When addressing the aging face, there are many causes associated with the changes in appearance. There is a loss of volume or deflation; a loss of elasticity; and the resulting ptosis of the face, neck, and brows. The defining feature of the lower face is the jawline, and it should be a straight line from the chin extending to the ear. Factors affecting the straight jawline are jowling and the development of the prejowl notch or sulcus and the associated marionette line (the line from the oral commissure to the jawline). The key here is the recognition of the area anterior to the jowl, where there is atrophy of the soft tissue and the gradual bony loss of the mandible below the mental foramen at the prejowl sulcus [1].

The prejowl sulcus or antigonion notch can be congenital and its presence may exist from childhood. It may also be a result of resorption of the anterior mandible below the mental foramen. This anterior mandibular groove develops with aging as an indentation of the external inferior margin of the jawline between the chin and the jowl (Fig. 1) [2]. With aging, this notching increases because of atrophy of the soft tissue or the development of the anterior mandibular groove. This process makes jowling more prominent.

The most common complaint aging-face patients present with is jowling. The face-lift operation [3–5], whether it is a superficial muscular and aponeurotic system, deep plane, composite, long flap, with liposculpture, and so forth, cannot adequately recreate the smooth mandibular line. The face-lift can reposition and tighten the soft tissue along the jaw line but the sulcus remains ever present. To correct this situation, one must address the prejowl sulcus by filling in or augmenting the notch with a prejowl implant. A series of prejowl and prejowl-chin implants have been designed by Mittelman [6] (Implantech, Ventura, California). The implants used in conjunction with face-lift surgery can now provide the ability to create a straight youthful jawline.

Patient evaluation

When evaluating a patient with a ptotic lower face and neck, it is critical to recognize the changes that occur in the aging process. It is also important to demonstrate these findings to the patient. The examination and evaluation is conducted in front of the mirror. The primary feature that dictates the appearance on the lower face is the jawline. The jawline should be a straight line from the chin extending to the ear lobe (or angle of mandible). The factors impacting the straight jawline are the jowling; the prejowl sulcus; and the marionette line (the line from the oral commissure to the prejowl notch). It is pointed out to the patient that the development
of the jowls in combination with the prejowl sulcus has actually changed the shape of the face, from an oval to a square (Fig. 2) and it is imperative that the patient's more youthful oval face be restored. With conventional face-lift procedures, it is impossible to pull the jowl up because prejowl indentation is contributing to the irregular jawline. The marionette line is contributed by the attachment of depressor labii inferioris muscle and depressor anguli oris to the inferior mandible (Fig. 3) [7]. By elevating the attachment of the depressors, the pull creating the marionette line is reduced or softened.

The aging process, in addition to the loss of volume and ptosis of soft tissue, involves boney resorption of the mandible and chin. The loss of projection of the chin is often seen in aging and contributes to the loss of facial-cervical definition [1]. The chin should project to the level of the vermilion border of the lower lip. The combination of the poorly projecting chin and the prejowl sulcus increases the aging ptotic appearance of the lower face. It is important to recognize that the entire anterior mandible, not just the central chin, needs to be augmented (Fig. 4). The button or other nonanatomic implants can actually accentuate the prejowl sulcus and jowls. Recognition of these findings preoperatively and selection of the anatomically correct extended implant with prejowl augmentation, provides not only an aesthetic augmentation of the anterior mandible and prejowl sulcus with a smooth jawline transition, but also reduces the appearance of jowls, marionette lines, and neck line.
and putting the mental nerve at greater risk for injury or impingement. If the patient has had previous dental implants, posts or plates may be present and interfere with the positioning of the prejowl or chin-prejowl implant. History of mandibular trauma and fractures needs also to be evaluated.

**Implants**

The choice of implants is critical (Fig. 5). For patients with a prejowl sulcus and adequate chin projection, there are prejowl implants. These implants are available in four sizes depending on the size of the sulcus. They have no central anterior chin augmentation but create a transitional augmentation along the mandibular border at the prejowl groove below the mental foramen. Sizers are available to assist the surgeon in determining the correct implant size.

