Chin Ptosis: Classification, Anatomy, and Correction

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ABSTRACT

For years, the notion of chin ptosis was somehow integrated with the concept of witch's chin. That was a mistake on many levels because chin droop has four major causes, all different and with some overlap. With this article, the surgeon can quickly diagnose which type and which therapeutic modality would work best. In some cases the problem is a simple fix, in others the droop can only be stabilized, and in the final two, definite corrective procedures are available. Of note, in certain situations two types of chin ptosis may overlap because both the patient and the surgeon may each contribute to the problems. For example, in dynamic ptosis, a droop that occurs with smile in the unoperated patient can be exacerbated and further produced by certain surgical methods also. This paper classifies the variations of the problems and explains the anatomy with the final emphasis on long-term surgical correction, well described herein. This article is the ninth on this subject and a review of them all would be helpful (greatly) for understanding the enigmas of the lower face.

KEYWORDS: Lip incompetence, chin ptosis, witch's chin, chin droop, mentalis muscle

All chin ptosis patients are not alike. The proper diagnosis of the type of chin ptosis places the patient into one of four categories, which will determine who can and who cannot be helped and by which methods. The four types of chin ptosis are: (1) illusory, (2) developmental, (3) iatrogenic, and (4) dynamic. The last two—iatrogenic and dynamic—may overlap.

As a general rule, chin ptosis describes the descent of the soft tissues of the presymphyseal soft tissues below the inferior border of the mandible. It is *not* the witch's chin, which projects forward. Chin ptosis cannot be addressed by standard rhytidectomies, and certain deformities may become more noticeable if other misdirected procedures are performed, for example, a submental lipectomy in the presence of dynamic ptosis. The goal of this article is to describe the normal and

abnormal anatomy, diagnosis, and management of the four types of chin ptosis, as well as how to manage dynamic ptosis in the presence of other problems—surgeon-caused or not.

ESSENTIAL CHIN ANATOMY

The mentalis muscles are paired elevators of the central lower lip that originate from the mandible at the level just beneath the attached gingiva of the central and lateral incisors.¹ They usually overlap and insert into the deep dermis of the chin pad. Often some fat may lie between the separate origins, but the height of the origins is 8 to 10 mm.

A good way to think of the mentalis muscles is as searchlights that usually overlap to insert into the chin

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Craniomaxillofac Trauma Reconstruction 2008;1:1–14. Copyright © 2008 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662. DOI 10.1055/s-0028-1098968. ISSN 1943-3875.

Figure 1 Patient with Bell's palsy. (A) Note atrophy of mentalis muscle with loss of bulk on the patient's right. (B) Note inability to elevate lower lip on affected side (right side) and loss of dimpling with attempted contraction of mentalis muscles.

pad dermis. A chin cleft is essentially a muscle-deficient zone, where the "searchlights" are not overlapping; that is, a "muscle-free" area. When the zone of overlap is predominantly at the superior chin pad, the result is an inferior chin cleft with upper chin pad muscle excess. Patients with considerable superior overlap tend to have a deep labiomental fold with a high takeoff; that is, a bulge in the upper portion of the pad.² The true insertion of an individual's mentalis muscles can often be seen in patients with Bell's palsy, where muscle atrophy and loss of lip elevation are seen on the affected side (Fig. 1).

To understand iatrogenic and developmental ptosis, the surgeon must better understand the anatomy and action of the mentalis muscles. On a sagittal cut through the midportion of the face, certain crucial anatomical landmarks must be recognized and their importance known: (1) the horizontal upper fibers maintain lip

position—this part arises from just below the attached gingival; and (2) the oblique fibers whose direction and vector of pull are responsible for lower lip elevation, pouting, and the ability to firmly press the lips together. The junction of the upper mentalis and the orbicularis oris muscles forms the labiomental fold. If an overlap occurs, the fold is indistinct. If the orbicularis is thin or narrow, the fold is high. A distinct junction leads to a distinct fold. Thus the labiomental fold marks the point of junction of the lower lip stabilizers with the marginal lip pursers (orbicularis oris) (Fig. 2).

