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# Vertical Incision Intraoral Silicone Chin Augmentation

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## Abstract

**Objective.** Solid silicone augmentation mentoplasty is a common procedure with consistent aesthetic results in properly selected patients. While many plastic surgeons employ the external approach, the intraoral method affords excellent aesthetic outcomes while avoiding an external scar. This is the largest series in the literature describing the midline intraoral incision approach with minimal disruption of soft tissues.

**Study Design.** Case series.

**Setting.** Academic medical center.

**Subjects and Methods.** One hundred twenty-five patients underwent chin augmentation with solid silicone implants between 2004 and 2010. Among these implants, 105 were placed transorally. Eighty-five patients were followed for at least 1 year. Demographic information, indications, patient satisfaction questionnaire results, and complications were recorded.

**Results.** All implants yielded satisfactory results with no displacement, infection, tissue reaction, lower lip incompetence, mental nerve injury, or intraoral implant contamination. Two cases of superficial mucosal irritation at the suture site were observed and resolved without consequence. Symmetry, projection, and overall balance of facial components were excellent. Although all patients were satisfied with the functional and aesthetic results, 20% stated they would like further augmentation. Patients were extremely satisfied with the lack of an external scar.

**Conclusions.** Based on our series, the intraoral technique with a midline incision avoiding disruption of the mentalis muscle is recommended for its ease, simplicity, patient satisfaction, low complication rate, and circumvention of an external scar. The external approach should be considered in cases that require a very large implant.

## Keywords

chin augmentation, augmentation mentoplasty, facial implants, microgenia

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The chin plays a critical role in the aesthetic perception of the face. Because of its relatively central location, the chin, along with the nose, affects the overall balance and appeal from the frontal and profile views. Spanning across multiple cultural and gender boundaries, strong chins have consistently represented strength and confidence, whereas microgenia suggests weakness.<sup>1–3</sup>

Several methods of analyzing the chin in multiple planes exist. A detailed description of each is beyond the scope of this article. The most frequently used approach to measuring horizontal chin projection involves dropping a perpendicular line from the vermilion border of the lower lip with the patient positioned in the Frankfort horizontal plane. The ideal anteroposterior aesthetic chin position in males is with the pogonion sitting at this vertical line, and in females with the pogonion just posterior to this line. Microgenia is diagnosed when the soft-tissue pogonion is positioned posterior to this vertical line.<sup>3–5</sup> Chin augmentation, or augmentation mentoplasty, is a cosmetic surgical procedure that addresses chin retrusion or microgenia in patients with horizontal or anteroposterior deficiencies in chin projection. Proper dental occlusion, which is not addressed with this procedure, must be initially assessed as well. The approach consists of placing an alloplastic implant over the pogonion, providing improved chin projection resulting in a more aesthetically balanced facial profile. Genioplasty is generally reserved for patients with significant vertical chin discrepancies or transverse chin asymmetries.<sup>6,7</sup>

An assortment of alloplastic implant materials such as Silastic (solid silicone; Michigan Medical Corporation, Santa Barbara, California), Mersilene mesh (polyester fiber mesh; Ethicon, Somerville, New Jersey), Supramid (polyamide nylon mesh; Ethicon), Proplast (polytef; Novamed, Chicago, Illinois), Medpor (porous polyethylene; Porex Surgical Inc, College

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Park, Georgia), and Gore-Tex (polytetrafluoroethylene; W.L. Gore & Associates Inc, Flagstaff, Arizona) have gained popularity because of their availability, lack of donor site morbidity, and acceptable tissue tolerance.<sup>8</sup> Originally introduced in the 1950s, silicone implants have become the most frequently used material for chin augmentation.<sup>9</sup> The rubber is firm, flexible, and resistant to changes in body temperature. In addition, it is relatively nonreactive to the recipient bed with no absorption, calcification, or degradation.<sup>10</sup>

With regard to the correction of microgenia, while the external approach has been found to be aesthetically satisfactory with minimal morbidity,<sup>8</sup> avoidance of a submental scar is desirable when possible. This is often the case with men with a noticeable scar due to scar alopecia within hair-bearing submentum. Noted complications associated with the intraoral approach from prior series include extrusion, infection, and soft-tissue ptosis. These issues have been seen in the presence of horizontal incisions, where the attachments of the mentalis muscle and periosteum are disrupted.<sup>8,9,11</sup> We review our experience with the intraoral and external placement of preformed solid silicone implants in 125 patients with horizontal deficiencies in chin projection. Notably, the feasibility of the intraoral approach is examined, given the potential simplicity, safety, and circumvention of an external scar with this method. To date, this is the largest series in the literature describing the midline vertical incision for silicone augmentation mentoplasty.

