►**Fig. 8**). The SMAS is identified in the preauricular area. A vertical strip of redundant SMAS in the preauricular area is excised from the level of the superior border of the external auditory canal inferiorly past the angle of the mandible. This excised strip of SMAS can later be used for augmentation of the nasolabial folds, upper and lower lips, or marionette lines (►**Fig. 9**). The exact amount of SMAS excised varies between patients based on the amount of redundant SMAS present. A SMAS flap is elevated from parotid fascia anteriorly 3 to 5 cm until tension on the SMAS flap provides the desired amount of lift in the jowl and neck. This is usually confined to the anterior border of the parotid gland, but sometimes it is necessary to extend the dissection further anteriorly (►**Fig. 10**). The SMAS is suspended superiorly and posteriorly and imbrication is performed with several buried interrupted sutures of 2–0 Ethibond on a V-7 needle (Ethicon, San Angelo, TX). The first suture is anchored to the sternocleidomastoid fascia immediately inferior to the lobule and extends to the SMAS flap at the angle of the mandible, creating a posterior and superior

Fig. 7 The incision is carried to the superficial layer of the deep temporal fascia in the temple and subcutaneously in the cheek area. The intervening band of tissue contains a branch of the superficial temporal artery, which must be carefully cauterized. The frontal branch of the facial nerve is found anteriorly in this bridge of temporoparietal fascia.

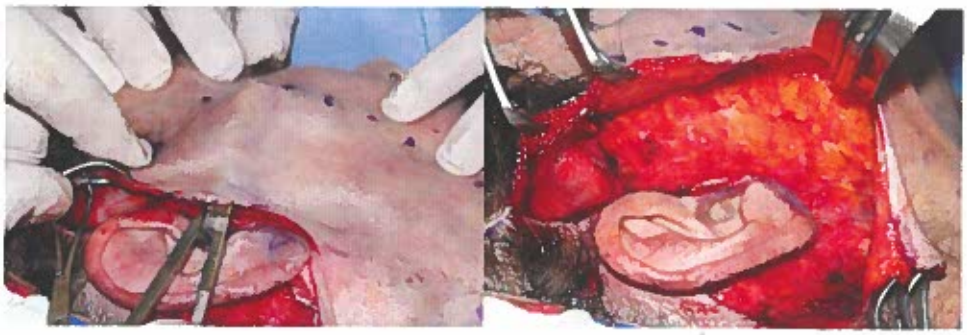

Fig. 8 The skin flap is elevated using beveled face-lift scissors in the subcutaneous plane.

Fig. 9 Vertical SMASectomy is performed in the preauricular area.

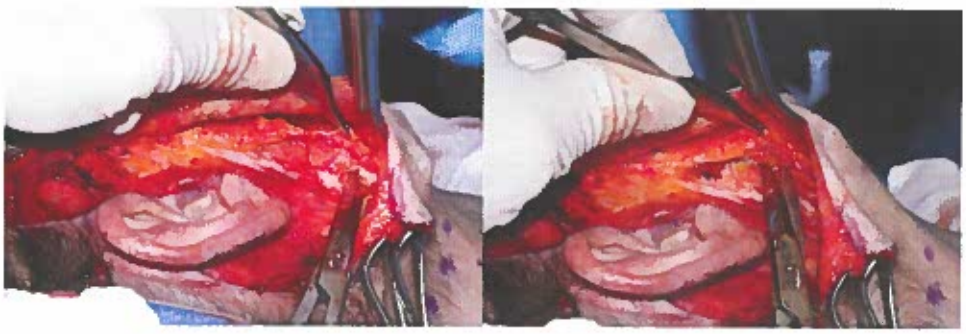

Fig. 10 A superficial musculoaponeurotic system (SMAS) flap is created by dissection in the sub-SMAS plane to the anterior border of the parotid, or until the desired amount of lift is possible.

vector of pull. Care is taken to not put tension on the ear causing dislocation and distortion. The second suture is placed at the superior margin of the SMAS flap anchoring this, again with a posterior and superior vector to either the preauricular edge of the SMAS or the deep temporal fascia. Multiple intervening sutures are placed to fill in the gaps between the primary anchoring sutures reapproximating the edges of the SMAS (►**Fig. 11**). After all sutures are placed, excess tissue is trimmed with the facelift scissors to prevent a lumpy or full contour in the imbricated area. The surgical field is irrigated and meticulous hemostasis is obtained with bipolar cautery.

