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Master Techniques in Facial Rejuvenation

Aesthetic Midface Implants

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HISTORY

Tessier was one of the earliest surgeons to utilize autogenous bone grafts in the 1960s to correct congenital and traumatic deformities of the facial skeleton.[1] Donor site morbidity, prolonged operative time, and resorption of tissue grafts limited the widespread use of these techniques. Alloplastic implants were first introduced in the late 1960s when Spadafora and Hinderer pioneered the use of synthetic implants for aesthetic facial enhancement.[2,3] Since that time, many other prominent surgeons have advocated the use of alloplastic implants for facial aesthetic surgery.[4-9]

The use of facial implants continued to grow beyond its indication for *malar* augmentation. As early as the 1970s, Gonzalez-Ulloa recognized the ability of midface implants to rejuvenate the midface when performed with standard rhytidectomy.[4] Most of his work focused on improving facial appearance by altering cheek shape and contour. This "profileplasty" was a natural progression from the earlier craniofacial techniques popularized by Tessier and others. Many realized that midface augmentation could produce fuller cheeks and a more youthful appearance. However, the emphasis of this early work was more on improving the overall shape of the face, rather than reversing the effects of aging on the midface.

After extensive modification of early implant prototypes, Binder advocated the use of midface augmentation as an independent and powerful method for midface rejuvenation in the 1980s.[10] An important innovation in Binder's work was the increased emphasis on *submalar* "soft tissue" augmentation, which he showed could have a significant impact on midface aesthetics by restoring the volume lost because of atrophy associated with the aging process. In the 1990s, Terino further promoted alloplastic facial contouring as a way of improving the overall facial aesthetics.[11]

PERSONAL PHILOSOPHY

The last two decades have seen rapid advances in the understanding and treatment of midface aging.[10,12-16] Midface rejuvenation has evolved far beyond the rhytidectomy procedure to involve deeper and more fundamental levels of dissection with attempts at elevating and replacing lost midface volume. The pathophysiology of the aging process is a key factor in determining the correct surgical treatment. It is now well understood that the aging process results not only in the descent of the midface but also in the atrophy of the soft tissue in multiple facial planes. Midface rejuvenation can therefore be achieved not only through suspension techniques but also by the augmentation of the soft tissue and skeletal foundation. As a result, we have found that alloplastic implants are an effective way to alter the midface appearance in appropriate candidates. Midface augmentation is a straightforward, long-lasting, and relatively low-risk surgical option that can consistently and predictably improve midface aesthetics. It has the ability to replace lost facial soft tissue volume and to increase the anterolateral projection of the area, thereby reducing midface laxity and decreasing the depth of the nasolabial folds (Fig. 12-1). Implants are readily reversible and can be combined with standard rhytidectomy procedures. The net effect is a softening of the sharp angles and depressions of the aged face, resulting in a natural "unoperated" look. In appropriate candidates, moderate facial rejuvenation can be achieved simply with the placement of submalar midface implants without concomitant rhytidectomy (Fig. 12-2). This technique is particularly applicable to middle-aged patients (ages 35 to 45 years) who show early signs of facial aging and atrophy without significant soft tissue laxity of jowls or deep neck rhytids.

In patients who require rhytidectomy because of significant lower facial laxity, alloplastic implants can also augment the bony scaffold of the malar region, thereby improving the fundamental base upon which facial tissues are suspended. This midface recontouring allows for dramatic results that are not possible with soft tissue techniques alone. The benefit is especially apparent in patients who have a combined deficiency of the facial skeleton and soft tissues, and in those patients who have a prominent malar skeleton but lack adequate submalar soft tissue. Midface implant augmentation facilitates rhytidectomy in several ways. The skin and soft tissue can be draped over a broader, more convex midface region
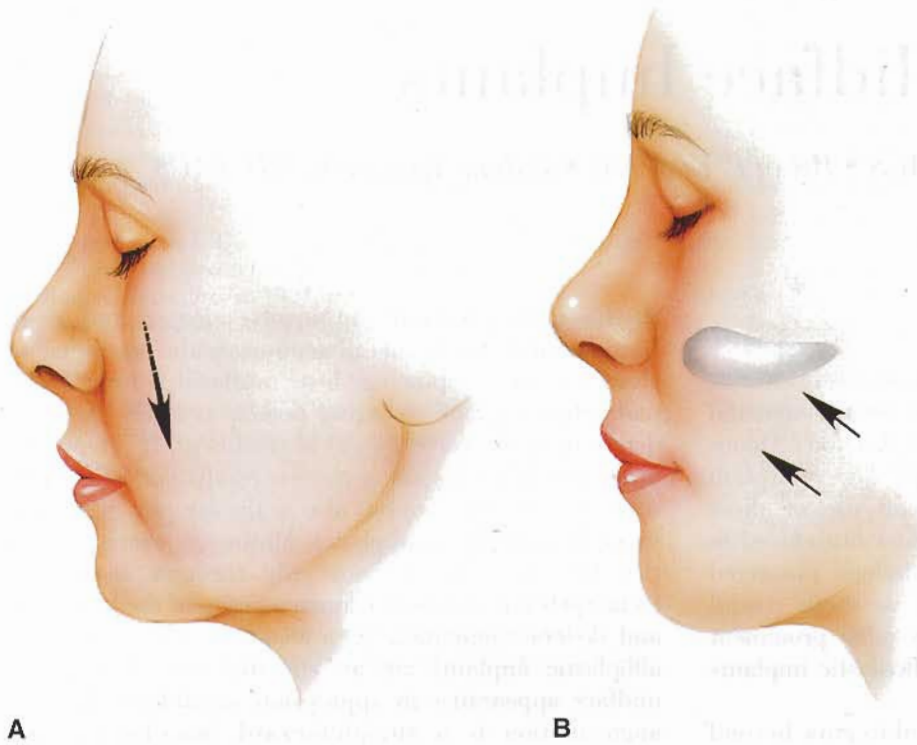
A   B

