

Essentials of Cheek and Midface Implants

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This author has placed cheek implants sporadically for the past 25 years. Previous to 2004, expanded polytetrafluoroethylene cheek implants were used, but since that time, only Silastic implants (ImplanTech, Ventura, CA) have been placed.

Since 2004, the author's practice has been limited to cosmetic facial surgery and with this focus many more implants were placed as a solitary procedure or more commonly with facelift or other cosmetic procedures. From January 2004 to December 2007, 204 Silastic cheek implants were placed in 102 patients. Of these 204 implants, 3 implants were removed due to infection for an infection rate of 1.5%. All 3 of these were replaced after resolution of the infection. Three other patients had implants electively removed and replaced with different size implants for a replacement rate of 3%. A single patient electively had implants removed and not replaced for an elective removal rate of 1%.

In the author's experience, most implant infections manifest early in the recovery period, usually within 72 hours. The clinical manifestations are very similar to maxillary dentoalveolar infections and present with pain, swelling, erythema, purulence, and drainage from the incision site. Delayed infections have been rare and could be associated with a mobile implant producing a foreign body reaction or a sinus or dental infection whose spread can involve the implant.

When a patient presents with a suspected infection, he or she is placed on antibiotics and, if there is drainage, the incision is opened. Salvage may be attempted for implants that have been secured with rigid fixation screws and are not mobile. Any infection associated with a mobile implant requires explanation. For the secured infected implant, the incision is opened and the purulence is expressed and the entire surgical site is copiously irrigated with an appropriate antibiotic irrigation solution. The incision is not resutured and the patient is seen daily for irrigation. The author has salvaged several implants by this

method and the incision will granulate and healing can be uneventful. If the infected implant does not quickly respond to this conservative therapy, it should be removed. Cultures and gram stains are performed before any surgical therapy. The author does not attempt salvage procedures on smokers, as the continual perioral movement and fresh smoke decrease the chance of success.

Reimplantation is always an option after infection and the author usually waits about 6 weeks for reimplantation.

Over the 48-month period, the author performed 227 facelifts and 27% of these patients (62/227) had concomitant cheek implants placed, underlining the utility and popularity of this procedure (Table 1).

Table 1 shows the number of midface implants simultaneously used in facelift patients.

Discussion

THE AGING MIDFACE

The aging midface is one of the most overlooked areas in cosmetic facial surgery. Many well-known surgeons perform extensive surgery on the upper and lower face and overlook the midface. One of the problems associated with cosmetic facial surgery over the past 30 years was the fact that after surgery we often made the patient's face look tighter, but not younger. One of the primary advances in cosmetic facial surgery has been the realization of volume loss in aging and volume replacement in cosmetic surgery. Contemporary cosmetic facial surgeons routinely address midface issues in many ways; by making small corrections in the midface, big changes are realized in the final result. Synergy results in the situation when the total is greater than the sum of the parts; this phenomenon is common with simple midfacial augmentation.

Beauty equals youth and youth equals facial volume. One of the main reasons that a person looks young or beautiful is the abundance of midfacial volume. In short, it involves having the right amount of fat in the right areas of the face. It is the loss or senescent repositioning of this fat that is a main contributor to facial aging.¹

The youthful midface is discernable as a single convexity in harmony with the lower eyelid esthetics, as shown in Figure 1A. In the younger patient, the lower eyelid periorbital fat is not visualized because it lies tight behind the orbital septum.

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0278-2391/6806-0035\$36.00/0
doi:10.1016/j.joms.2009.12.004

Table 1. SILASTIC CHEEK IMPLANTS WITH FACELIFT SURGERY

Year	Number of Facelifts	Number of Cheek Implants (pairs)	Percentage
2004	35	12	34
2005	47	13	28
2006	67	18	26
2007	78	20	26
Total	227	62	27

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Aging changes cause weakening of the lower eyelid orbital septum, resulting in pseudoherniation of the lower orbital fat pads; this change is coupled with aging changes to the overlying skin. The sum of these changes produces a double convexity profile, as shown in **Figure 1B**.

