Anatomy of the Facial Glideplanes, Deep Plane Spaces, and Ligaments: Implications for Surgical and Nonsurgical Lifting Procedures

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Background: The soft-tissue glideplanes of the face are functionally important and have a role in facial rejuvenation surgery. The aim of this study was to improve understanding of soft-tissue mobility of the face and its effect on the redraping of tissues involved in face lifting. The consequences of no-release and extensive-release lifting were analyzed to explain the difference in efficacy and potential longevity between these 2 contrasting philosophies.

Methods: Preliminary dissections and macrosectioning were followed by a definitive series of standardized layered dissections on 50 cadaver heads, along with histologic analysis, sheet plastination, and mechanical testing.

Results: The previously described spaces are potential surgical dissection planes deep to the superficial fascia layer. The classically described retaining ligaments are local reinforcements of a system of small retaining fibers (retinacula cutis and deep retinacula fibers) that provide support to the soft tissues of the face and neck against gravitational sagging while allowing certain mobility. This mobility is used when mobile tissues are lifted without surgical release. However, the process of dragging up these fibers results in a loss of their previous antigravitational, supportive orientation.

Conclusions: No-release lifting techniques, such as thread lifts and minimal-invasive face lifts, tighten tissue laxity with a change of the gravity-opposing tissue architecture, placing the weight of the flap solely on the fixation, which limits longevity of the lift. The alternative—full release with redraping—enables reattachment of the flap to a higher position, with preservation of the original deep fascial architecture with its antigravity orientation and natural mobility, conceivably improving the longevity of the lift. *(Plast. Reconstr. Surg.* 154: 95, 2024.)

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We won't claim that miracles can be achieved with a piece of extensive thread 'anchored' to a bit of subcutaneous fat! We truly love this profession and, therefore, believe it correct to use only tangible and stable procedures based on indisputable anatomo-pathophysiological and clinical evidence that can constantly guarantee satisfactory results, and will not wear off in a short period of time.

—Giovanni Botti and Mario Pelle-Ceravolo, *Midface and Neck Aesthetic Plastic Surgery*, 2012

Disclosure statements are at the end of this article, following the correspondence information.

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Repetitive movement of the face, in the presence of gravity, is the principal factor in the pathogenesis of age-related soft-tissue laxity and ptosis.[1] This contributes to the aged face appearance, with its characteristic stigmata such as temporal hooding, nasolabial folds, jowls, and anterior neck laxity. Facial movement related to the functions of mastication, expression, and communication depends not only on muscle action, but also on the presence of glideplanes that allow this movement.

Central to the understanding of tissue mobility are the soft-tissue spaces beneath the mimetic muscles that allow gliding movement.[2] These soft-tissue spaces were described as "anatomically 'predissected' glideplanes while retaining ligaments separate the spaces."[3] This concept gained widespread acceptance despite some criticism.[4] Eight sub–superficial musculoaponeurotic system (SMAS) spaces have been described.[5–11] Since the original 1989 description of the retaining ligaments by Furnas,[12] several additional ligaments have been described, and some have been redefined (Fig. 1).[5,13–29] A recent reevaluation of the fascial layers of the face has indirectly challenged this spaces and ligaments concept.[30,31] This study was undertaken to expand the understanding of soft-tissue mobility, including the natural glideplanes and soft-tissue spaces.

A new categorization of face-lifting techniques has been introduced: no-release versus extensive-release lifting techniques (Table 1). The mechanical consequences of both categories were studied. The information obtained from this study was applied to explain the differences in efficacy and longevity between these different approaches.