A   B

after implant augmentation (Fig. 12-3). There is also minimal traction on the perioral tissues and lateral commissure if placed prior to the rhytidectomy, which can help to avoid an "overoperated" appearance. Similarly, the subperiosteal dissection of the midface during the implant placement also releases the deep attachments of the superficial musculoaponeurotic system (SMAS) to the facial skeleton, allowing greater mobilization and suspension of ptotic soft tissues, which greatly enhances the results of sub-SMAS and deep plane rhytidectomy.[12]
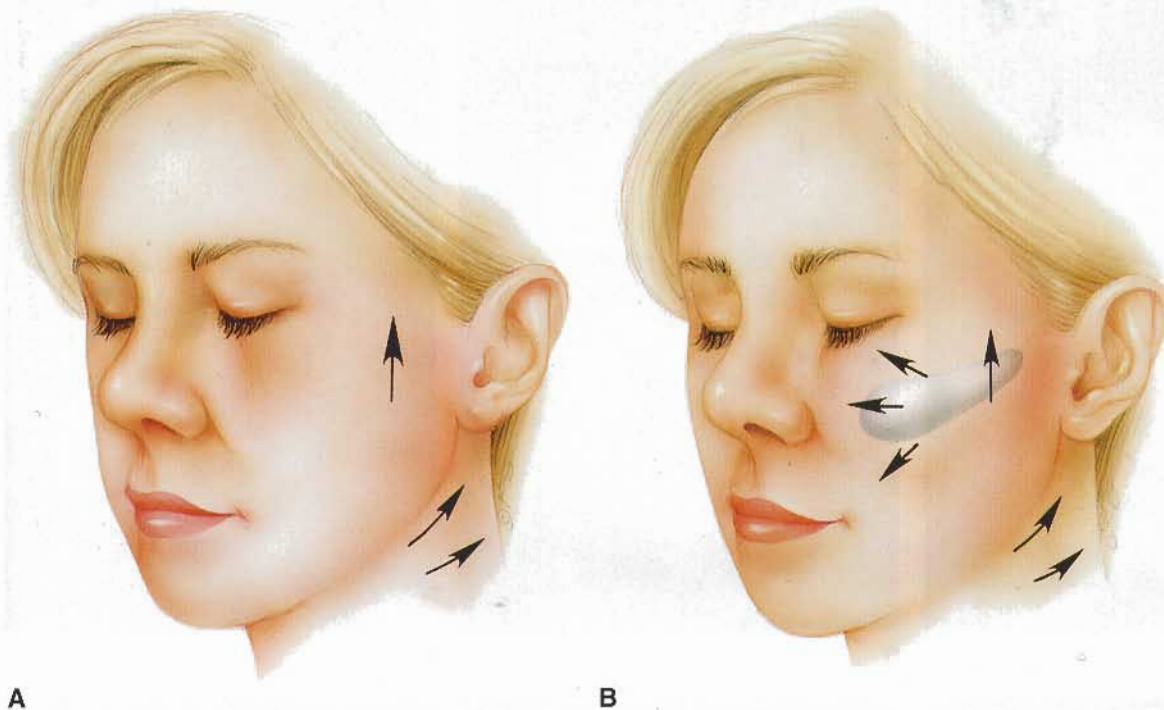
Figure 12-3 Convexity effect of midface implants. Facelifts generally stretch skin over a flat midface structure in a two-dimensional pattern (*arrows* in **A**). Malar and submalar implants create a more convex midface region allowing for a more natural skin draping and resulting in a third dimension for facial rejuvenation (*arrows* in **B**).

Many patients who present for revision rhytidectomy and require volume restoration can also be improved by expanding the midface region while decreasing downward vertical traction forces on the lower eyelid.

The deep plane facelift, subperiosteal facelift, and fat grafting have become popular methods for improving the aesthetics of the midface.[12-18] These techniques can be useful alternatives to alloplastic implants in appropriate candidates; however, they do have limitations in addressing the underlying pathophysiology of midface aging. The subperiosteal midface lift and deep plane rhytidectomy can have a tremendous impact on the midface by suspending the existing soft tissue but cannot replace the deeper or superficial soft tissue that is lost with aging. Furthermore, subperiosteal midface lifts cause significant edema and distortion to the periorbital region that can last for several months. Facelift surgery may even worsen the overall appearance by "skeletonizing" the face in patients with significant midfacial volume loss or extremely prominent bone structure.

Injectable soft tissue fillers such as hyaluronic acids, calcium hydroxylapatite, and collagen can efface the nasolabial fold, but they seldom yield permanent results or produce significant volume enhancement. They may serve as a valuable option in treating early stage nasolabial fold and facial atrophy in younger individuals. Injectable poly-L-lactic acid (Sculptra, Dermik Aesthetics, Bridgewater, NJ) may be able to produce more dramatic

volume enhancement than other fillers but generally requires yearly maintenance. Free fat transfer can also produce moderate volume augmentation, but long-term results and longevity are not predictable.