The depressors of the lower lip include the two strong depressors (the triangularis and the quadratus) and the ancillary depressor (i.e., the anterior platysma). The lower lip does not come down on the affected side in cases of marginal mandibular palsy, and the mentalis on that side is paretic as well.

Figure 2 (A) Arrow points to the most medial of the lip depressors, which consist of triangularis, quadratus, anterior platysma. Shiny tissues medially are the mentalis insertions into the chin pad. (B) The level at which the orbicularis oris and the mentalis muscles intersect leads, in this cadaver, to a high labiomental fold (arrowhead). The distinctiveness of the fold is determined by the amount of overlap. The upper part of the mentalis muscle contains horizontally directed fibers that stabilize the lower lip (arrow). The oblique lower fibers allow the lip to pout.

Figure 3 Illusory ptosis: (A) In this unoperated patient, a crease exists that extends on each side laterally onto the face. Even with smiling, the pad and crease remain stable. (B) Postoperative image following creation of a de-epithelialized flap placed under the excess crease, placement of a small implant, and lateral undermining. The contour is improved.

ABNORMAL ANATOMY

The key in managing the issue of chin ptosis rests on making the correct diagnosis and having a clear understanding of the involved anatomy of each type. The surgeon must look at the chin as starting at the lower lip and continuing onto the submental region. A prominent submental crease, when combined with lack of bony projection and ptosis of the soft tissues of the chin pad, constitutes the witch's chin deformity described by González-Ulloa in 1972³; but, in truth, his nomenclature was inaccurate. In the illusory type of chin ptosis, lip position is normal, the intraoral sulcus is normal, and the movement is normal. *Illusory ptosis*, as the name suggests, describes the perceived descent of the chin without this actually being the case. It is caused by an exaggerated crease that may extend cephalad over the inferior mandibular border on each side. The patient has usually not had surgery. The solution for this is straightforward: Eliminate the submental crease (by excision or augmentation) and undermine the soft tissues up onto the face to allow redraping.

Lesavoy,⁴ Peterson,⁵ and Feldman⁶ all describe a variety of techniques to address the exaggerated submental crease. The senior author's preferred technique is to either excise the fold as an ellipse or to deepithelialize

the fold and close the wound in a "pants-over-vest" manner similar to that described in Peterson's and Lesavoy's articles. The crease, if it extends onto the face, is undermined (Fig. 3) lateral to the crease. Droop and/or muscle elongation occurs after large implant removal caused by muscle stretch. Redraping results after bone burring and bony resection without resuspension of the chin pad. The risk of the latter sequela can be reduced by replacement of a too-large implant with a smaller implant or bony advancement rather than no implant. Removal of a chin implant without replacement can lead to isolated contraction of the muscle (balling),⁷ dimpling, and/or the need for life-long Botox treatment to treat the fasciculations noted at the pad (Fig. 4). Resection or total detachment of the muscles should never be performed in an attempt to correct any aesthetic deformity (Fig. 5). The same must be said for suction lipectomy of the chin in the presence of dynamic ptosis. This is inadvisable for two reasons: (1) It does not accomplish any reasonable goal of fat removal, and (2) it cannot be corrected. Total loss of the mentalis muscles from any cause is impossible to reverse.

Dynamic ptosis connotes an effacement of and drop of the soft tissues of the chin pad in patients who

Figure 4 The balling phenomenon is caused by the contraction of the scar under the mentalis muscles.⁷ (A,B) When an implant is removed and nothing is done, the contraction may provide some residual projection, but lip compression will show the dimpling or reduction of the pad size.

Figure 5 (A) Vestibuloplasty with replacement by a skin graft made central lip closure impossible and drooling occurred constantly. (B) Note lower central lip at rest.

smile horizontally without commissure lift. This type of ptosis can be either natural or acquired, and even may be accentuated after procedures such as bone reduction. Usually the dominating lifting vector of pull of the zygomaticus major and minor prevent this; but if the horizontal pull of the risorius muscles dominate, compression of the soft tissue of the chin pad against the bony prominence of the symphysis will result in chin pad drop. The effaced tissue is either lifted with the smile or not (Fig. 6).

