

Stephen Baker and Kevin Han

Introduction

The chin is an important structure in creating an aesthetic facial shape. Not only does it contribute to facial proportion in frontal and lateral views, but it also supports the overlying soft tissues. The chin can be moved three dimensionally with an osteotomy (osseous genioplasty) or can be augmented with an alloplastic implant (implant genioplasty) for more limited changes in chin position. The versatility of an osteotomy provides more precision to move the chin to its ideal position, but it is a more invasive procedure when compared to an implant. Most surgeons consider an alloplastic chin augmentation a simpler procedure with a faster recovery, but in the majority of indications, an implant cannot provide the same result as an osseous genioplasty. When compared to other maxillofacial procedures, either type of genioplasty is a relatively straightforward procedure that produces a predictable result with a fast recovery.

Anatomy

The chin is comprised of skin, subcutaneous tissue, fat, muscle, and bone. The *depressor angularis oris*, *depressor labii inferioris*, and *mentalis* muscles attach to the anterior plane of the chin. The *geniohyoid*, *genioglossus*, *mylohyoid*, and anterior belly of the *digastric* attach to the lingual aspect of the chin at the genial tubercle. The blood supply to the mental area is from the inferior alveolar artery and vessels from the geniohyoid, genioglossus, and anterior belly of the digastric muscles. The mental nerve supplies sensation to the anterior mandibular gingival mucosa and lower lip. This nerve is a continuation of the inferior alveolar nerve and becomes the mental nerve after it exits the mental foramen between

the first and second premolars. The mental foramen has been shown to be located 14.61 mm superior to the inferior border of the mandible. Because the inferior alveolar canal runs lower than the mental foramen, an osteotomy must be planned at least 6 mm caudal to the foramen.

Diagnosis and Treatment Planning

Frontal View

Because the chin contributes to facial proportion, it is important to have an understanding of normal and aesthetic values prior to treatment planning a genioplasty. When examining the face, it is important that the teeth are in occlusion and the lips are in repose. The vertical height of the face can be divided into thirds. The trichion to the glabella is the upper third, the glabella to subnasale is the middle third, and subnasale to menton is the lower third. The lower facial third can be further subdivided so that the distance between the stomion and the menton should be twice as long as the distance from subnasale to stomion.

When examining transverse symmetry of the chin, it is useful to mark several points (glabella, nose, dental midlines, vermillion, and chin) to see if all are congruent. Occasionally, these points are not aligned, and the surgeon needs to point this out to the patient preoperatively and explain the limitations of surgery. Ideally, the center of the chin is congruent with the mandibular skeletal and dental midlines. If the chin is not centered, a simple centering genioplasty is indicated. If both the chin and the mandible are not centered, a mandibular osteotomy is necessary to correct the asymmetry. In rare cases, both the chin and the mandible are off the midline, and the patient desires improved symmetry but does not wish to undergo a mandibular osteotomy. In these cases, the chin alone can be moved to improve lower facial symmetry without moving the mandible. When the chin is moved, a 1:1 ratio of bone to soft tissue movement is anticipated when planning the final position.

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Lateral View

From a lateral view, the three aspects of the chin that affect aesthetics the most are the sagittal projection of the chin, the labiomental angle, and the submental soft tissue support. The sagittal projection of the chin may be determined by several methods. Byrd has described a method using the mid-dorsum of the nose and dropping a line from this point inferiorly and tangential to the upper lip. Assuming the nose is of normal length, the chin should be about 3 mm posterior to this line. Another method is to drop a line inferior and perpendicular to Frankfurt horizontal that is tangential to the lower lip. The chin should be just posterior to this line in females and at or slightly anterior to it in males. A final analysis is Riedel's line. This line connects the most prominent points of the upper and lower lips. The most prominent point of the chin should be the third point on this line.

The labiomental angle is another important dimension that contributes to the aesthetic appearance of the chin in profile. Vertical reduction or anterior movement will increase the acuity of the labiomental angle, and vertical elongation or posterior positioning will make the angle more obtuse. Farkas described the normal adult female labiomental angle as 121° and the adult male angle as 114° , and Reyneke has stated it to be 130° . However, it is important to remember that in the majority of cases, the patient does not necessarily want to be normal but beautiful. Iglesias-Linares et al. reviewed the labiomental angles of the 40 most beautiful white and black females as voted by a popular beauty magazine, and the average labiomental angle in this group is 108.75° for the 40 white women and 104.75° for the 40 black women. There is no statistical significance between the two groups. The ultimate judgment of the result is the patient, but it is important to note that norms do not always equate the aesthetic ideals.