For the patient who requires additional augmentation to the chin, there are implants that augment both the anterior mentum and prejowl sulcus. These extended mandibular implants also are available in four sizes and create an aesthetic chin and jawline. Extended mandibular implants correct a congenitally weak chin or create a more youthful jawline by improving the bony absorption and soft tissue atrophy of the aging process.

**Technique**

Placement of the prejowl or chin-prejowl implant is through a submental incision, and is usually...
performed during the face-lift surgery (Fig. 6). An external incision of 2 to 3 cm is made below the inferior mandible in the area of the submental crease. The incision is carried through the subcutaneous fatty tissue and mentalis muscle in a stair-step fashion to the level of the supraperiosteum at the inferior border of the mandible and an anterior pocket is elevated above the periosteum over the chin superiorly for approximately 1 to 1.5 cm (Fig. 7). The periosteum is then incised at about 1.5 to 2 cm lateral to the midline and a subperiosteal tunnel is extended laterally for approximately 7 cm, which can be confirmed using a ruled malleable retractor. The elevation should be performed under direct vision using a headlight and retractor (Maliniac or Aufricht nasal retractor) actually to visualize the nerve, which can vary in position from patient to patient. This leaves the central chin covered with periosteum, which decreases the amount of pressure-induced bone remodeling.

Fig. 4. This patient demonstrates a poorly projecting chin in addition to a prejowl sulcus. The chin-prejowl augmentation as part of the face-lift procedure facilitates the creation of a straight youthful jawline.

Fig. 5. Mittelman prejowl and chin-prejowl implants (Implantech Associates, Ventura, California) are each available in four sizes providing varying amounts of augmentation.
or resorption. It is also important to extend the lateral tunnels far enough and to remain below the mental foramen (Fig. 8). It is recommended that the mental nerve be identified first while bluntly elevating the periosteum to avoid injury or compression to the nerve. Elevation onto or above the nerve can lead to hypoesthesia, dysesthesia, bleeding, and malposition. The subperiosteal tunnel must remain above the inferior border of the mandible and not extend below the inferior border.

The tunnels can be irrigated with an antibiotic solution (lincomycin or gentamicin) and the implant is soaked in the antibiotic solution and care is taken not to handle or touch the implant during the placement process. The implants are then carefully positioned in the tunnels below the mental foramen so it is not buckled or folded on itself (Fig. 9). The implant is then palpated externally to check for symmetry and to make sure the implant does not extend below the inferior border of the mandible, especially the distal tip. When the correct placement is confirmed, the anterior aspect of the implant is secured in place by suturing it to the periosteum with a 5-0 Prolene. The incision is then closed in layers by first closing the muscle and subcutaneous layer, and then carefully closing the skin using 5-0 Prolene vertical mattress stitches.

Complications

Serious complications are rare with this procedure. The most common complication is occasional hypoesthesia or paresthesia of the lower lip or chin, which is usually unilateral. Mittelman [1] reports this may occur about 35% of the time. If the implant pocket is done under direct vision using a headlight and retractor, my experience and that of others is closer to 5% [8]. It is mostly temporary, beginning immediately after surgery and lasting only a week or so. Less frequently, some patients have a complete anesthesia of all or part of the lower lip, which is temporary and may last for up to 1 to 2 months. Dysesthesia is rare and unilateral, and caused by the malposition of the implant impinging on the mental nerve. Infection is uncommon but can occur as with any implant. Infections can be reduced by meticulous care in the handling of the implant, soaking the implant, irrigating the tunnels with antibiotics, and treating the patient with prophylactic antibiotics.

Asymmetry is also rare, as is displacement. Because of the extended design, the sutures to the periosteum, and the contracture of the periosteum that “shrink-wrap” the lateral tunnels, the implant is unlikely to move, especially if the tunnel is in the correct position and does not extend below the inferior border of the mandible. One should
be aware that if the patient is asymmetric preoperatively, they remain with the same asymmetry when a symmetric implant is used. Any asymmetries should be pointed out to the patient preoperatively.

