

# Technical points in alloplastic chin augmentation

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## Introduction

Aufricht was the first to describe chin augmentation for cosmetic purposes<sup>1</sup>. Although numerous homografts have been utilized for this purpose, none has consistently resulted in long-term maintenance of structure and bulk. Cartilage grafts have a significant potential to warp with the passage of time, as well as to resorb when followed long-term<sup>2,3</sup>. Bone grafts, although encouraging initially, often melt away over time. Additional surgical time, cost and potential morbidity associated with the utilization of a donor site, have provided the impetus that has spearheaded the development of a wide variety of allografts for chin augmentation.

Vulcanization technology allowed for the development of a stable implant made of silicone rubber (silastic). This material has been successfully utilized for chin augmentation for almost 40 years<sup>4</sup>. It continues to represent the material of choice largely because of its inertness, long-term stability and ease of use. Polytetrafluoroethylene implants have recently been developed. These may be offered as an alternative to patients not wishing to have alloplastic augmentation with silastic.

In this brief article, I will outline my method of alloplastic augmentation of the chin, highlighting both intraoral and external approaches.

## Technique

### General principles

The patient should have a thorough preoperative analysis of his/her facial aesthetics and goals. Particular attention is initially directed at the profile analysis. Many patients seeking major reduction of an apparently large nasal dorsum, in actuality, require minor nasal reduction in conjunction with chin augmentation<sup>5</sup>. The re-establishment of a harmonious, aesthetically pleasing facial balance is the ultimate goal of this, and any other aesthetic surgery. As a general rule of thumb, a vertical line, perpendicular to the Frankfurt plane, passing through the lower lip vermilion, should just contact the anterior most projection of the mentum in most males, and be 2-3 mm anterior to such a point in most females. We feel that these are useful starting points from which to begin the analysis. We need to be aware that strict application of these guidelines will not always result in the most favorable cosmetic result. An artistic perception of the degree of individual augmentation required is invaluable in this regard.

The use of sliding advancement genioplasty should be considered in patients with significant vertical deficiency or vertical excess in the lower third of the face. Orthodontia and orthognathic surgery may be required in the patient with major occlusal abnormalities<sup>6</sup>. However, even in the



aforementioned surgical groups, one may also consider adjunctive alloplastic augmentation of the mentum<sup>7</sup>.

Any concomitant need for submental liposuction should also be addressed. This can safely be performed both in the submental area and along the outer aspect of the mandible in a subcutaneous plane. This will serve to dramatically highlight the mandibular line where no such delineation was previously noted. If liposuction is to be performed, it is done by utilizing a 0.5 cm incision, hidden within an existing submental crease. I prefer the use of 3 or 4 mm cannulas directed away from the skin surface to effect efficient liposculpture. Once completed, the initial incision is extended by 1.0 cm to provide access for external placement of a chin implant, as described below.

Chin augmentation may be performed either with the use of general or sedation anesthesia. The choice should be left up to the discretion of the anesthesiologist under the guidance of the patient.

#### *Intraoral approach*

The inferior gingivobuccal sulcus and adjacent mucosa are infiltrated with 1% lidocaine with 1 in 100,000 epinephrine solution. A No. 15 scalpel blade is then used to incise through only the mucosa in a half circle shape centered on the lower frenulum (Fig. 1). Next, fine iris scissors are utilized to pass submucosally down to the periosteum in the midline. Marking the midline with methylene blue or marking pen at this point will facilitate later placement of the implant in the anatomical midline. A limited elevation of the midportion of the mentalis muscle bilaterally, will allow for the insertion of Aufrecht-type retractors, significantly increasing the exposure for the subsequent steps of the procedure (Fig. 2). A paramedian incision (1 cm off of the mid-line on either side) of the periosteum along the antero-inferior edge of the mandible is followed by elevation of a precise subperiosteal pocket. A commercially available appropriately sized implant is then prepared for insertion into this pocket. The implant is first split vertically in the middle and then soaked in an antibiotic solution of ce-



Fig. 1. Note delineation of planned half circle incision centered on the midline frenulum.



Fig. 2. Paramedian periosteal incision has been made after elevation of the midportion of the mentalis muscle (being retracted by a Aufrecht retractor).

fazolin or equivalent. Each half of the implant is then inserted into the preformed subperiosteal pocket, taking care to align the anatomical midline (Fig. 3). No suture fixation is required as the implant is held in proper position both by the inelasticity of the precisely elevated subperiosteal pocket, and by the overlying mentalis muscles. The integrity of the mentalis muscles should be maintained as they will serve to fixate the implant in a natural manner. Caution should be exercised at all times not to damage these muscles (may give rise to asymmetries noticeable upon animation) or the mental nerves (may give rise to temporary or permanent sensory abnormalities). Closure of the mucosa is completed with two layers of 5.0 vicryl sutures after irrigation of the operative site with antibiotic solution. Perioperative antibiotics (first generation





Fig. 3. Implant being introduced into subperiosteal pocket which has been precisely elevated.

cephalosporin or equivalent) are utilized routinely for seven days, although the absolute need for this remains unproven. The patient is instructed to wear a jaw bra for one week continuously and then nightly for a further two weeks.