The youthful midface has voluminous and superiorly positioned malar fat pads. The malar fat pad is a triangular structure with its base against the nasolabial fold and its apex over the malar region (**Fig 2**).

Due to actinic and senescent skin changes as well as gravity, fat atrophy, and deep connective tissue laxity, the malar fat pads lose volume and descend lower into the face with age (**Fig 3**). The sum of these aging changes frequently yields a hollow or gaunt midface.

TREATMENT OPTIONS

A plethora of treatment options for midfacial rejuvenation include lifting procedures,¹⁻⁷ inject-

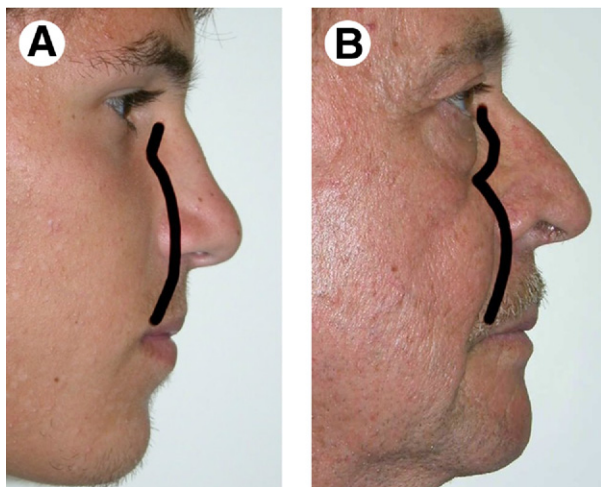


FIGURE 1. The youthful midface (A) consists of a single convexity, while periorbital and midface changes produce a double convexity facial curvature (B).

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FIGURE 2. The youthful malar fat pad has volume and lies superior in the midface.

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able synthetic fillers,⁸⁻¹² autologous fat,¹³⁻¹⁶ and facial implants.¹⁷⁻²¹ Each treatment option carries advantages and disadvantages but, in this the author's opinion, midface implants are an optimum choice in the average patient for multiple reasons. The main advantage is that they are a permanent option when compared with fillers and lifting procedures. The cheek midface implants lie in the subperiosteal plane, tight to the bone, and are not subject to the soft tissue changes of the more superficial planes. In addition, they are available in a vast array of anatomical sizes and shapes to customize augmentation. They are easily placed; the recovery is minimal, and the complication rate is low. The silicone structure renders them very biocompatible and they are not subject to degradation seen with fillers and fat grafts. Finally, and very importantly, they are very reversible. Should the surgeon or patient be unhappy with the result, the implants are easily removed under local anesthesia, or they can be exchanged for larger or smaller sizes with minimal dissection. Because silicone forms a well-developed capsule, the implants are much more easily removed or replaced with no tissue damage compared with implant materials that encourage tissue ingrowth that complicates removal. The aforementioned points make the placement of midface implants for midfacial rejuvenation a very attractive procedure.



FIGURE 3. The youthful midface is volumized and aging produces a gaunt or hollow appearance from atrophy and descent of malar fat as well as skin aging. The author's 8-year-old son pictured in (A), the 56-year-old author in (B), and the author's 83-year-old father (C) illustrate midfacial aging over 3 generations of males.

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FACIAL IMPLANTS

Cheek implants have existed for decades and have fallen in and out of favor for various reasons. One of the biggest problems with early implants was the lack of anatomical form. The early implants and the advocated positioning of them produced “blocky” and unnatural results that were very apparent. They were also usually placed high in the zygomatico malar complex, giving patients an exaggerated and unnatural appearance.