The skin is then advanced and secured in a posterior and superior vector. The infralobular skin is advanced to the peak of the postauricular incision and secured with a stainless steel auto suture staple. The preauricular and temple skin flap is then advanced and secured just above the helical root (►**Fig. 12**). The overlapping and excessive skin is excised in a systematic manner in the postauricular area, temple, then preauricular and tragal area taking care to leave enough skin that excessive tension is not required to close the incisions. In those patients who do not have a long sideburn extending inferiorly in front of the ear, a triangle of skin is removed just inferior to the sideburn to avoid moving the sideburn to a more superior position (►**Fig. 13**). The skin closure is accomplished in the hair-bearing area of the temple and postauricular scalp with stainless steel auto suture staples (►**Fig. 14**). A single vertical mattress 5–0 proline suture is placed at the inferior aspect of each lobule. The tragal flap is stabilized using two interrupted sutures placed above and below the tragal skin flap using a 5–0 plain catgut suture. The pre- and postauricular area is closed with a running locking suture of 5–0 plain catgut overlapping 1 to 2 cm with the staples to better evert the skin edges. A 1 cm gap is left open on the posterior surface of the conchal bowl for placement of a penrose drain.

Postoperative Care

Following the procedure, a bulky circumferential pressure dressing is applied. The dressing consists of Xeroform gauze (Covidien, Mansfield, MA) cut in a U shape and placed around each auricle followed by placement of two pieces of folded 4 × 4 gauze anterior and posterior to the auricle. The head is then wrapped with two Kerlix bandage rolls (Covidien) and a Coban dressing (3M, St. Paul, MN) (►**Fig. 15**). The patient is observed in the recovery area for at least 1 hour while awakening. Once the patient is alert and awake, answering questions appropriately, following commands, and tolerating liquids, the patient is discharged with a trained sitter. The sitter observes for any postoperative complications, including a hematoma, and places cold compresses over the eyes every 15 minutes throughout the night. The patient returns on postoperative day 1 when the bulky dressing and penrose drains are removed and a new lighter circumferential head wrap is placed.

Beginning on postoperative day 1, the patient is instructed to remove the new circumferential head wrap 4 hours after leaving the office. They may take a shower, with water only, at this time. Starting on postoperative day 2, the patient may begin taking two showers a day using baby shampoo. The periauricular incisions are cleaned with hydrogen peroxide and dressed with antibiotic ointment four to six times a day. The staples in the hair-bearing areas are cleaned with witch hazel. The patient is given a circumferential ace bandage or preformed facelift dressing to wear at all times the first 2 weeks following surgery, then at only at night for the following 2 weeks. The patient is restricted to light activity

