Aesth Plast Surg (2008) 32:185–195
DOI 10.1007/s00266-007-9060-3

ORIGINAL ARTICLE

# Surgical Anatomy of the Lower Face: The Premasseter Space, the Jowl, and the Labiomandibular Fold

**Bryan C. Mendelson · Mark E. Freeman · Woffles Wu · Richard J. Huggins**

Published online: 9 January 2008


**Abstract** The anatomic basis for the jowl has not been fully described. A formal analysis was performed of the sub-superficial musculoaponeurotic system (SMAS) areolar tissue layer, which overlies the lower part of the masseter. For this research, facial dissections were performed on 16 fresh cadavers ages 12 to 89 years, and detailed anatomic observations were made during the course of several hundred rhytidectomy procedures. Tissue samples from varying age groups were examined histologically. The areolar cleavage plane overlying the lower masseter has specific boundaries and is a true space named the "premasseter space." This space is rhomboidal in shape, lined by membrane, and reinforced by retaining ligaments. The masseter fascia lines the floor, and branches of the facial nerve pass under its deep surface. Histologically, the floor is formed by a thin layer of dense connective tissue, which undergoes minor deterioration in architectural arrangement with age. The roof, lined by a thin transparent and adherent membrane on the underside of the platysma, has a less dense collagen network and contains more elastin. With age, there is a significant reduction in the collagen density of the roof. Expansion of the space with aging, secondary to weakness of the anterior and inferior boundaries, results in formation of the jowl. Medial to the premasseter space is the buccal fat in the masticator space, which descends with aging and contributes to the labiomandibular fold and jowl. Application of the premasseter space in surgery provides significant benefits. The SMAS incision should be forward of the traditional preauricular location to be over the space, not behind. Because the space is a naturally occurring cleavage plane, dissection is bloodless and safe, as all facial nerve branches are outside. The premasseter space should be considered as the preferred dissection plane for lower (cervicofacial) facelifts.

**Keywords** Facelift · Facial ligament · Jowl · Labiomandibular fold · Mandible · Masseter · Platysma · Premasseter space · SMAS

B. C. Mendelson (✉) · R. J. Huggins
Toorak Cosmetic Surgery Centre, 109 Mathoura Road, Toorak, Victoria 3142, Australia
e-mail: bcm@bmendelson.com.au

M. E. Freeman
Ponte Vedra, Florida, USA

W. Wu
Camden Medical Centre, Singapore, Singapore

R. J. Huggins
Department of Anatomy, The Faculty of Medicine, Monash University, Clayton, Victoria, Australia

*"I'll go with you, cheek by jowl . . ."*
*—A Midsummer Night's Dream, William Shakespeare*

The word "jowl" originates from the middle English *cholle*, meaning "a fullness and looseness of the flesh of the lower cheek and jaw" [22]. The word jowl, taken directly from common parlance, is used clinically, presumably in the absence of an appropriate anatomic term.

The jowl and its counterpart, the labiomandibular fold, appear with the onset of facial aging. In this they differ fundamentally from other facial landmarks, such as the nasolabial groove and the lid cheek junction, whose presence is integral to the shape of the youthful face, although they deepen with facial aging.

**Fig. 1** The labiomandibular fold transitions into the jowl at the point of cutaneous fixation provided by the mandibular ligament (*yellow dot*). The accumulated lax soft tissues of the medial cheek overlie the region medial to the masseter. The anatomic question is why the jowl is beyond the masseter

**Fig. 2** At surgery, an instrument positioned inside the premasseter space demonstrates the correlation of the anterior extent of the premasseter space with the anterior limit of the jowl

The specific anatomic features that constitute the jowl have not been fully described (Fig. 1). Jowls are reduced, but not eliminated, by a standard facelift, and further improved by liposuction and direct contouring of the subcutaneous layer beyond that of standard facelifts [11]. The superficial musculoaponeurotic system (SMAS) here is thought to be an integral part of the jowl structure based on the fact that facelifts correcting the SMAS achieve improved correction of the jowl.

The attachment of the SMAS to the underlying deep structures is not uniform [12, 14]. The SMAS separates with difficulty from the underlying parotid capsule, whereas it separates with less difficulty when the sub-SMAS dissection is continued forward over the masseter. In fact, blunt dissection can often be used for this. The presence of an areolar tissue layer between the cheek SMAS and the masseter fascia accounts for the ease of dissection. This was mentioned 30 years ago when the SMAS and the masseteric-cutaneous ligaments were originally described [14, 20].

A definitive study of this areolar layer was undertaken, with a specific focus on its structure, extent, anatomic relations, and clinical significance.

## Materials and Methods

Detailed dissections of the face were performed on four elderly fresh cadavers, ages 68 to 87 years, using loupe magnification. A further six fresh cadavers were dissected for verification of detail and for histology. Measurements were taken and photographic documentation obtained.

Additionally, on six younger cadavers (ages 12–26 years), a modified composite facelift dissection was performed to evaluate the anatomy before the onset of aging. Small samples of youthful tissues were obtained for "normal" histology.[1] In addition, detailed intraoperative observations of the anatomy have been made during many hundreds of sub-SMAS rhytidectomy procedures.

## Results

The soft tissues overlying the masseter are in two distinct areas. The upper area contains key anatomic structures, which include, from above, the zygomatic branch of the facial nerve, the accessory lobe of the parotid and parotid duct, and the upper buccal trunk of the facial nerve. Overlying the lower half of the masseter is an avascular cleavage plane, which by contrast contains no vital structures. This cleavage plane lies immediately superficial to the masseter fascia and underlies the SMAS, which here incorporates the platysma. The cleavage plane is defined by distinct boundaries. Accordingly, it can be considered to be a space. Because this space has not previously been described, it is referred to as the "premasseter space."

