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Submalar Augmentation: An Alloplastic Method for Aesthetic Contouring of the Midface

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The desire for permanent beauty and youth has been mankind's eternal fantasy. Throughout history, each culture has formulated its own unique criteria and perceptions for evaluating the ideal beauty of its people. In the ancient Greek culture, classical beauties such as Phryne and Aphrodite were described as having features of regular, symmetric proportions, with high cheekbones, but not excessively so, and with a bright and joyous expression.[37]

Subsequent neoclassical doctrines delineating facial measurements have attempted to define the ideal facial form. However, it has been recently demonstrated that these detailed tables of measurements do not necessarily represent the general population or define the absolutes of beauty.[14,41] To date, there are still no standardized measurements that can define the essence of beauty for all civilizations. Therefore, it is important to emphasize that the only factor found as a constant in almost all historical definitions of beauty is the inclusion of that which exemplifies youth.

One of the strongest characteristics of youth is depicted by a fullness of the cheeks, indicating presence of healthy midfacial soft tissue. In improving facial form, emphasis should therefore be placed on supplementing the midfacial area as well as smoothing out folds, tightening sagging skin, or augmenting the zygomatic prominences.

It is universally established that a combination of both strong and well-balanced skeletal features will best endure the ravages of age. Moderate to severe underdevelopment of the mid-third of the face and degenerative soft-tissue changes often combine to produce signs of facial aging, which are

difficult to treat. These changes are commonly revealed by the development of folds and cavitary depressions of the cheeks. Patients who prematurely exhibit these signs of aging become early candidates for facial rejuvenation procedures.

Conventional rhytidectomy presents acknowledged limitations and, sometimes, subsequent problems as a sole technique for facial rejuvenation. For many in the early age group (mid 30s to late 40s), midfacial depressions and hollows may not be remedied—indeed, they may be exaggerated—if dealt with via rhytidectomy. There are also patients who are poor candidates for rhytidectomy, others for whom the face-lift procedure is only a partial solution to appearance problems, and still others who require follow-up enhancement of successful rhytidectomy. Although the newer methods of rhytidectomy, utilizing superficial musculoaponeurotic system (SMAS) platysmal flaps, and fat sculpting, have made substantial progress in reducing jowls and submental pathologic features, there has been minimal success in long-term reversal of the degenerative signs of aging found in the mid-third of the face.

Other aesthetic contouring procedures, such as malar or chin augmentation, that strive to attain more ideal facial proportions may not simultaneously restore youthful qualities. For example, conventional or "standard" malar implants placed over the prominent part of the zygoma will enhance the lateral facial profile, but in some patients may also emphasize an undesirable submalar depression.

The primary motivation of the majority of patients seeking consultation for the purpose of facial rejuvenation surgery is to restore attractiveness or correct perceived facial flaws that have become visible or more pronounced with age. Usually, they do not want to drastically alter their basic facial architecture or to insist on a preset surgical procedure; instead they simply want to look younger.

The goal of submalar augmentation is to deal effectively with many of the problems encountered in midfacial rejuvenation. This is accomplished by surgically positioning anatomically designed silicone rubber (Silastic) implants of various sizes over the midthird of the face in a safe and consistent method. In addition to augmenting bone structure, the submalar implant emphasizes midfacial correction, simulating the appearance of adequately padded skin at healthy levels of distention and elasticity, while avoiding distortion of normal facial anatomy.

When used alone, submalar augmentation provides a single alternative method for midfacial rejuvenation in younger patients. When used in conjunction with rhytidectomy, particularly in patients with deficient bone structure or atrophy of overlying soft tissue, it establishes the foundation for enhanced and longer lasting face-lift results, and avoids a stretched or masklike appearance.

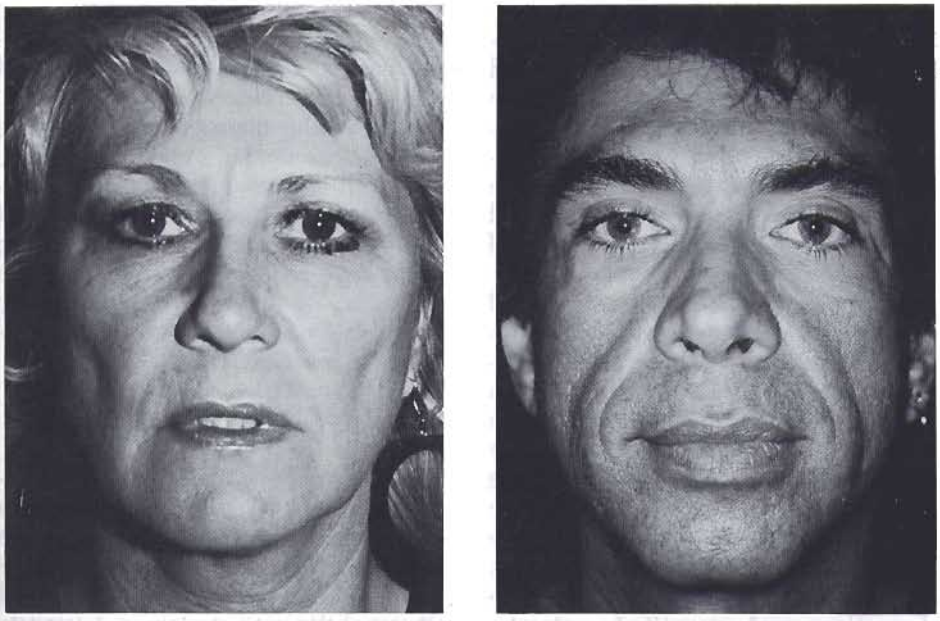
CONSIDERATIONS

A complete understanding and accurate analysis of the processes of aging is a prerequisite for obtaining successful results in facial rejuvenation surgery. In one patient midfacial deficiencies may be primarily due to normal loss or atrophy of adipose tissue (Fig. 27-1*A*). In another, the perceived flaws may be the revelation by aging of previously hidden imperfections or deformities in facial skeletal structure.

Adult loss of quantity and character of a subcutaneous fat buffer thins the face, renders the skin inelastic, and hastens wrinkling.[23,35] Atrophy of the buccal fat pad and relaxation of the skin also deepen nasolabial folds and thin the vermilion border of the lip.[27] The inferior migration and redistribution of cheek fat form jowls and indentations, contributing to typical midfacial signs of aging[18] (see Fig. 27-1*B*).

In the aged, progressive loss of facial skeletal volume, generalized fibrosis and shortening of facial musculature, and degenerative soft-tissue changes combine synergistically so that the skin, lacking subcutaneous tissue, comes into contact with the deep, receding structures of the face. This results in a gaunt appearance with marked hollows and depressions (Fig. 27-2*A* and *B*).