Midface implants not only help reverse the effects of aging, but they are also useful in a variety of other conditions. Midface contouring can mask post-traumatic and congenital deficiencies while avoiding lengthy reconstructive surgeries and graft donor site morbidity.[19] Implants can improve the facial atrophy that results from anorexia nervosa or the effects of protease inhibitors in treating conditions such as human immunodeficiency virus (HIV) lipodystrophy (Fig. 12-4).[20] We have also successfully used facial implants for patients with longstanding facial paralysis and Bell's palsy who have significant unilateral facial and muscle atrophy.

ANATOMY

Youth is marked by an abundance of facial soft tissue, allowing for full cheeks and smooth, pleasant contours without sharp irregularities or indentations.[21] The aging process begins to appear in persons who are in their 30s and 40s and significantly progresses by the time individuals reach their 50s and 60s. The effects of the midface aging process are a result of volume loss, the gradual descent of soft tissue, and decreased skin elasticity.

Figure 12-4 Submalar midface implants for treatment of HIV lipodystrophy. Preoperative (**A**, **C**, and **E**) and 1-year postoperative (**B**, **D**, and **F**) views of a 34-year-old man who underwent customized submalar implant placement.

The malar, buccal, temporal, and infraorbital fat pads atrophy and lose their fascial support, becoming progressively ptotic secondary to gravity. The malar fat pad, suborbicularis oculi fat (SOOF), and orbicularis oculi muscle descend inferiorly, causing an exaggeration of the nasolabial folds and exposure of the infraorbital rim. Cavitary depressions and submalar hollowness may develop in addition to the deepening nasolabial and

nasojugal folds. The end result is flattening of the midface with an aged and fatigued appearance, often unmasking underlying bony anatomy.

Surgical treatment of the aging face requires a keen understanding of the soft tissue and bony landmarks of the midface. The *malar eminence* is a key element that is localized to the anterior one third of the zygomatic arch, and is a common area of implant augmentation.

A   B

C   D

Figure 12-6 Type I midface deformity. Preoperative (A and C) and postoperative (B and D) photographs of a patient with type I *malar* hypoplasia who has relative deficiency of the midface skeleton and underwent placement of malar shell implants.

atrophy of the midface. This is the most common deficiency found in the aging face as the soft tissue components of the midface start to atrophy and lose luster. Soft tissue atrophy and inferior descent leave a hollowed-out appearance, resulting in a flat and dull-appearing midface. Type II deficiency is best treated with submalar implants that fill in the midface depressions and give greater anterior projection to the flattened face (Figs. 12-2, 12-7, and 12-8).

Type III deformity occurs when there is a combined bony malar hypoplasia and soft tissue deficiency. These patients have the propensity to suffer exaggerated effects of aging because ptotic soft tissues have little bony support and readily descend along the nasolabial folds and oral commissure. Type III patients can greatly benefit from the placement of combined malar-submalar implants (Fig. 12-9). Many of these patients would be poor candidates for rhytidectomy alone, because there is

A

B

C

D

■ **Figure 12-7** Type II midface deformity. Preoperative photographs (**A** and **C**) of a patient with type II *submalar* deficiency. The patient had adequate facial skeleton but deficiency of the submalar soft tissues. Seven-year postoperative photographs (**B** and **D**) after placement of submalar and chin implants demonstrating the long-term enhancement of facial rejuvenation.

limited underlying skeletal support with which to resuspend the skin and soft tissue. The surgical results are often suboptimal and short-lasting.

SURGICAL TECHNIQUE

GENERAL GUIDELINES

Biomaterials such as silicone, polytetrafluoroethylene (Medpor, Porex Surgical Products, Newnan, GA), and expanded polytetrafluoroethylene (Gore-Tex, W.L. Gore & Associates, Inc., Flagstaff, AZ) can be used for midface augmentation. We prefer silicone because it is flexible, has a low incidence of infection, and can be easily inserted and removed.[6-11] The transoral approach is utilized to place the implant in a subperiosteal pocket. This approach allows easy insertion of the implant and direct visualization of all midface anatomic structures (especially the infraorbital nerve). There are no external skin scars and the inferior dissection helps avoid postoperative traction on the lower eyelid. In the

Figure 12-8 Type II midface deformity with dermatochalasia and lower facial laxity. Preoperative (**A** and **C**) and postoperative (**B** and **D**) photographs of a patient with type II *submalar* deficiency, aging eyes, and lower facial laxity who *underwent placement of submalar implants,* facelift, and upper and lower blepharoplasty.

subperiosteal plane, silicone implants become firmly attached to the facial skeleton by capsular fibrosis, which helps ensure against implant migration during the postoperative period.[23] A potential disadvantage of this approach is the increased risk of wound infection; the implant could be contaminated by oral microbes because it is placed through the mouth. Fastidious surgical technique can help to reduce this risk. Occasionally, other approaches such as the subciliary and lateral facelift approaches are utilized.

When performing concomitant rhytidectomy, the surgeon can insert the implants before or after the facelift surgery. Type I and III patients, who have a malar component to the midface augmentation procedure, should have the implants placed prior to the rhytidectomy so that the surgeon can compensate for the structural changes that may not be obvious after swelling occurs. When implants are placed prior to the facelift procedure, it is prudent to place a Penrose drain into the oral incisions to prevent seroma and hematoma formation.