After the premasseter space is dissected, an instrument or finger can be placed inside the space, which is inside

[1] These dissections followed a formal coroner's autopsy according to a protocol approved by the National Health and Medical Research Council (NHMRC) and the Human Research Ethics Committee (HREC) of the Victorian Institute of Forensic Medicine (VIFM), and after specific consent from the next of kin.

the jowl, up to the resistance offered by the mandibular ligament (Fig. 2). The premasseter space tends to be rhomboidal in shape and 40 to 50 mm in transverse width and vertical height according to the size and age of the subject. Both surfaces and the four boundaries are described, together with a detailed discussion of the two anterior corners, which are significant in facial aging (Fig. 3).

*Floor*

The shape of the space reflects the shape of the floor, which is based on the underlying masseter. The anterior edge of the masseter is curved, with the concavity facing the oral cavity (Fig. 4). In the upper part of the masseter, the anterior fibers angle backward, parallel to the nasolabial fold, as they descend from their origin on the front of the body of the zygoma.

At the level of the oral commissure, the anterior border changes direction and angles forward. This reflects the attachment of the masseter to the underlying bony ridge on the anterior border of mandibular ramus, which is directed obliquely downward and forward onto the body. Accordingly, the anterior part of the masseter, where it underlies the premasseter space, has a triangular shape (Fig. 3).

The aponeurotic fibers on the masseter, seen beneath the space, are the downward extension of the dense aponeurotic fibers over the upper part of the masseter. These fibers progressively diminish in thickness from above and are visible as white bands through the translucent masseter fascia that lines the floor of the space. The membranous masseter fascia, although thin, is unyielding and strongly adherent to the underlying masseter by fibrous bands extending through the muscle (Fig. 5).

A few facial nerve branches are clearly visible coursing under the floor on the surface of the masseter, where they

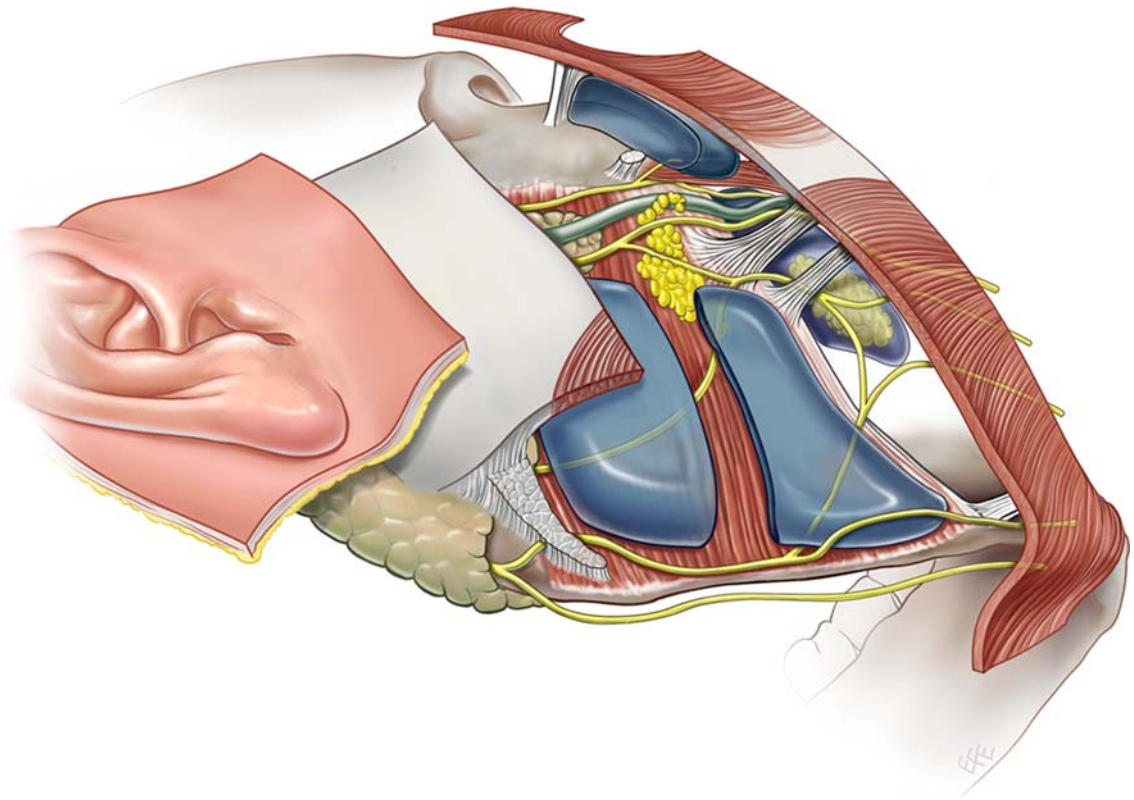

**Fig. 3** Shape and anatomic relations of the premasseter space. The premasseter space overlies the lower masseter. The platysma part of the superficial musculoaponeurotic system (SMAS) forms the roof of the space. The posterior and superior edges of platysma overlie the respective boundaries of the space. The posterior boundary is formed by the dense platysma auricular fascia (PAF). The key masseteric cutaneous ligaments define the upper anterior corner of the space, and the mandibular ligament defines the lower anterior corner, which is beyond the jowl recess. The inferior boundary of the premasseter space is membranous with no ligamentous support between the PAF and the mandibular ligament. All facial nerve branches are outside the space. The upper mandibular branch is under the lower boundary, then on its outer surface. The lower buccal trunk crosses under the floor of the space to wind around the lower key masseteric ligament. The masticator space, containing buccal fat, is medial to the key masseteric ligament in youth