The last decade has brought a refinement of both implant form and placement. Contemporary midface implants are available in many sizes and shapes and have different indications dependent on the esthetic need. These anatomical implants have also given way to more conservative surgical approaches that again are designed to provide targeted, precise, and natural-appearing augmentation specific to various regions of the midface. Finally, with computer-assisted design/computer-assisted manufacturing technology, customized facial implants can be fabricated to personalize the augmentation as well as to correct defects and asymmetries or to accommodate personal preferences on the part of the patient or surgeon.

IMPLANT SELECTION

Implants can be placed in most patients. Smokers can be problematic from the effects of heat and nicotine on the incision line as well as the fact that they generally resume smoking immediately after surgery and the continual perioral movement can disrupt unsecured implants. The author has placed many im-

plants in smokers without problems and all of these implants have been secured with a single rigid fixation screw. Other contraindications to implant placement include active dental periodontal or sinus infections.

Common implant materials have included expanded polytetrafluoroethylene, methyl methacrylate, porous polyethylene, and silicone rubber. Currently, porous polyethylene and silicone rubber implants are the most commonly used. The author prefers silicone rubber implants for numerous reasons. They can be easily trimmed and, being flexible, conform well to underlying anatomy. Additionally, they become well encapsulated and hence are easily removed or replaced if desired. Although the structure of porous polyethylene implants allows better tissue integration, this can be extremely problematic when attempting to remove or replace an implant. The porosity encourages tissue ingrowth and significant tissue injury and defects can occur with removal, as well as implant fragmentation.

Which implant to use and where to place it can be confusing. The greatest pitfall for the novice implant surgeon is the understanding of which implant is appropriate for a given aging indication. Although this is related to personal preference, this author has refined the choices to 3 broad categories that are effective for almost all cosmetic (or reconstructive) patients.

The basis of implant selection lies in the recognition of where the aging changes have occurred in the face and if they are single or multiple in nature. Most

patients, as they age, lose volume in the submalar region. In this article the submalar area includes the hollow area of the infraorbital, anterolateral maxillary region, and canine fossa regions. If the astute surgeon pays close attention, he will notice that loss of facial volume represents early aging changes (late third and early fourth decade) that are apparent in virtually all patients regardless of gender.

Many esthetic practitioners and most patients are unaware of this phenomenon unless it is pointed out to them. If the surgeon hands the patient a mirror and asks him or her to smile, the lip elevators lift the ptotic malar fat and produce a more youthful look. This simulation will cause many patients to comment that “this is how I looked when I was younger.” If you hold the elevated tissues in place with your thumb and index finger and ask the patient to relax his or her smile, the surgeon and patient will notice the midface volume quickly drops to its aged position lower in the face once the finger is released. In essence, the youthful cheek fat becomes the jowls later in life. Having the patient recline during the examination change will also “reposition” the ptotic cheeks to a more youthful position and can be used to illustrate aging and predictive correction. Close observation will also show that although most of these patients have a hollow submalar region, they have adequate and well-defined zygomatico malar esthetics. That is to say that despite having lost submalar fat, they have adequately projected cheekbones. This type of patient is best treated with only submalar fill, as his or her problem and solution are not malar deficiency, but rather the loss of submalar volume. This type of patient is illustrated in Figure 4A. Figure 5A shows the approximate

positioning of the submalar implant. In the author’s practice, the submalar implant is used in approximately 95% of midface implant patients.

The second type of common facial esthetic deficiency found is in patients who have adequate submalar and anterior maxillary fill but deficient “cheekbones” (Fig 4B). Such patients have hypoplasia of the zygomatico malar regions or simply desire a more defined, or “chiselled,” appearance, or in layman’s terms, “higher cheekbones.” The author treats these patients with the malar shell implant (Fig 5B), which is used in approximately 1% to 2% of patients.

The third type of common midfacial aging change is shown in the patient who has submalar deficiency but in addition is in need of more zygomatico malar augmentation. In essence, these patients need both anterior maxillary (submalar) fill coupled with malar (“high cheekbone”) augmentation (Fig 4C). These can be patients who have lost volume as a result of aging in both areas, or those patients who have underdeveloped skeletal anatomy. These patients are well suited for treatment with the combined submalar shell implant (Fig 5C). This implant is designed to augment the submalar region as well as a portion of the actual zygomatico malar region. This implant is indicated for males and females and probably constitutes approximately 4% to 5% of the author’s implant cases.