Figure 12-9   Type III midface deformity. Preoperative (**A**, **C**, and **E**) and postoperative (**B**, **D**, and **E**) photographs of a patient with type III volume-deficient face who lacks adequate facial skeletal structure and soft tissue bulk who underwent placement of combined *malar-submalar* implants with enhanced midface volume and overall improvement of facial aesthetics.

Type II patients who will require only submalar soft tissue augmentation can undergo the rhytidectomy procedure prior to the implantation. The advantages of placing the alloplastic implant at the end of the procedure include maintaining a dry implant pocket, reducing subperiosteal bleeding, and closing the intraoral wound immediately following the augmentation, thereby reducing the risk of infection.

PREPARATION FOR SURGERY

Patients are started on a broad-spectrum oral antibiotic the day before the procedure. In the preoperative holding area, crucial areas of the midface are marked on the face while the patient is sitting upright (Fig. 12-10). The markings include the midface volume deficit, areas of depression, infraorbital nerve axis, and the malar

Figure 12-10 Preoperative markings. With the patient sitting upright, the areas of midface deficiency requiring augmentation are marked. The infraorbital nerve axis along the midpupillary line designates the medial border of dissection.

Figure 12-11 Oral incision. The gingival-buccal incision is made over the lateral canine fossa. Only 5 mm is required as the initial incision, because the mucosa will stretch and provide adequate exposure of the midface skeleton. A 1- to 1.5-cm cuff of gingiva is maintained inferiorly.

eminence. The infraorbital nerve lies along the midpupillary line when the patient is staring straight ahead, and denotes the medialmost border of the typical midface implant. The patient is asked to smile broadly to help determine the most inferomedial position of the implant and to ensure that there is no interference with facial mimetic function. After the skin marking, the patient can look into a mirror and decide if the proposed changes will satisfy his or her expectations.

Implant placement can be performed using intravenous sedation or general anesthesia. Intravenous antibiotic and steroids are routinely utilized. After an adequate anesthetic state is reached, 1% lidocaine with epinephrine is injected into the gingival-buccal sulcus and the midface in a subperiosteal plane. Hyaluronidase (Wydase, Wyeth-Ayerst, Philadelphia, PA) is added to the anesthetic solution to help disperse the local anesthetic evenly and minimize contour irregularities from the accumulation of fluid. The face is then massaged in order to disperse the solution evenly. The operative site is prepared with povidone-iodine (Betadine, Purdue Frederick, Norwalk, CT) from soaked gauze sponges placed into the gingival-buccal sulcus at the level of the canine fossa for 10 minutes.

INCISION AND DISSECTION OF MALAR EMINENCE

A 5-mm stab incision is made in the gingival-buccal sulcus over the lateral canine fossa and maxillary buttress (Fig. 12-11). It is unnecessary to make a large incision, because the mucosa can stretch to accommodate larger implants. The incision is made in an upward oblique direction and is carried immediately and directly onto the maxillary bone. Compression of the mucosa against bone

during incision will help minimize bleeding. At least a 1-cm cuff of gingival mucosa is left to facilitate closure at the end of the procedure. Dentures can remain in place during the operation, as they will not interfere with implant insertion and actually direct the placement of the incision to the correct location.

The periosteum of the anterior maxilla is elevated superiorly and laterally (Figs. 12-12 and 12-13). The surgeon's external free hand is crucial in guiding the direction and extent of dissection using the preoperative markings. The subperiosteal elevation is started with the Joseph elevator but is quickly changed to a broader 10-mm Tessier elevator (Fig. 12-14). Extensive dissection, stretching, and traction around the infraorbital foramen are avoided. If the proposed implant is large or has a significant medial component, the infraorbital nerve is carefully identified in order to avoid placement of the implant over the foramen.

Dissection is extended laterally to the malar-zygomatic junction and zygomatic arch. The subperiosteal plane is utilized for dissection particularly over the lateral zygomatic arch where branches of the facial nerve traverse just superficial to this plane (Fig. 12-15). Gentle blunt dissection over the midzygomatic arch will help avoid injury to the temporal branch of the facial nerve. A broad instrument is far safer than a delicate thin elevator. Thin elevators can more easily puncture the periosteum laterally, where there is limited visibility during the dissection.

EXPOSURE OF THE SUBMALAR TRIANGLE AND CREATION OF AN IMPLANT POCKET

The submalar space requires exposure in patients with types II and III midface deficiencies. The submalar space
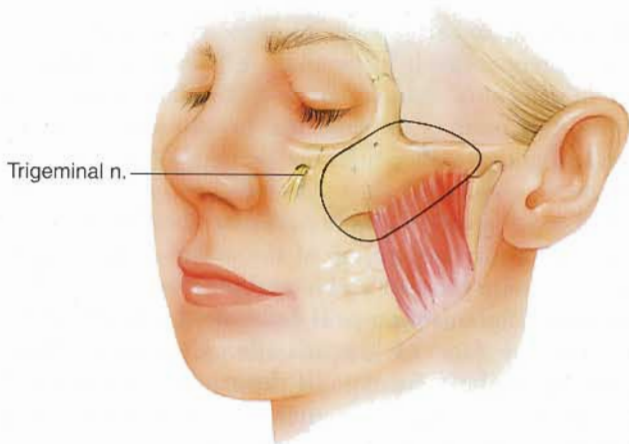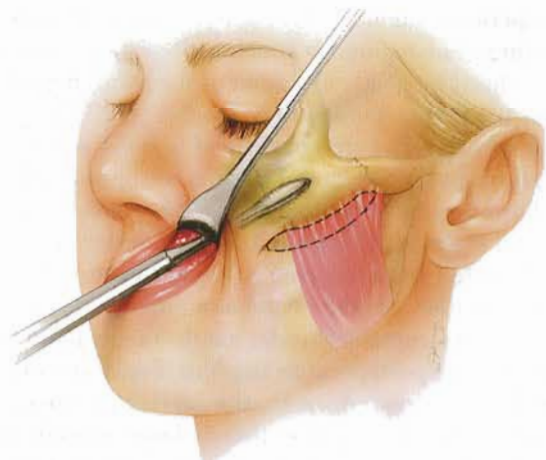
A