The submental soft tissue needs to be assessed prior to modification of the chin. In patients who desire to have their chin projection reduced, one must be careful not to compromise submental laxity by posteriorly positioning the chin and therefore reducing skeletal soft tissue support. Occasionally, it is better to leave the patient with a slightly strong chin in order to avoid creating laxity of the submental tissue. If a patient requires posterior chin positioning that will lead to submental laxity, an adjunct neck lift may be necessary to reduce the resulting submental laxity. In contrast, anterior chin movements will stretch and tighten the submental tissue thus improving the cervico-mental angle. In older patients, this increased skeletal support will have rejuvenative effects in the lower face.

Influence of Facial Features on the Perception of the Chin

Other factors that affect the perception of chin position but are not intrinsic to the chin itself are nasal projection, vertical maxillary position, and mandibular projection.

An overprojected nose may give the illusion of a small chin and vice versa. Vertical maxillary excess will cause the mandible to be rotated in a clockwise position, which will decrease anterior chin projection. A vertically short maxilla will lead to counterclockwise mandibular rotation that will increase chin projection. Problems related to abnormal vertical maxillary position are best treated by maxillary osteotomies.

The labiomental fold and chin-lip relationship will aid in determining whether deficient chin projection is due to the chin, the mandible, or both. A deficient chin with a normal labiomental angle and lower lip relationship is likely due to mandibular retrognathia. If the labiomental crease is obtuse and the chin is well posterior to the lower lip, the deficiency is likely due to the chin. The degree to which the mandible contributes to chin projection may be evaluated by examining the occlusion. If an overbite is noted on physical examination, the degree to which the mandible would need to be advanced to achieve a class I occlusion is typically the degree of mandibular deficiency. This value assumes normal maxillary projection and normal dental alignment. If after advancing the mandible, the chin would remain deficient, the chin can be advanced to achieve an ideal projection based on the criteria discussed previously (see Part III).

Orthognathic Camouflage

A patient may exhibit mandibular retrusion but will present with a class I occlusion. This is typically a patient who originally would have been ideally treated with orthognathic surgery but opted for nonsurgical orthodontic treatment. Achieving a class I occlusion using only orthodontics in a patient whose skeletal discrepancy would ideally be treated with orthognathic surgery is known as dental compensation. These patients will demonstrate a dental class I occlusion but at the expense of facial disharmony. Frequently orthodontists will extract upper premolars to allow room for the upper teeth to be pulled back to meet into a class I occlusion with the lower teeth. As the upper teeth are moved posteriorly, lip support is lost giving the perception of an overly projected nose. This commonly encountered group of patients will have the appearance of a large nose and a small jaw/chin yet possess a class I occlusion. In addition to an advancement genioplasty, these patients also may be candidates for a rhinoplasty.

Facial Rejuvenation

Previous studies have demonstrated that skeletal projection has beneficial effects on the overlying soft tissue envelope. In middle age to elderly patients who present with deficient chin projection and soft tissue complaints of redundant submental skin and an obtuse cervical mental angle, an advancement

genioplasty will have beneficial effects on the overlying soft tissue. The muscles attached to the genial tubercle underneath the neck are advanced and tightened analogous to a rubber band as the chin segment is moved forward. Additionally, the increase in the length of the distance from the cervical mental crease to gonion will be elongated giving the illusion of a more well-defined neck. A tightening of skin that occurs in the area of the lower lip, jowls, and marionette lines is also achieved as the underlying skeleton is projected in the area of the chin. Genioplasty is a good procedure in patients who do not desire the scars or stigmata of a facelift yet seek some soft tissue improvement in the lower facial third.

Cephalometric Evaluation

A lateral cephalometric radiograph is a standardized lateral radiograph of the face that shows both the bone and soft tissue and can be easily obtained at any orthodontist's office. This image is useful in determining the degree to which the chin will be advanced or setback. Clear acetate tracing paper is taped over the radiograph, and the soft tissue and skeleton of the chin and mandible are traced in pencil. A second small piece of tracing paper is then used to just trace the bone and overlying soft tissue of the chin. The smaller tracing is then moved over the original tracing so that the soft tissue pogonion (most anterior chin point) is in the optimal location relative to the face. The measured difference between the original and newly positioned skeletal chin is the distance the surgeon will move the osteotomized chin segment to achieve that result. The soft tissue moves with the bone in approximately a 1:1 ratio making this an accurate predictive tool. Software programs are also available to analyze the image and provide similar information.