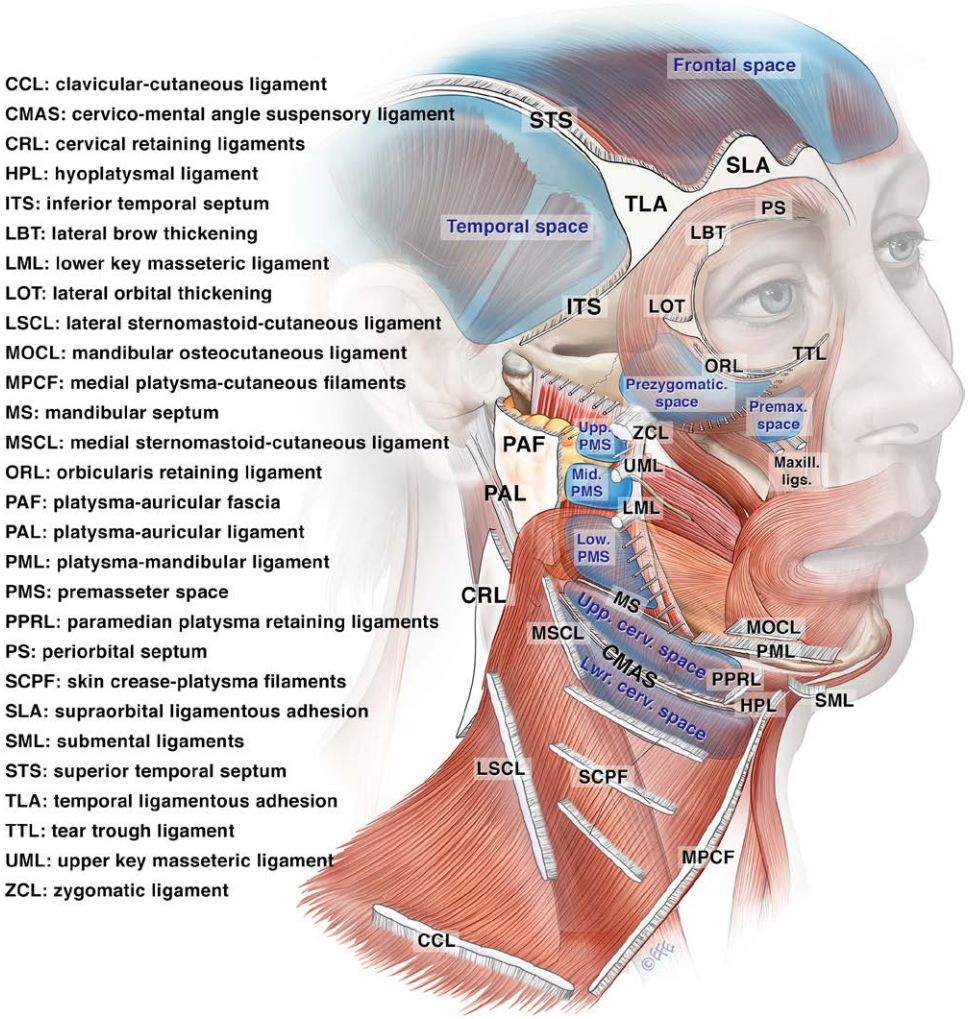


Fig. 1. The traditional understanding of the spaces and retaining ligaments as originally described. Most spaces were described to be bordered by ligamentous boundaries. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

Table 1. No-Release versus Extensive-Release Lifting Techniques[a]

Area	No Release	Extensive Release
Subcutaneous (layer 2)	Thread lift, S lift, J lift, MACS lift, lateral SMAS-plication	Level 2a: gliding lift; level 2b: ESP lift
Deep to superficial fascia (level 4)	SMASectomy	High SMAS, deep plane
Deep to deep fascia (layer 6)	NA	Subperiosteal, subfascial

ESP, extended supraplatysmal plane; MACS, minimal access cranial suspension; SMAS, superficial musculoaponeurotic system.
[a]No-release lifting techniques, such as minimally invasive or noninvasive lifts, use the existing soft-tissue mobility among the natural glideplanes to lift the anterior face, without release of any retaining ligaments. In contrast, the more invasive extensive-release lifts work by surgically separating 2 fascial layers by releasing the retaining ligaments in between. Subsequently, the released superficial layer is fixed to a higher position relative to the deeper layer, without directly using the mobility of the underlying fascia.

MATERIALS AND METHODS

Ethical approval for the project was granted by the human ethics advisory groups of the University of Melbourne for the feasibility study and the Queensland University of Technology for the definitive study (project nos. 14243 and LR 2021-4306-4761, respectively).

Based on the feasibility study of 15 embalmed and 6 fresh-frozen cadavers (n = 21; 10 male, 11 female; mean age, 76 years), a definitive study was conducted on an additional 27 cadavers. A series of standardized dissections was performed on 1 embalmed and 13 fresh (nonfrozen) cadavers (8 male, 6 female; mean age, 80 years; body mass index, 25.5). On the first side of 6 cadavers, a surgical composite deep-plane face lift dissection was performed to establish the surgical presentation of the facial spaces and ligaments; on another 6 cadavers, a no-release lift was performed along with histologic analysis of the change in architecture.[3] On the contralateral side of all, a previously described methodologic sharp layered dissection technique was used to investigate the amount of gliding or mobility of each of the facial soft-tissue layers in different areas.[30] In addition, areas of relatively increased or decreased attachment were noted on the superficial surface and subsequently of the deep surface of the mimetic muscle layer (layer 3).