SURGICAL CORRECTION OF THE PTOTIC CHIN—THE BASIC PROCEDURES

Illusory ptosis often occurs in the patient without a history of chin surgery. Correction of this deformity has been well-covered in the earlier literature.

The processes that lead to developmental ptosis (bone resorption secondary to periodontal disease, ill-fitting dentures, or dental bone removal) are impossible to reverse but may be stabilized. The best possible treatment is to arrest the progression of further bone loss and inferior displacement of the mentalis origin. This can be done by placement of implants and proper denture refining to prevent further traumatic bone loss and mentalis origin lowering.

In Fig. 7, a woman whose lower denture rocked up and down presented with progressive loss of her ability to play the clarinet. This loss of embouchure (labiomental support for reed instrument playing) is easily explained by the decreased mentalis function secondary to denture-induced atrophy and muscle loss. The acquired ptosis in this case can only be stabilized because the replacement level for the horizontal portion of the mentalis is now gone.

Iatrogenic ptosis is a disturbing cause of chin ptosis. The intraoral approach to the menton for placement of implants or osseous genioplasty with subsequent failure to reattach the mentalis muscles at the appropriately high point leads to many problems. Scarring from multiple intraoral surgical procedures also can lead to origin lowering. Other causes include intraoral removal of an overly large or infected implant with resultant scarring or removal of symphyseal bone, which leaves the residual soft tissue unsupported. The key aspects of the repair of iatrogenic ptosis are: (1) resuspension of the detached mentalis to the level at which the horizontal portion of the mentalis is again horizontal; that is, just below the attached gingiva; (2) provision of ancillary support in the form of an inferior anchor or suture to

Figure 6 (A,B) Unoperated dynamic ptosis. These patients always have a horizontal upper lip with smile. The zygomatic muscles fail to lift the commissures, allowing risorius dominance with smile, effacing the soft tissue against the bone and causing the chin pad to move inferiorly.

Figure 7 (A) Developmental ptosis due to denture trauma on the alveolar bone. (B) The upper mentalis fibers originate from the top of the ridge. (C) During surgery (another patient), the fibers can be seen coming directly from the top of the ridge (arrows). (D) In a cadaver, the side view shows the mentalis origin coming from the top of the edentulous ridge. *Note:* If a woodwind musician loses the ability to purse his or her lips, this results in loss of embouchure and playing is made difficult.

existing hardware or porous implant at the symphysis; (3) wide lateral and caudal undermining and release of the submental tissue for recruitment; and (4) adequate drainage.

The problem of dynamic ptosis is more complicated and multifactorial and, correspondingly, requires a variety of approaches based on the patient's particular anatomy and surgical history. The common feature of all patients with this subtype of ptosis is a horizontal, non-elevating smile resulting in inferior displacement of the chin pad below the lower margin of the mandible. The effaced soft tissue goes "south." Correction usually requires a measured amount of inferior defatting and skin excision, the pattern and size of which depend on the amount removed. The position of the chin pad is marked with the patient smiling and in repose. An implant can be used to modify the shape of the underlying mandible. This may reduce the need for skin excision. Thus, if an implant is used, skin excision should be performed after its placement, because this may negate the need for skin excision. Fat, of course, must still be adjusted.

THE UPDATED MENTALIS SUSPENSION PROCEDURE¹

This iatrogenic problem may be caused by not reattaching the intraoral incision to include a muscle layer, by subperiosteal release of the origin, or, for example, by removal of an infected intraoral implant allowing the

sulcus to heal by itself, and by multiple operations devascularizing the origin. The weakened hold of the origin drifts downward caused by the weight of the chin. In each case, the sulcus is low, the incisors (lower) more visible, and the interlabial flap is increased beyond the normal 3.5 mm (Fig. 8). Mostly, the patient says that "she has to think to close her lips," an involuntary action that becomes voluntary, uncomfortable, and that causes chin dimpling because the mentalis has to over work. Most cases are performed under local anesthesia with oral premedication. The patient is instructed to use antibacterial mouthwash preoperatively and to take one dose of oral antibiotic 2 hours before the procedure. No intravenous medication or monitoring is used, but the surgeon may decide on his own. Bilateral inferior alveolar nerve blocks are placed. The patient is positioned with a shoulder roll beneath the scapulae and the neck slightly extended.