Digital Imaging

Digital imaging is important for both treatment planning and documentation. Recommended views include a frontal, right and left lateral, right and left oblique, worm's eye, and bird's eye views of the patient's face. From these images, a dimensional analysis of the patient's chin can be made incorporating the previously mentioned normative values. Predictive digital imaging can also be performed giving the patient an idea of the final result. However, it is important to inform the patient that the predicted image is not a guarantee of the result but a prediction to make sure the surgeon and the patient have the same goals in mind. In order to improve accuracy in treatment planning, it is recommended to apply a ruler to the patient's face and enlarge the image to a 1:1 reproduction. This allows movements in the prediction to be accurately quantified in millimeters and produce the most accurate assessment of the patient's goals. The ruler taped to the face can easily be calibrated to actual size using calibration tools

found on both Adobe Photoshop and Mirror imaging software. The amount of movement that is desired by the patient in the image will dictate the amount of skeletal movement the surgeon will move the chin. Studies have shown that soft tissue follows skeletal movements in a 1:1 ratio, so the millimeter difference between the preoperative and predicted image can be directly translated to the skeletal movements of the chin. When using an implant, the soft tissue to implant ratio is 0.8:1. Radiographic imaging should be obtained as well to document the absence of osseous pathology prior to performing osseous surgery of the chin.

Basic Genioplasty Technique

- Infiltrate lower lip mucosa and mentalis with 10 cc of 1 % lidocaine 1/100,000 epinephrine. Because the injection is done before prepping and draping the patient, it has redistributed by the time of the procedure so that the volume of infiltration does not compromise accuracy.
- The patient is prepped after the injection allowing the epinephrine to take effect.
- The throat pack is placed and Peridex is poured into the oral cavity and remains for 5 min prior to suction.
- Use non-dominant hand to evert the lip, using the index finger to palpate below intraoral incision.
- Using a guarded blunt tip Bovie, make the initial mucosal incision from canine to canine. Then, redirect the Bovie towards the bone to divide the mentalis muscle. The left index finger is used to make sure that the Bovie tip does not inadvertently cut through the cutaneous surface.
- A periosteal elevator is then used to dissect from the incision to the inferior border of the mandible in an inferior direction. Once the inferior border has been identified, the periosteal elevator can be used to dissect laterally in the subperiosteal plane along and parallel to the inferior aspect of the mandible. Because the mental foramen is 14 mm superior to the inferior mandibular border and the widest Obwegeser periosteal elevator is 10 mm, this dissection can be done rapidly and blindly without worry of hitting the mental nerve. I refer to this region as a dissection "hot lane" meaning the dissection can be done very quickly without risk of injury to the mental nerve as long as the surgeon keeps the elevator flush with the inferior border of the mandible. Once this dissection has been done bilaterally, careful superior elevation easily identifies the mental nerve.
- A reciprocating saw with a long blade is used to make a vertical line between the midline of the lower central incisors and additional lines 10 mm lateral to midline on both sides. The midline cut is typically made between the lower central incisors; however, if it's slightly off midline, it is of no relevance as it is drawn merely as a reference to make sure that the chin remains midline when the plate is secured.

- Genioplasty retractors are placed to retract the mucosal tissue as well as to identify the mental foramen and to protect the mental nerve. The osteotomy cut should be at least 6 mm inferior to the mental foramen because the nerve runs through the mandible inferior to the mental foramen before exiting and rises superiorly as it exits the mental foramen.
- It is important to use the reciprocating saw to get around the lateral aspect of the chin when making the osteotomy; and it is also important to go far posteriorly so that in addition to the chin button, the wider portion of the inferior mandible is also advanced. Initiating the osteotomy from a more posterior position (around the first molar) reduces an iatrogenic appearance after chin surgery when advancement is being performed. Frequently, if there is an area that does not appear released after the osteotomies are complete, it is usually in the far lateral areas of the osteotomy. The problem usually relates to the fact that the tip of the saw blade has not made it completely around the lateral genial segment during the osteotomy. When making the cut, it is also important to be aware of the angle of the osteotomy. If the cut slopes from low to high as it goes posterior, the chin will be elongated as it is advanced. It is important the surgeon be aware of the three-dimensional nature of the movement to avoid an unanticipated result.
- If the surgeon feels as though the osteotomy should be complete but the genial segment is not mobile, he needs to avoid the temptation of snapping it free with the periosteal elevator. Although this will usually free the segment, it does so leaving a spicule of bone that will likely interfere with the continuous slide of the osteotomized segment and thereby may introduce a degree of error to the final result. Instead, it is recommended that the osteotomy be checked with the saw to see where the incomplete cut is in order to free it where the bone remains intact.
- It is the author's preference not to dissect the soft tissue off of the genial tubercle because as the genial segment is advanced, the musculature under the neck gets stretched which enhances the overall neck chin profile from the lateral view.
- The genioplasty advancement plates come in sizes that differ by 2 mm increments. The desired advancement plate is picked. The inferior mobile genioplasty segment is typically secured to the plate first, with the midline mark being directly under the middle hole of the plate. A Kocher or a small "L" retractor or elevator can be used to pull the segment from below and stabilize the bone segment. This may help orient the mobile segment as well as provide some resistance as screws are being inserted. It is important to ensure that the shaft of the drill does not touch the lip as the screws are inserted. If this occurs, a friction burn may result and be noticeable postoperatively.
- Once the inferior segment is secured, the top screws will be easier to place in the superior or stable mandibular segment. It is important to make sure that the vertical reference lines are congruent if no lateral movement of the chin is desired. If an asymmetry is going to be corrected, the degree of lateral movement can be calculated from the difference between the reference lines.
- Once the chin plate is secured, the incision is loosely approximated, and the patient is evaluated from the side to make sure that both the anterior movement and the acuity of the labiomental fold are acceptable to the surgeon.
- If the anterior movement is sufficient but the labiomental fold is too acute, it is possible to inferiorly position the chin segment to soften the acuity of the labiomental fold while preserving the sagittal projection of the chin segment.
- After the final chin position is established, the lateral edges of the chin are assessed. If an irregular transition is present between the mandible and the newly positioned chin, the lateral bony edges can be smoothed with a burr or a power rasp.
- Once the chin has been plated in the proper position, 2–0 Monocryl sutures on an SH needle are used to approximate the mentalis muscle. It is recommended to put two or three sutures in the muscle to restore to its anatomic position and prevent postoperative chin ptosis. It is important when passing the needle through the mentalis on the skin side that the skin is not puckered as the suture is tightened. Gentle traction on the suture after it has been placed can check this. If puckering is noted, redo the suture with a bite less superficial to the skin. Also, the bites should correspond to the labiomental fold to minimize soft tissue distortion from the mentalis closure. Finally, the sutures are held on snaps until all have been placed to maintain visualization while placing them. After all the sutures are placed, they are tied to approximate the mentalis. After the mentalis was approximated, the mucosa is closed with interrupted 4–0 chromic sutures on a tapered needle.
- The postoperative dressing consists of either an elastic compression jaw bra or an elastic adhesive dressing to provide soft tissue support over the osteotomized chin.