## Methods

### Subjects

Over a 6-year period from 2004 to 2010, 125 consecutive patients underwent chin augmentation with silicone implants in combination with or independent of accompanying procedures. All implantations were carried out by the senior author (A.P.). Isolated mentoplasty was performed in the office under local anesthesia and conscious sedation. Mentoplasty with rhinoplasty or rhytidectomy was done under general anesthesia. Patients were evaluated preoperatively and postoperatively with photo documentation. Patient satisfaction and complications were recorded as well. A State University of New York Downstate Medical Center Institutional Review Board waiver was granted for this study.

### Implant Characteristics and Size Selection

Various preformed sizes and shapes of solid silicone rubber implants are commercially available for augmentation mentoplasty. A single type of concave back solid silicone implant (Spectrum Designs Medical Inc, Carpinteria, California), available in 4 different sizes, was used for this study. Implant size was primarily based on the largest implant that fit within the vertical height of the mandible at the midline, measured from the inferior border of the mandible to the base of the gingival sulcus. To minimize the risk of intraoral extrusion,<sup>9,12</sup> implant height was generally limited to 1.5 cm. Extended implants were not used. This size selection methodology was combined with an assessment of the deficiency observed while in the Frankfort horizontal

position along with an anticipated 70% gain in soft-tissue projection after implantation.<sup>13</sup>

### Surgical Technique

**Markings and local anesthetic.** Chin markings were made in the midline, at the inferior edge of the bony chin, and at 2 cm from the center bilaterally. The lower lip and chin were then injected with local anesthetic. First, 1 mL of 1% lidocaine with 1:100,000 epinephrine was injected at the mental foramen bilaterally. The mucosa and gumline were then injected with the 2 mL of the same local anesthetic agent transorally. This was followed by a subperiosteal injection and hydrodissection of the chin in preparation for the implant pocket.

**Procedure.** Once adequate time had passed, using a No. 11 blade, a 2-cm vertical midline incision was made in the gingivobuccal sulcus. Attention must be given to leaving 4 mm of mucosa at the gingival sulcus to facilitate mucosal closure. Holding the lower lip up, the blade can be pushed all the way down in the midline dividing the periosteum with minimal disruption of the mentalis muscle. Once hemostasis was achieved, subperiosteal pockets were developed symmetrically and bilaterally to the width of the implant using a small and sharp periosteal elevator (**Figure 1**). Care was taken not to divide the periosteum superiorly in order to maintain the superior periosteal attachments and minimize the risk of intraoral extrusion.

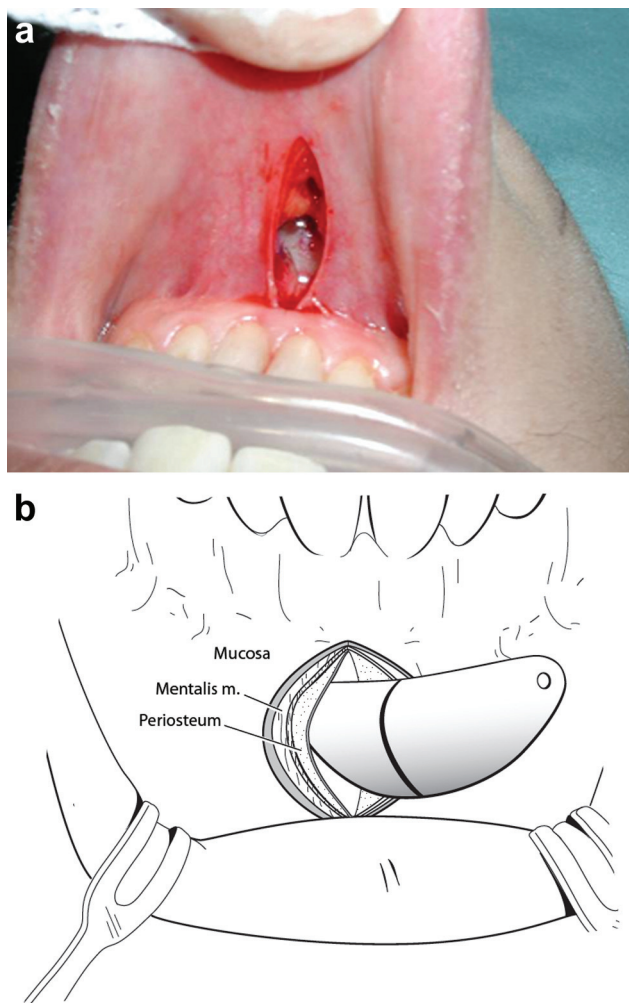
The superior aspect of the implant was then marked in the midline to allow confirmation of central positioning upon insertion. The implant was then inserted through this incision (**Figure 1**). Once the implant position was confirmed, the incision was closed in a single layer of deeply placed 4.0 chromic sutures. Because of the minimal disruption of soft tissues with the midline vertical incision, only the portion of the periosteum above the implant is included in the suture bites in order to secure a tight pocket with minimal dead space (**Figure 2**).