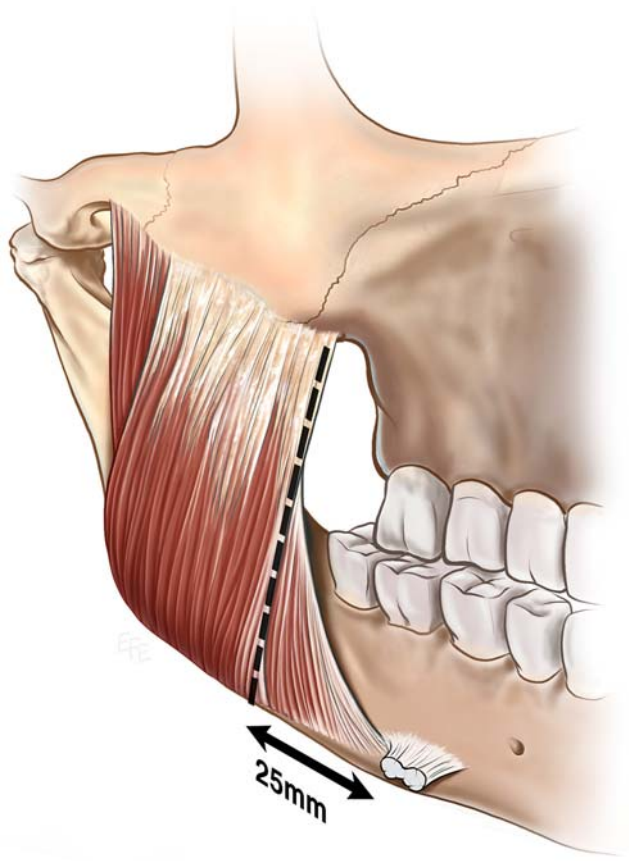


**Fig. 4.** Shape of the anterior border of the masseter. The lower anterior border is curved as the muscle extends about 25 mm beyond the "expected" position on the mandible. The mandibular ligament relates to this location. The triangular shape of the "additional" masseter is the basis for the jowl recess of the premasseter space. The dashed line indicates the projection of the upper masseter onto the mandible based on a linear expectation of the shape

remain "protected" beneath the masseter fascia. The lower buccal trunk is the most obvious and most posteriorly located nerve. It appears near the posteroinferior corner of the space at about the level of the earlobe and courses obliquely beneath the floor to reach the upper boundary near the anterior corner. The upper mandibular branch of the facial nerve may also been under the floor at or beneath the inferior border of the space. An upward-directed branch from this ramifies with a downward-directed branch from the lower buccal trunk in the vicinity of the medial extent of the floor (Fig. 3).

*Roof*

Structurally, the roof is formed by the superficial fascia enclosing the platysma. Similar to the floor, the lining membrane is strongly adherent to the muscle by fibrous

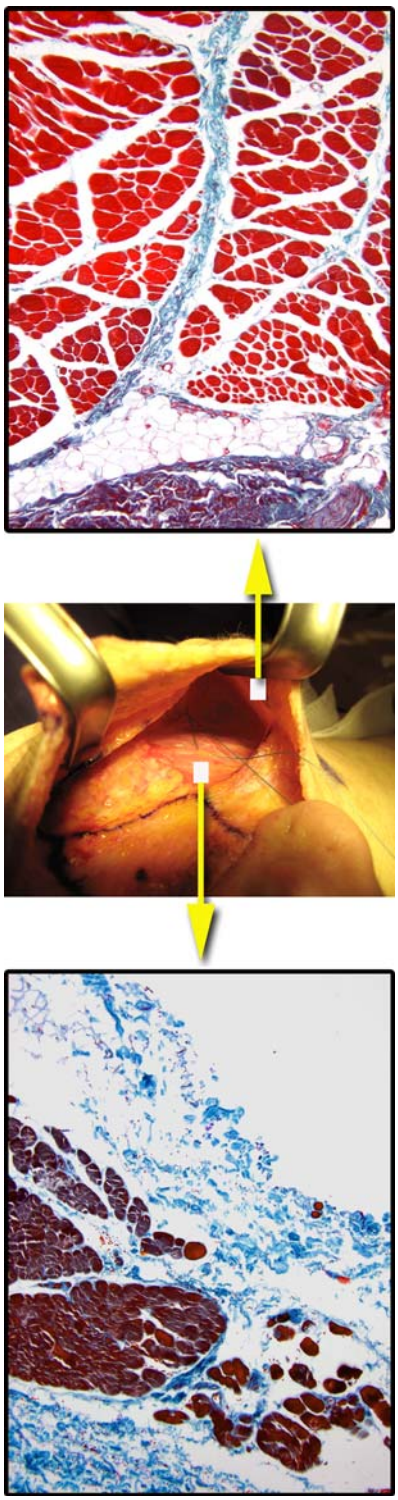

**Fig. 5** Intraoperative dissection of the premasseter space (*right side of face*). The upper border has been removed, showing the floor overlying the masseter. The lower buccal trunk of the facial nerve is seen adjacent to the white aponeurotic fibers into which a suture is inserted. The accessory lobe of the parotid is seen cephalad to the space. The histology of the lining of the roof (*above*) and the floor (*below*) shows the fibrous anchoring of the connective tissue of the lining into the respective muscle layers (*collagen fibers stained blue*)

bands through the platysma (Fig. 5). The roof of the premasseter space is lined by an adherent smooth, thin, bursa-like layer. This glistening membrane is transparent, through which the overlying structures are clearly visible when viewed from within the space. At surgery, the platysma often is thin, with muscle fibers stretched apart so that the overlying subcutaneous fat is visible.

The platysma muscle fibers have an oblique orientation as the platysma continues up from the neck and over the space from where they converge toward the oral commissure. The posterior border of the platysma is relatively distinct and does not extend as far back as the tragal cartilage (Fig. 3). The upper border of the platysma becomes progressively more defined and transversely orientated upon approaching the anterior border of the space. The superior edge of the platysma has a strong deep fixation at the anterosuperior corner of the space by a key masseteric cutaneous ligament. There are no facial nerve branches within the superficial fascia forming the roof of the premasseter space.

### *Posterior Border*

In the interval between the anterior ear cartilage and the posterior border of the space, the SMAS is tightly adherent to the underlying structures, particularly the parotid capsule. This dense attachment extends beyond the tragus for approximately 25 to 30 mm, then abruptly terminates over the lower part of the masseter. The posterior border of the premasseter space begins where this dense attachment ceases, just beyond the anterior edge of the parotid and well beyond the posterior border of the mandible. In contrast to the other three boundaries, which are defined by membrane, the posterior border is rigidly attached and tends to correspond to the location of the posterior edge of the platysma.