Objective technical investigations were used to complement the dissection findings:

- Histologic images of full-thickness macrosections were studied on 10 cadavers to investigate the microanatomy of glideplanes and ligaments.[32] In addition, the difference between a hanging cheek versus a no-release lifted cheek was studied histologically in 6 hemifaces.
- Sheet plastination of the head and neck of 10 fresh cadavers was processed by von Hagens plastination in the axial, sagittal, and coronal planes using the latest technique (4 male, 6 female; mean age, 67 years).[33]

RESULTS

Mobility and Glideplanes

In contrast to traditional descriptions of a separate anatomic layer 4, containing spaces and ligaments and providing gliding, no separate layer 4 can be distinguished from the deep fascial layer 5 by anatomic dissection, histologic analysis, or sheet plastination. Apart from local exceptions in the midcheek, the mimetic muscles (layer 3), where present, separate the subcutaneous fat of the superficial fascia (layer 2) from the deeper fat within the deep fascia (layer 5). The connective tissue of the superficial fascia features fibrous retinacula cutis that are oriented perpendicular to the skin as they connect the mimetic muscles to the skin, and inherently have limited mobility. In contrast, the connective tissue of the deep fascia features deep retinacula fibers that are oriented largely parallel to the skin in an arrangement of multi-lamellated sheets. Because of this arrangement, deep fascial movement is a multiplanar phenomenon: a minor amount of gliding between adjacent sheets adds up to significant range of motion with a collective of sheets. (**See Video [online]**, which demonstrates the mobility of the deep fascia in the area of the premasseter space.) The deep fascia usually features fat interspersed between the sheets (fibrofatty), whereas in the specialized areas of the spaces, these sheets are closely stacked without fat interspersion (mille-feuille–like) (the term mille-feuille is French for "1000 petals or sheets," referring to the layering of pastry, the effect of which in pastry is to be airy and light).

Qualitative mechanical testing of the deep fascial layer demonstrated that the direction of movement provided by the deep fascia multilamellated sheets is specific, to allow the necessary movements while preventing unnecessary movements. In a standing position, the multilamellated sheets support the superficial soft tissues against gravitational pull, as was confirmed by histologic analysis and sheet plastination. In

addition to providing antigravitational stability, this connective tissue allows certain mobility until maximal tension is reached, thereby limiting further movement (Fig. 2).

The mobility provided by the deep fascial connective tissue allows lifting of the overlying tissues without surgical release because of the inherent mobility, especially in the anterior midcheek and neck. However, doing so results in a pulled state of the tissues, associated with an immediate lack of normal functionality of the deep fascial structure. In this situation, normal soft-tissue movements of the face and neck are somewhat restricted (eg, wide opening of the mouth).

Spaces

The spaces of the face, previously described by our group as part of a distinct anatomic layer 4, are not true anatomic spaces as, for example, the pleural space. The so-called spaces are potential dissection planes between 2 laminae of the mille-feuille–like areas of the deep fascia (layer 5), which readily opens by blunt dissection, in contrast to the surrounding fibrofatty

