Malar Augmentation

A 5-Year Retrospective Review of the Silastic Midfacial Malar Implant

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Objectives: To determine the effectiveness and safety of the Silastic midfacial malar implant and to review indications, patient selection, technique, and complications of malar augmentation.

Design: Five-year retrospective review of clinical cases with at least 2-year follow-up.

Patients: A cohort of 60 consecutive private patients with complaints of malar hypoplasia or facial asymmetry.

Setting: A plastic surgery clinic.

Intervention: Silastic midfacial malar implants were fitted in each patient. Most underwent implantation via the canine fossa approach and in conjunction with another facial plastic procedure.

Main Outcome Measures: Subjective patient satisfaction, photographic grading using a visual analog scale, and complications.

Results: Of the 60 patients, 51 (85.0%) reported an excellent result after at least a 2-year follow-up. Ten patients (16.7%) had some form of undesirable sequelae; however, only 4 (3.4%) of 118 implants had to be revised. Photographically, all 60 patients graded postoperative improvement.

Conclusions: Findings support the contention that the Silastic midfacial malar implant is a safe and effective alloplastic alternative to treat malar hypoplasia and facial asymmetry. The complication and revision rates are acceptable. Relative technical ease of insertion makes malar augmentation an excellent adjunct for rhytidectomy and rhinoplasty.


Attractive malar prominences are an important perception in the western concept of youth and beauty. The pleasing malar prominence should appear round and full, but not too sharp. It should be balanced to the chin and nose. A flat, hypoplastic malar eminence can make the face blunt and wearisome, which contributes to a premature aged appearance. Strong cheek bones seem to give the face a fresh youthful look. Makeup artists accentuate the malar prominences by artificially highlighting those contours and darkening the cheek below to simulate a shadow. The facial plastic surgeon strives to create this youthful, vibrant expression through malar augmentation.

Alloplastic augmentation is a relatively recent procedure. In 1971, Hinderer and Spadafora et al independently reported using alloplastic implants for bilateral malar augmentation.

The degree of distinction of the malar prominence varies most commonly owing to differences in the inherited bony structure. Trauma, congenital defects, and acquired problems are other causes of deficiencies of the malar region. Strong, well-developed cheek bones support the malar soft tissues better than flat, hypoplastic malar prominences. This strong, solid appearance contributes not only to a youthful aesthetic, but also to facial harmony.

Patient selection, facial analysis, and implant selection (implant material and configuration) are key to successful malar augmentation. There are a number of different methods used to determine appropriate implant size and location. Hinderer preferred his method of crossed lines. One line was drawn from the lateral canthus to the commissure of the ipsilateral lip, and the other line was drawn from the nasal ala to the tragus. The implant was placed in juxtaposition to the crossed lines in the upper outer quadrant (Figure 1). Powell et al demonstrated that the precise areas for augmentation were not universally agreed on. They attempted to define a universal point using...
PATIENTS, MATERIALS, AND METHODS

We retrospectively examined 60 consecutive patients who underwent malar augmentation using the MMI. All patients requested an alloplastic alternative for their malar defect. The candidates for malar augmentation presented for the following different reasons: posttraumatic depressions of the malar bone(s); congenital defects; aged face with atrophy and sagging of the subcutaneous tissues; asymmetrical, unbalanced face; very round, full face; and very thin, long, slender face. The first 2 categories are usually obvious; however, the other reasons require a more contemplative approach with an emphasis on facial balance and harmony.

We approached these candidates through a 5-step method: history and physical examination, uniform photography and computer imaging, facial analysis, implant selection, and operative technique (alone or in combination with other procedures).

A detailed history will disclose traumatic or congenital reasons for malar defect. A careful and thoughtful examination for malar deficiency is then performed. The frontal examination is performed smiling and in repose. The patient is examined in lateral and oblique positions with notice of the melolabial folds, malar mounds, and any asymmetries are noted, recorded, and discussed with the patient. Careful documentation and frank discussions with the patient are essential.