### *Superior Border*

The superior border of the premasseter space crosses the surface of the masseter on an oblique trajectory line from the inferior edge of the tragal cartilage to just below the oral commissure. Accordingly, it is this border that bisects the area overlying the masseter into the lower safe area (premasseter space) from the upper area of key anatomy passing to the midcheek. Structurally, the superior border is formed by firm fascial septum second only to the posterior border in its rigidity. The septum is strongly secured by a ligament at its anterior and posterior ends. The key masseteric cutaneous ligament at the anterior end is part of the complex of masseteric cutaneous ligaments near the anterior border of the masseter. The upper edge of the platysma overlies this border, and some platysma fibers are usually visible through the membranous superior septum near its anterior extent adjacent to the key masseteric ligament.

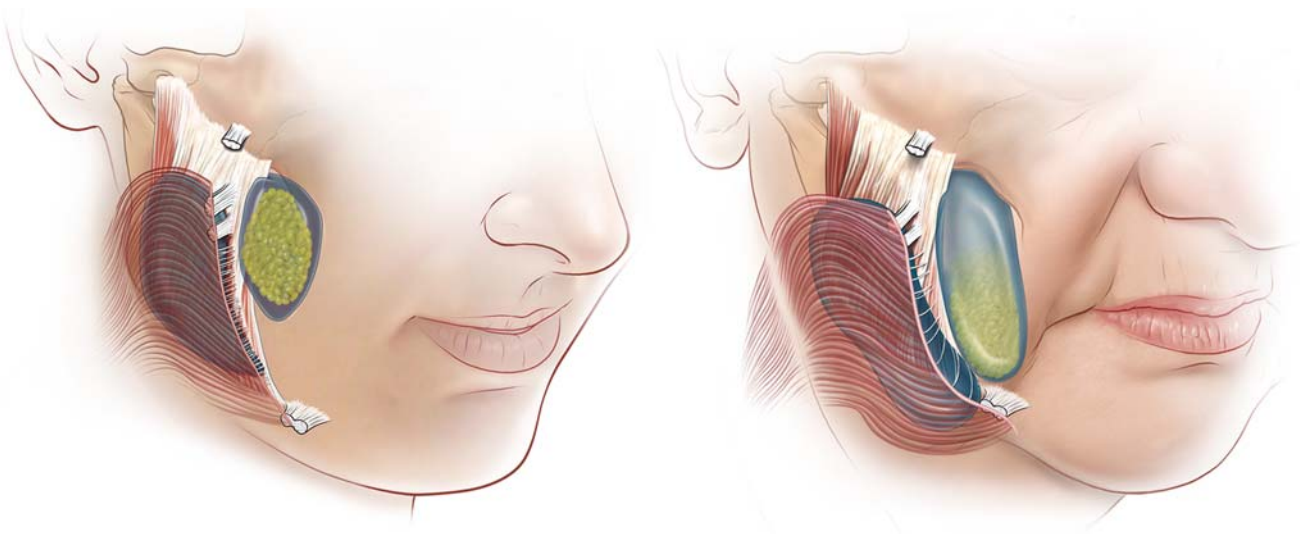

**Fig. 6** Anterior boundary of the premasseter space. *Left:* In youth, there is a tight arrangement of masseteric cutaneous ligaments, which reinforce the membrane at the anterior border. The platysma roof is closely applied to the masseter. The masticator space in youth is medial to the masseter. *Right:* With aging changes, a progressive attrition of the masseteric ligaments, especially those closer to the mandible, results in a looser attachment of the platysma roof. Distention of the anterior and inferior borders and roof allow an expansion of the premasseter space, leading to the development of the jowl. The masticator space medial to the masseteric ligaments undergoes similar expansion and contributes to the fullness of the labiomandibular fold

Closer study of the superior border shows it to be formed by two separate membranes with a narrow interval between, which at times contains a small prolongation of the buccal fat pad. The lower membrane is a continuation of the lining of the premasseter space reflected from the floor to form the superior boundary and continues as the lining of the roof (Fig. 3). The lower buccal trunk of the facial nerve emerges from beneath the floor of the space near the key masseteric ligament and, remaining outside the space, rises on the outside of the lower membrane of the superior wall to be adjacent to the key masseteric ligament (i.e., the nerve is in the interval separating the two membranes of the superior border).

### *Inferior Border*

The inferior border of the space originates posteriorly where the SMAS is adherent to the parotid capsule, approximately 15 mm superior to the angle of the mandible. It tends to parallel the upper boundary, so that the anterior extent of the lower boundary has descended to the rim of the mandible. The inferior border is membranous along its entire length, rather like a mesentery, and does not tightly hold the roof of the space to the masseter. This absence of ligamentous fixation of the soft tissues overlying the mandible extends from the posterior boundary all the way forward to the mandibular ligament, the next point of fixation at the anteroinferior corner of the space (Fig. 3).

The upper mandibular branch of the facial nerve crosses the posterior border of the masseter an average of 8 mm above the angle of the mandible, then continues on the masseter underlying the membranous attachment of the inferior border. Part way along this border, the nerve rises off the floor and courses directly on the outside of the mobile mesentery to approach the underside of the platysma.

### *Anterior Border*

The shape of the anterior border of the masseter determines the shape of the space. The forward prolongation of the masseter's lower anterior part for 20 to 25 mm is the basis for the jowl recess at the anteroinferior corner of the space (Fig. 3).

The membranous anterior border, formed by the reflection of the lining membrane between the floor and ceiling of the space, is several millimeters posterior and parallel to the anterior border of the masseter. Like the masseter, the anterior border is angled downward and forward to the anteroinferior corner, which is defined by the mandibular ligament. Immediately medial to the membrane is a discontinuous sheet of masseteric ligaments, which provide structural support (Fig. 6). These ligaments form a "picket fence"-like reinforcement of the border, extending from the key masseteric cutaneous ligament at the anterosuperior border of the space down to the mandibular ligament.