B

C

Figure 12-12 Periosteal elevation. The periosteum is elevated over the maxilla superiorly and laterally. The borders of dissection are the masseteric tendon and infraorbital rim.

A

Trigeminal n.

B

Figure 12-13 Midface dissection. The outlined area in **A** represents the extent of the malar and submalar dissection. The dashed area in **B** represents the submalar dissection over the superior tendinous origin of the masseter muscle.

Figure 12-14 Periosteal elevators. Periosteal elevation begins with the narrow elevator to gain initial access, but most of the dissection should be performed with the broad 10-mm Tessier elevator (shown in this figure).
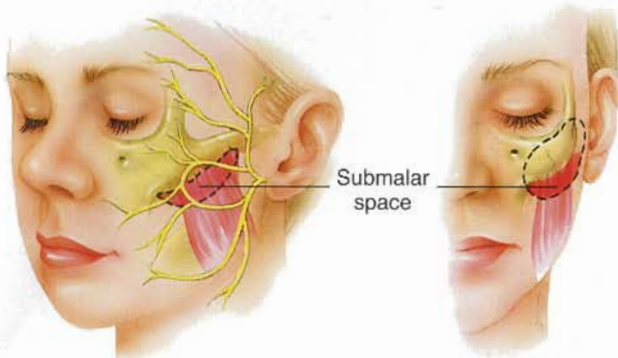

Submalar space

Figure 12-15 Facial nerve branches in the region of dissection. It is crucial to dissect in the subperiosteal plane over the zygomatic arch in order to avoid injury to the temporal branch of the facial nerve. The use of a broad elevator will help prevent perforation of the periosteum in this region. The buccal branches are also at risk if the masseteric dissection is not performed carefully.

Figure 12-16 Submalar triangle and masseteric tendon. The lateral aspect of the dissection will be over the masseteric tendon, inferior to the lateral zygomatic arch. In this region, the soft tissues are gently elevated over the glistening white fibers of the tendon, allowing placement of the tail of the submalar implant.

is an anatomic hollow that extends about 3 cm below the zygoma. To expose this region, the subperiosteal dissection is continued inferiorly below the zygoma and over the superior tendinous origin of the masseter muscle. The glistening white tendinous attachment of the masseter can be visualized by gentle elevation of the overlying soft tissue from the deeper plane of the tendon (Fig. 12-16). The muscle attachments are not divided because they are a crucial platform for the lateral portion of the submalar implant. Posteriorly the submalar space becomes much narrower and is not easily accessed. The posterior limit is carefully dissected by advancing a blunt elevator along the inferior border of the zygomatic arch. Masseter contraction at its superior border tends to be limited, thereby preventing postoperative implant displacement.

A pocket is created over the malar-zygomatic complex and submalar triangle that is large enough to accommodate the appropriate implant. The implant should easily fit into this dissected space, which should always be larger than the implant without any compression by the surrounding tissues, especially in the posterior region. An implant that is forced into an inadequately sized pocket will become displaced. If the posterolateral portion of the pocket is inadequately exposed, constriction of this area will push the implant anteriorly and cause migration or extrusion. One should be able to move the implant at least 3 to 5 mm in all directions. In general, the periosteum and soft tissues reapproximate immediately after surgery and obliterate the dead space within 24 to 48 hours.[22]