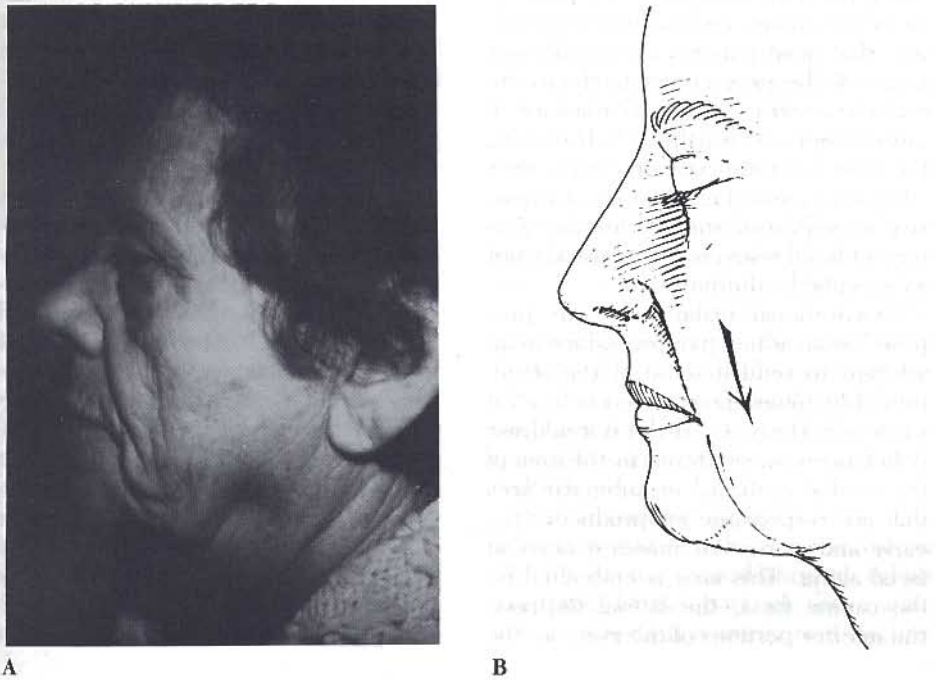
Sudden weight loss or cachexia evoke similar changes. Watanabe and colleagues[2] described an equivalent hollowed-out appearance in a group of Japanese patients showing loss of adipose tissue in the temporal fossa. Coelho[10] described two patients having a "cadaver-like appearance" of marked cheek



A B

Fig. 27-1. Variations of midfacial aging. A. *Example of 48-year-old patient with focal areas of midfacial soft-tissue atrophy.* B. *Forty-four-year-old man with severe anterior facial folds, demonstrating a greater loss of soft tissue than laxity of skin.*

Fig. 27-2. A *and* B. *The aging process causes the soft tissues of the face to lose inherent structural integrity. Inferior migration of less elastic, thinner soft tissue over a receding skeletal structure forms redundant jowls and depressions that contribute to the characteristic midfacial signs of aging. The addition of a more prominent supporting structure can slow this process.*



A B

depressions resulting from premature lipodystrophy localized to the nasolabial sulci. Facial contour was restored by means of placing carved silicone rubber on the maxilla beneath the nasolabial sulci. This was a unique treatment because the augmentation of the underlying facial skeletal with a solid structure simulated the replacement of deficient soft tissue.

Developmental alterations in facial skeletal structure range from minor imperfections to severe deformity. Recently, emphasis has been placed on avoiding arbitrary distinctions between deformity and deficiency.[30,44] Primary surgical anterior-posterior repositioning of bony segments using Le Forte-type maxillofacial procedures can provide more ideal facial skeletal relationships, particularly in severe congenital malformations and associated malocclusions. However, grafts or facial prosthetics have been used to mask the aesthetic deformity that may still remain even after completion of successful orthognathic surgery.[3,4] In selected cases, alloplastic augmentation has been used alone in an attempt to eliminate more extensive maxillofacial procedures.[2,6]

Since the soft tissues of the cheek may camouflage midfacial skeletal defects throughout the first four decades of life, it becomes particularly important to inform patients who are contemplating cosmetic surgery about the presence and significance of these deficiencies. It is the experience of most surgeons during preoperative counseling, that most patients are usually not aware of the presence of moderate facial asymmetries or the significance of more major abnormalities.[19] However, for most of these patients, even after adequate counseling, the idea of extensive maxillofacial surgery for the purpose of facial rejuvenation is usually not an acceptable alternative.

Conventional malarplasty was proposed as an adjunctive procedure in an attempt to reduce some of the structural difficulties encountered in face-lift surgery.[17] However, it did not address deficiencies encountered in the area of the medial midfacial or submalar area that are responsible for producing the early and persistent manifestations of facial aging. This area is embodied by the canine fossa, the lateral buttress, the inferior portions of the zygoma, the zygomatic arch, and the area overlying the tendinous insertions of the masseter muscle along the inferior border of the malar complex.

Noting the importance of restoring depressions in this region of the face, Guerrerosantos[21] suggested onlay cartilage grafts covered with fascia, and Whitaker and Linton[43] proposed using paddle-shaped polytetrafluoroethylene (Proplast) implants, which, however, additionally accentuated the malar-zygomatic prominence.

PREOPERATIVE EVALUATION

The aesthetic correction of contour deficiencies, particularly in relationship to overlying soft tissue, requires precise evaluation and careful patient selection. Meticulous analysis of the size and shape of the patient's face and accurate placement of appropriate alloplastic implants are ultimately responsible for successful results in aesthetic facial contouring.

Over the past few decades, craniofacial analysis using cephalometrics has formed the basis for preoperative planning in facial restructuring. Less consideration has been devoted to quantitative measurements of the overlying soft tissues. Calculations, such as the facial proportion index, will only give a general idea of facial form.[16] Neger[32] pointed out the importance of assessing soft-tissue structure while measuring the facial skeleton. It was shown anthropologically that soft tissue does not always distribute itself in a uniform manner.[24] As the aging process continues, this asymmetrical distribution will continue to have an adverse effect on facial harmony.

Similarly, patients in their mid-30s may suddenly discover facial asymmetry previously camouflaged by "baby cheeks." In pronounced skeletal asymmetry, the smaller side of the face will display more flattening and drooping of anterior facial skin, and greater deepening of the nasolabial groove than the larger side.

It has been further emphasized that smoothing out sharp angles or depressions can restore symmetry and render a softer appearance, as well as enhance the aesthetic quality of the face.[1,8] For example, deep-set eyes, prominent malar-zygomatic arches, or a prominent

nose can produce a shallow look in the medial midfacial region. Alternatively, enhancing the fullness and curvature in the premaxillary area can effect a relatively decreased anterior-posterior projection to the nose, and provide a softer appearance to the total face.[2]

Some patients seeking aesthetic surgery comment on their apparent "loss" of high cheekbones. Comprehensive preoperative evaluation of these patients reveals that actual skeletal structure has not changed significantly. Instead, the overlying soft-tissue pad that formerly was positioned prominently over the malar eminence has both atrophied and migrated inferiorly, losing its enhancing effect. Pronounced underlying bone structure then becomes most important in slowing down this process (see Fig. 27-2*B*).

Relatively young patients (ages 30 to 50) with degenerative soft-tissue changes or deficient midfacial bone structure may have a sunken or flattened facial appearance, demonstrating premature loss of a youthful expression. These patients say they look depressed, mean, or haggard; this was described by one author as the "gestalt of sadness"[37] (Fig. 27-3). It is this flattened appearance that often motivates patients to seek early consultation for facial rejuvenation surgery.

Face-lift surgery is usually unsuccessful as a long-term solution in correcting many of these structural problems of facial form. The commonly accepted rule that the ideal face-lift candidate is thin, is in the mid 40s, and has prominent malar eminences and mandibular angles does not necessarily apply to all patients, given the limited ability of rhytidectomy to correct midfacial problems.[36] Patients with cavitary changes in the cheeks and thin, atrophic skin may demonstrate minimal or no jowl formation or redundancy of skin or muscles of the neck. It is more to their advantage to fill out their specific midfacial deficiencies (Fig. 27-4*A* through *D*). In older patients, significant underlying skeletal deficiency makes draping of inelastic skin difficult, resulting in early recurrence of redundant skin folds, yielding a less than desirable face-lift result.