Immediately outside the space, mainly on the medial side of the ligaments, course the several ramifications of the upper and lower buccal trunks of the facial nerve with connections to each other and to the zygomatic and mandibular branches. These continue their course from beneath the floor, where they are in proximity to the masseteric ligaments, pass more superficial to ramify with the adjacent branches, then continue on the underside of the superficial fascia into the medial face (Fig. 3).

In the dissection for the younger subjects, it was more difficult to elevate the roof from the floor, particularly near the anterior border where the platysma of the roof appeared to be fixed directly to the masseter edge. The anterior border appears as an opaque whitish membrane. With aging, this membrane attenuates as it distends, becoming thinner and translucent as the roof becomes separated from the floor. With further distension, areas of the membrane become virtually transparent so that the fat medial to the space can be seen from within the space. When these changes are present, it becomes increasingly easy to elevate the roof from the floor and to extend blunt dissection into the jowl recess of the premasseter space.

Further medial to the premasseter space, in the interval between the masseteric ligaments and the oral commissure, are the structures overlying the fascia on the buccinator. Above is the masticator space, which contains the buccal fat pad, and below this is a soft fat pad. The masticator space is limited in its inferior extent where the facial vein courses transversely in the soft fat pad just below the level of the oral commissure. Further below is the vertical part of the facial vein, which courses over the most anterior fibers of masseter between the jowl recess of the premasseter space and the mandibular ligament.

## Histology and Changes with Aging

The floor membrane consists of densely arranged collagen fibers with sparse elastin and adipose tissue (Fig. 7). The collagen is intimately intertwined with the collagen elements around the underlying masseter.

The membrane lining the roof contains a similar arrangement of collagen fibers interspersed with numerous

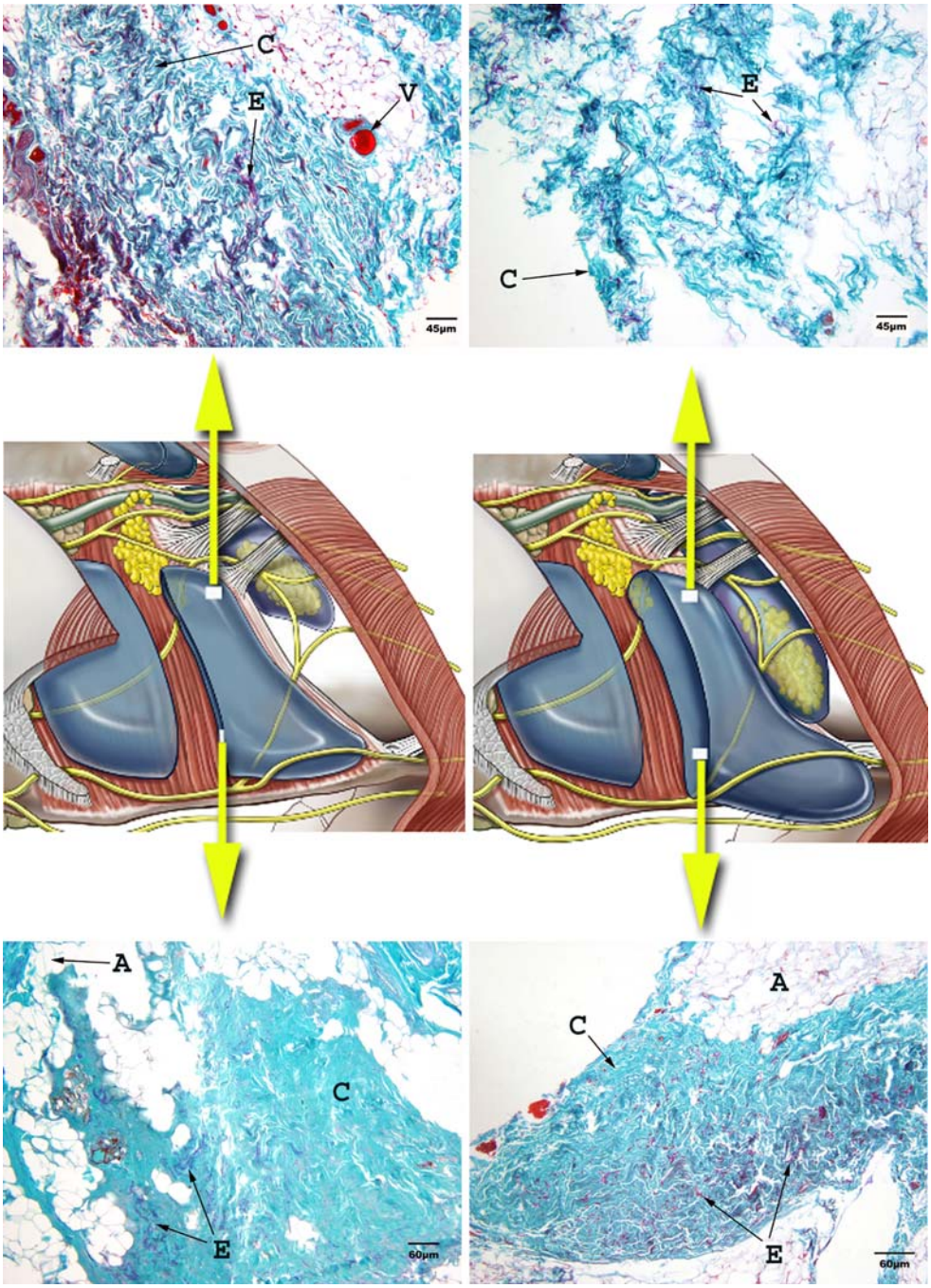


**Fig. 7** Aging changes of the roof and floor. The tissue samples stained with Gomori trichrome are from the roof (*above*) and floor (*below*) of the premasseter space of a youthful face (left: 15-year-old male) and a face showing the aging changes (right: 87-year-old male). The lining of the roof is composed of collagen fibrils (**C**), with fine strands of elastin fibers (**E**) evenly distributed throughout. Adipocytes (**A**) and vessels (**V**) are present. Significant changes with age are seen in the roof. The collagen arrangement is less compacted with age, and the collagen and elastin fibers become degraded. The lining of the floor shows a similar collagen and elastin fiber structure. There is a similar but less significant reduction of the architecture in the floor with age

elastin fibers (Fig. 7). In comparison with the floor, the collagen in the ceiling is less densely arranged, and there is significantly more elastin.