As stated earlier, these 3 implant configurations are used for the described aging changes and satisfy all the author’s esthetic midfacial enhancement indications.

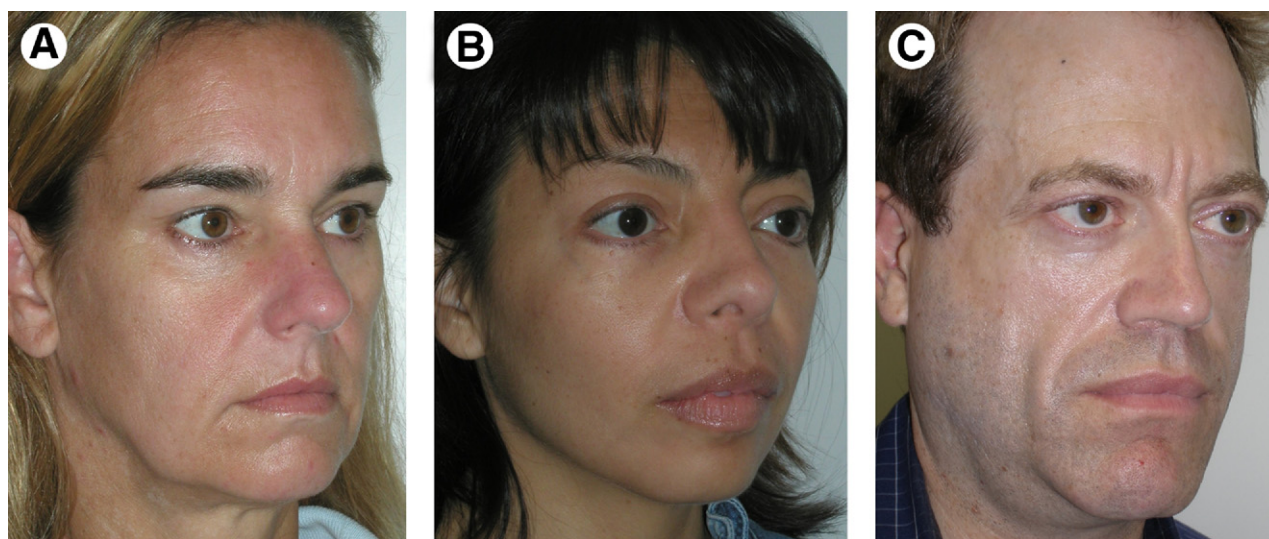


FIGURE 4. (A) shows a patient in need of submalar augmentation, (B) shows a patient with adequate submalar fill but in need of zygomatico malar augmentation, and (C) shows a patient in need of both zygomatico malar and submalar augmentation.