Types of Osseous Genioplasty

The basic steps outlined above generally apply to the following osteotomies. Any variance or modification specific to a desired osteotomy will be mentioned under each specific type of osteotomy mentioned below.

Sliding Genioplasty (Anterior-Posterior Movements)

The osteotomy is performed as a single cut through the chin at least 6 mm inferior to apices of the mandibular teeth and the mental foramen. It is important to be aware of the angle of the osteotomy because a sloped cut will change the vertical position of the chin as it is advanced or set back (see technique section). Once the osteotomy is complete, the caudal segment can be moved anteriorly or posteriorly while maintaining contact between the two bone segments. Prefabricated genioplasty plates come in 2 mm increments and can be used to secure the segments in the desired position. For a setback genioplasty, the plates are just inverted and bent to fit the contour of the bone. These plates can then be used to set the chin back to the desired number of millimeters. When performing advancement genioplasty, it is important to assess the labiomental crease as well as chin projection. If the desired projection results in an excessively deep labiomental crease, the degree of advancement should be reduced or the chin elongated to reduce the acuity of the crease if the lower facial third will not be excessively elongated.

Vertical Reduction Genioplasty

When the vertical height of the chin is excessive, two horizontally parallel osteotomies are made with removal of the intervening segment. The amount of bone to be removed is based on the preoperative determination from radiographs and clinical examination. Once the bone is exposed, two horizontal lines are marked and measured using a sterilized pencil. If a cant exists in the inferior chin, the lines may be adjusted to remove more bone from the elongated side of the chin. The inferior osteotomy is performed first followed by the superior cut. This allows the surgeon to make both cuts on stable bone. If the superior osteotomy is done first, the inferior osteotomy will be difficult to perform since the genial segment will be mobile. In large vertical reductions, it may be necessary to remove some bone from the inferior mandible just posterior to the osteotomy to prevent a boxy appearance in the frontal view. It is recommended to evaluate the labiomental fold after mentalis approximation because vertical reduction may cause it to become too acute.

Vertical Elongating Genioplasty

The horizontal osteotomy is marked and performed in the usual manner. If the vertical elongation is less than 5 mm, a genioplasty plate is used to secure the segments apart in desired distance. A caliper is used intraoperatively to confirm

the degree of elongation. If the segments are to be spaced greater than 5 mm apart, a bone graft or a piece of hydroxyapatite (HA) is placed between the bone segments to add stability to the lower portion of the chin. It is recommended to evaluate the labiomental fold after mentalis approximation because vertical elongation may cause it to become too obtuse.