In the current study, aging of the floor consisted only of a minor reduction in the density of the collagen fiber arrangement, whereas the aging roof showed a significant change in architecture, with the linear collagen structure becoming more loosely organized and the collagen fibers becoming fragmented and degraded. The elastin strands become sparser with aging.

## Discussion

This anatomic study resolves several key questions.

### What Is a Jowl?

Until now, the general understanding of the mechanism leading to the formation of jowls has been that an attenuation of the masseteric ligaments results in inferior descent of the cheek soft tissue [20]. The anatomy introduced in this discussion brings an extra dimension of anatomic understanding, particularly concerning the central role of the premasseter space and its changes with aging. The changes are most apparent in the anterior and inferior borders and the roof, where distension occurs, associated with a reduced tightness of deep fixation along the anterior and inferior boundaries. This allows the roof to slide. The changes along the anterior border are not uniform. There is less laxity above, where the key masseteric ligaments provide stronger fixation, and more laxity below in the vicinity of the jowl recess. The anterior end of the inferior border becomes fuller with the descent of tissues from above, and the premasster space descends below the rim of the mandible. Together, these changes result in the development of the jowl (Fig. 6).

### Location of the Mandibular Ligament

The mandibular ligament demarcates the transition between the inferior extent of the labiomandibular fold and the anterior boundary of the jowl [4] (Fig. 1). The more prominent the jowl, the more apparent is the osteocutaneous fixation effect of the mandibular ligament.

The exact relationship between the jowl and the mandibular ligament has not been fully explained. An ongoing difficulty in understanding has been how to reconcile the surface anatomy, in which the front edge of the jowl appears to be well beyond the anterior border of the masseter, with the way this relates to the location of the mandibular ligament (Fig. 1).

Our dissections confirmed that the mandibular ligament is located immediately in front of the masseter's anterior border and also explained the reason for the difficulty in understanding. The "missing link" has been the failure to appreciate the exact location of the anterior border of the masseter on the mandible. There seems to be a widespread misunderstanding about the external form of the masseter based on the descriptions and depictions of the masseter in standard anatomy works and perpetuated in articles [2, 6, 17, 19]. The masseter is not simply a rhomboidal shape, as described, suggesting a linear anterior border, which is usual for the border of a muscle. Rather, the anterior border of the masseter is curved. This curvature is associated with the attachment of the masseter on the mandible extending 20 to 25 mm beyond where it usually is illustrated and "expected to be" (Fig. 4). This expectation is based on a linear projection from the more defined anterior border of the masseter's upper part. The forward extension of the masseter's lower part results in the triangle-shaped extension of the floor of the premasseter space, the jowl recess.

The consequences of the curved anterior border of the masseter include:

- The lower boundary of the premasseter space is longer than expected.
- The mandibular ligament is located significantly forward from where expected.
- The jowl extends forward on the mandible.
- The space is rhomboidal rather than rectangular.

### The Posterior Border and the Platysma Auricular Fascia

In the preauricular area, the posterior SMAS is thin, strong, and densely adherent to the underlying parotid fascia and the posterior part of the parotid-masseteric fascia. This adherent posterior part of the SMAS is a distinct entity, which Furnas [5] named the platysma auricular fascia (PAF). The PAF combines the part of the SMAS layer between the ear cartilage and the posterior edge of the platysma as well as the extensive deep fixation. As such,

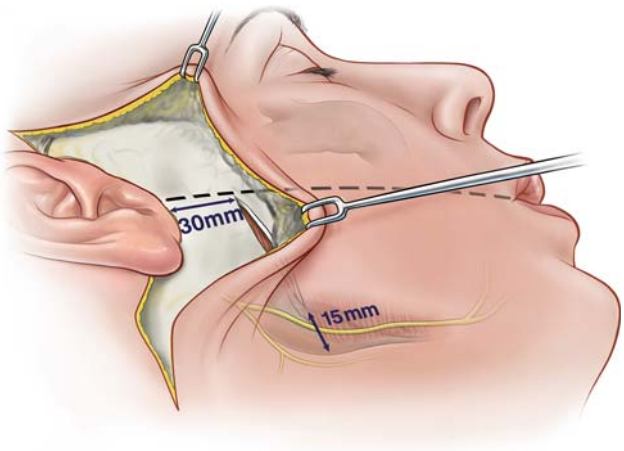


**Fig. 8** Clinical application for SMAS surgery. (1) The subcutaneous flap elevation of 30 mm allows an anterior location of the vertical SMAS incision, which should be over the roof of the premasseter space just beyond the posterior border. (2) The inferior extent of the SMAS incision is discontinued 15 mm above the mandibular rim, comfortably superior to the mandibular branch of the facial nerve (where it courses on the masseter under the mobile inferior boundary)

the PAF is unique and an important part of the ligamentous support system of the face.

The traditional preauricular location of the SMAS incision is at the posterior part of the PAF, from which the SMAS is elevated off the PAF. What had not been recognized previously is that the ease of anterior sub-SMAS dissection is due to the existence of a defined space anterior to the PAF. This has major implications because dissection within the space allows the surgeon to advance the dissection quickly and with assurance, secure in the knowledge that the facial nerve branches are outside the space.