INSERTION OF IMPLANT

The location and size of the implants are typically determined preoperatively depending on the facial analysis, type of deformity, and patient desires. When choosing the appropriate midface implant, it is best to use an implant that is slightly smaller than the desired volume changes, in order to account for the bulk of the overlying soft tissue and fibrous capsule formation. *Malar* shell implants for type I deformity rest on top of the malar and zygomatic bone in a more superior and lateral position (Fig. 12-17). *Submalar* implants for type II deformity generally lie over the anterior face of the maxilla. Combined *malar-submalar* implants for type III deformity will cover both the malar bony eminence and the submalar triangle. Positioning an implant in the submalar triangle is more subjective than placement over the malar eminence requiring a greater judgment to effect the desired facial contour changes.
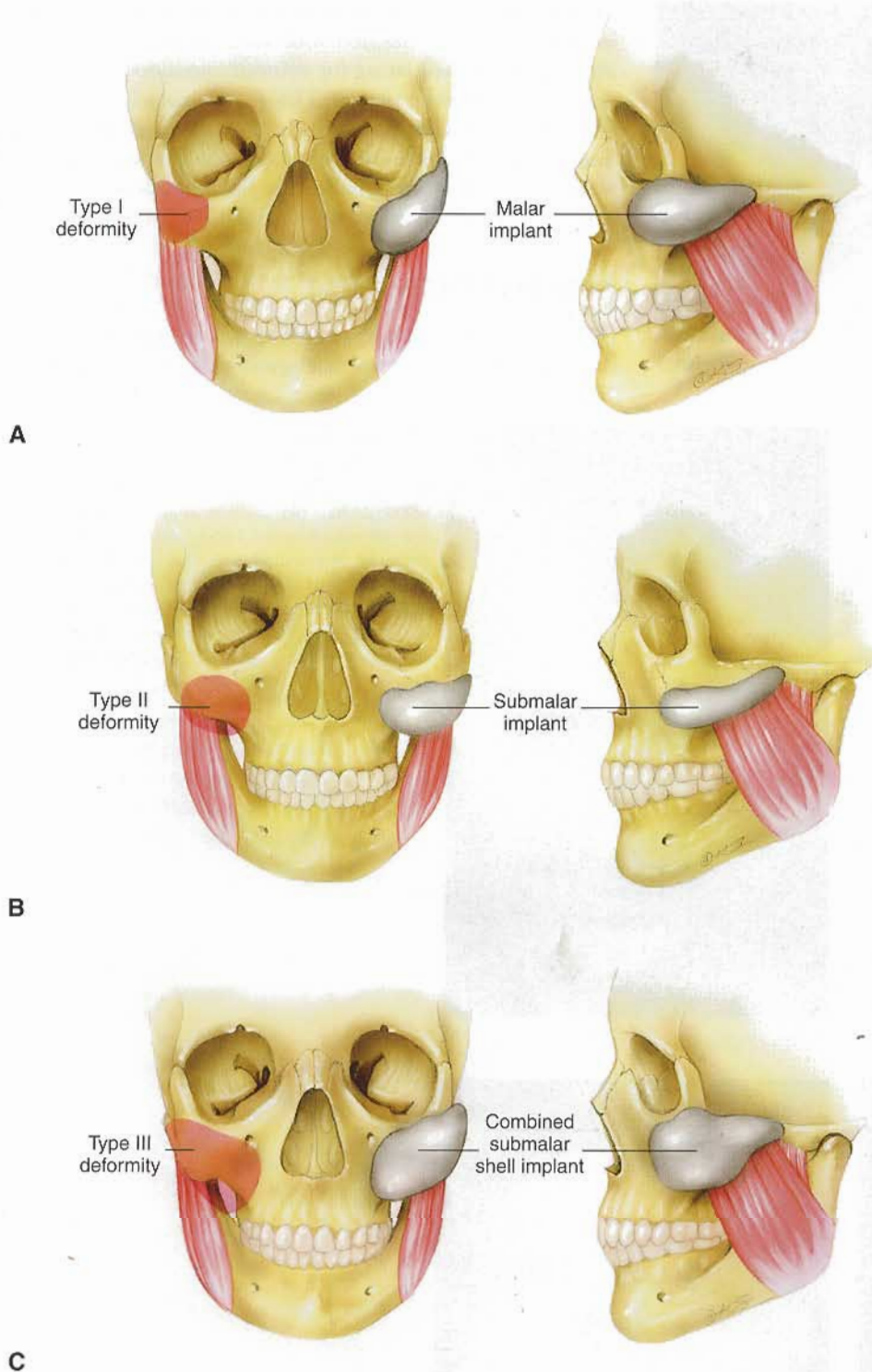
A

B

C

Figure 12-17 Implant placement. *Malar* shell implants for type I deformity rest on top of the malar and zygomatic bone in a more superior and lateral position (**A**). *Submalar* implants for type II deformity generally lie over the anterior face of the maxilla (**B**). Combined *malar-submalar* implants for type III deformity will cover both the malar bony eminence and the submalar triangle (**C**).

Sizers should be used to determine and confirm the appropriate implant shape and size. The actual implants should be placed in antibiotic solution (Bacitracin 50,000 U/L) at the beginning of the procedure and allowed to soak until insertion. A variety of implant sizes and shapes should be available in the operating room, and the surgeon must be ready to customize these implants (Fig. 12-18). Shaving an implant by even 1 mm can have

a significant impact on the final result, especially in patients with thin facial skin.

It is very important to assess for facial symmetry following the insertion of the implants. A ruler can be used to measure the distances from the medial border of the implants to the midline. Preexisting facial asymmetry can be very challenging, requiring exquisite attention to the bony and soft tissue topography (Fig. 12-19). As a

Figure 12-18 Intraoperative carving of implant.

result, each implant may need to be asymmetrically contoured and positioned. Standing at the head of the table helps in evaluating for contour symmetry after both implants have been placed. This is particularly evident in patients who have particularly thin skin or prominent facial skeleton. In these patients, the edges and contours of larger, thicker implants tend to be palpable with visible irregularities if not addressed during the initial procedure.

SECURING THE IMPLANT

After final placement, the implant will need to be secured. Larger implants that are not prone to migration within a

A

B

Figure 12-19 Facial asymmetry. This patient has a very common pattern of facial asymmetry (**A** and **C**). The patient's right side is narrower with malar eminence in a higher position and more projected. The left side is wider, flatter, and more posteriorly displaced. Postoperative photographs (**B** and **D**) after placement of asymmetrical midface implant placement. A medium malar shell implant was placed in the right side, whereas a large combined malar-submalar implant was placed in the left side of the face.