**Perioperative care.** The chin and lip were iced overnight. Patients were treated with perioperative antibiotics and analgesics.

## Results

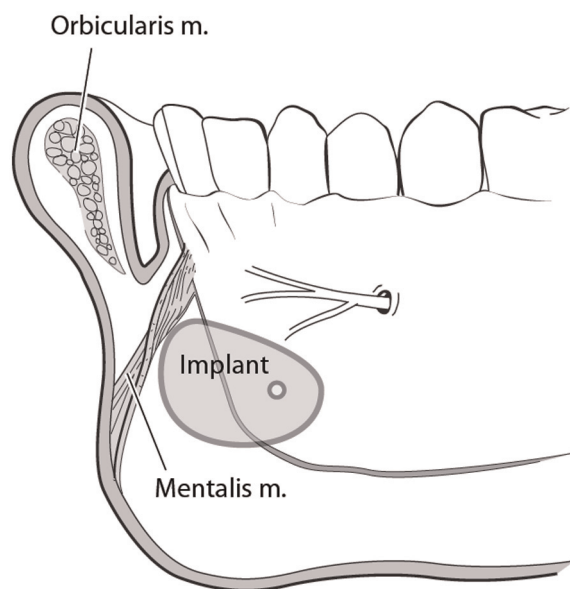
Over a period of 6 years, 125 consecutive patients underwent augmentation mentoplasty with solid silicone implants. One hundred five of these subjects underwent the intraoral approach, while the remainder were inserted externally. **Figures 3** and **4** feature two implant recipients. The average patient age was 31 years, ranging from 18 to 56 years. Thirty-four of the subjects were males. Eighty-five patients were followed for at least 1 year. All subjects were followed for at least 4 months, with a mean follow-up of 17 months. **Table 1** reveals the distribution of procedures done in combination with chin augmentation along with implant size. All chin implants performed with submentoplasty were approached externally, with the remainder being placed intraorally.

The aesthetic results were satisfactory, with no displacement and good symmetry and balance. In terms of projection,



**Figure 1.** (a) Intraoperative photograph and (b) illustration of the implant marked in the midline and inserted into the subperiosteal pockets. The superior attachments of the periosteum and mentalis muscle are not disrupted.

21 patients who underwent the intraoral approach felt that they would have preferred additional augmentation, but no requests were made to have the implants removed or



**Figure 2.** Illustration of the implant sitting beneath the periosteum. Note the uninterrupted attachments of the mentalis muscle and periosteum to the mandible.

replaced. All recipients via the intraoral route were very pleased with the absence of a submental scar. All male patients who underwent submentoplasty combined with external implantation demonstrated a visible region of alopecia from the scar. From this consecutive series of 125 patients, there were no reports of implant displacement, labiomental sulcus obliteration, infection, tissue reaction, lower lip incompetence, clinically evident bony resorption, dental disease, or mental nerve injury. In addition, no intraoral contamination of the implants occurred. Two cases of superficial mucosal irritation at the suture site in intraoral recipients were observed and resolved without consequence.