In such subjective preoperative analysis, there is an obvious need for standardized measurements to provide guidelines for making decisions in treatment planning. Considering the infinite variations of facial form, most analytical measurements used in determining aesthetic guidelines have been unreliable.[14] For most surgeons, accurate quantitative analysis using the new three-dimensional imaging technology is not yet practical, widely available, or cost-effective for routine clinical use.[26] Until a more precise method of evaluation is available, clinical observation and reliance on good photographic documentation are the most important tools for the evaluation and treatment of aesthetic contour deficiencies using alloplastic implants. It therefore becomes essential for each surgeon to accurately assess how augmenting underlying bone structure will affect overlying soft tissue.

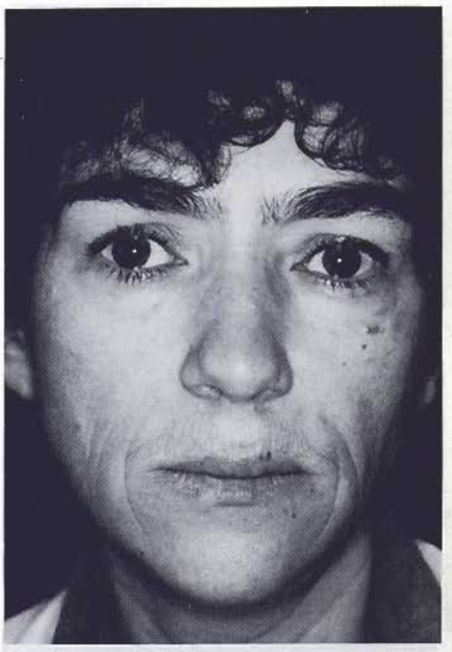


Fig. 27-3. A 40-year-old woman with a generalized flattened facial appearance ("gestalt of sadness") that often motivates young patients to seek early consultation for facial rejuvenation surgery.

MATERIALS AND METHOD

The day before surgery the patient is started on a broad-spectrum antibiotic regimen, which is continued for 5 days. Intravenous antibiotics are also given just prior to beginning the procedure.

Before anesthesia is started, the exact area of midfacial deficiency to be augmented is outlined with a marking pen, with the patient in the upright position (Fig. 27-5A). The patient is then asked to smile broadly so that the most medial position of the implant can be determined without interfering with mimetic function. In addition to a routine preparation, both areas of the canine fossae are also prepped by inserting gauze sponges impregnated with povidone-iodine (Betadine) into the buccal-gingival sulcus for approximately 5 to 10 minutes, and then removing the sponges.

The type of anesthesia used is primarily intravenous sedation accompanied by a wide-field local block. The addition of hyaluronidase (Wydase) facilitates dispersion of the local anesthetic and reduces distortion of soft tissue. General endotracheal anesthesia can also be used, particularly if required by concurrently performed procedures.

A small incision, approximately 1 to 1.5 cm, is made on the inner surface of the lip at the buccal-gingival sulcus over the lateral part of the canine fossae. Bleeding is minimized by first

A

B

C

D

Fig. 27-4. A *and* C. *Preoperative appearance. Patient might be the "ideal face-lift candidate" (i.e. in the mid 40s, has high cheekbones and good jaw structure), but she has minimal jowl formation or loose neck skin. Instead, the most conspicuous problems are related to midfacial degenerative soft-tissue changes.* B *and* D. *Appearance 16 months after operation. Instead of undergoing rhytidectomy, submalar augmentation was used to fill out the depressions and restore a more youthful appearance to the middle third of the face.*

Fig. 27-5. A. *Prior to any infiltration of local anesthetic, the areas of maximum midfacial deficiency are specifically outlined with the patient sitting in the upright position.* B. *A small incision is made over the canine fossa and the periosteum is elevated. The infraorbital nerve may be identified as a landmark, or used to indicate the medial border of the dissection.* C. *Dissection continues laterally around the zygoma and zygomatic arch and inferiorly over the anterior surface of the superior tendinous insertions of the masseter muscle. The pocket is made large enough so that there is no encroachment of soft tissue on any part of the implant.* D. *The shape of the submalar implant is specifically designed to deal with the three-dimensional problems encountered in midfacial structure.* E. *An appropriately sized submalar implant is chosen and placed over the canine fossa, wrapping around the zygoma and zygomatic arch and may rest partially on the tendinous attachments of the masseter muscle.* F. *The submalar implant is adjusted in the desired position so that the two most medial fenestrations of the implant correspond to the markings on the external skin surface.* G. *A double-armed 2-0 silk suture is passed around the posterior surface and through the fenestrations of the implant. From inside the pocket, the needles are passed directly perpendicular to the skin, exiting at the external markings, corresponding in position to the implant fenestrations.* H. *The implant is stabilized by tying the suture directly over an external bolster (comprised of two cotton rolls).*

compressing the mucosa against the underlying bone before making the incision. The incision is made high enough so that it does not interfere with dentures. The periosteum is incised and elevated superiorly off the anterior surface of the maxilla. Although it is not always necessary to do so, the infraorbital nerve may be easily identified, particularly if the implant is to be positioned in a more medial location (see Fig. 27-5*B*).

Using both a Joseph's and "spatula-type" periosteal elevator, the dissection is continued laterally and a subperiosteal pocket is created, providing exposure from the anterior surface of the maxilla to the lateral malar-zygomatic areas of the facial skeleton (see Fig. 27-5*C*).

The pocket may be continued inferiorly by bluntly unroofing the anterior surface of the tendinous insertions of the masseter muscle beneath the anterior-inferior surface of the zygoma. The attachments of the masseter muscle are left intact because they function as a supporting structure on which to place part of the implant.

The pocket is always made large enough so that there will be no compression of soft tissues on any part of the

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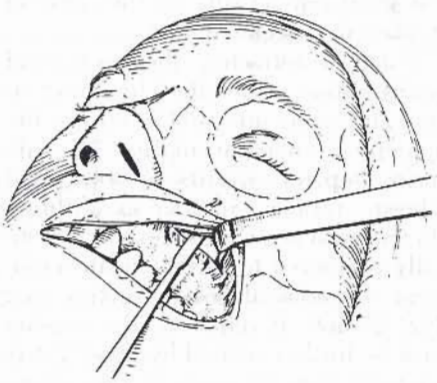

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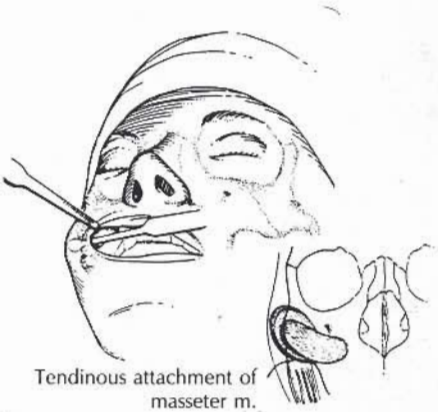
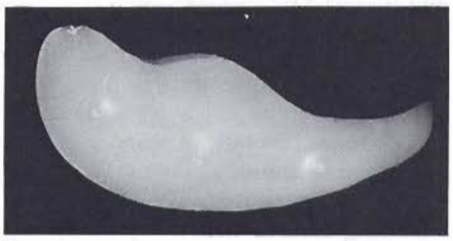

Tendinous attachment of masseter m.