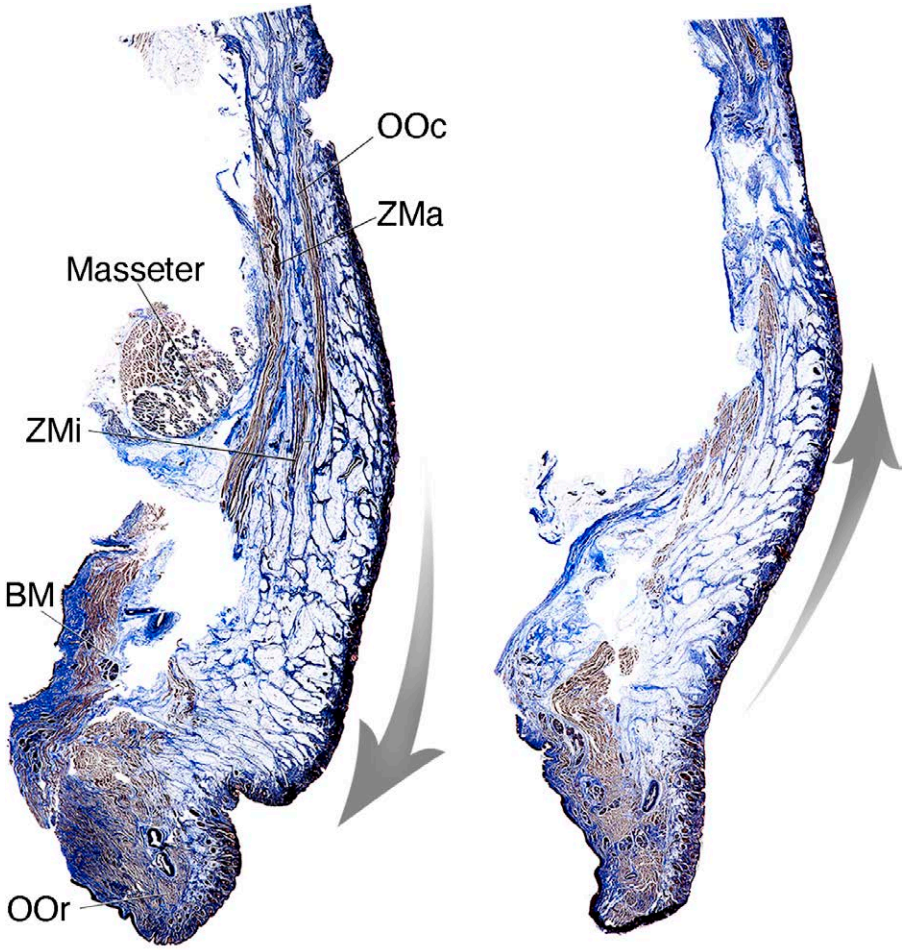


Fig. 2. Histologic images of the cheek demonstrating how "no-release" lifting is possible because of the inherent mobility of the face. Histologic image before (*left*) and after (*right*) a midcheek lift by a prezygomatic space dissection in which the area antero-inferior to the zygoma remains nonreleased. This figure represents the result of a no-release lift of the anterior cheek, as applicable to face-lifting techniques that do not release the tissues anterior to the masseter and zygomatic bone, including thread-lifting. Before the lift (*left*), the connective tissue is oriented in a supportive hanging-down arrangement that opposes gravitational pull. After the lift (*right*), the connective tissue is oriented in a pulled-up arrangement that no longer opposes gravity. The weight of the flap is now supported only by the fixation (see also Fig. 9). *BM*, buccinator muscle; *OOc*, orbicularis oculi muscle; *OOr*, orbicularis oris muscle; *ZMa*, zygomaticus major muscle; *ZMi*, zygomaticus minor muscle.

connective tissue of the regular regions of deep fascia (Fig. 3). The depth of dissection can be determined by the surgeon, while the resulting borders of the surgically created space will be consistent, determined by the extent of this mille-feuille deep fascia.

The loose areolar tissue areas (potential spaces) exist in several areas in the face: the premasseter, prezygomatic, premaxillary, temporal, and occipitofrontal. Each of these areas allows mobility in different specific directions:

- The lower premasseter space is situated over the lower muscular part of the masseter inferior to the level of the oral commissure and underlies a variable extent of platysma (Fig. 4). This area allows 2 related movements: (1) contraction of the masseter and platysma independent of each other and (2) lengthening of the masseter on lowering of the mandible, unrestricted by the overlying soft tissues, to open the mouth for mastication and in speech. The previously described middle and lower premasseter spaces are functionally not separate spaces but can be dissected individually. The middle space overlies the lowest part of the aponeurotic portion of the masseter and to a degree accommodates the premasseter extension of the buccal fat pad.
- The prezygomatic space lies between the pars orbitale of the orbicularis oculi and the body of the zygoma. The space allows concentric movement of the orbicularis oculi with the overlying malar fat pad to provide additional tissue mobility in the event of a forceful lid closure to protect the eye (Fig. 5).
- Further medially, the premaxillary space lies between the medial part of the pars orbitale of orbicularis oculi and the levator labii superioris muscle to allow independent movement between the lower lid and the upper lip.
- The temporal space overlies the upper part of the deep temporal fascia and underlies the temporoparietal fascia (superficial temporal fascia [STF]), which includes the vestigial fan-shaped auricularis anterior, superior, and posterior muscles. The space allows mobility between the temporalis muscle moving in the superoinferior direction while the auricularis muscles contract in a centrifugal direction from their auricular insertion to their temporal crest origin (Fig. 1). This area is bordered superiorly by the superior temporal septum (STS) and inferiorly by the inferior temporal septum (ITS).