**Discussion**

This study reports our experience with the vertical incision for silicone augmentation mentoplasty. Notable trends within this consecutive series can be found in **Table I**. The

**Table I.** Distribution of Chin Augmentation Combination Procedures and Implant Sizes

Procedure	Number of Subjects			
	Size 1	Size 2	Size 3	Size 4
<b>Intraoral approach</b>				
Chin augmentation alone	0	24	0	0
Chin augmentation with rhinoplasty	27	39	8	1
Chin augmentation with rhytidectomy	0	6	0	0
<b>External approach</b>				
Chin augmentation with submentoplasty	0	0	1	0
Chin augmentation with submentoplasty and rhinoplasty	0	0	1	0
Chin augmentation with rhytidectomy and submentoplasty	0	3	6	1
Chin augmentation with submentoplasty, rhytidectomy, and rhinoplasty	0	0	6	2



**Figure 3.** Preoperative (left) and 8-month postoperative (right) photos of a recipient of an intraoral solid silicone chin implant.

2 most common procedures, chin augmentation combined with rhinoplasty and augmentation alone, were approached intraorally. Among the 105 patients who underwent intraoral

augmentation, 96 (91%) received relatively smaller (sizes 1 and 2) implants. In contrast, only 3 of 20 patients (15%) who underwent a submental approach were given sizes 1 or



**Figure 4.** Preoperative (left) and 1-year postoperative (right) photos of a recipient of an intraoral solid silicone chin implant and rhinoplasty.

2. The avoidance of implants with greater than 1.5 cm of vertical height was a key factor in this disparity, which manifested with 21 intraorally implanted patients preferring increased augmentation. We chose not to shave down the vertical height of the larger implants in the interest of avoiding a knoblike chin with an overaccentuated transition to the implant-bony margin. In terms of anesthesia modality,

24 (23%) of the intraorally implanted subjects received conscious sedation compared with only 1 (5%) of the 20 externally implanted patients.

Common complications with chin implantation in decreasing order include asymmetry, malposition, infection, extrusion, mental nerve dysfunction, and chin ptosis.<sup>11,12</sup> Aside from 2 subjects with inconsequential mucosal irritation following the

intraoral approach, our population did not demonstrate any of the above-mentioned issues. Our results appear to compare favorably with those in previous studies of silicone augmentation mentoplasty, with very low complication rates. A series by Vuyk<sup>8</sup> describing a submental approach to silicone insertion noted 1 patient with implant malposition and asymmetry most likely due to creation of an excessively large subperiosteal implant pocket. Despite the utilization of larger (sizes 3 and 4) implants in 26 patients within a subperiosteal space, we did not encounter any implant displacement or asymmetry. In a series of 602 patients by Pitangy et al,<sup>14</sup> only 4 subjects developed an infection necessitating removal of the implant, which was attributed to trauma and odontogenic etiology. The main distinction between this technique and our own was the use of a midline raphe flap in the former to theoretically aid in decreasing implant mobility. In addition, we used a midline vertical incision rather than a horizontal incision to preserve the mentalis muscle attachment to the mandible. The risks of infection and displacement were further curtailed in our approach by closing the periosteum above the implant, resulting in a tighter pocket with minimal dead space. In a survey of more than 11,000 augmentation mentoplasty procedures by more than 90 surgeons, silicone was associated with overall infection and extrusion rates of 1.7% and 0.3%, respectively.<sup>9</sup> A unique feature of chin implantations relative to other facial sites is the potential for the late occurrence of infections, up to almost 50 years postoperatively. Dental health has been concluded to be the main factor in this complication, and patients may be screened prior to implantation.<sup>15</sup> Evidence of infection or extrusion should generally be treated conservatively prior to removal of the implant.<sup>16</sup> It should also be noted that because of the fibrous capsule formed around the solid silicone rubber, patients have been shown to retain chin projection following implant removal.<sup>14,17</sup>

A less common complication of chin implantation is bony resorption. Since being incidentally discovered on radiographs in the late 1960s, this has been a focus of concern with alloplastic chin implants. While studies revealed that up to several millimeters of bone resorption could occur with most implants, loss of soft-tissue projection or pain did not accompany these changes.<sup>15,18,19</sup> Furthermore, bone resorption was less likely to occur with supraperiosteal implant placement.<sup>19</sup> Despite the abundant radiographic documentation of bone resorption, little evidence exists for periodontal destruction or loss of tooth vitality.<sup>9</sup> Many surgeons use the subperiosteal technique for improved implant fixation.<sup>9</sup> Vuyk<sup>8</sup> noted the development of erosion in 8 of 40 subjects, with no loss of correction. Without preoperative or postoperative radiography, the presence or degree of bone resorption in our population with subperiosteally placed implants is unknown. The clinical significance of this potential complication is uncertain, as no clinically evident loss of projection was observed. This preservation of augmentation in various studies, including our own, is most likely related to the aforementioned fibrous capsule formed around the solid rubber implant.<sup>17</sup>