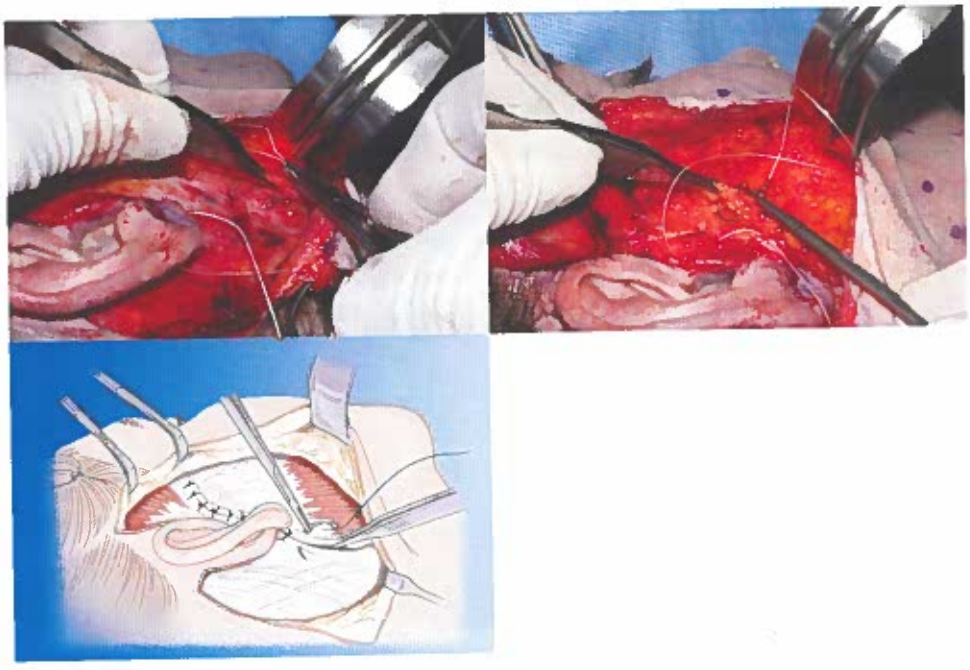

Fig. 11 Imbrication of the SMAS flap is performed using a 2–0 Ethibond suture and creating a superior and posterior vector of pull.

Fig. 12 The infralobular skin is advanced to the peak of the postauricular crease and the first anchoring suture is placed. The preauricular skin is then advanced superiorly and posteriorly and the second anchoring staple is placed at the helical root.

Fig. 13 In those patients who do not have a long sideburn a triangle of skin is removed just inferior to the sideburn to avoid moving the sideburn to a more superior position.

for 2 weeks following the procedure. In addition, they are instructed to sleep with their head elevated for at least 2 weeks, refrain from driving for 10 days, and avoid extensive twisting of the neck.

Three days before surgery, the patient may start a regimen of Arnica Montana and Bromelain to help reduce edema and bruising. Because of the potential interaction of these supplements and Warfarin resulting in an increased

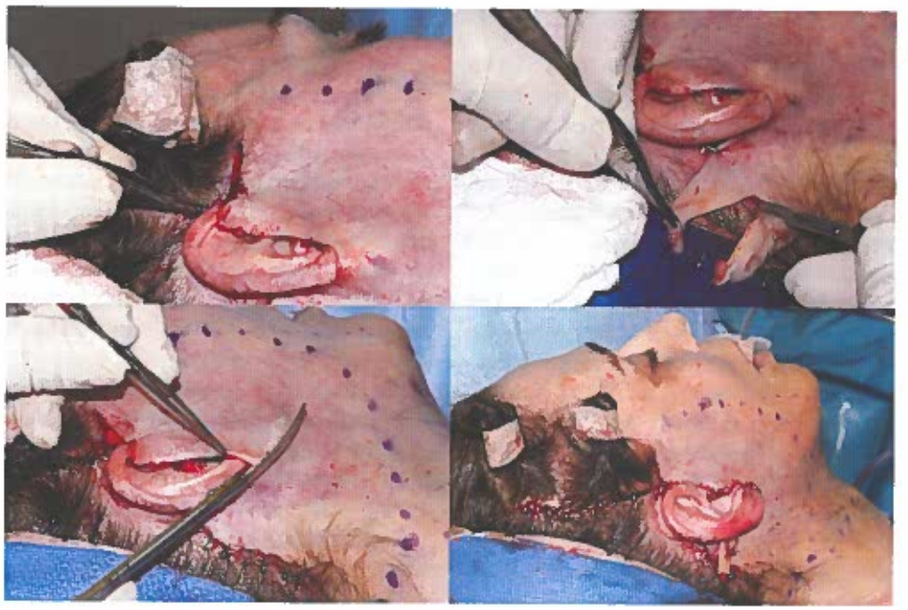

Fig. 14 Excess skin is excised in a systematic manner and the incisions are closed with staples in the hair-bearing areas and sutures in the areas without hair. A penrose drain is placed overnight.