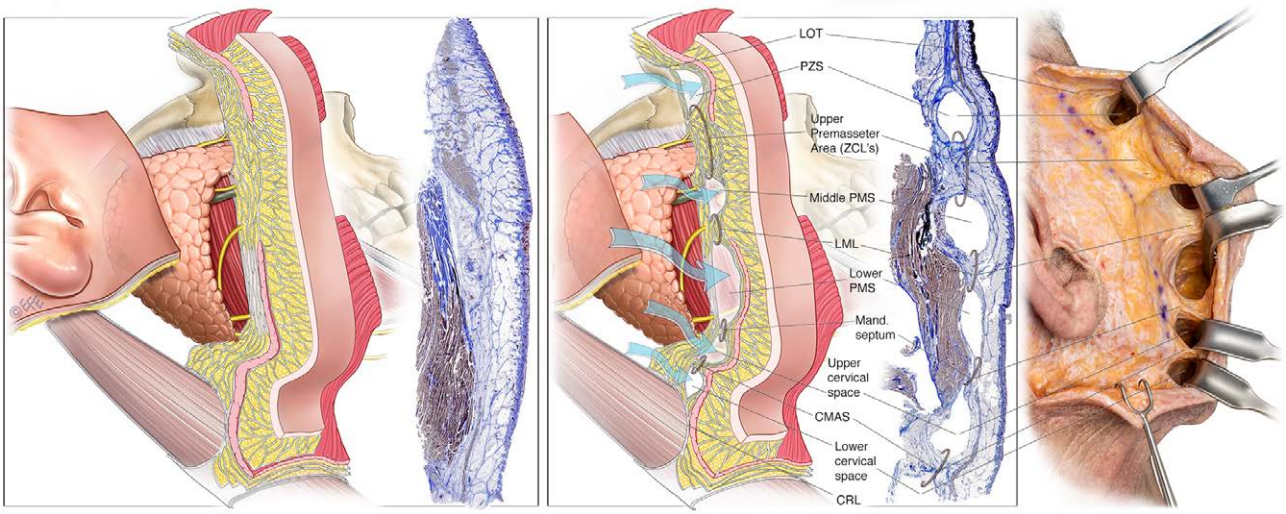


Fig. 3. Development of the surgical spaces within the horizontally oriented connective tissue of the deep fascia superficial to the level of the facial nerve. To visualize the spaces as described in the literature, the relevant areas must be dissected. This requires understanding of the location and blunt-dissection technique, to expand the potential spaces into surgical entities. (*Left*) Undissected concept and histologic image. (*Center*) Dissection into the superficial layer of the deep fascia (*blue arrows*) bluntly opens the potential spaces. (*Right*) Dissection image, with retractors lifting the roof of the expanded spaces. *CMAS*, cervico-mental angle suspensory ligament; *CRL*, cervical retaining ligaments; *LML*, lower masseteric ligaments; *LOT*, lateral orbital thickening; *PMS*, premasseter space; *PZS*, prezygomatic space; *ZCL*, zygomatic ligaments. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