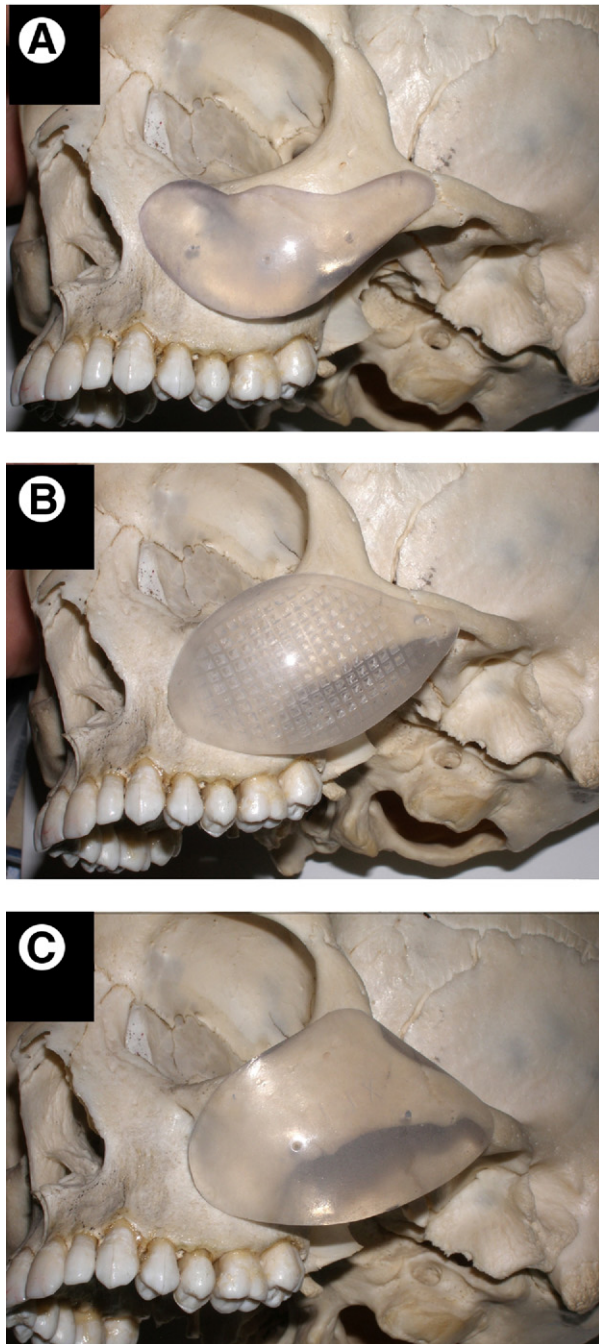


FIGURE 5. This image shows the approximate positioning of the submalar implant (A), the malar shell implant (B), and the combined submalar shell implant (C).

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SURGICAL PLACEMENT

The placement of midfacial implants is a simple and straightforward surgical procedure for those surgeons with maxillofacial experience. With experience, actual placement can be performed in less than 10 minutes. The implants are always placed in the subperiosteal plane and this must remain an axiom of

insertion. With the exception of the infraorbital neurovascular bundle, there is little vulnerable anatomy in the midface region, when dissecting in the subperiosteal plane.

Midface implants can be placed under local anesthesia, although this author almost always uses IV sedation. The implants can be placed as a solitary cosmetic procedure or concomitantly with other esthetic or orthognathic surgical procedures. Most patients are unaware or ignorant of midface aging changes and their contemporary treatments and when educated frequently accept midface implants.

The procedure is begun by injecting about 5 mL 2% lidocaine with 1:100,000 epinephrine transcutaneously in the subperiosteal plane along the region to be dissected. This usually includes the anterior maxilla, malar region, and the anterior zygomatic arch region. Additionally, approximately 3 mL of the same anesthetic is infiltrated in the soft tissue planes above the canine tooth.

A 1-cm incision is made just below the maxillary vestibule, approximately 1 cm above the canine tooth. The author usually uses a radiofrequency microneedle and incises mucosa and soft tissues in the canine fossa region and through the periosteum (Fig 6A). At this point, subperiosteal dissection is performed for the remainder of the procedure. The extent of the dissection is dictated by the shape and size of the intended implant. Small or medium submalar implants require smaller dissections than do combined submalar or malar shell implants. The larger or more superolaterally placed implants require more aggressive dissection to accommodate them. The combined submalar and shell implants require more dissection over the malar and zygomatic regions. It is important to not overdissect the implant pocket, as a large pocket can contribute to implant mobility. The dissected pocket should be just slightly larger than the actual implant.