#### *External approach*

A No. 15 scalpel blade is utilized to fashion a 1.5-2.0 cm incision within an existing submental crease after local infiltration of 1% lidocaine with 1 in 100,000 epinephrine solution. Dissection within the immediate supraperiosteal plane is then performed with fine iris-type scissors (Fig. 4). After exposure of the anteroinferior aspect of the mandible, the precise midline is demarcated to serve as a guide during placement of the alloplast. Paramedian vertical incisions (1.0 cm from the midline) are made in the periosteum, and precise subperiosteal pockets, which will fit the implant like a hand in a glove, are elevated (with a periosteal elevator) bilaterally. The implant is soaked in antibiotic solution as before. However, the implant is best not sectioned when utilizing this approach. The fixation provided with the intraoral approach by the mentalis muscles is lacking with the external approach. This may contribute to a theoretically increased risk of postoperative migration if the implant is divided. Thus, the implant is inserted as a whole unit, one flange at a time, into the subperiosteal pockets (Fig. 5). Once inserted, the implant should be additionally stabilized with one or two 5.0 nylon (or equivalent) sutures running be-



Fig. 4. External incision providing access to the anteroinferior-most portion of the mentum.

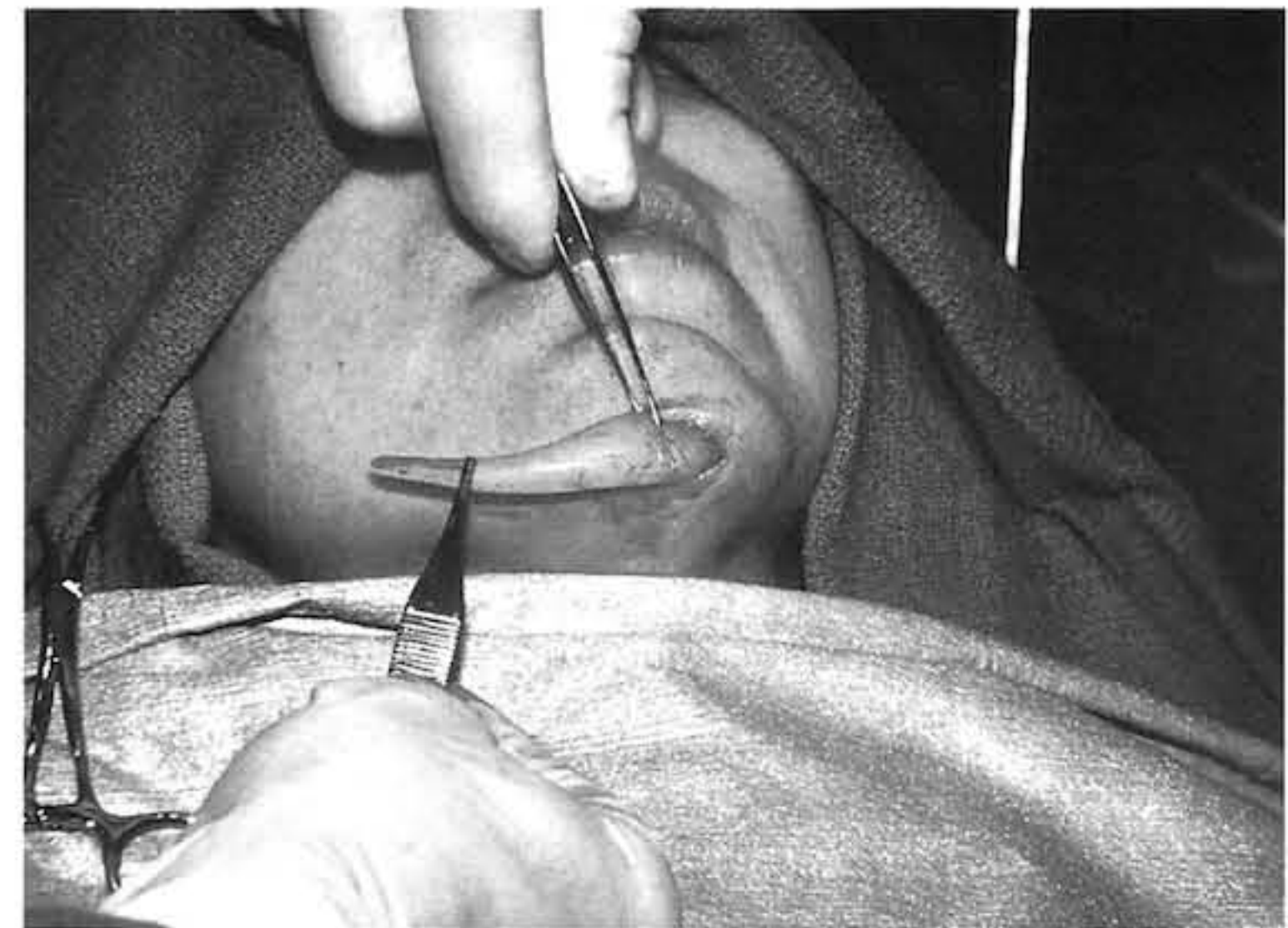


Fig. 5. Implant is introduced as a whole unit into precisely elevated paramedian subperiosteal pockets

tween the silastic alloplast and the periosteum of the midline. The external incision is closed in layers, utilizing 5.0 vicryl for the subcutaneous and 5.0 nylon or fast absorbing gut suture for the skin incision. The perioperative and postoperative care is as for the intraoral approach.

#### **Discussion**

Equally gratifying results can be achieved with either approach. Generally, the external approach is used in instances where there is a concurrent need for submental access incisions, as is the case both with submental liposuction and in platysmaplasty during rhytidectomy (Figs. 6 and 7). Otherwise, preference is given to the intraoral approach described herein. The





Fig. 6. Preoperative view of a patient with deficient mentum.



Fig. 7. Three-month postoperative view of same patient following silastic chin augmentation and submental liposculpture.

soft tissue of the chin has been noted to become ptotic following surgical augmentation of the mentum, prompting some authors to recommend mentalis muscle suspension at the time of the procedure<sup>9</sup>. The need for this is obviated when the implant is placed beneath the mentalis muscles, as described for the intraoral approach. This maneuver will result in an aesthetically gratifying increase in the amount of tension exerted upon these muscles, thus reversing the tendency towards postoperative soft tissue ptosis of the mentum.

The key to maintaining fixation in both techniques is the formation of precise subperiosteal