Narrowing Genioplasty

To narrow the wide chin (facial feminization, softening lower face), a genioplasty is performed with the removal of a central segment of bone (typically about 1 cm) in the inferior segment to allow the two lateral segments to be medialized and secured to each other as well as the mandible with a plate. The sequence is to first mark the mandibular midline with a reciprocating saw. Second, make two vertical reference lines on the inferior segment that are separated by the degree to which the chin needs to be narrowed. It is important that this distance is split evenly on each side of the upper midline reference mark, so the chin remains symmetric after surgery. The first cuts in bone are the two vertical cuts in the inferior segment. Second, the horizontal osteotomy is made. As you come across horizontally with the saw, the lateral segments and central segment of the inferior chin will become mobile as they are released. The central segment can now be removed and cautery is used to release it from its lingual muscle attachments with minimal bleeding. The two inferior segments are medialized and secured so the line between them lines up with the midline vertical reference in the mandible. If an advancement or setback is planned in addition to the narrowing, a standard chin plate is used with one screw in each of the inferior segments and three screws in the superior segment. It is the author's feeling that one screw in each inferior segment is sufficient to prevent rotation because the segments abut one another and the chin is not under any functional loading.

Widening Genioplasty

Dividing an osteotomized segment in the midline and moving each piece laterally to the desired degree will widen the narrow chin. After the bone is exposed, the horizontal osteotomy is marked with a sterile pencil. A midline vertical mark is also made that extends from the inferior chin to the horizontal mark. The vertical cut is made first, and then the horizontal cut is made. Once each piece is free, it is evaluated to make sure that any irregular edges are smoothed. If the widening of the chin is greater than 5 mm, a bone graft or piece of block hydroxyapatite will be required as a midline

spacer for stability. Widening the chin may prevent the prefabricated genioplasty plates from being used because the lateralized segments may be moved beyond the dimension of the plate. In these cases, two plates can be adapted laterally to secure each segment, and a transverse plate can be used to secure the graft or hydroxyapatite.

Centering Genioplasty

A centering genioplasty is performed when the chin midline deviates from the facial midline. It is important to identify the asymmetry prior to performing the genioplasty. Commonly used midline landmarks for the face are the intercanthal midline, nasal tip, Cupid's bow, upper and lower dental midlines, and the center of the chin. If all of these landmarks are on midline except the chin, it is reasonable to assume the chin is accounting for the asymmetry. If, however, the chin midline is centered to the mandible but off the facial midline, the problem may be due to mandibular asymmetry. Asymmetry due to either jaw is best treated with orthognathic surgery. Occasionally, a patient will have an asymmetry of the lower face that would ideally be treated with orthognathic surgery but refuses this treatment. In these cases symmetry may be improved with a genioplasty even though the chin is not the underlying etiology.

Evaluating preoperative photographs of the patient's face and documenting all preexisting facial asymmetries will assist with planning a centering genioplasty. The surgeon then determines how much the center of the chin needs to move to give the best overall appearance of facial symmetry. After exposure, the midline of the chin is scored with a saw. A second vertical mark is made on the inferior genial segment that corresponds to the distance the chin will be moved. The second mark is made on the opposite side of that to which the chin will be moved. Therefore, when the lateral vertical line on the inferior segment is aligned with the midline reference line on the superior segment, the chin will be centered in its desired position.

Leveling Genioplasty

If a cant or vertical asymmetry exists on the chin, it can be corrected with a wedge osteotomy. A posterior-anterior cephalometric radiograph or a frontal image is assessed to determine the degree of cant. Then a decision is made whether to lower the short side, shorten the long side, or perform a combination of both to achieve the desired cant correction and vertical dimension of the chin. A sterile pencil is used to mark the desired dimensions of the wedge osteotomy, and these marks are verified with a caliper. After the

osteotomy is performed, the fixation is applied and the chin is assessed for symmetry. If a slight cant persists, bending the plate can achieve minor modifications. Larger discrepancies require replating to get a correct result. For very minor cants, burring may be performed but a caveat of this technique is that it may be hard to reach the inferior border of the chin through an intraoral incision, and a submental approach results in a scar.

Jumping Genioplasty

This is performed usually in the setting syndromic deformities (Treacher Collins). An osteotomy is made through the inferior mandible and then bringing the segment anteriorly and superiorly so the posterior edge of the chin segment rests against the anterior portion of the inferior mandible. This type of genioplasty is used for severe microgenia and because the jumping segment moves superiorly, it will shorten the lower facial third. In many patients who need correction of severe microgenia, they already have a short lower facial third and therefore cannot tolerate further shortening of the facial third. For this reason, the author prefers a double step genioplasty for severe microgenia.