When beginning the dissection, it is not necessary to dissect medially to the piriform aperture, as no part of the implant lies in this region. As the subperiosteal dissection is begun in the anterior maxillary region, it is important to protect the infraorbital neurovascular bundle. The described implants rarely impinge on the infraorbital nerve, and therefore aggressive infraorbital dissection is not necessary. After the anterior maxilla is dissected, the periosteal elevator is angled and the remainder of the dissection is primarily in an oblique vector. This oblique vector of dissection is carried out over the malar region and extends over the anterior portion of the zygomatic arch. For the small or medium submalar implants minor zygomatic dissection is required, but for the combined submalar and malar shell implants, more aggressive malar and zygomatic dissection is necessary. These larger im-

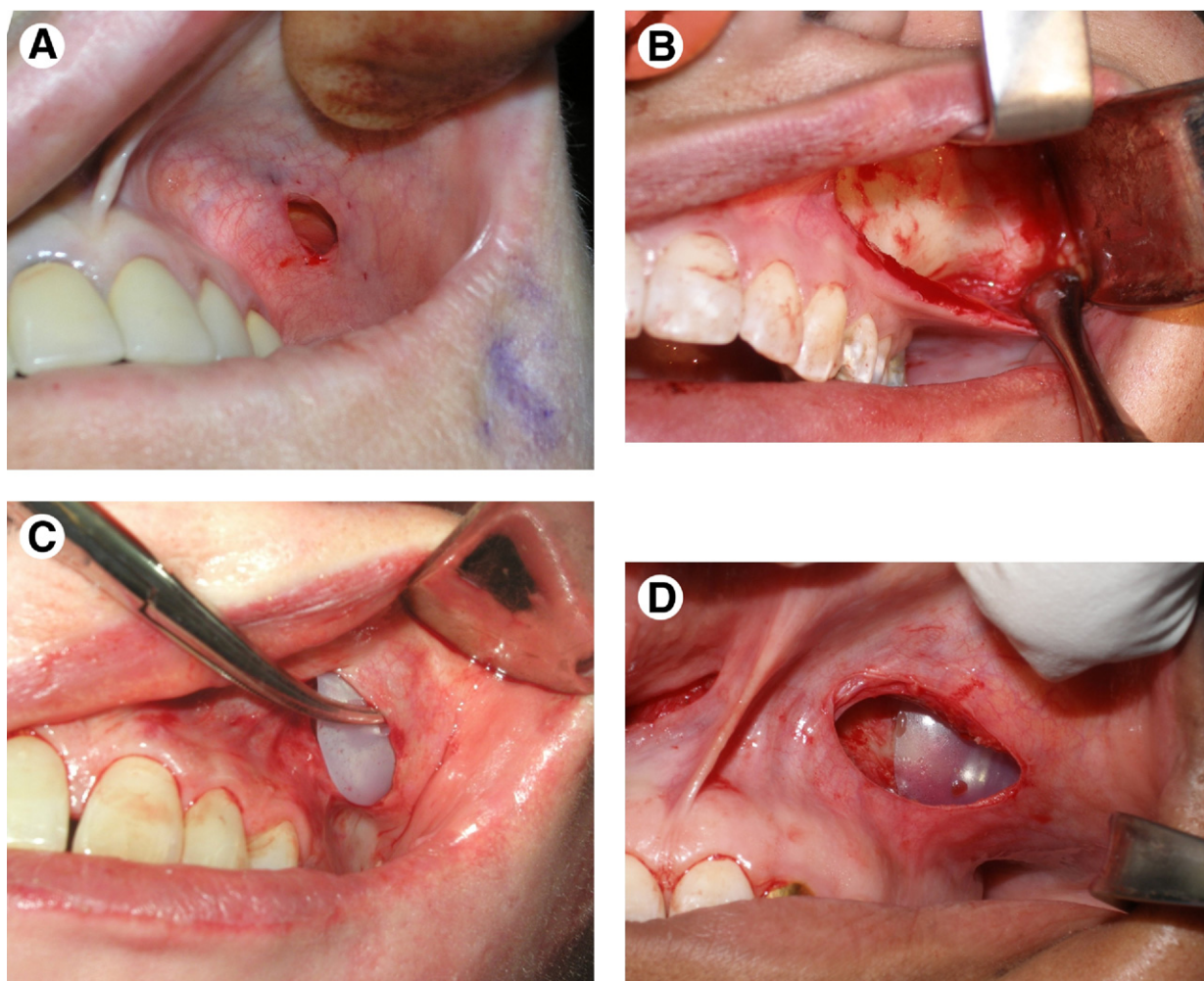


FIGURE 6. (A) Shows the small initial incision required for implant placement. The tissues in this area are very elastic and will stretch. (B) Shows the dissected maxillary and malar regions. (C) Shows the implant being inserted into the pocket with a tonsil clamp and (D) shows the implant in its intended position.

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plants also require more aggressive inferolateral dissection, and it is not uncommon to encounter the origin of the masseteric tendon (or muscle) while dissecting in the area. There is no need to violate the tendon or muscle, as the silicone implant can safely lie over these soft tissue structures without problem, and frequently do. Figure 6B shows the typical dissected implant pocket.