pockets. If these pockets are even slightly large, the likelihood of postoperative migration is increased. Further fixation is provided by placing the implant deep to the mentalis muscles in the intraoral approach, and with suture fixation to the periosteum in the external approach.

Both polytetrafluoroethylene and silastic are easily carved to allow for camouflage of minor asymmetries that may be present in the mentum of a given patient. Hydroxyapatite blocks and proplast are not as simple to carve, and require larger access incisions<sup>8</sup>. Although tissue ingrowth may provide better fixation in theory with this latter group of alloplasts, no significant problems with migration have been encountered utilizing the techniques outlined for placement of silastic implants.

The major potential complications with any alloplastic augmentation are mental nerve dysfunction, migration and infection. Meticulous technique is important to decrease the risk of these complications in the postoperative period. However, the patient should be counselled that direct trauma to the area and late infection (especially noted with dental root infections) are lifelong risks of any alloplastic augmentation. Erosion of the underlying mandible is not a major problem if the central part of the implant, representing the greatest volume (and hence the greatest potential source of resorption pressure) is placed above the periosteum, while the tails of the implant are placed in subperiosteal pockets. Although complete supraperiosteal placement is associated with less bone erosion, it is associated with unacceptably high rates of implant migration, and is thus not recommended.

In conclusion, adherence to the outlined technical details will allow rewarding, lasting results to be achieved in patients presenting for alloplastic chin augmentation.

## References

1. Aufricht G: Combined nasal plastic and chin plastic: correction of microgenia by osteocartilagenous transplant from large hump nose. *Am J Surg* 25:292, 1934
2. Gillies H, Millard R: *The Principles and Art of Plastic Surgery*. Boston, MA: Little Brown 1957
3. Gibson T: Transplantation of cartilage. In: Converse J (ed) *Reconstructive Plastic Surgery*, 2nd edn, p 301. Philadelphia, PA: WB Saunders 1977



4. Risk B: Alloplastic materials in the creation of facial contour. *Arch Otolaryngol* 72:212, 1960
5. Wider TM, Spiro SA, Wolfe SA: Simultaneous osseous genioplasty and meloplasty. *Plast Reconstr Surg* 99(5):1273-1281, 1997
6. Rosen HM: Surgical correction of the vertically deficient chin. *Plast Reconstr Surg* 82(2):247-256, 1988
7. Proffit WR, Turvey TA, Moriarty JD: Augmentation genioplasty as an adjunct to conservative orthodontic treatment. *Am J Orthodont* 79(5):473-491, 1981
8. Moenning JE, Wolford LM: Chin augmentation with various alloplastic materials: a comparative study. *Int J Orthodont Orthognath Surg* 4(3):175-187, 1989
9. Zide BM, McCarthy J: The mentalis muscle: an essential component of chin and lower lip position. *Plast Reconstr Surg* 83(3):413-420, 1989