After allowing time for the nerve blocks to become effective, 2-0 nylon traction sutures are placed through the lip on each side. A surgical marker is used to indicate a point between the lower central incisors at the inferior-most extent of the attached gingiva where good bone exists (Fig. 9A). An incision line is marked on the lip between the mental nerves bilaterally and 20 cc of Xylocaine Marcaine mixed with epinephrine is injected subperiosteally from premolar to premolar. The area between the incision and the mark on the attached gingiva is tumesced to ease elevation of the proximal

Figure 8 Although some patients will show incisors at rest (A and C), all have a low, scarred sulcus (B and D). Patients complain that they must think to close their lips, straining the lower mentalis, and causing dimpling or fasciculations at the chin pad.

flap (Fig. 9B). Additional local anesthetic is injected in the supraplatysmal plane of the neck and slightly to one side, where a dependent drain will be placed. The area of skin recruitment from the neck is marked with additional local more caudal on one side for drain placement (Fig. 9C).

With traction placed on the nylon sutures, the incision is made and carried vertically to the tooth roots until bone is exposed from canine to canine (Fig. 9D). The tumesced flap is elevated to the dot between the central incisors, where a drill hole is made to accept an absorbable anchor. The curve of the bone between the roots makes this point easy to find. A single absorbable anchor is used in this central location if there is not too much crowding of the central incisors (Fig. 9E). Alternatively, two anchors can be placed, one between each of the central and lateral incisors, if too much crowding is present. Good bone is critical for placement of the anchor. Therefore, periodontal disease may need preoperative correction or the implant must be placed lower.

With the high anchor in place, the mentalis remnant is left as an 8 × 30-mm segment (or smaller) for later reattachment to chin tissues. The cutting cautery is used to dissect to bone. Dissection from premolar to premolar continues to the inferior border of the mandible (Fig. 9F). The nonabsorbable anchor site is marked just above the lower border of the mandible where the lower mentalis would be. The bone hardware or implant, if present, is exposed and dissected clean.

Next, after cutting the periosteum, Metzenbaum scissors are used to dissect in the supraplatysmal plane to mobilize a sufficient segment of neck skin to move

cephalad (Fig. 9G). A stab wound is made to one side of the dissection to permit passage of a small segment of drain, which is sutured in place. A large, permanent anchor is placed just above the lower border of the mandible. Sometimes hardware or a textured implant can be used to hold a permanent 3-0 suture. After the neck skin is mobilized, this suture or the anchor suture is placed solidly into the subdermis or muscle, affixing the recruited neck skin (Fig. 9H,I). The front of the chin is checked to make sure there is no dimpling and the suture is tied. Next, two 3-0 polydioxanone sutures (PDSs) are used to attach the chin pad to the mentalis remnants on each side for additional support (Fig. 9I [dyed PDS to mentalis remnant on right side]).

Holding the chin up, the now-elevated soft tissue of the chin is pressed against the absorbable anchor and fixed with the double-armed suture. The mucosa is closed with running and interrupted 4-0 chromic suture (Fig. 9K-M). At this point, the lax lower lip can be draped over the teeth, and it should sit well above the incisal edges. A dressing is placed over the submental drain and a chin support is placed. The drain is removed on day two, and the patient wears the chin support at night for 3 weeks.

The key concepts in resuspension of the mentalis muscles are as follows:

1. These paired muscles consist of two parts: a horizontal upper part that originates below the attached gingiva and stabilizes the lip position and an oblique lower part that elevates the central lip, allowing pouting and tight labial competence.