After the implant pocket is dissected, the area is checked for hemostasis, which is imperative to prevent hematoma formation. The pocket is then irrigated with antibiotic solution (300 mg of clindamycin mixed with 30 mL of sterile water) and the implant placed. A long, thin tonsil clamp facilitates placement in the narrow pocket (Fig 6C). An Aufricht nasal retractor (Miltex Inc, York, PA) is also convenient to assist in visualization and placement of the implant in the pocket. Due to the customized anatomical shape, the implants frequently seek the

proper position. When inserting the implant, caution is exercised to prevent the thin implant tail from folding over on itself. Implants can be easily trimmed with scissors to further control position and augmentation.

After implant placement, the surgeon then pushes on the external cheeks and manipulates the upper lip. If these maneuvers displace the implant from the pocket or cause it to protrude out of the incision, the pocket is enlarged or the implant is trimmed. It is important that the implant lies passively and does not have macro movement when manipulating the surrounding soft tissues. When the implant is successfully placed, a decision is made in reference to fixation. A well-conforming implant in a tight pocket is generally not fixated by the author, as personal experience has shown the implants to remain stable (Fig 6D). If the pocket is



FIGURE 7. This patient developed an immediate post implant infection on the left cheek. It began to swell at 24 hours and is shown at 72 hours (A) and 24 hours later (B) after incision and drainage and implant removal.

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considerably larger than the implant, if the implant does not stay in the desired position, or if there is increased mobility of the implant, a single fixation screw can be placed. It is important not to place the fixation in the thin bone of the anterior sinus