Double Step Genioplasty

This osteotomy is indicated for extreme microgenia (Treacher Collins) and is preferred by some over the jumping genioplasty because it does not vertically shorten the chin. Two horizontal lines are marked on the chin taking care to ensure that each of the segments is of sufficient width to receive a fixation screw. The two osteotomies are then made making sure to do the most inferior cut first. After both cuts are made, the two mobile segments can be aligned for fixation. One technique is to use two separate genioplasty plates. One plate is used to secure the middle segment to the superior, intact mandible. Only the middle screw is placed in the middle segment leaving the lateral holes open to receive screw from the second plate. After the middle segment is attached to the mandible, the inferior segment is plated to the middle segment by overlapping the plate holes so that the lateral holes of the second plate overlap the lateral holes from the first plate on the middle segment. Screws are then inserted that secure the lateral holes from both plates. The inferior segment is secured with using three screws in the three holes.

A second technique is to use two lattice plates that are cut and bent to the desired dimensions and place one on each side of the chin. This type of plate application can be difficult because the plates need to be bent to accommodate all three levels of screw fixation, maintain symmetry, and preserve

overlapping bone at each step. Both of these techniques require that some overlap of bone be maintained at each step so that healing can occur between the osteotomized segments and maintain stability. It is also important to note that the fixation be of sufficient strength to maintain the projection of the chin in these severe cases of microgenia. As one approaches advance of 18–20 mm, the soft tissue begins to exert a strong force against the fixation, and if the surgeon does not use adequate fixation, the plates may bend, compromising the result.

Management of Soft Tissue

An osseous genioplasty is a powerful tool to improve the appearance of the lower face and neck. Smaller advancements and correction of minor asymmetries are usually well tolerated by the soft tissue envelope and result in a natural look. However, in larger advancements or in correction of asymmetry, overlying soft tissues may be less forgiving. As described previously, a “Pharaoh deformity” occurs when the chin is advanced to the point that it loses a natural transition to the posterior jawline and has the overprojected look of a Pharaoh. This deformity is accentuated from unsupported soft tissue in the parasymphiseal region that results in parasymphiseal hollowing thus exaggerating the prominence of the chin. Additionally, soft tissue irregularities may become apparent when large asymmetric movements are necessary in order to achieve skeletal symmetry of the lower face. Depending on how the soft tissue drapes, noticeable angles or palpable deformities may result and be of significant concern to the patient. Autologous fat grafting has provided a useful tool to ameliorate or correct these persistent soft tissue irregularities that may occur after chin surgery.

Postoperative Care

The patient is sent home with an Elastoplast compressive tape dressing to reduce swelling, decrease hematoma formation, and support the mentalis closure. The dressing can be removed in 5–7 days and patient can resume showering. Peridex mouth rinse is recommended twice a day for 7 days. Occasionally, Peridex may cause a darkening of the teeth; however, discoloration is rare after only 7 days of use and can be treated. Brushing can be done as tolerated but patients are instructed to use a soft brush and stay away from intraoral incisions. The patient can start on a liquid diet on the day of surgery and advance to a regular diet as tolerated within the first 48 h after surgery. Prophylactic antibiotics are given IV in the operating room but are not routinely continued after surgery.

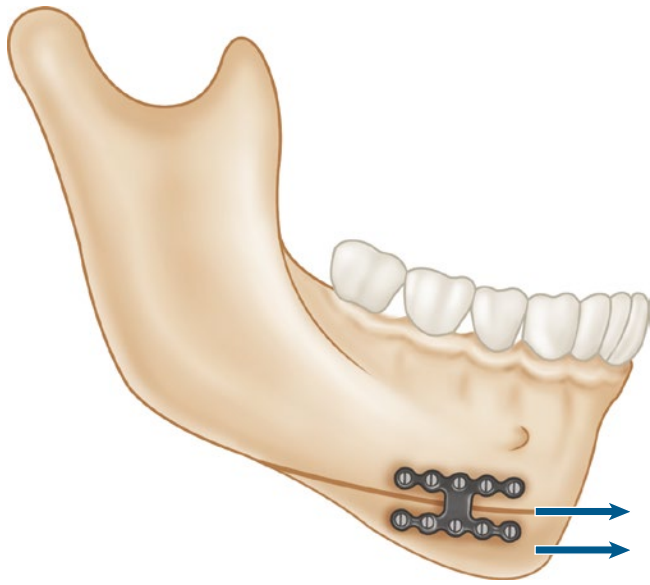
Complications and Side Effects

The surgical risks such as paresthesia, dental injury, infection, and revision must be discussed with patient during the preoperative visits. Wound dehiscence and infections are extremely rare. Infections have been reported to occur in approximately 5–7 % of chin implant procedures and less frequently in osseous genioplasty. If the infection is superficial without any fluctuance or exposed hardware, the standard treatment and follow-up for cellulitis is sufficient. If an abscess is suspected, it is important to avoid a percutaneous drainage if at all possible. The author’s recommended approach to an abscess is either repetitive aspirations and oral antibiotics or intraoral incision and drainage. Percutaneous incision and drainage will likely result in skin retraction and a divot that is very difficult to correct without an additional scar.