C

D

relatively tight pocket may not require fixation. Several methods can be used to fix the implant in order to avoid postoperative migration. We prefer to use external suture fixation using one of two techniques.[23] The first technique is an *indirect lateral suture fixation*. Long (10-inch) double-armed Keith needles on 0-0 silk suture are passed through the lateral end of the implant (Fig. 12-20). These needles are then placed into the wound and are directed posterolaterally, exiting the temporal region behind the hairline. The implant is then placed into the final position and the sutures are tied over a cotton roll bolster. This method is best for malar shell implants (type I deformity) by applying a superolateral tension on the implants and maintaining their position over the bony malar-zygomatic eminence.

The second suture technique is a *direct external fixation* (Fig. 12-21). This method is better for submalar and combined malar-submalar facial implants (type II and III deformities). It is also the preferred technique when the implants have excessive mobility within the wound pocket. Midface implants usually have two preformed fenestrations. The position of the medial fenestration should be marked on the external skin while the implant is inside the subperiosteal pocket. Locating these holes can be achieved with a right-angle clamp that pushes the implant upward, underneath the fenestration, causing an external protuberance that can be marked on the external skin. Symmetry is confirmed by measuring and comparing the distance of each marking to the
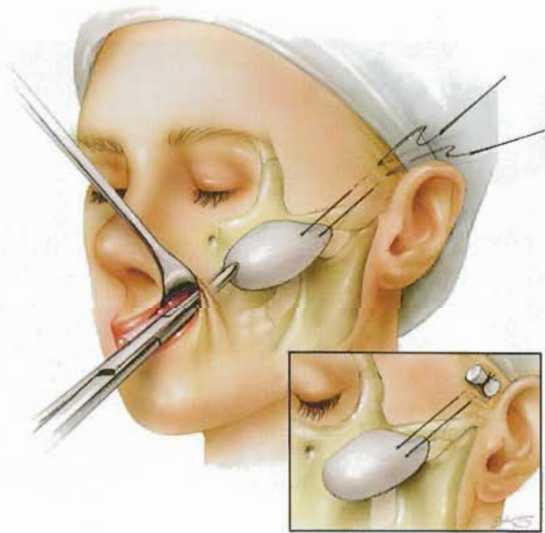
midline. After marking the medial fenestrations, the implants are removed and placed on top of the midface. The implants are positioned to coincide with the desired contour and preoperative markings; the second mark is then made on the skin to coincide with the location of the lateral fenestration of the implant. Double-armed 3-0 silk sutures are used to go through the medial and lateral fenestrations with the loop around the deep surface of the implant. The needles are then placed into the wound pocket and passed perpendicularly through the skin markings corresponding to each fenestration. The implant is then brought into the pocket, ensuring proper position and symmetry. The sutures are gently tied over cotton roll bolsters overlying the anterior cheek. These bolsters help compress the midface and reduce any potential dead space and prevent fluid from collecting in the subperiosteal pockets. External sutures and bolsters are removed 24 to 48 hours after operation.

If implants are placed prior to a concurrent rhytidectomy procedure, they can be secured with internal suture fixation, which allows the oral incision to be completely closed. If external suture fixation is desired, the implant should be left in place with the oral incision temporarily or loosely closed. When the rhytidectomy is completed, the oral incision is reopened in order to fix the implant with external sutures. Intraoral Penrose drains can be placed if required.
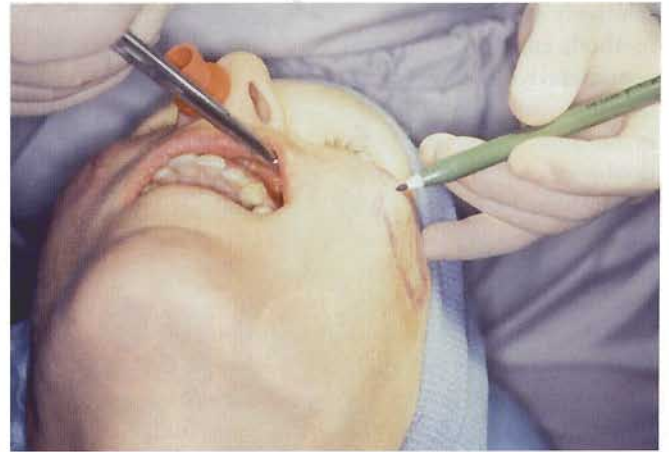
WOUND CLOSURE AND DRESSING

The intraoral incisions are copiously irrigated with antibiotic solution and closed in one layer with chromic sutures. Bandages are then placed over the external suture bolsters and an elastic facial dressing is applied. We prefer a full elastic garment dressing that applies even midface compression (CaroMed International, Tucson, AZ) and remains in place for 24 hours (Fig. 12-22). The suture bolster closes the midface pocket anterior to the implant while the elastic dressing applies adequate pressure to obliterate the pocket posterior to the implant. The patients are encouraged to use this elastic dressing after the bolsters are taken out for an additional 24 to 48 hours. If performed with rhytidectomy, a lighter neck and facial compression dressing composed of cotton and cling is also used.