Figure 9 (A) Incision is made on the lip. The dot shows the height of the mentalis reinsertion. (B) The area between the incision and the dot is tumesced for ease of proximal flap elevation. (C) The area of submental undermining is marked and injected with a small amount of extra anesthetic placed on one side for drain placement. (D) After the incision extends from “nerve to nerve,” the proximal tumesced flap is elevated to the lower attached gingiva. If the patient has periodontal disease, the reinsertion point may need to be lower. (E) An absorbable anchor is placed between the central incisors (the anchor can be placed later). (F) Leaving the lower, avascular origin of the mentalis attached to the bone below the anchor, the symphysis is exposed from bicuspid to bicuspid. The menton area periosteum is released from side to side to approach the submental region.

2. Intraoral procedures that transect these muscles devascularize the origin, and, after multiple procedures, the origin will drift inferiorly, often lowering the lower lip.
3. Resuspension to elevate the lip requires reinsertion of the upper muscles to just below the attached gingiva. Bone loss from denture trauma or periodontal disease may prevent this.
4. To reach the appropriate level, the surgeon must recruit skin from the neck. The procedure as described can restore lip competence and sulcus height in one procedure.

The following cases demonstrate the variety of situations that involve dynamic ptosis, both as an isolated deformity and in conjunction with other issues (e.g., implant, large chin, pointy chin).

Case 1

Patient presented to her surgeon with a high, indistinct labiomental fold. A large chin implant was subsequently placed. The combination of the two made her chin pad percentage too high and made her chin appear enormous. After implant removal, the capsule contracted and

Figure 9 (Continued) (G) Submental, wide, supraplatysmal undermining will allow the neck, as well as the chin pad, to move up. (H) A lower, permanent, larger anchor is placed to suture to the lower mentalis fibers. If hardware or a porous implant is present, the suture may go from the muscle to the prosthesis. A drain is placed in the submental area. (I) The dark suture is the lower anchor suture. Now, semipermanent sutures are placed from the muscle to the drifted mentalis remnant. (J) The final suture comes from the upper anchor. This double-armed suture is placed as a figure 8, while elevating the chin from below. (K) Closure of the mucosa is performed with a central 4-0 chromic suture and then a water-tight, running suture. (L) The lip now rests easily above the level of the lower incisors. A dressing is placed over the drain and jaw put so the upper part rests below the lip.

the overlying, stretched soft tissue drooped. This led to iatrogenic dynamic ptosis and “balling” of her chin. Repair involved defatting the excess lower tissue and overlapping of the lower mentalis to the platysma (Fig. 10).

Case 2

Patient presented with naturally occurring dynamic ptosis and a deficient chin sagittally. No excision of skin was done until the implant was placed and the

area below it defatted. The final result shows a shorter chin with smile and good sagittal projection (Fig. 11).

Case 3

This woman presented with dynamic ptosis and a previously placed high chin implant. The bulge below the labiomental fold was uncomfortable and visible with smile. The neck was initially untreated for excess fat and bands. The operative procedure was as follows: Via a submental approach, the neck was defatted and a corset

Figure 9 (Continued) (M) A view of the dependent drain exiting the submental area is seen. The drain is removed in 1 or 2 days.

platysmaplasty was performed. The ptotic fat was removed, and a subperiosteal dissection allowed the high implant to be removed. A lower profile, textured implant was fixed to the bone, and a capsule from the old implant

was sutured down to the textured implant with polypropylene sutures to reduce dead space under the fold. The muscles were closed and the skin adjusted as required. Postoperative pictures show a smooth neck, no ptosis with smile, and a normal labiomental angle (Fig. 12).

Case 4

Patient with iatrogenic dynamic ptosis had previously received injection of 16 cc of semipermanent filler into a chin with a high labiomental fold and rounded bottom. This resulted in farther drooping with smiling. A full-thickness elliptoid skin excision was performed first. Then, based on images of the patient smiling, an appropriate amount of fat and filler was excised. Further minor contour adjustment to smooth the margin of the lower chin will be performed (Fig. 13).

Case 5

Patient presented with iatrogenic and dynamic ptosis with a full neck. This 56-year-old woman had a chin implant placed via an intraoral route 37 years before presentation. Over time, she reported increasing pain from the implant (secondary to erosion). Intraoral

Figure 10 Case 1. This patient presented with a high labiomental fold and removal of a large chin implant. The combination of a high, indistinct fold and high chin pad percentage made her chin appear enormous after implant placement. After implant removal, the capsule contracted and the overlying stretched muscle and skin drooped. This led to iatrogenic dynamic ptosis and "balling." Repair involved defatting the excess lower tissue and reorientation of the lower mentalis to the platysma in a "vest over pants" fashion. (A and C) Preoperative photos. (B and D) Postoperative photos.