There is no advantage to performing the usually difficult dissection of the posterior SMAS off the PAF. This step can be completely avoided without any compromise of result by moving the location of the vertical SMAS incision 25 to 30 mm beyond the preauricular groove, to where it is beyond the PAF (the fixed SMAS) (Fig. 8). The incision can now be placed through the mobile SMAS where it forms the roof of the premasseter space. It is inherently easier to elevate the SMAS where it overlies a space rather than where it is fixed.

## The Inferior Border and the Mandibular Branch of the Facial Nerve

The inferior boundary, in contrast to the upper boundary, is flexible because of its mesentery-like nature without any supporting ligaments between the posterior boundary and the mandibular ligament. Functionally, the absence of firm fixation allows the inferior border of the space to glide during jaw opening. The histologic finding of an elastic component within the roof membrane correlates with the clinical observation of the roof's mobility in relation to the jaw function. This anatomic arrangement is significant in predisposing to the formation of the jowl.

The mandibular branch has an inherent mobility as it travels forward in relation to the membranous inferior boundary of the space (Fig. 3). The mobility of this branch is "protective" and may explain the reported variability in the location of this nerve in previous studies [3].

The mandibular branch is at potential risk when the traditional preauricular SMAS incision is used, but this risk is essentially avoided with the anterior SMAS incision. Two fundamental anatomic factors account for this. The first relates to the location of the upper mandibular branch, behind the space within the firmly attached tissue of the PAF. The anterior SMAS incision is located overlying the space, beyond where the mandibular branch is within the PAF.

The second anatomic factor contributing to safety is the mobility of the inferior border of the premasseter space. When the traditional posterior SMAS incision is used, it is extended inferiorly behind the angle of the mandible to where the SMAS and platysma are adherent to the sternomastoid fascia. In contrast, when the anterior SMAS incision is used, it can be discontinued 15 mm above the lower border of the mandible, which is cephalad to the location of the upper mandibular branch (Fig. 8). There is no advantage to be gained by extending the anterior incision inferiorly as far down as the rim of the mandible. The mobility of the inferior boundary precludes the requirement for sharp dissection or forceful surgery in the vicinity of this border. The mobility of the platysma here and the ready displacement of the mandibular branch minimize the possibility of a traction neurapraxia. The lower mandibular and cervical branches, by contrast, remain posterior to the angle of the mandible to become well inferior to the mandible and outside the premasseter space as they travel forward on the underside of the platysma. As a result of the short anterior SMAS incision, the upper mandibular branch remains outside the operative field at all times.

## The Anatomy Medial to the Premasseter Space

This region narrows medially and is limited deep by the buccinator fascia as it extends to the modiolus and the depressor anguli oris passing to the corner of the mouth. In the upper part is the masticator space, which also undergoes changes with aging. In youth, the inferior extent of the masticator space is at about the level of the oral commissure and separate from the jowl recess of the premasseter space by an interval of 10 to 15 mm [9]. As the masticator space is affected by aging laxity, an inferior prolongation of the space develops, which passes superficial to the facial vein. This results in the lower edge of the buccal fat pad becoming positioned lower.

When significant aging changes are present, the buccal fat may extend down so low as to bulge into and distend the anterior boundary of the premasseter space (where it is angled obliquely forward above the jowl extension). Buccal fat in this area contributes to the heaviness of the labiomandibular fold and in cases of major descent also may contribute to fullness of the jowl (Fig. 6).

It is the laxity of the superficial fascia (platysma) where it overlies the jowl extension of the premasseter space immediately above the mandibular ligament that allows fullness of the labiomandibular fold to develop. This is different from the formation of the labiomandibular crease, which defines the medial extent of the fold and results from the line of fibrous adhesion between the fascia of the depressor anguli oris and the overlying dermis [15, 18].

Rejuvenation of the labiomandibular fold requires that the prolapsed buccal fat be corrected and the laxity of the

superficial fascia be tightened. For this to be comprehensive, there should also be a replication of the original masseteric ligament function, which is to maintain the superficial fascia in close proximity to the fascia on the anterior border of the masseter. Surgical access to the buccal fat and to the lax superficial fascia of this region can be obtained through the attenuated anterior border of the premasseter space. This is in contrast to the inferior boundary and the mandibular ligament, for which surgical release is not required.

### Relation of the Premasseter Space to Existing Techniques

It is a long-held belief that the subcutaneous plane of dissection used in a traditional facelift is preferable because it is easier, less traumatic, and safer. It is appropriate to reconsider this assumption given that the premasseter space is a natural cleavage plane immediately deep to the above and the platysma. It would seem more logical to use the premasseter space in the lower face because the plane of dissection already exists, inherently avascular and free of facial nerve branches.

It is now apparent that the effectiveness of those techniques using limited dissection of the lower SMAS, such as the MACS lift [21] and the recently described technique of simplified posterior platysma suspension [10], is due to the inherent mobility of the platysma (over the space and over the mandibular rim). The platysma redraping is so effective because of the absence of deep fixation, which obviates the need for preliminary undermining.

The effectiveness and safety of the SMASectomy facelift technique [1] also are explained by the anatomic findings. The strip of excised SMAS is from the roof of the premasseter space in this area. The location of the excision over the space accounts for the inherent safety with regard to facial nerve risk because no nerve branches exist in the roof. The nearest branch (buccal) is under the floor. When the SMAS edges are approximated, the mobile tissues of the anterior roof of the space are advanced to the fixed PAF behind. The improvement in the laxity of the labiomandibular fold and jowl is secondary to the posterosuperior displacement of the mobile roof (to the extent permitted by intact masseteric cutaneous ligaments).

The term "mesomandibularis" was introduced with Hamra's [7] composite facelift. This structure is not the same as the mesenteric lower boundary of the premasseter space. With the composite procedure, the mesomandibularis is the surgical web separating two dissection planes [8]. Above the mandible, the sub-SMAS dissection is within the premasseter space, whereas a subcutaneous plane is used inferior to the mandible. The inferior boundary of the premasseter space remains uninterrupted by the dissection and within the "mesomandibularis." In other words, the term mesomandibularis is applied to a structure created by surgery that differs from the mesenteric inferior boundary, which is an inherent anatomic structure.