C



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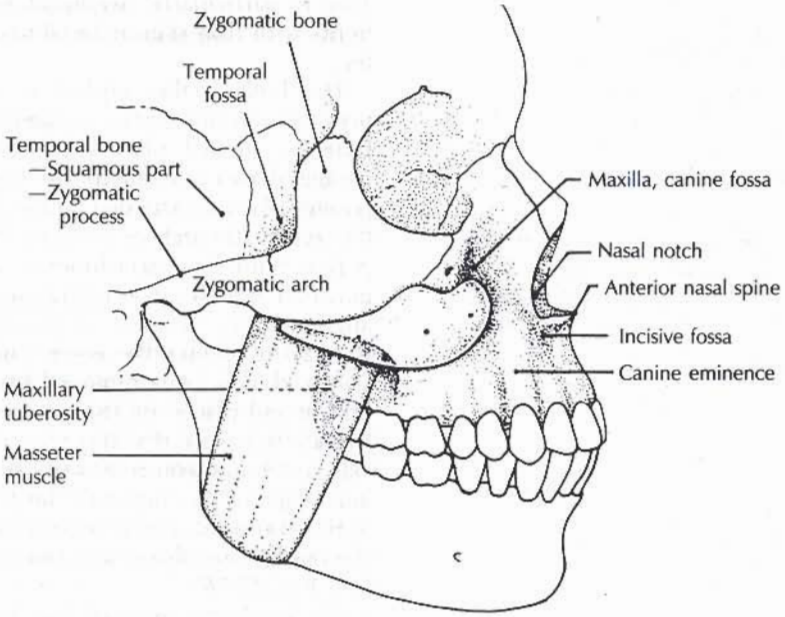
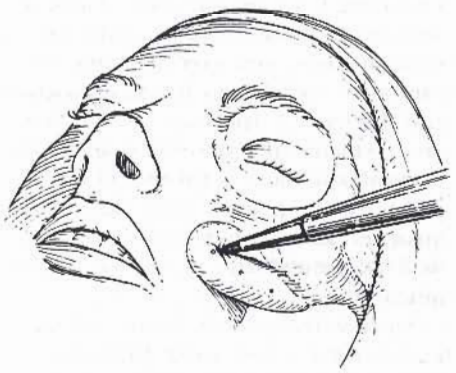

Zygomatic bone
Temporal fossa
Temporal bone
—Squamous part
—Zygomatic process
Zygomatic arch
Maxilla, canine fossa
Nasal notch
Anterior nasal spine
Incisive fossa
Canine eminence
Maxillary tuberosity
Masseter muscle

E



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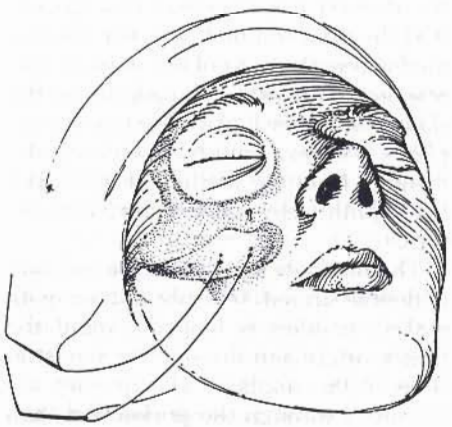

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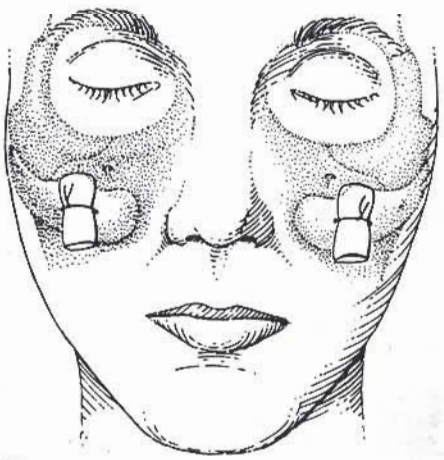

H

implant, particularly from the posterior portion of the dissection. It is thought that making a small, tight soft-tissue pocket surrounding an implant provides for stabilization. However, it has also been shown that a pocket that is too small can actually be the cause of implant displacement.[13]

Using a retractor, the anatomical configuration is identified by direct vision and sizers are used to choose the appropriate submalar implant. The submalar implant consists of soft, solid silicone rubber (Silastic) in a three-dimensional anatomical design, specifically contoured to accommodate variations of midfacial bone structure (see Fig. 27-5*D*). If required, the implant may be further refined by carving it to conform more precisely to unusual anatomical bony or soft-tissue variations. This is particularly beneficial for patients with thin skin or facial asymmetry.

The bulk of the implant is placed over the anterior surface of the maxilla. Extreme medial placement near the paranasal area is avoided. The tapered, posterior-lateral extension wraps around the zygomatic arch or rests on the superior tendinous attachments of the masseter muscle, depending on where augmentation is most required (see Fig. 27-5*E*). Once the correct implant size is chosen, it is removed from the pocket and placed on the anterior skin surface to ensure that the preoperative skin markings coincide with the size and shape of the implant. The position of the two most medial fenestrations of the implant are also marked on the skin (see Fig. 27-5*F*).

The implant is inserted back into the pocket and is adjusted in position until the desired facial contour is achieved. It is then determined whether the two medial fenestrations of the implant correspond to the external markings on the skin. Symmetrical placement of the implants is determined by measuring the distance from the midline of the upper lip to both right and left medial markings.

The implants are then removed, and a double-armed 0-0 silk suture with cutting needles is looped around the undersurface and through the fenestrations of the implant. The needles are advanced through the pocket and then passed perpendicularly through the skin, exiting at the external markings (see Fig. 27-5*G*). The implant, following the needles, is placed into the pocket in the predetermined position. It is then stabilized by tying the sutures externally over a bolster (using 2 cotton rolls), thereby immobilizing the implant (see Fig. 27-5*H*).

After the contralateral side is completed, both implants should be examined by palpation and direct vision to ensure that they are positioned symmetrically. The incision is then closed in two layers. At the conclusion of the procedure, stretch adhesive bandages are placed over the bolster to further immobilize the implants.[11]

The intraoral route of insertion has been used exclusively when performing submalar augmentation. This approach allows for direct visualization of all structures and ease of implant insertion and it leaves no external scars.

The direct fixation technique allows a large pocket to be made for accurate placement, and prevents implant slippage. It also provides a method for measurement to ensure symmetry and more predictable results. We have found that adequate fixation by the surrounding tissues occurs by the third postoperative day, at which time the sutures are cut and the bolsters removed.

RESULTS

Indications for Submalar Augmentation

From May 1982 to February 1990, submalar augmentation was performed on 303 patients. All patients underwent bilateral augmentation, with the exception of eight patients in whom submalar implants were used for correction of a unilateral bony or soft-tissue facial deformity. Initially, Silastic implants of varying sizes and consistencies were carved to conform to the more medial and inferior portion of the midfacial area, which evolved to the shape of the current submalar implant. These implants were placed over the canine fossa and anterior face of the maxilla, as well as around the zygomatic prominence.

During the past 8 years, submalar augmentation was used primarily for four major aesthetic purposes (Table 27-1). It was utilized as the sole alternative method for midfacial rejuvenation in 149 patients between the ages of

Table 27-1.