After history, physical examination, and discussion with the patient, standardized photography is performed. We use frontal (smiling and in repose), lateral, oblique, basal (worm's eye), and overhead views (crow's nest). We also isolate and photograph close-up views of any traumatic or congenital defect, especially if unilateral. We generally use a computer-generated artist's conception to create an image of the corrected defects or to enhance hypoplastic malar prominences. This is used to demonstrate a goal or objective of the surgery as a teaching tool with the patient, never as a guarantee or a promised result. The patient must understand this completely.

After studying the patient and the photographs, a detailed facial analysis is performed using a combination of the techniques of Hinderer,3 Powell et al,4 and Prendergast and Schoenrock.5 This aids in the diagnosis and identification of the specific type of malar deficiency.

Once the defect is properly analyzed, the next step is operative correction. Different capacity sizers may be placed preoperatively on the patient's malar eminences until the correct shape and contour are achieved. The MMI comes with 9 different sizers in anatomic configurations. Once the correct size and shape are determined, and the proper position is achieved, a marking pen is used to outline the sizer carefully. This is done as accurately as possible to avoid miscalculations (Figure 4).

3-dimensional reconstructions of facial computed tomography scans. They found the height of the contour vertically was just at or below the Frankfort horizontal plane. They also made a practical division of the malar anatomy by arbitrarily dividing the prominence into anteromedial and posterolateral segments. This division was created by dropping a vertical line from the lateral canthus. This classification is significant because it defines the type of malar deficiency. Malar defects may be classified as anteromedial, posterolateral, or a combination (Figure 2, A and B).

Prendergast and Schoenrock6 defined the malar eminence as the point below the lateral canthus that gives the impression of being the most prominent point of the

After informed consent is obtained, the patient is prepared for surgery. Local anesthesia with intravenous sedation is the aesthetic of choice. The preferred local anesthetic is 1% lidocaine hydrochloride with 1:100 000 epinephrine bitartrate. After the patient is prepared steriley and draped for surgery, the procedure begins. The canthus fossa (infraorbital) approach is preferred. External incisions are thus avoided; however, it is also possible to use temporal and inferior blepharoplasty approaches.

Lifting the upper lip superiorly, a vertical incision is made in the mucosa about 1 cm superior to the buccal sulcus. Next, Metzenbaum scissors (Snowden-Pencer, Tucker, Ga) are used gently to develop a tunnel, penetrating directly to the malar bone. A number 15 scalpel blade then is used to incise the periosteum, and a periosteal elevator is used to create a very precise subperiosteal pocket as directed by the previous sizer markings. Short, firm, controlled pushes are used to elevate the periosteum. A Converse retractor (Snowden-Pencer) is used to visualize the pocket (Figure 5). The pocket needs to be the exact dimensions of the sizer outline. If the pocket is too small, the implant may bend, or its edges may fold. If the pocket is too large, the implant may move or become displaced.

On completion of the precise pocket, the implant is removed from its sterile package and soaked in an antibiotic solution. The no-touch technique is used at all times (ie, the implant is handled only with sterile instruments). The MMI is labeled L for left and R for right. There is a light-blue stripe at the superior border to help with orientation. Multiple fenestrations are usually found in the implant, which can be used for guide sutures, suture fixation, or screw fixation. Fixation has not been necessary; however, the perforations allow tissue ingrowth to secure the implant better.

The retractor is placed in the pocket for exposure, and the pocket is irrigated with antibiotic solution. A right-angle hemostat is used to grasp the implant. Great care is taken not to touch the patient's teeth or mucosa during insertion. If the pocket is the correct size, the implant will generally slide in and secure itself in position without sutures (Figure 6). A hemostat is passed over the top of the implant to correct any folded edges. The medial end of the implant is checked visually for placement position and symmetry (Figure 7).

Synchronous palpation of both implants from the head of the table while looking downward across the cheeks provides a further check for symmetry. Once symmetry has been obtained, the incision is closed using a double-layer repair. The closure should approximate the soft tissue edges but also allow gravity-dependent drainage of any blood and/or serous fluid.

The patient is given preoperative and postoperative antibiotics and is maintained on a soft diet for 1 week. External taping is placed during healing 1 week postoperatively to help stabilize the implant.
malar mound in any view. They believed the oblique view was the most valuable in the assessment of the projection of the malar eminence. Looking at the face obliquely, they drew a line from the lateral canthus to the ipsilateral commissure. A line drawn 90° off this line at two thirds of the distance went through the most prominent point of the malar complex (Figure 3).