**Discussion**

The mandible is the key feature of the lower face, and by creating a smooth jawline, without jowling and a prejowl sulcus, a youthful oval face can be restored. The addition of an implant to correct any bony loss or soft tissue atrophy at the time of a cervical-facial rhytidectomy produces superior aesthetic results (Figs. 10–12). The development by Mittelman of the prejowl and chin-prejowl implant has made it possible to obtain consistent superior results creating better facial-cervical definition and cleaner necks.
Fig. 10. Preoperatively this patient demonstrates jowling, prejowl notching, marionette lines, and loss of jawline definition. Postoperatively, a youthful straight jawline has been achieved with the use of a prejowl implant and face-lift.

Fig. 11. A medium prejowl implant in association with a face-lift restores the youthful beauty of the mandible and provides improved cervical-facial definition.
Fig. 12. Use of a medium prejowl implant recreates a younger smoother jawline, eliminates jowls, and softens marionette lines.

Fig. 13. This patient shows inadequate chin projection and prejowl notching, in association with jowling of the aging process (left). After face-lift surgery and placement of a medium prejowl-chin implant, a younger jawline is obtained (right).
Fig. 14. This patient has loss of elasticity, loss of anterior mandibular projection, prejowl notching, and jowling (left). A small prejowl-chin implant with a face-lift is used to redefine the jawline (right).

Fig. 15. This patient exhibits the signs of the aging face (left). The use of face-lifting alone cannot recreate the smooth straight jawline demonstrated here. The medium prejowl implant helps create the youthful lower face (right).
Most aging face patients present complaining of their jowls and neck and, if after a face-lift their jowls remain, the patients are not happy. The concept of augmenting the mandible to re-establish a youthful contour by correcting the prejowl sulcus and possibly the chin is truly one of the secrets of rejuvenation.

Those patients, whether young or old, who are retrognathic with a hypoplastic chin and who have had conventional chin implants or even extended chin implants without augmentation at prejowl sulcus, may notice the creation of the button chin or a deepening of the prejowl sulcus. All chin augmentations should have a prejowl component that augments the mandible beyond the prejowl notch, not just the central chin (Figs. 13–16).

Summary

When addressing the aging face it is imperative that the aesthetic surgeon assess all changes that have occurred, both obvious and subtle, because the aging mandible changes in many ways. Although it is not described in the classic anatomy texts, the development of the prejowl sulcus was first described by Mittelman [1]. In addition to the notching of the anterior mandibular groove with bony absorption, there is loss of soft tissue volume and associated ptosis of the soft tissue. This produces the classic signs of aging and converts the youthful oval face to that of the square face, which is associated with aging. The prejowl sulcus and jowling camouflage the jawline. No matter how much lift or pull, no matter how long or short the flap, no matter if it is a superficial muscular and aponeurotic system or a composite procedure, the jowl remains, and the patient will not be happy.

Recontouring the mandible and restoring the smooth straight jawline has become an integral part of face-lift surgery in my practice. Almost every face-lift receives a prejowl or chin-prejowl augmentation to provide the optimal result.

The use of implants improves the face-lift by creating the smooth jawline, eliminating the jowling, and softening the marionette lines, providing for a cleaner cervical-facial definition.

The concept of the prejowl sulcus and its relationship to the jowling of the aging face process was introduced to me by Harry Mittelman, MD, and Edwin Cortez, MD (personal communication, 1994) over 12 years ago. It has not only become an integral part of my face-lift surgery, but it is the reason for the consistent superior, natural results and satisfied patients.

![Fig. 16. Preoperatively there is soft tissue atrophy and ptosis of the lower face and neck, loss of chin projection in combination with a prejowl sulcus and jowling, marionette lines, and loss of cervical-facial definition with neck banding (left). The use of a medium chin-prejowl implant with a face-lift not only restores a youthful appearance but redefines the anatomy (right).](image-url)
References