Indications	No. of patients
Primary aesthetic categories	
Sole aesthetic procedure for midfacial rejuvenation	149
Adjunctive procedure to enhance rhytidectomy	87
Method used for correction of midfacial problems after fact lift (i.e., "mask look")	14
Malarplasty alternative	12
Reconstructive indications	
Unreduced, depressed zygomatic complex fracture	4
Large atrophic midfacial depressions secondary to long-term acne scarring	2
Defects of midfacial area after excision of soft-tissue tumors	2
Soft-tissue loss secondary to trauma	2
Soft-tissue loss after radiation of hemangioma	1
Hemifacial atrophy after permanent unilateral, facial nerve paralysis	1
Reconstruction after midfacial liposuction	3
Midfacial bone resorption secondary to extraction of teeth	4
Other indications	
"Long face syndrome"	5
Replacement for previously inserted malar or midfacial implants	5
Premature (accelerated) midfacial fat resorption in athletes (i.e., marathon runners)	3
Correction of specific midfacial asymmetry	2
Patients with scleroderma, unable to undergo face-lift surgery	1
Combined submalar-malar augmentation	6
Total no. of patients	303
Total no. of implant procedures	598

30 and 50. In the second group of 87 patients, submalar augmentation was used as an adjunctive procedure to enhance and prolong the results of rhytidectomy. In the third group, it was used successfully to treat recurring or postoperative midfacial problems in 14 patients who had previously undergone face-lift surgery. In the fourth group, submalar augmentation was used in 12 patients as a substitute for traditional malarplasty, providing greater anterior projection to achieve the effect of a rounder, more natural high cheekbone.

Submalar augmentation has evolved as a practical treatment technique for numerous pathological defects. Some of these are: traumatic or postablative midfacial soft-tissue defects; depressed, unreduced zygomatic-complex fractures; and localized, atrophic areas of the midface after prolonged acne scarring. Over the past year (1989 to 1990), the indications for midfacial augmentation have expanded development of a combined "submalar-malar" implant for simultaneous treatment of both skeletal and soft-tissue deficiencies of the midfacial area (E. Terino, personal communication, 1990) (see Table 27-1).

Complications

In this series, overall the complications were minor and the incidence small. The greatest difficulty encountered when performing any bilateral surgical procedure is establishing perfect symmetry. As Gorney and Harries[19] illustrated well, preexisting facial asymmetry may become more apparent to the patient after aesthetic surgery. Four patients who complained of mild postoperative asymmetry reviewed their preoperative photographs and were satisfied that the same degree of facial asymmetry existed prior to surgery.

Eight patients with postoperative asymmetry, due to either slippage or malposition, required adjustment of the implant. In five patients, replacement of the implant was required due to improper size or shape. In only one patient were the implants removed due to patient dissatisfaction. No difficulties occurred when an implant was repositioned during a secondary procedure. In each case, a smooth capsule formed around both the anterior and the posterior surface of the implant. On no occasion was bone erosion observed or

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B

C

D

Fig. 27-6. A *and* C. *Preoperative views, demonstrating an early loss of a youthful appearance primarily due to discrete areas of midfacial soft-tissue atrophy.* B *and* D. *Postoperative views 8 months following upper and lower blepharoplasty and submalar augmentation.*

demonstrated by roentgenograms of four patients.[5,7,22]

Three patients developed unilateral infections that were successfully treated by drainage and antibiotics. Since the nonporous Silastic does not harbor bacteria, all infections were satisfactorily resolved without requiring removal of the implant.

Eight patients who experienced partial numbness of the upper lip had complete return of sensation within 3 months. In one patient, it persisted for 6 months before final resolution. Unilateral reduced mobility of the upper lip was found in five patients. Four of these patients had complete return of function within 4 weeks. In these cases it was thought that localized swelling rather than neuropraxia was the most likely cause of muscle dysfunction. In one of these patients, reduced upper lip mobility lasted 10 weeks before complete return of function. In this series, there was no instance of permanent motor or sensory nerve damage.

The majority of patients experienced very little postoperative discomfort. Three patients were seen for a delayed onset of premaxillary pain at least 6 months following surgery. Concurrent sinusitis or an acute exacerbation of chronic allergic rhinitis and nasal congestion was found to be the etiological factor in all three. As soon as the nasal or sinus problem was appropriately treated with antibiotics and decongestants, the symptoms were alleviated within 48 hours. Subsequently, this problem did not occur in any of these patients.

The overall results have shown submalar augmentation to be an extremely low-risk procedure. Owing to placement of the implant under the thicker, more medially positioned soft-tissue mass, most patients reported that they could not feel the implant, regarding it as a normal, natural part of their facial structure. To date no implant has been rejected.

A

B

C

D

Fig. 27-7. A *and* C. *A 40-year-old patient seeking early consultation for facial rejuvenation surgery. The patient complains of looking "tired" and "haggard," and having a generalized "depressed" appearance, resulting from loss of soft tissues in the midfacial region.* B *and* D. *Appearance 16 months after operation. Submalar augmentation was used alone to provide the appearance of soft-tissue enhancement and to restore the brightness and vibrancy of the middle third of the face.*

DISCUSSION

Since replacement material for large soft-tissue deficiencies does not yet exist, we have provided a technique that simulates the appearance of increased soft-tissue bulk to return youthful, natural contours back to the face (Figs. 27-6 and 27-7). Placing the submalar implant over the anterior surface of the maxilla provides a wider, convex surface area that supports and repositions the displaced soft tissues toward their original superior-anterior location (Fig. 27-8). Correct placement of the implant following normal anatomical configurations augments the skeletal structure and corrects many of the problems of hollowness, folds, and integumentary collapse (Figs. 27-9 and 27-10).

Successful alloplastic augmentation depends on the type of material, correctly configured implant shape, and adequate amount of soft-tissue covering.[9,15] Placement of Silastic beneath the more protective, thicker skin flaps of the medial midthird of the face ensures longevity and security of the submalar implant. This avoids certain

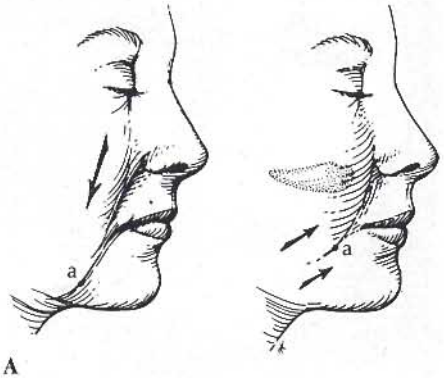

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Fig. 27-8. A. *The submalar implant augments skeletal structure while providing a scaffolding for the ptotic overlying soft tissues. This repositions the relaxed midfacial soft tissues to a more anterior-superior location and fills out this recessed area, thus providing a more youthful look. Lateral and anteroposterior views.* B *and* D. *Preoperative.* C *and* E. *After blepharoplasty and submalar augmentation. The amount of midfacial soft-tissue projection obtained is demonstrated.*

limitations imposed by traditional malarplasty techniques whereby relatively bulky implants, positioned over prominent skeletal structure, are protected by only a thin layer of soft tissue[20] (Fig. 27-11).

If desired, the unique design of the implant can provide a natural high cheekbone effect by additionally emphasizing projection over the anterior-lateral portion of the malar complex (Fig. 27-12). In selected cases, the submalar implant can also establish the appearance of more harmonious facial proportions in patients exhibiting the long face syndrome.