The type of malar defect varies from patient to patient, and can vary from one side of the face to the other. Therefore, no single method can identify the malar eminence or localize the appropriate placement for a cheek implant.1,6 For these same reasons, there is no universal implant.

The ideal implant would be nonimmunogenic and nonmutagenic, easily tailored and sculpted to provide the desired contour, and resistant to infection and would have a low or at least predictable absorption rate.8 Unfortunately, no single material universally satisfies all these requirements. We performed a 5-year retrospective study of malar augmentation using a midfacial malar implant (MMI; McGhan Medical, Santa Barbara, Calif). We will review our patient selection, operative technique, postoperative results, and any undesirable sequelae.

RESULTS

Sixty consecutive patients undergoing malar augmentation using the MMI were reviewed retrospectively. The follow-up period ranged from 24 to 60 months, with an average of 41 months. The cohort consisted of 45 fe-
male and 8 male patients ranging in age from 17 to 76 years, with a mean age of 47 years. Fifty-eight patients underwent bilateral and 2 underwent unilateral augmentation. Two procedures were performed to correct traumatic deformities and 5 to correct congenital abnormalities; 53 were performed primarily for aesthetic reasons. Fifty-six procedures were performed in combination with some other facial plastic surgical procedure. The most common additional procedure was rhinoplasty; the sec-

Figure 3. Analysis by Prendergast and Schoenrock. Looking obliquely at the face, a line is drawn from commissure to lateral canthus. One third of the distance down this line, a perpendicular line will go through the most prominent point of the malar complex.

Figure 4. Left oblique view with preoperative midfacial malar implant (McGhan Medical, Santa Barbara, Calif) sizer in position. Careful outline of the sizer is seen. Precision is key in preoperative markings.

Figure 5. Intraoral view of subperiosteal pocket. Converse retractor (Snowden-Pencer, Tucker, Ga) is in superior position.

Figure 6. Midfacial malar implant (McGhan Medical, Santa Barbara, Calif) is in position without suture or screw fixation.

Figure 7. Rechecking of position of a midfacial malar implant (McGhan Medical, Santa Barbara, Calif) to confirm symmetry and location.
ond was rhytidectomy. The most common approach was intraoral (n = 57); the second, inferior blepharoplasty (n = 2); and the third, temporal (n = 1). Preoperative photographs were graded on a visual analog scale (1 indicated poor result; 10, excellent result) describing the malar defect as well as facial asymmetry. The patient’s 1-year postoperative photographs were graded using the same visual analog scale and grading criterion. All sets of patient photographs were randomly graded, and all 60 patients graded postoperative improvement. The range was 1 to 4 points, with a mean of 2 points.

In addition to the objective analysis, we also obtained subjective data from the cohort. All 60 patients were asked to rank their postoperative result as excellent, good, fair, or poor. All were at least 2-year postoperative results. Fifty-one patients graded their results as excellent; 5 patients, good; 1 patient, fair; and 3 patients, poor (Figure 8, A-I) The 1 implant with

the fair and 3 implants with the poor results were all revised. After revision surgery, the fair was upgraded to a good result; 1 poor, to a good result (Figure 9, A-D); and the other 2 poor, to fair results (Figure 10, A and B).

We also reviewed undesirable sequelae. Four cases of superior displacement were found (2 transient and 2 that required revision); 1 case of initial misalignment required revision; 3 cases of trigeminal hypesthesia (all transient) occurred; 1 patient requested implant removal in favor of larger implants; and 1 patient had persistent edema, which eventually resolved (after 6 months). In our series, there were no infections, hematomas or seromas, evidence of bony resorption, extrusions, facial nerve damage, or reported connective-tissue disorders.