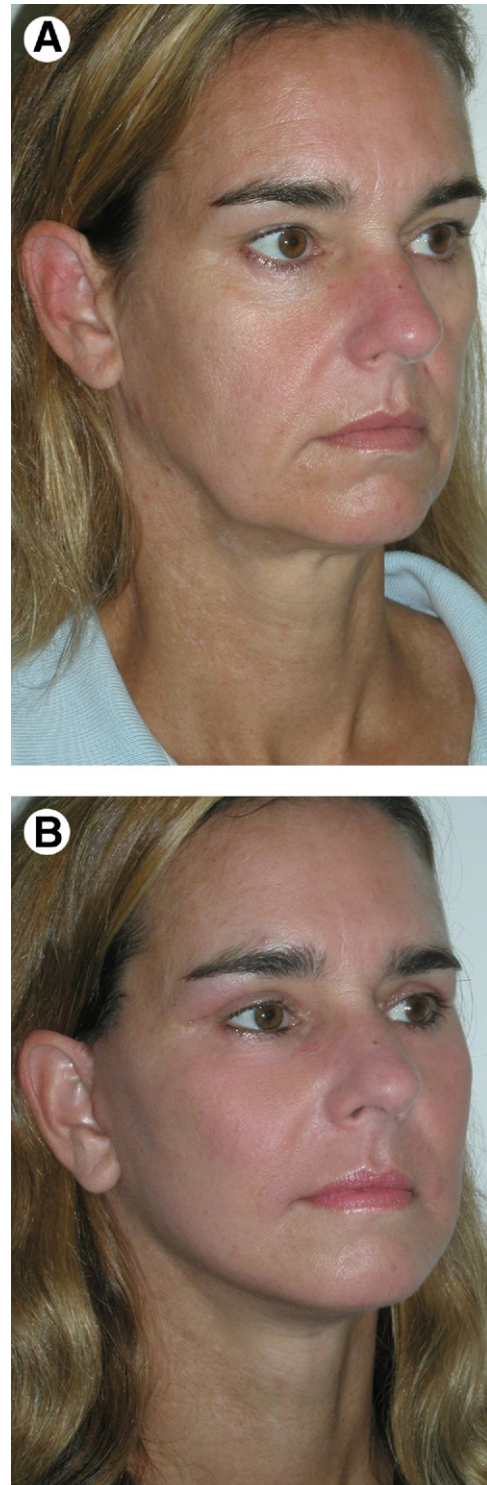


FIGURE 8. This 45-year-old female underwent a mini facelift, upper blepharoplasty, and concomitant placement of medium type II submalar implants. The before (A) and after (B) midface changes illustrate the need and utility of cheek augmentation when treating global facial aging changes.

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FIGURE 9. This 66-year-old patient exhibited typical aging changes (A) and was treated with comprehensive facelift, 4-quadrant blepharoplasty, full face CO₂ laser resurfacing, and large type II submalar implants (B).

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wall, as it is vulnerable to perforation or loss of fixation. The fixation screw is best placed in the thicker bone of the buttress area. An alternate means of fixation is to place a 4-0 Vicryl suture from the anterior medial portion of the implant to the deep tissues in that area. Finally, the incision is

closed with interrupted 4-0 gut suture. At the end of the procedure, several layers of 4 × 4 gauze are compressed on the external cheeks and held in place for 5 minutes to compress the surgical pocket.



FIGURE 10. A, This 24-year-old male model requested more distinct midface and cheeks. B, He was treated with large combined submalar shell implants.

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FIGURE 11. A, This 57-year-old patient shows extreme mid and lower facial ptosis. B, She was treated with comprehensive facelift, lower blepharoplasty, full face CO₂ laser resurfacing, and large combined submalar shell implants.

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POSTOPERATIVE CARE

No dressings are required and the postoperative care includes analgesics, antibiotics, and tapering steroids if desired. The patient is instructed to refrain from significant talking and animation for the first 48 hours and is asked to follow a liquid or soft diet for the same period. Ice packs are used for the first several days.

SEQUELAE AND COMPLICATIONS

The patient must be warned that during the first 1 to 2 weeks he or she will experience abnormal animation when smiling and puckering. The initial implant dissection violates the orbicularis oris and lip elevator musculature, which heals uneventfully with the return of normal animation. Significant edema is not uncommon, especially with larger implants and in the early postoperative period. Cold packs and tapering steroids are routinely used. Severe swelling may indicate hematoma formation and, if the surgeon feels that there is significant hematoma, it must be drained. This can usually be done by opening the incision and suctioning the blood or clot from under or around the implant without compromising the result. Minor hematomas will usually heal uneventfully without treatment.

Although numerous complications of implant placement have been described,²²⁻²⁸ they have been rare in the author's experience. Infection has been an uncommon experience and usually manifests in the first week or 2. It is generally manifested by 1 side failing to heal with complaints of pain, increased swelling, periorbital edema, and drainage (Fig 7). It is possible to salvage a minor infection with open incision, drainage, irrigation, and systemic antibiotics. Resistant infections warrant implant removal and the implant can be replaced after healing. Occasionally, subconjunctival or periorbital ecchymosis is seen but remains a rare occurrence.

CASE PRESENTATIONS

Figures 8 through 11 illustrate cases performed by the author using the implants and technique described within.

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