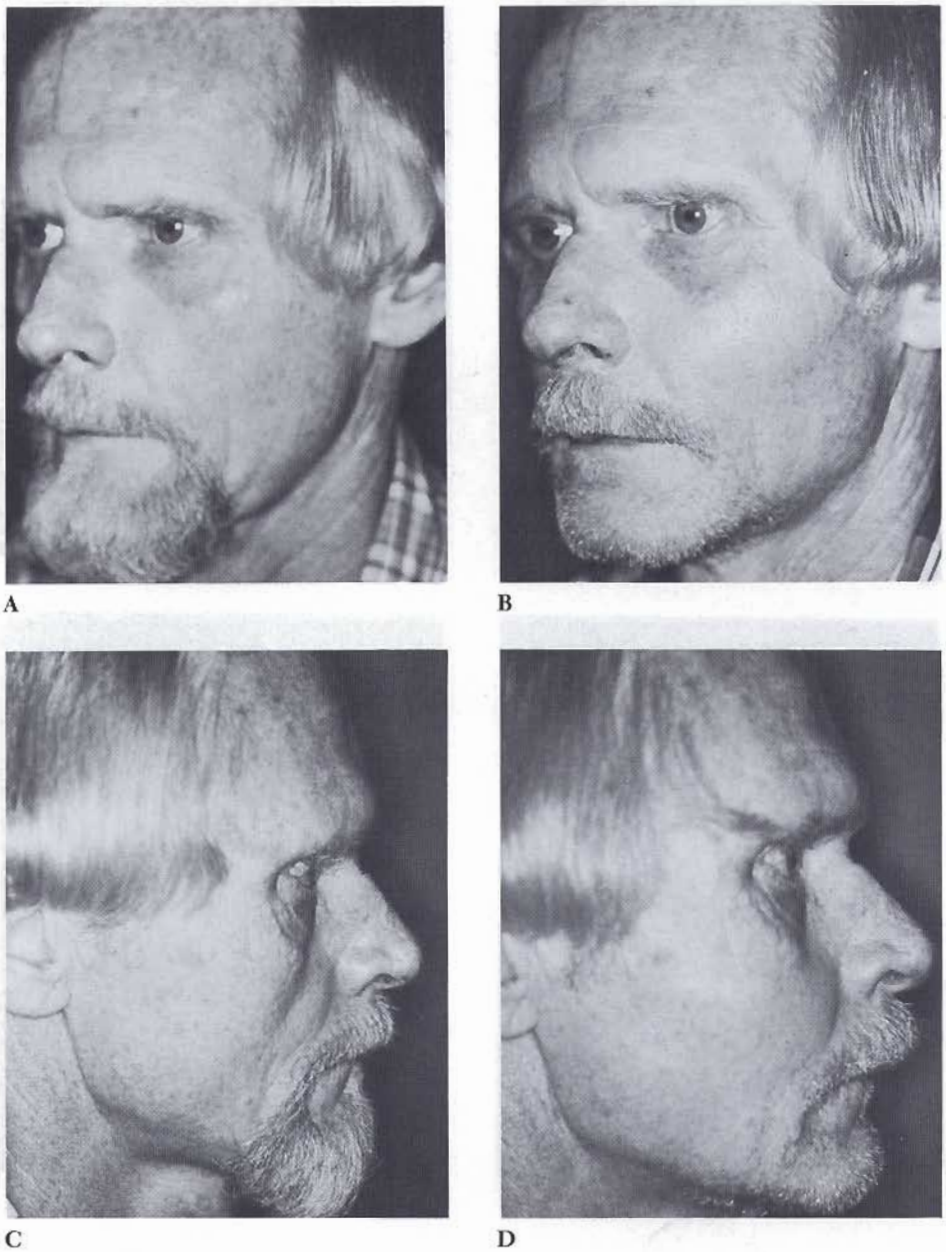


Fig. 27-9. A *and* C. *Preoperative vie illustrating prominent bone structure deterioration of midfacial soft tissue, which combine to produce an emaciat appearance in an otherwise healthy patient.* B *and* D. *Postoperative view Submalar augmentation was used as procedure to restore the appearance healthy substance to the collapsed midfacial integument.*

Although there is no perfect alloplastic implant, we believe the properties of silicone rubber fulfill many of the requirements of an ideal synthetic implant.[39] Silicone rubber (Silastic) has advantages over other available materials, particularly conquering the tendencies that Proplast implants have toward shrinkage, migration and the bacteria-entrapping ingrowth of granulation tissue.[4,28] Unlike resilient Silastic, Proplast, which is easily fragmented, makes secondary repositioning difficult.[38]

Silastic (silicone rubber) is biologically inert, has mechanical and thermal stability, and causes little tissue reaction. It is not absorbed, can be shaped precisely, and does not warp or disintegrate. Silastic can be obtained in different consistencies, and its compressibility allows insertion through small openings. Since silicone rubber is nonporous, it is resistant to infection and can be resterilized. By contrast, once an infection is diagnosed, the Proplast implant must be removed and discarded.

Many patients with deficient facial skeletal structure or severe degenerative soft-tissue changes, or both, are considered poor candidates for face-lift surgery and are sometimes denied its