A connective-tissue disease survey was also distributed to our study cohort. We inquired about rheumatoid arthritis, systemic lupus erythematosus, Sjögren syndrome, dermatomyositis, polymyositis, systemic sclerosis, ankylosing spondylitis, psoriatic arthritis, polymyalgia rheumatica, vasculitis, arthritis associated with inflammatory bowel disease, and polychondritis. In addition to our study cohort, we surveyed 60 patients from our clinic population who were matched by age (±1 year), race, sex, and geographic location. The control group consisted of patients with no alloplastic implantation. Our rheumatologic survey actually found more problems with our control group than with our study group (Table). Although these differences are not statistically significant, they do not show any increased risk for

Figure 9. A and B, Preoperative lateral and oblique views, respectively, of male patient. C and D, Eighteen-month postoperative malar augmentation, lateral and oblique views, respectively. The patient also underwent a superficial muscular aponeurotic system–type rhytidectomy and upper and lower eyelid blepharoplasty.
connective-tissue disease within our cohort group compared with the general population.

Of the 60 patients, 10 (16.7%) had some form of undesirable sequelae; however, only 4 (3.4%) of 118 implants had to be revised.

**COMMENT**

Alloplastic cheek augmentation can achieve an attractive malar prominence that is in balance and harmony with the rest of the face.\(^10\) It can repair traumatic and congenital defects while restoring form and function without donor site morbidity. Proper patient selection, preoperative facial analysis, implant selection, and operative technique are all essential for a successful outcome. Our experience suggests that Silastic malar implantation is a great asset to facial plastic surgeons in correcting malar deficiencies.

The first polymeric alloplast to achieve widespread use in the face was silicone.\(^11\) It has been implanted in humans for more than 40 years.\(^12\) Recently, silicone has come under scrutiny by the US Food and Drug Administration; however, from a scientific perspective, solid silicone should be considered one of the safest implantable materials currently available in the United States.\(^13\) The excellent biocompatibility of silicone (Silastic) stems from its close proximity to carbon on the periodic table.\(^14,15\) Silicone and carbon have the same valence structure, and both are capable of 4 stable chemical bonds.\(^15\) Silicone is entirely composed of interlinked molecules of silicone and oxygen with methyl side groups, resulting in a true organosilicone polymer. The silicon-oxygen bonds in Silastic are particularly strong, making this material quite resistant to degradation in the body.\(^14,15\) Silastic implants can be steam autoclaved and sterilized with radiation or ethylene oxide gas.\(^15\) Silastic can be carved intraoperatively, greatly facilitating its use in complex contouring situations. Because of desirable capsule formation that always occurs around a Silastic implant, if removal becomes necessary, Silastic is removed more easily than porous or textured implants.\(^12,13,17\) The MMI is made of Silastic and therefore has all of these advantages plus ease of insertion and, if needed, removal. The nonporous surface resists infection, and the small peripheral holes encourage tissue ingrowth, thus promoting fixation. It is not our general practice to use or recommend Silastic implantation in areas of previous irradiation, thin skin—soft tissue envelope secondary to trauma or scarring, or malar frac-

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**Rheumatologic Survey of Malar Implant Population vs General Population**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Malar Augment (n = 60)</th>
<th>No Implant (n = 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis*</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Sicca†</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rash</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seizure or psychoses</td>
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<td>0</td>
</tr>
<tr>
<td>Oral ulcer (aphthous ulcers)</td>
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<td>1</td>
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<tr>
<td>Photosensitivity</td>
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<td>0</td>
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<tr>
<td>Salivary gland enlargement</td>
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<td>0</td>
</tr>
<tr>
<td>Symmetric muscle weakness</td>
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<td>0</td>
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<tr>
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<td>0</td>
</tr>
<tr>
<td>Cancer</td>
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</tr>
</tbody>
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*Includes swelling of the wrist, swelling of 3 or more joints, symmetric joint swelling, or any other documented arthritis or synovitis.†Includes dry eyes, dry mouth, or keratoconjunctivitis sicca.‡Includes serosal inflammation such as pleuritis and pericarditis.
tures with exposed sinus mucosa. With proper patient selection, preoperative planning, and operative technique, Silastic is an excellent implant choice. Our experience indicates that Silastic is safe, simple, predictable, and durable.

CONCLUSIONS

Malar augmentation with the Silastic midfacial malar implant is a reliable and effective means to correct many types of malar defects. The incorporation of careful patient selection, prudent facial analysis, the no-touch operative technique, and proper implant selection can lead to dependable restoration of malar defects. We have found the described technique to carry a high degree of patient satisfaction while providing low morbidity. Our complication and revision rates are acceptable for the procedure(s) described.

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