Fig. 15 A circumferential dressing placed.

international normalized ratio (INR), this is avoided in patients taking these particular anticoagulants. In addition to the Arnica Montana and Bromelain, postoperative medications include a 1 week prednisone taper starting at 30 mg. A 1 week course of antibiotic prophylaxis using a first generation cephalosporin oral antibiotic, such as cephalexin, is prescribed. All patients are also given narcotic pain medications, promethazine, and zolpidem to be used on an as needed basis.

The patient is seen again 1 week following surgery. At this appointment, all staples and sutures are removed, except the proline sutures at the ear lobule. The patient returns 2 weeks following surgery for removal of the infra-auricular proline sutures. The patient is then seen at 3 months, 6 months, 1 year, and yearly thereafter. Standard photographs are obtained at all postoperative visits to document patient progress. Pre- and postoperative photos of three of Dr. Daniel Rousso's patients are seen at 1 year (►**Figs. 16–18**).

Complications

Complications after elective cosmetic procedures can be distressing to both the patient and surgeon and may occur in nearly 4.5% of patients.[22] Patients must know what to expect following their procedure, which can be done with proper preoperative counseling, the use of the imaged photographs, and by showing the patient a catalog of previous postoperative photographs. In addition, patients must be aware of what to expect with regards to postoperative edema, bruising, pain, and temporary numbness. For the surgeon, the risk of complications can be reduced with meticulous surgical technique and knowledge of how to minimize these risks. Possible postoperative complications may include hematoma, facial paresis or paralysis, hypesthesia, flap necrosis, undesirable scarring, and under correction. Less common complications include infection, alopecia, hairline changes, earlobe and tragal distortion, and submental contour deformities.

Hematoma

The most common complication following a rhytidectomy is a hematoma, which has been found to occur in 1 to 15% of patients.[14,22–26] Patients with perioperative hypertension, postoperative nausea, postoperative anxiety, tobacco use, and those undergoing a platysmaplasty have been found to be at an increased risk of hematoma formation in some studies.[23,26] In addition, the male gender has been found to be an independent risk factor for a hematoma with the risk ranging from 8.7 to 12.9%.[15,23] The use of nonsteroidal anti-inflammatory drugs, aspirin, and some herbal supplements may also contribute to hematoma formation. These should all be stopped 2 weeks before surgery. Hematomas may be rapidly expanding requiring surgical intervention or smaller, slowly accumulating hematomas that can be managed with multiple needle aspirations. In the case of a rapidly expanding hematoma, the most common symptoms are unilateral pain, swelling, and ecchymosis. These require immediate surgical evacuation and control of hemorrhage to decrease the risk of vascular congestion in the flap resulting in flap necrosis and scarring. Other consequences of hematomas include excess fibrosis, skin puckering, and skin discoloration.

Facial Paralysis

Injury to the branches of the facial nerve can result in temporary paresis, and rarely permanent paralysis. In a systematic review of the literature, nerve injury occurs in 0.5% to 2.5% of patients.[10] These injuries are most frequently a result of a traction injury and result in complete recovery. The most frequently injured branches are the temporal and marginal mandibular branches, but literature is conflicting on which is the most common. In a review of 7,000 cases, Baker found the marginal mandibular (40.0%), temporal (32.7%), and buccal branches (12.7%) to be the

Fig. 16 A 54 year-old female patient 1-year postoperative biplanar SMAS rhytidectomy with upper and lower lid blepharoplasty and SMAS augmentation to upper and lower lips.

most frequently injured.[27] Lower lip paresis and paralysis may also be a result of cervical branch injury in "pseudo-marginal mandibular nerve weakness." Clinically, this can be differentiated by lip eversion, controlled by the mentalis muscle, which solely innervated by the marginal mandibular branch.[16]