POSTOPERATIVE CARE

Postoperatively, the patients can recover at home or an aftercare facility. They are encouraged to use ice packs for 3 to 4 days and sleep with the head elevated. All patients are prescribed antibiotics, analgesics, and antinausea medication. The first follow-up appointment is on postoperative day 1 or 2 when facial dressings and external sutures are removed. At this time, any drains placed

Figure 12-20 Indirect lateral suture fixation. This method is best used for malar shell implants (type I deformity) by applying a superolateral tension on the implants and maintaining their position over the bony malar-zygomatic eminence. Long (10-inch) double-armed Keith needles on 0-0 silk sutures are passed through the lateral end of the implant and directed posterolaterally, exiting the temporal region behind the hairline. The implant is then placed into the final position and the sutures are tied over a cotton roll bolster.
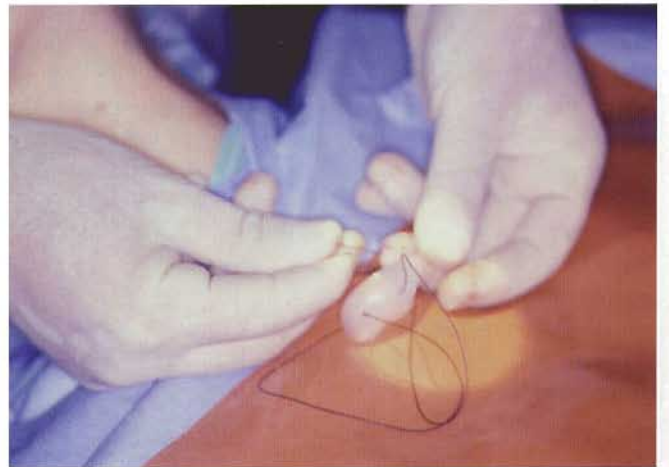
Figure 12-21 Direct external fixation. Direct external fixation allows precise fixation and is best suited for submalar and combined implants in type II and III patients. The implant is adjusted in the pocket to obtain the exact desired location (**A**). A right-angle clamp is utilized to mark the location of the implant fenestrations by pressing behind the fenestration outward through the facial skin and marking the area of protuberance (**B**). A second fenestration mark is placed to ensure adequate orientation. Symmetrical placement of markings is checked (**C**). The suture needles are passed perpendicularly through the skin markings corresponding to each fenestration (**D–H**).

G
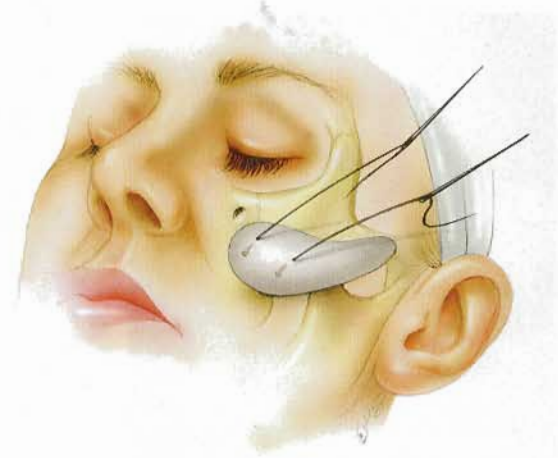
H

I

J

K

Figure 12-21 *Continued.* After ensuring precise location and adequate fixation of the midface implants, the sutures are tied over a cotton roll bolster (**I–J**). Benzoin and a flexible bandage can then be placed over the bolster (**K**).

Figure 12-22 Elastic facial dressing. A full face compression garment can help reduce postoperative edema and fluid collection.

during rhytidectomy are also removed. Patients are then seen on a regular basis until facial edema resolves. The patients are generally able to return to routine activity 5 to 7 days following the procedure. About 80% to 85% of the edema will resolve within 3 to 4 weeks. The remaining 15% to 20% of facial edema will gradually resolve over the ensuing 6 months.

COMPLICATIONS

The most frequent complications of facial implants include malposition and choosing an incorrect implant.[6,24] Postoperative displacement may result from incorrect positioning, insufficient pocket size, or inadequate fixation of the implant. Other complications include bleeding, hematoma, and seroma. It is important to assess the patients within 48 to 72 hours after surgery to ensure against significant facial asymmetry. The placement of drains can help prevent fluid collection, especially when a concurrent rhytidectomy is performed or when there has been excessive bleeding during the procedure.

The rate of infection for alloplastic silicone implants is about 1%.[24] Soaking the implant in antibiotic solution, irrigating the wound pocket, and preventing the accumulation of fluid and blood in the surgical pocket can all help to minimize the risk of infection. Implant extrusion is extremely rare and usually occurs through the intraoral incision due to an inadequate dissection of the posterolateral pocket. Other complications include infraorbital and facial nerve injury. Infraorbital numbness

can persist from days to weeks postoperatively but is rarely permanent. Damage to the frontal branch of the facial nerve can occur during dissection of the zygomatic arch, and the buccal branch could be injured with aggressive masseter dissection.

Future Directions

Alloplastic implants will continue to gain a more prominent role in facial aesthetic surgery. Currently, computer technology allows for more precise facial implants that can be customized for correcting complex facial defects.[19,20] Computer-aided design (CAD) and manufacturing (CAM) of implants starts with a high-resolution computed tomographic (CT) scan of the face. A precise life-size three-dimensional model is then computer-generated via stereolithography. The surgeon then creates a custom silicone implant template using this model along with direct analysis of the patient's face that can also be facilitated with a moulage. This template is then used to produce a mold and ultimately a silicone implant that precisely fits the topography of the bony skeleton with the desired surface contour. These custom-designed prostheses are especially useful for cases of severe facial asymmetry seen in patients with longstanding facial paralysis as well as congenital and post-traumatic defects. The late stage sequelae of facial trauma can be especially difficult to treat with conventional open reduction and internal fixation. In this setting, camouflage with custom implants can be an effective and straightforward way to achieve facial symmetry and normalcy, while avoiding lengthy, extensive reconstructive surgery and donor site morbidity.

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