### Anatomic Basis for Fixation of Mobilized Flaps

An additional benefit of not dissecting the PAF is that a segment of firm, nonmobile SMAS remains for secure fixation of the surgically repositioned SMAS flap. Surgical experiences show that fixation sutures placed through the underside of the roof and the floor of the premasseter space are not prone to cutting through, although the lining structure is thin. This is explained by the histology, which shows the fibrous component of the membrane layer to be integral with the fibrous component of the platysma and masseter and thus not prone to delamination.

### Significance of the Premasseter Space in Anatomic Understanding

The definition of a sub-SMAS space in the lower face adds to the overall understanding of the facial structure. Previously, the temporal space was defined in the upper face and the prezygomatic space in the middle third [13, 16]. Adding the premasseter space in the lower third of the face completes a pattern. For the surgeon, these spaces provide an easy dissection to be sought for and used.

## Conclusion

A soft tissue space not previously described overlies the lower part of the masseter. The premasseter space is a "natural" cleavage plane directly underlying the platysma. The space is avascular and contains no vital structures. The facial nerve branches are outside the space. The upper mandibular branch of the facial nerve is within the mesenteric inferior boundary of the space.

In youth, the space is more potential than real, with the roof in apposition to the floor. With aging, the roof and the membranous inferior and anterior boundaries distend and become more lax, which results in the formation of the jowl and the labiomandibular fold.

These anatomic findings provide important surgical benefits. In surgical rejuvenation of the lower face and jowl, it may be preferable to operate through the "predissected" avascular premasseter space instead of dissecting within the overlying subcutaneous layer.

An anterior located SMAS incision is inherently safe with respect to the mandibular branches of the facial nerve. Further dissection of the SMAS flap needs only to be blunt and atraumatic, which further reduces concerns of injury to the mandibular branch. Correction of the jowl and the labiomandibular fold can be readily performed, with a faster postoperative recovery due to the minimization of bleeding and postoperative bruising.

**Acknowledgments** The authors thank the VIFM, the Donor Tissue Bank of Victoria, and the respective families. They also thank Associate Professor Jeffrey Kerr and Mr. Ian Boundy from the Department of Anatomy and Cell Biology, Monash University, Victoria; Ian Bouch from the Department of Anatomy, the University of Melbourne; Ian Tew from the Zimmer Institute; Robert Ang; and the Department of Experimental Surgery, Singapore General Hospital for their assistance in this study.

## References

1. Baker DC (1997) Lateral SMASectomy. Plast Reconstr Surg 100:509–513
2. Clemente CD (2006) Anatomy, a Regional Atlas of the Human Body. 5th ed. Lippincott Williams & Wilkins: Philadelphia, USA
3. Dingman RO, Grabb WC (1962) Surgical anatomy of the mandibular ramus of the facial nerve based on the dissection of 100 facial halves. Plast Reconstr Surg 29:266
4. Furnas DW (1989) The retaining ligaments of the cheek. Plast Reconstr Surg 83:11
5. Furnas DW (1994) The superficial musculoaponeurotic plane and the retaining ligaments of the face. In: Psillakis JM (ed) Deep Face-Lifting Techniques. Thieme Medical Publishers Inc.: New York, NY
6. Gray's anatomy. Williams, Warwick, Dyson, and Bannister (eds). 37th ed. Churchill Livingstone, 1989
7. Hamra ST (1992) Composite rhytidectomy. Plast Reconstr Surg 90:1
8. Hamra ST (2002) Surgical anatomy of the ligamentous attachments of the lower lid and lateral canthus: Surgical anatomy of the midcheek and malar mounds (discussion). Plast Reconstr Surg 110:900
9. Kahn JL, Wolfram-Gabel R, Bourjat P (2000) Anatomy and imaging of the deep fat of the face. Clin Anat 13:373–382
10. Labbe D, Franco RG, Nicolas J (2006) Platysma suspension and platysmaplasty during neck lift: Anatomical study and analysis of 30 cases. Plast Reconstr Surg 117:2001–2007
11. Little JW (2000) Three-dimensional rejuvenation of the midface: Volumetric resculpture by malar imbrication. Plast Reconstr Surg 105:267–285
12. Mendelson BC (2002) Surgery of the superficial musculoaponeurotic system: Principles of release, vectors, and fixation. Plast Reconstr Surg 109:824–825
13. Mendelson BC, Muzaffar AR, Adams WP Jr, (2002) Surgical anatomy of the midcheek and malar mound. Plast Reconstr Surg 110:885
14. Mitz V, Peyronie M (1976) The superficial musculoaponeurotic system (SMAS) in the parotid and cheek area. Plast Reconstr Surg 58:80–88
15. Morales P (2000) Repeating rhytidoplasty with SMAS, malar fat pad, and labiomandibular fold treatment: The NO primary procedure. Aesth Plast Surg 24:364–374
16. Moss CJ, Mendelson BC, Taylor GI (2000) Surgical anatomy of the ligamentous attachments in the temple and periorbital regions. Plast Reconstr Surg 105:147
17. Netter FH (1997) Atlas of Human Anatomy. 2nd ed. Novartis Medical Education: New Jersey
18. Pessa JE, Garza PA, Love VM, Zadoo VP, Garza JR. (1998) The anatomy of the labiomandibular fold. Plast Reconstr Surg 101(482):48–6
19. Snell RS (2003) Clinical Anatomy. 7th ed. Lippincott Williams & Wilkins: Philadelphia
20. Stuzin JM, Baker TJ, Gordon HL (1992) The relationship of the superficial and deep facial fascias: Relevance to rhytidectomy and aging. Plast Reconstr Surg 89:441
21. Tonnard P, Verpaele A, Monstrey S, et al. (2002) Minimal access cranial suspension lift: A modified S-lift. Plast Reconstr Surg 109:2074
22. Webster's Third New International Dictionary. Merriam-Webster, Massachusetts, June 2002