Numbness

Decreased sensation to the cheek, neck, and ears is not uncommon following a rhytidectomy. Separation of the distal cutaneous sensory branches from the skin when elevating the facial and neck flaps, edema, and trauma all contribute to postoperative hypesthesia. This is most commonly temporary and requires only time, patience, and reassurance. However, the most commonly injured nerve during a rhytidectomy is the greater auricular nerve, occurring in up to 7% of patients.[15] To avoid permanent injury to this nerve, the postauricular skin flap should be elevated in the immediate subcutaneous plane once past the hair follicles. This allows preservation of the fascia overlying the sternocleidomastoid muscle and the greater auricular nerve. Injury to the lesser occipital nerve may also occur if the postauricular flap is elevated in the subfascial layer rather than the subcutaneous layer. This results in numbness of the superior aspect of the auricle.

Flap Necrosis

Skin flap necrosis may occur from vascular compromise to the flap resulting in skin slough and occurs in 0.3% to 3% of patients.[10] The most common areas for this to occur are the postauricular area where the skin flap is the thinnest and at the tragus. This may occur as a result of a large expanding hematoma that causes vascular congestion and arterial compromise. It is essential to immediately evacuate the hematoma to prevent this complication. Other risk factors for skin

Fig. 17 A 61 year-old female patient 1-year postoperative biplanar SMAS rhytidectomy with upper and lower lid blepharoplasty and SMAS augmentation to upper and lower lips.

flap necrosis include tobacco use, systemic medical conditions, injury to the subdermal plexus during flap elevation, and excessive tension on the flap during closure.[15] Tobacco users are 12 times more likely to have skin flap necrosis.[15] Tobacco cessation for at least 2 weeks can decrease this risk. Others prefer cessation for 3 to 6 months before surgery.[21] However, even with tobacco cessation, long-term irreversible changes to the microvasculature in addition to aging may contribute to necrosis.[28] Management includes the use of oral niacin in a dose that produces a flush four times daily and topical nitroglycerine paste used twice daily.[21]

Scarring

Proper incision placement and minimal tension during skin closure are important to avoid hypertrophic and noticeable scars. Despite this, undesirable scarring occurs in 2.3% to 11.9% of patients.[10] Placement of the incision in the temporal scalp, preauricular sulcus, posterior aspect of the tragus, posterior aspect of the auricle, and along the occipital hairline best disguises the scars in our experience. By placing the incision on the posterior aspect of the auricle, the scar will remain hidden despite normal inferior migration of the scar. In addition, a few millimeters of excess skin is left on the skin flap where it is attached to the lobule. While this initially creates a bunched appearance of the lobule, over time with healing and downward migration, this prevents lobular deformities such as the pixie ear. Should hypertrophic scarring be present, it can be injected serially with increasing strengths of traimcinolone starting at 10 mg/mL.

Undercorrection

Patients must have proper preoperative counseling and expectations, otherwise they risk being disappointed by the results of their surgery. This is particularly true in patients

Fig. 18 A 55 year-old female patient 1-year postoperative biplanar SMAS rhytidectomy with upper and lower lid blepharoplasty and SMAS augmentation to upper and lower lips and chin implant.

with a heavy neck, low-lying hyoid bone, and ptotic submandibular glands. Preoperative imaging plays a large role in allowing the patients to recognize what limitation may be present. In the case of ptotic submandibular glands, we do not routinely perform elective submandibular gland excision for cosmetic improvement. In a survey of plastic surgeons, 45% of surgeons said they would not treat ptotic submandibular glands, 47% said they would plicate the glands, and only 3% said they would excise them.[10]

Conclusion

The biplanar SMAS imbrication rhytidectomy provides patients with a natural, refreshed, and unstretched appearance resulting in high patient satisfaction. As with any surgical procedure, proper patient selection is imperative to provide desirable aesthetic outcomes. Through a detailed knowledge of the surgical anatomy and meticulous attention to detail, many complications can be avoided while allowing the benefits of minimal downtime and a relatively rapid recovery.

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