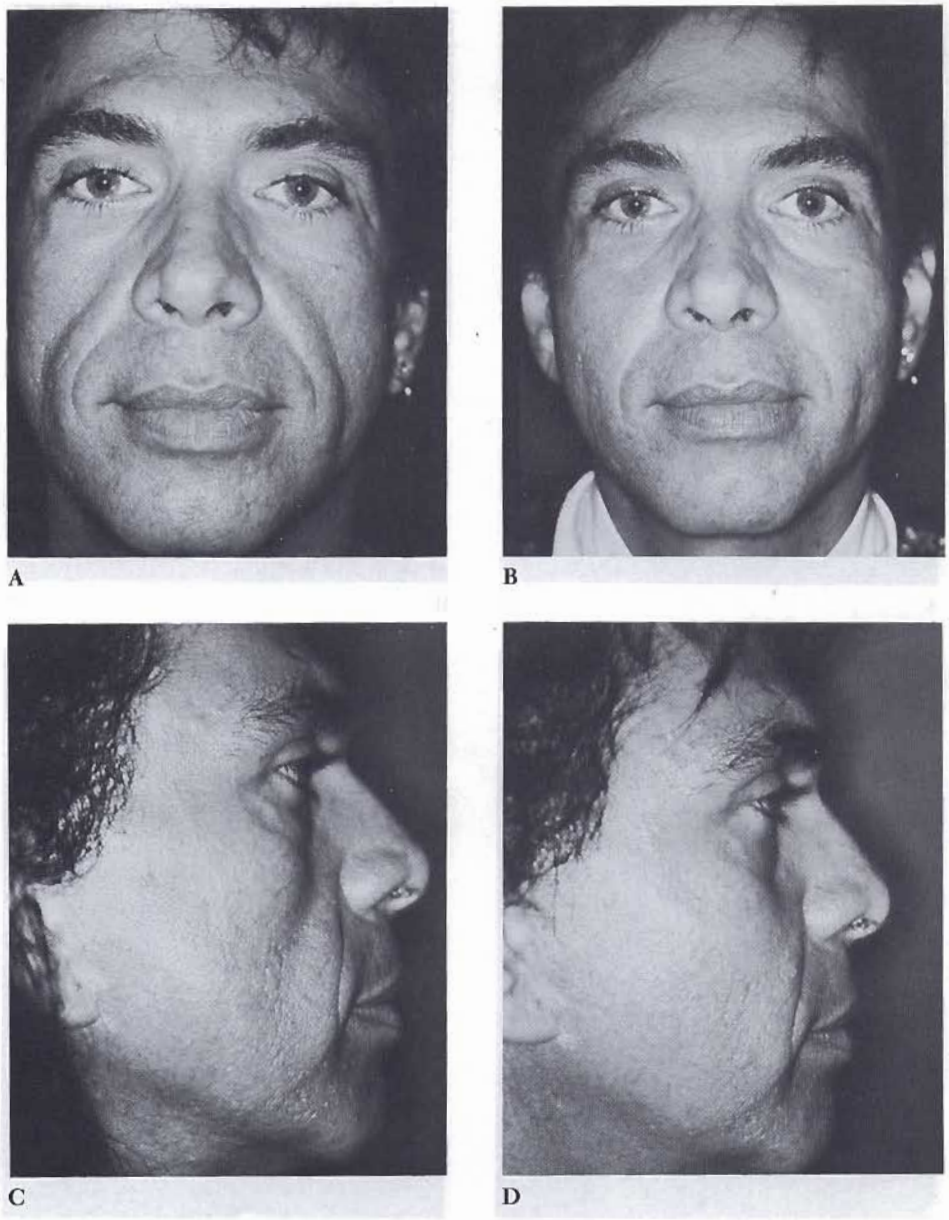


Fig. 27-10. A *and* C. *Preoperative views, illustrating significant depth to the nasolabial folds but without a similar degree of redundancy or chalasis of the skin.* B *and* D. *Six months after submalar augmentation was used as a sole procedure to reexpand the skin, smooth out the folds, and reduce the midfacial recess.*

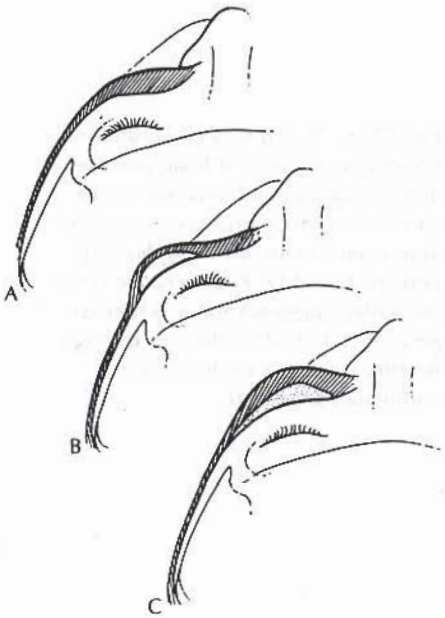


Fig. 27-11. A. *Normal relationship of skin covering the midfacial skeleton.* B. *A standard cheek implant inserted over an already prominent part of the facial skeleton, covered by thinner skin, which can sometimes produce an overaccentuated facial contour.* C. *The submalar implant is positioned in a more inferior and medial location where it is protected by thicker soft-tissue covering. This location also provides for a smoother, more natural facial contour.*

benefits. By enhancing midfacial deficiencies, submalar augmentation has the unique ability to change the status of a patient from that of a poor candidate to one who can benefit from rhytidectomy (Fig. 27-13).

It has been accepted that gravitational folds located in the medial midfacial area are the most difficult to improve by means of face-lift surgery.[12,29] Attempts to treat these problems have consistently met with patient dissatisfaction.[25,31,34] The persistence of the nasolabial folds after rhytidectomy has prompted development of many primary as well as ancillary surgical procedures. These include direct skin excision, tun-

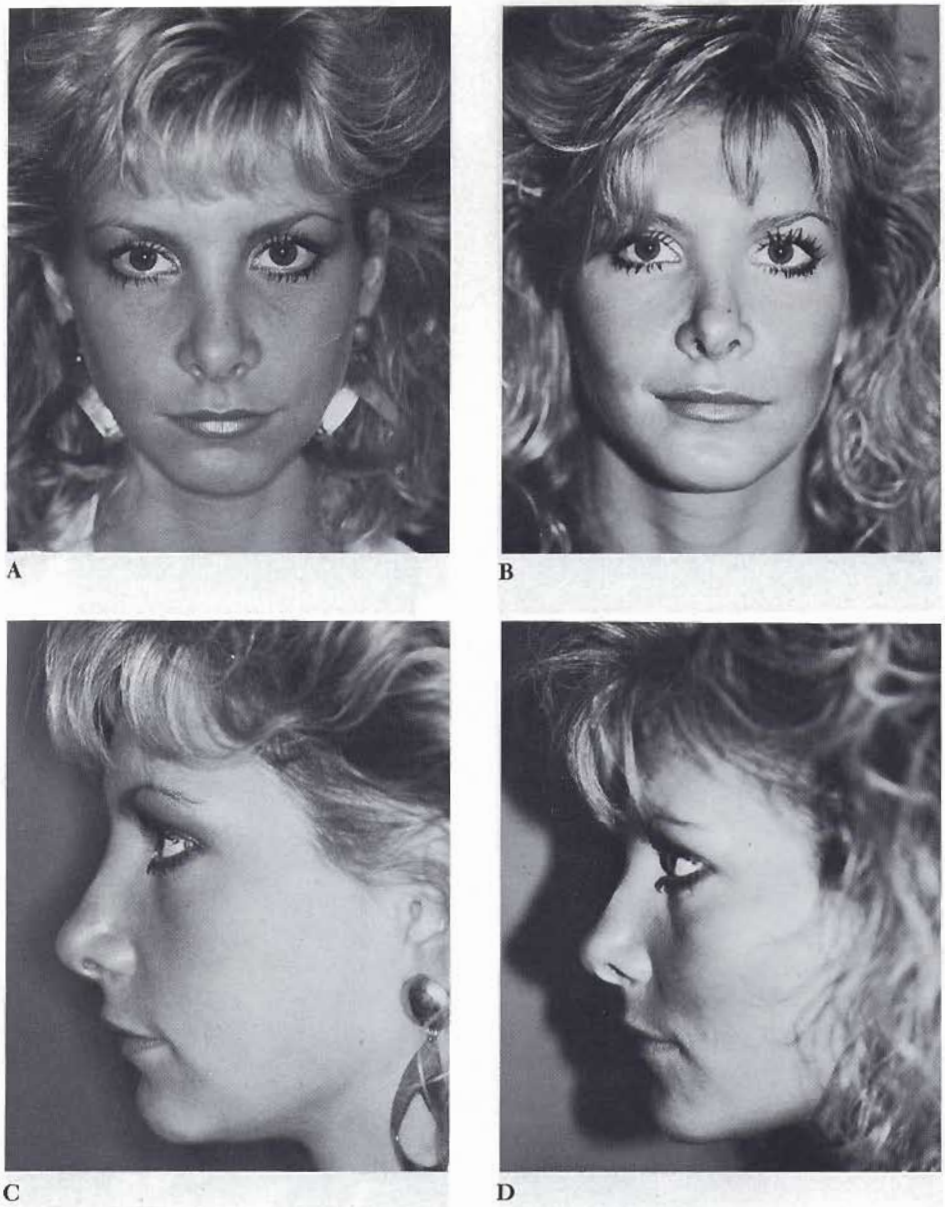


Fig. 27-12. A *and* C. *Preoperative views. This 21-year-old woman has adequate lateral projection to the malar complex, but a flatness to the midfacial area below the zygoma.* B *and* D. *Postoperative views 18 months after submalar and chin augmentation. The submalar implant provides a more anterior projection than do the traditional, laterally positioned cheek implants, and achieves a more natural high cheekbone effect.*

neled dermal grafts, imbrication fascial techniques, extended rhytidectomy procedures, injection of silicone or collagen, and the recent reported use of liposuction.[33,40]

We have found that liposuction can actually accentuate the problem. Excessive fat extraction, particularly of the buccal fat pad, alone or in conjunction with rhytidectomy, can have the long-term effect of causing loss in elasticity, producing thinner, looser, and more redundant skin. A youthful, vibrant appearance is then lost.[27]

It is generally agreed, however, that a smooth nasolabial fold is part of youthful facial expression. In an attempt to reduce the nasolabial folds, multiple or overextended face-lift techniques mobilize and stretch already thin and inelastic skin over a shrinking skeletal mass. This may result in an unnatural, skeletonized, mask-like appearance with general loss of facial expression or cause lateral "pull lines" often found in older patients with thin skin[23,36] (Figs. 27-14 and 27-15). Extensive undermining with tension can also cause ischemic changes in the skin, increase the chance of skin slough or temporal alopecia, and cause hypertrophic periauricular scarring.