If dehiscence exposes the hardware, surgical debridement and washout followed by oral antibiotics are recommended. Typically, explant of the hardware is not necessary. Postoperative hematoma should be drained and irrigated adequately to prevent infection. This can be done in an office setting under local anesthesia. Tooth devitalization is uncommon but when it happens, the involved tooth will need root canal treatment. Temporary lip anesthesia or paresthesia is normal in the postoperative period, and a permanent sensory deficit may also occur with an incidence that approximates 10 % in one or both nerves. Traction is generally the etiology and it should resolve in weeks. If there is complete sensory loss with no returning of sensation months after surgery and a true avulsion or transection is suspected, then investigation and repair is required.

When an osseous genioplasty is advanced to more than 5–6 mm, a step off may be palpable at the lateral edge of the osteotomy. This may result in a visible parasymphiseal contour irregularity, and if this persists beyond 6 months, fat grafting can be used to smooth the contour. An over advanced chin also can cause excessive deepening of the labiomental crease therefore creating a prematurely aged appearance. As mentioned previously, the labiomental crease should never be deeper than 4 mm in women and no more than 6 mm in men. Further, excessive vertical elongation can occur as the chin is advanced. The elongated lower third of the face can create a very aesthetically displeasing appearance known as a Pharaoh deformity.

In contrast, excessive reduction genioplasty (more than 3–4 mm) can create soft tissue redundancy in the submental region. Also, as the symphysis of the chin is posteriorly positioned, a boxy appearance can be created as the facial shape becomes square and loses the ideal oval shape. Narrowing the symphysis and removing some of the inferior mandible posterior to the osteotomy can restore a tapered jawline (Figs. 29.1, 29.2, 29.3, 29.4, 29.5, and 29.6).