## Conclusions

This study describes our optimized technique to placing a silicone chin implant in a simple and efficient manner, which can be performed in an office setting with local anesthesia and is associated with low complication rates and high patient satisfaction. This is the largest series in the literature describing the minimally disruptive midline vertical incision, which carries the advantages of avoiding an external scar, most relevant in hair-bearing chins. Regardless of horizontal or vertical incisional approach, however, intraoral augmentation is limited to relatively smaller implants in the interests of minimizing the risk of extrusion. The external approach should be considered in cases that require a very large implant.

## Author Contributions

**Behrad B. Aynehchi**, conception and design, acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published; **David H. Burstein**, conception and design, acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published; **Afshin Parhiscar**, conception and design, acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published; **Mark A. Erlich**, conception and design, acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published.

## Disclosures

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## References

1. McCarthy JG, Ruff GL. The chin. *Clint Plast Surg*. 1988; 15(1):125-137.
2. Tolleth H. Concepts for the plastic surgeon from art and sculpture. *Clin Plast Surg*. 1987;14(4):585-598.
3. Webster RC, White MF, Smith RC. Chin augmentation: subperiosteal and supraperiosteal implants. *Aesth Plast Surg*. 1977;1:149-160.
4. Powell N, Humphreys B. *Proportions of the Aesthetic Face*, New York, NY: Thieme-Stratton; 1984.
5. Zide BM, Pfeifer TM, Longaker MT. Chin surgery: I. Augmentation—the allures and the alerts. *Plast Reconstr Surg*. 1999;104(6):1843-1853.
6. Gross EJ, Hamilton MM, Ackermann K, et al. Mersilene mesh chin augmentation: a 14-year experience. *Arch Facial Plast Surg*. 1999;1(3):183-189.
7. Erbe C, Mulié RM, Ruf S. Advancement genioplasty in Class I patients: predictability and stability of facial profile changes. *Int J Oral Maxillofac Surg*. 2011;40(11):1258-1262.
8. Vuyk HD. Augmentation mentoplasty with solid silicone. *Clin Otolaryngol Allied Sci*. 1996;21(2):106-118.
9. Scaccia FJ, Allphin AL, Stepnick DW. Complications of augmentation mentoplasty: a review of 11095 cases. *Int J Aesth Rest Surg*. 1983;1:3-8.

10. McCollough EG, Hom DB, Weigel MT, et al. Augmentation mentoplasty using Mersilene mesh. *Arch Otolaryngol Head Neck Surg.* 1990;116(10):1154-1158.
11. Zide BM. The mentalis muscle: an essential component of chin and lower lip position. *Plast Reconstr Surg.* 2000;105(3):1213-1215.
12. Cuzalina LA, Hlavacek MR. Complications of facial implants. *Oral Maxillofac Surg Clin North Am.* 2009;21(1):91-104, vi-vii.
13. Kent JN, Westfall RL, Carlton DM. Chin and zygomaticomaxillary augmentation with Proplast: long-term follow-up. *J Oral Surg.* 1981;39(11):912-919.
14. Pitanguy I, Martello L, Caldeira AM, et al. Augmentation mentoplasty: a critical analysis. *Aesthetic Plast Surg.* 1986;10(3):161-169.
15. Rubin JP, Yaremchuk MJ. Complications and toxicities of implantable biomaterials used in facial reconstructive and aesthetic surgery: a comprehensive review of the literature. *Plast Reconstr Surg.* 1997;100(5):1336-1353.
16. Szachowicz E II, Kridel RW. Adjunctive measures to rhinoplasty. *Otolaryngol Clin North Am.* 1987;20(4):895-912.
17. Wolfe SA, Posnick JC, Yaremchuk MJ, et al. Chin augmentation. *Aesthet Surg J.* 2004;24(3):247-256.
18. Robinson M, Shuken R. Bone resorption under plastic chin implants. *J Oral Surg.* 1969;27(2):116-118.
19. Robinson M. Bone resorption under plastic chin implants: follow-up of a preliminary report. *Arch Otolaryngol.* 1972;95(1):30-32.