The extended underlying skeletal structure satisfies the need for supple-

Fig. 27-13. A *and* C. *Preoperative views, showing insufficient facial skeletal structure unable to support collapse of degenerative soft tissue and aging skin. The underlying bone structure must first be enhanced in order for even extensive face-lift surgery to provide a satisfactory, long-lasting result.* B *and* D. *Views 2 years postoperatively, showing the results of submalar augmentation and chin augmentation before planned rhytidectomy. The enhanced facial structure will now provide the basis for more successful face-lift surgery.*

mentary enhancement of the midface to avoid exerting excessive tension on the skin, thus preventing distortion of midfacial architecture (Figs. 27-16 and 27-17). Dispersing the direct vector forces from a two-dimensional flat surface over a three-dimensional raised surface avoids exerting a direct pull on the oral commissure and perioral structures. The skin is therefore repositioned and draped over a larger, convex structure rather than a smaller, concave structure (Figs. 27-18 and 27-19).

As a means of renewing youthful facial appearance, submalar augmentation provides particular advantage for those in whom face lift is not yet indicated, or for those who are not ready for a complete face lift. Overall, it reduces the need for secondary "tuck up" procedures and allows the face-lift operation to achieve enhanced, longer lasting results with an increased rate of patient satisfaction (Figs. 27-20 and 27-21).

By utilizing submalar augmentation in aesthetic facial contouring, a restorative approach to facial rejuvenation surgery is emphasized.

A

B

Fig. 27-14. A. *Preoperative view. Too much skin tightening from prior face-lift surgeries can produce a stretched, mask-like appearance.* B. *View 10 months postoperatively. Instead of removing more skin or soft tissue, submalar augmentation was used to restore lost fullness and vibrancy to the midface, particularly around the perioral area.*

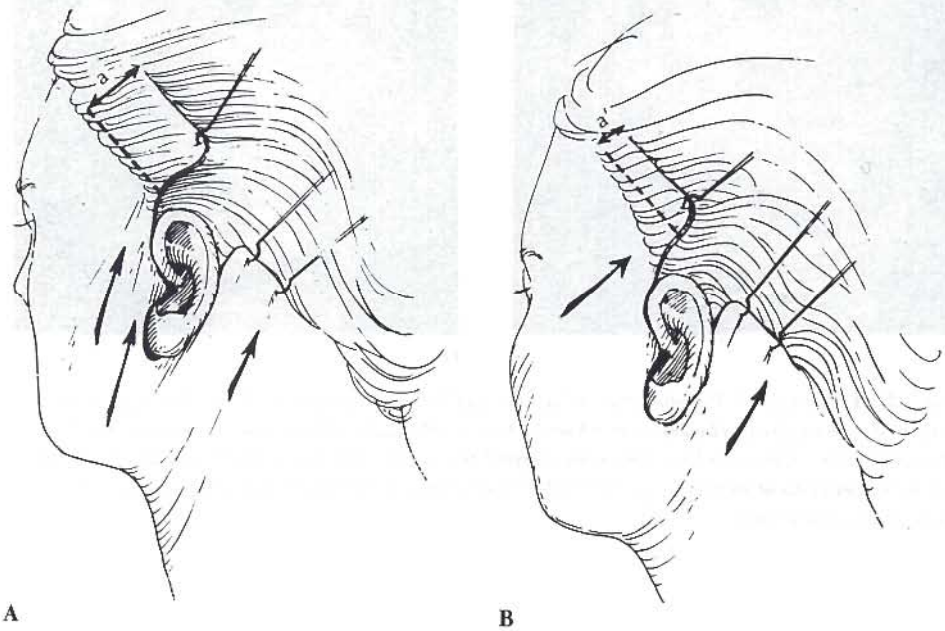
Fig. 27-15. This patient demonstrates the linear "pull lines" extending laterally from the oral commissure, caused by multiple face-lift procedures.

Fig. 27-16. A *and* C. *Preoperative views. A major part of this patient's problem is associated with the extensive wrinkling and depth of folds around the nasolabial and perioral areas of the face. Face-lift surgery alone would have difficulty in eliminating this problem, potentially producing a stretched appearance around the mouth.*
B *and* D. *Views 1½ years postoperatively. Submalar augmentation was performed first, followed by face-lift surgery. The enhanced facial structure provided by submalar augmentation enabled the face-lift operation to smooth out the wrinkles and folds around the mouth without pulling the skin too tight, thus achieving a more natural and longer lasting face-lift result.*

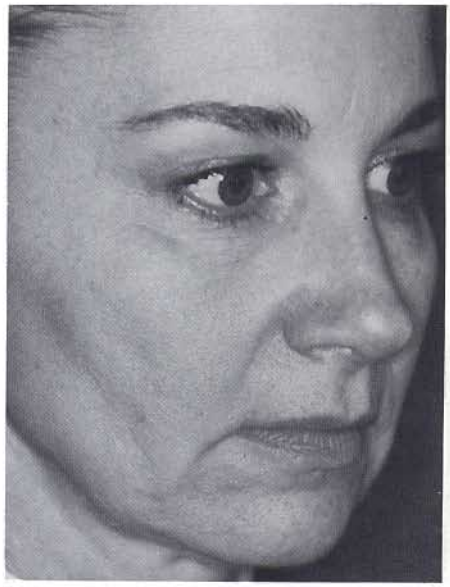
A B

Fig. 27-17. A. *Preoperatively the loss of midfacial soft tissue is depicted by a flattened appearance of this area.* B. *View 12 months after submalar augmentation and rhytidectomy. By enhancing midfacial bone structure, submalar augmentation gives rhytidectomy the capacity to achieve enhanced, longer lasting results.*

Fig. 27-18. *The submalar implant augments the anterior facial structure so that instead of draping the skin over a smaller concave structure* (A), *it is draped over a larger convex structure, requiring more surface area of skin to cover it* (B). *This also avoids applying excessive tension on the skin and reduces the amount of temporal hair-bearing skin that must be excised during rhytidectomy.*



A B



A

B

Fig. 27-19. A. *Preoperative view.* B. *View 18 months postoperatively illustrates how submalar augmentation establishes the foundation for improved results in rhytidectomy. Notice the significant enhancement of the left buccal area.*

A B C D

Fig. 27-20. A *and* C. *Preoperative views.* B *and* D. *Postoperative views after upper and lower blepharoplasty, rhinoplasty, rhytidectomy, submalar augmentation, and perioral dermabrasion. Although dermabrasion helped the vertical lip lines, there is also an overall subtle improvement in the shape of the lips and entire perioral area as well as enhanced midfacial architecture.*

A B C D

Fig. 27-21. A *and* C. *Preoperative views.* B *and* D. *Postoperative views 1½ years after upper and lower blepharoplasty, rhytidectomy, and submalar augmentation were performed. By producing a slight convexity to the midface, submalar augmentation has been able to provide a more vibrant and youthful appearance as well as to prolong the results of rhytidectomy.*

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