[AU1] Fig. 29.1

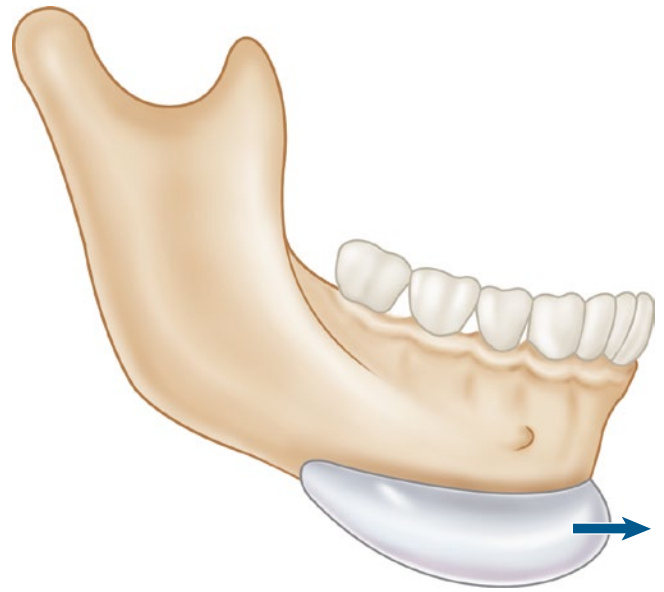


Fig. 29.3

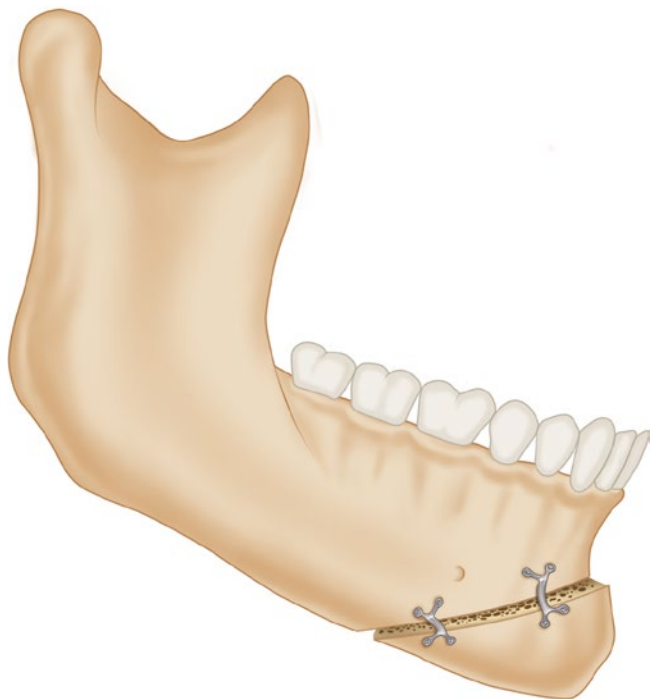


Fig. 29.2

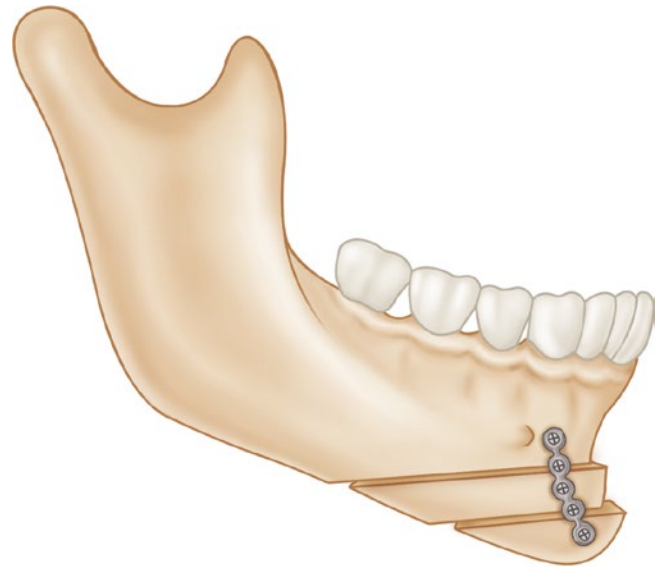


Fig. 29.4

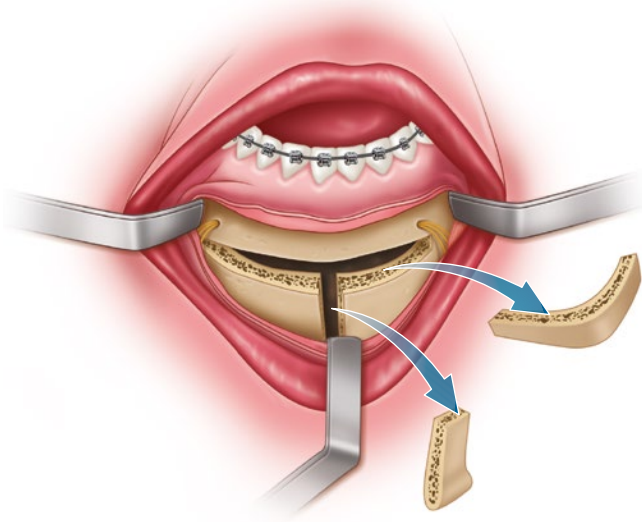


Fig.29.5

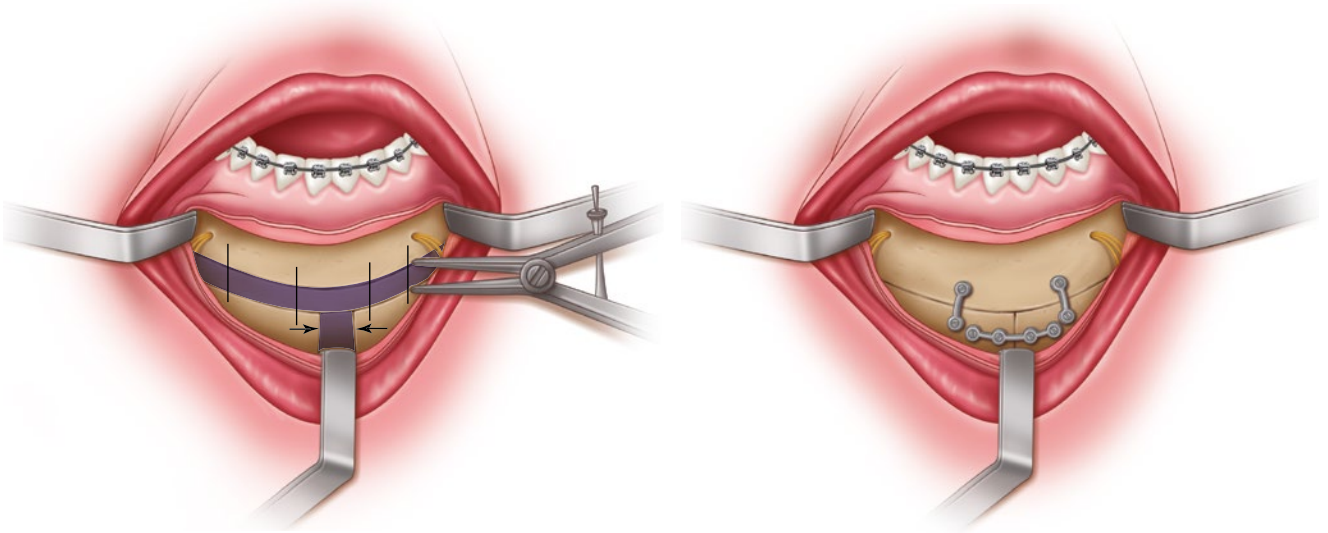


Fig.29.6

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