Figure 11 Case 2. This woman presented with dynamic ptosis and a deficient chin sagittally. No excision of skin was done until the implant was placed and the area defatted. The final result shows the shorter chin with smile.

scarring was evident. She had a low sulcus and an intraorally palpable bump. The mentalis muscle became centralized over the implant, which was too high. At the time of the first operation, the implant was removed (due to marked erosion noted over four tooth roots). A new, textured implant was placed along the lower pogonion. Defatting of the neck above and below the platysma was performed along with corset platysmaplasty. At the conclusion of the first operation, she could still not close her lips comfortably. During the second operation, almost 18 months later, she underwent mentalis suspension as described. The implant, rather than an anchor, was used to secure the recruited submental tissue inferiorly. An absorbable high anchor between the centrals was also used (time was required for bone to reform in the hole from the old implant). The second operation restored labial competence for the first time in 37 years. A third operation was performed to defat the lower mentalis region as is done for simple dynamic ptosis. The cumulative result is amelioration of pain, comfortable lip position, and normal contour (Fig. 14).

DISCUSSION

The intraoral surgical approach to the chin by its devascularizing nature compromises the proximal mentalis muscle, leaving it to heal as a fibrotic scar. A two-layer closure is mandatory for the primary procedure performed via this route. The proximal origin is dragged downward along the anterior mandibular surface with subsequent operations as the weight of the chin pad pulls down the increasingly weak origins. The sulcus gets

progressively lower, the lip position drops, and the patient eventually must think to close the lips. The oblique lower portion goes into overdrive to compensate, and dimpling often occurs at the chin pad with lip closure. A common cause of this scenario relates to reoperations for inappropriately sized implants placed intraorally, multiple bony operations, or, more often, after the removal of an infected implant while leaving the sulcus to drain spontaneously.

Any problem is compounded when a patient has had a silicone implant placed or removed via any approach. The capsule that forms around the implant often remains and contracts after removal of the implant. The result is a balling or contraction dimple phenomenon that occurs when the patient closes the lips. Incidentally, this same process is responsible for some of the persistence of chin projection seen after implant removal.⁷

The developmental problem is unique in that it is caused both by the patient and, inadvertently, by the dentist. In the patient with severe periodontal disease who loses his or her lower front teeth, the remaining alveolar bone left after extraction is thin and prone to resorption. Bone spicules may be rongueured down prior to lower denture fitting. Upper dentures fit by suction and/or adhesive. Ill-fitting lower dentures rock up and down causing constant bony resorption. As the mandible loses vertical height due to these traumatic forces, the origin of the mentalis migrates inferiorly, eventually resulting in the development of chin ptosis. The act of pursing the lips becomes more difficult as, over time, even the upper oblique portions of the mentalis muscle

Figure 12 Case 3. This woman presented with dynamic ptosis and a previous chin implant that was placed too high. This accentuated the labiomental fold, was uncomfortable, and was visible below the fold with smile. The neck was also untreated with excess fat and bands. Surgery was performed via a submental approach; the neck was defatted and a Feldman corset platysmaplasty was performed.¹⁴ The ptotic fat was removed and a subperiosteal dissection allowed the high implant to be removed. A lower profile textured implant was fixed to the bone and capsule from the old implant sutured down to the textured implant with polypropylene sutures to reduce dead space. The muscles were closed and the skin adjusted as required. (A,C,E) Preoperative photos. (B,D,F) Postoperative photos show a smooth neck, no ptosis with smile, and decreased labiomental angle.

become ineffective. The only option for treatment of this devastating problem is to attempt to stabilize the loss of bone with placement of implants that will prevent the denture from further pushing the mentalis inferiorly.