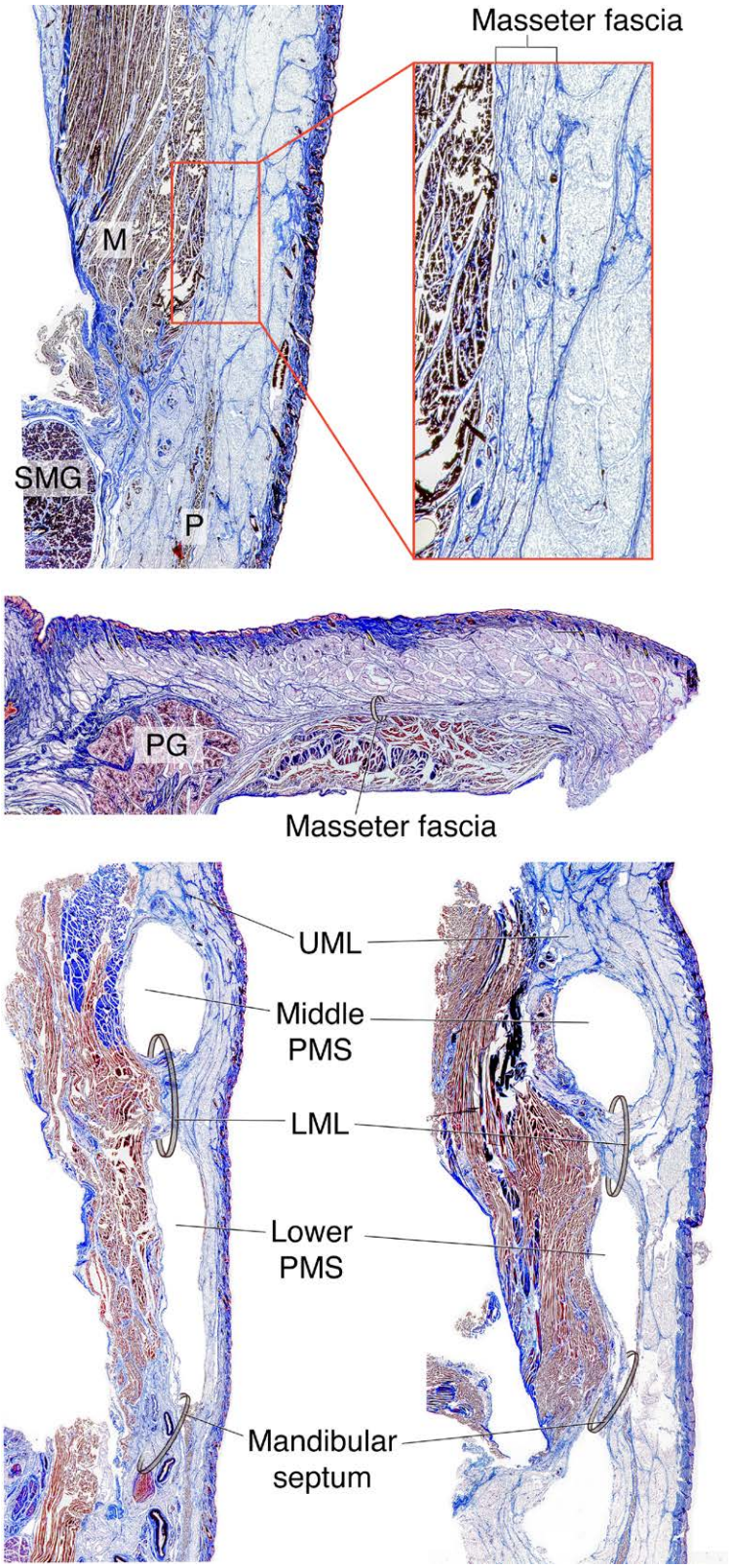


Fig. 4. Histologic analysis of the premasseter space before and after surgical dissection. (*Above*) Vertical histologic images of the premasseter space before opening, demonstrating the mille-feuille–like organization of the deep fascia in this area. Note how the platysma in this case (*Continued*)

- Underlying the occipitofrontalis muscle is a gliding occipitofrontal space that allows movement of the eyebrows and the forehead. This area starts at the supraorbital ligamentous adhesion (SLA) and temporal ligamentous adhesion (TLA) and continues over the cranium down to the superior nuchal line of the vertex.

Retaining Ligaments

All superficial tissues are connected to the deeper tissues by fascial connective tissue. The skin is connected to the mimetic muscles and the deep fascia by retinacula cutis within the subcutaneous fat of the superficial fascia (layer 2); the superficial fascia including the mimetic muscles are connected to the deeper structures by deep retinacula of the deep fascia (layer 5).[30] These retinacula fibers are dispersed throughout the entire face, not only in the locations of the retaining ligaments.

Two types of ligamentous attachments—real retaining ligaments (not necessarily osteocutaneous) and adhesion zones—are present in the face; the other ligaments are classified as pseudoligaments (surgical artifacts).

- Retaining ligaments could be considered dense collections of deep retinacula, which make them stand out against the surrounding tissues. Being more substantial, they are encountered using any type of dissection (sharp or blunt) and are seen on histologic images and occasionally on sheet plastination. The periorbital ligaments, including the lateral orbital thickening, orbicularis retaining, and tear trough ligaments, as well as the main zygomatic ligaments and lower key masseteric ligaments, are true anatomic retaining ligaments. The superior temporal septum is the origin of the auriculares muscles on the superior temporal crest just beyond the border of the temporalis muscle. The inferior temporal septum marks the inferior boundary of the temporal space and marks the zone where the nerve transitions from within the deep fascia of the midcheek (deep to the deep plane dissection) to within the innominate fascia of the temple (superficial to the deep plane dissection).
- Adhesion zones are larger areas where the mimetic muscle layer is adherent to the deep fascia or to the skin. Deep plane gliding cannot occur in these zones. A posterior adhesion zone and a perioral adhesion zone are present (Fig. 6). The posterior adhesion zone comprises (1) the platysma–auricular fascia (PAF), where the primitive platysma adheres to the preauricular parotid capsule; (2) the platysma–auricular ligament (PAL), where the primitive platysma adheres to the mastoid process; and (3) the cervical retaining ligaments (CRLs), where the platysma fascia adheres to (or fuses with) the sternocleidomastoid fascia as the platysma obliquely crosses superficial to sternocleidomastoid. The perioral adhesion zone comprises the adhesion of all layers from mucosa to the skin in the area around the mouth. Its boundaries are the alar base superiorly, the nasolabial crease and labiomandibular crease laterally, and the submental crease inferiorly. This includes the chin.
- Pseudoligaments (surgical artifacts) are areas featuring retinacula that are not stronger or denser than the surrounding connective tissue but can be isolated with a particular technique. They are not encountered with sharp layered anatomic dissection, nor are they visualized with technical investigations (histologic analysis and sheet plastination). Some pseudoligaments reflect the rigidity of the underlying structure to which the deep end of these retinacula cutis attach. An example of this is the mandibular ligament: the subcutaneous mandibular osteocutaneous ligament underlying the anterior portion of the jowl

Fig. 4. (Continued). does not reach high over the masseter, but nonetheless, the mille-feuille of the premasseter deep fascia is well developed. (*Center*) Axial histologic image demonstrating the mille-feuille organization of the masseter fascia. (*Below*) Dissection of the lower premasseter space over the muscular part (*red*) of the masseter and the middle premasseter space over the tendinous part (*blue*) of the masseter in an 87-year-old cadaver with a body mass index of 25. When the lower and middle premasseter spaces are developed separately, the appearance of the lower masseteric ligament is left in between. The dissection of 2 separate but parallel dissection tunnels with the use of a Trepsat dissector develops the upper and lower cervical spaces inferior to the lower premasseter space, with the cervicomental angle suspensory ligament in between the 2 tunnels in this 78-year-old cadaver with body mass index of 30. *LML*, lower key masseteric ligament; *M*, masseter muscle; *P*, platysma muscle; *PG*, parotid gland; *PMS*, premasseter space; *SMG*, submandibular gland; *UML*, upper key masseteric ligament.

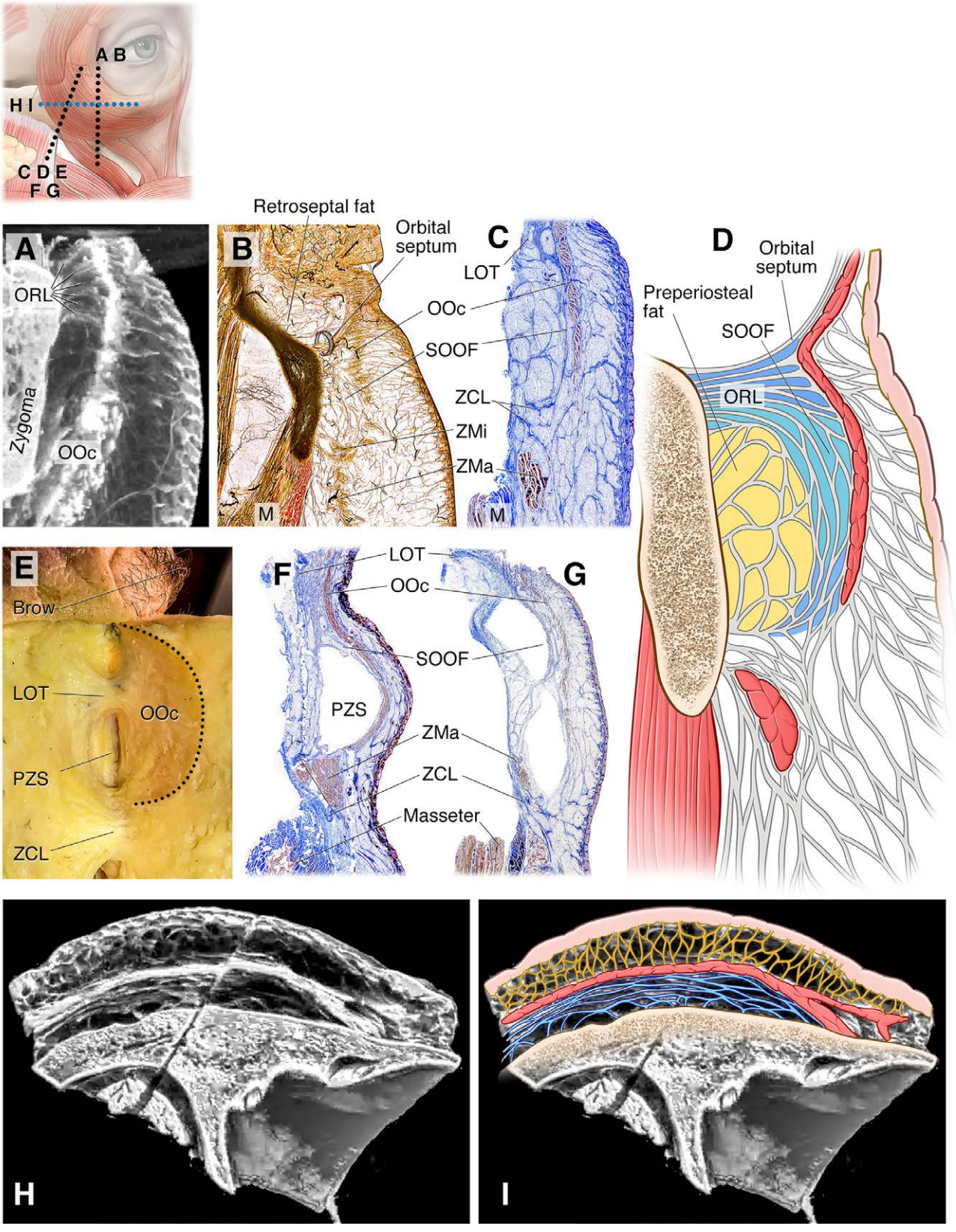


Fig. 5. The prezygomatic space (*PZS*) before and after surgical dissection. (*A*) Micro–computed tomography scan at the level of the lateral corneoscleral limbus. (*B*) Sagittal sheet plastination at the level of the lateral corneoscleral limbus. (*C*) Histologic view perpendicular to the skin from the lateral canthus directed toward the angle of the mandible before dissection (*Continued*)