The ptosis caused by over-zealous removal of the prominent symphysis, leaving the chin pad unsupported,

is actually a subcategory of iatrogenic ptosis because it is surgically induced. However, its correction is exactly the same as it is for the dynamic type ptosis if the lip position and sulcus height are normal. Therefore, it can be accurately termed acquired dynamic ptosis, a subcategory like that of the liposuctioned upper neck that makes dynamic ptosis look worse.

Figure 13 Case 4. (A,B) Preoperative images show iatrogenic dynamic ptosis. Artecoll (1,3 methyl methacrylate), 16 cc, was injected into the chin with high labiomenal fold and rounded bottom, resulting in farther drooping with smiling. (C,D) An ellipse of skin, fat, and Artecoll was excised; further defatting and wide undermining were performed. (E,F) Postoperative images were taken after 6 weeks.

The surgical correction of iatrogenic ptosis has been a dilemma for oral and plastic surgeons. Early on, many surgeons reattached the mentalis muscle to the lowered, devascularized proximal mentalis so the correction was better but still too low. Sometimes, periodontal disease prevents correct repositioning of the mentalis at proper height due to bone loss. Intraosseous anchors can also be difficult to place between crowded lower incisors. Rarely, root canal or tooth loss may result. At this time, the authors preferred approach is as follows: use of a tiny absorbable anchor placed very high between the central incisors and/or between the central and lateral incisors

with additional support for the residual lower mentalis to a central metal anchor in the symphysis. Reapproximation or reefing of the old mentalis also helps. Sometimes hardware or a porous implant may form this lower anchor point. The result provides a reproducibly high attachment that is stable and properly positioned. The soft tissue release for this must be complete and extend all the way into the submental region or else the chin pad cannot move up enough.

Leonard Rubin defined certain types of smiles.⁸ One of these was dominated by the risorius muscles, and thus the commissures were pulled directly laterally.

Figure 14 Case 5. (A,B) Patient had a chin implant placed just over the tooth roots 37 years ago. She presented with pain, a fatty neck, a low sulcus, and iatrogenic ptosis. (C,D) Photos show patient after first procedure, in which the old implant was removed through submental incision. New porous implant was placed along inferior margin. After 18 months, the sulcus was approached intraorally. The bone resorption had resolved. The lip was elevated and the mentalis muscles properly replaced. (E,F) Patient is seen after third procedure in which a small amount of residual dynamic ptosis was reduced. Front and side views show a normal chin shape, proper lip closure, and improved neck contour. Patient now wants a face lift.

When the average person smiles, the zygomaticus and levators of the upper lip elevate the corners of the mouth, revealing upper gingiva and uncovering upper teeth. Although the normal smile results in lifting of the chin, the horizontal smile (like Mona Lisa's) effaces the soft tissue pad of the chin against the mandible, with no resultant lift. The chin pad drops and the patient *dynamically* produces ptosis on his or her own. Fat removal in the submental region exaggerates this problem. The patient with this dynamic smile and a large chin, who undergoes intraoral chin reduction, will

present with this form of ptosis as the chin is now unsupported and ptotic.

The senior author's experience in chin surgery has hopefully led to the adoption of certain principles that that will assist the surgeon approaching this zone. The intraoral route of access to the chin for implant placement and osteotomies often involves division of the mentalis muscles to gain access to the mandibular periosteum. An extraoral, submental approach not only avoids mentalis problems but results in a well-hidden, very acceptable scar. Revising chin implants is better

accomplished with a well-secured implant or osteotomy advancement rather than with no implant. Removal alone can lead to dimpling and ptosis of the chin. Management of iatrogenic ptosis involves making an incision on the buccal surface of the lower lip, stably anchoring the mentalis muscles to the alveolus at the appropriate level, with wide undermining of the soft tissues beyond the submentum to the platysma to allow redraping. Stable, superior resuspension of the mentalis muscles with anchors fixed to the alveolus will avoid descent of the origin of the muscles. This article represents the next to last one in the 10-part series on chin surgery.⁹⁻¹³ For a clear understanding of chin surgery, we recommend that you review all of them. They will leave the reader with a finer understanding of the chin and its nuances which, like the nose, deserves great respect.

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