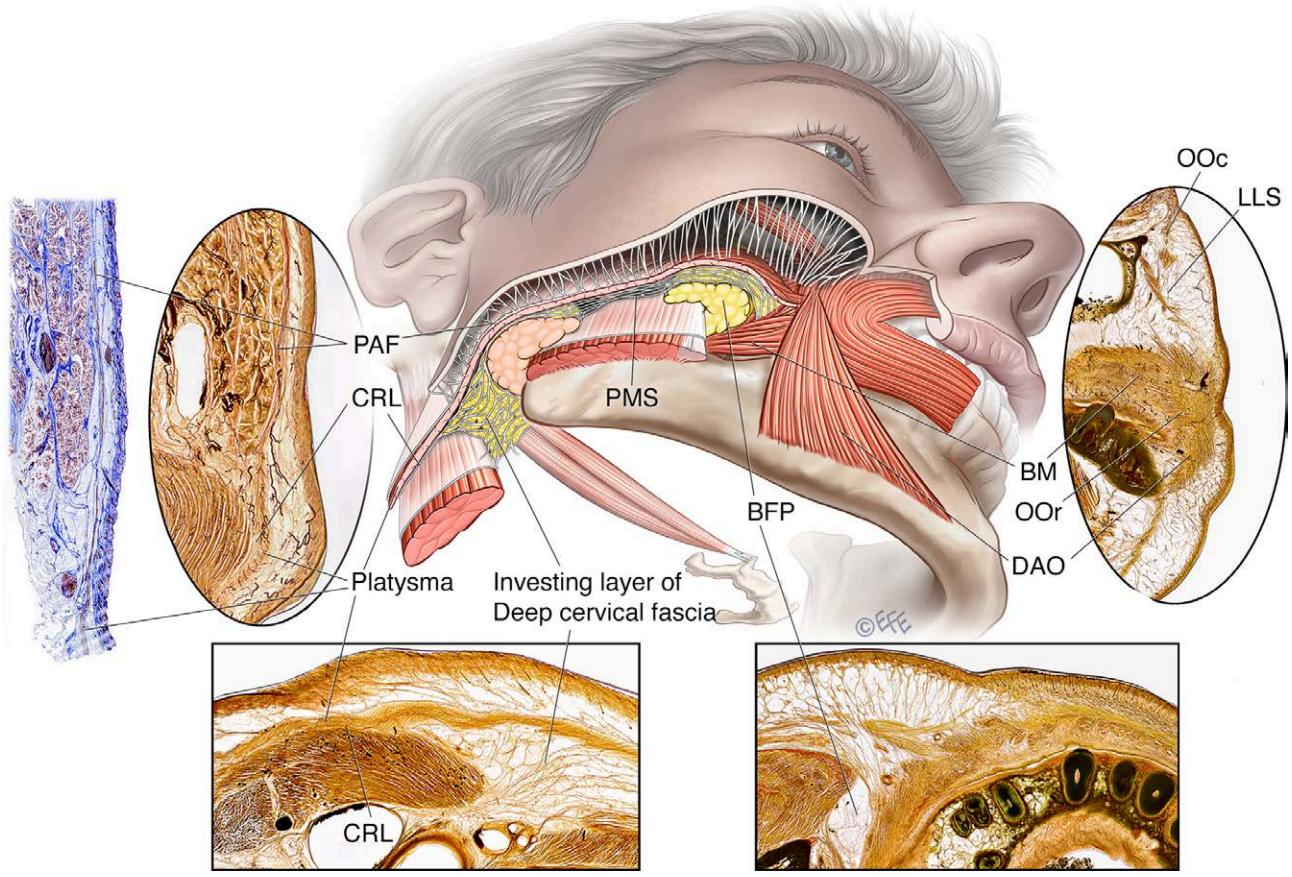


Fig. 6. The anatomy of the deep plane through a cut section from the upper lip to the neck. Areas of fibrofatty deep fascia, mille-feuille deep fascia, and adhesion zones (eg, cervical retaining ligaments [*CRL*]), constituting the potential surgical spaces (eg, pre-masseter space [*PMS*]), are adjacent to each other and define the ease of dissection of each specific area. Posterior adhesion zone with adhesion between platysma and parotid and sternocleidomastoid muscle. Perioral adhesion zone between dermis and perioral muscles. *BFP*, buccal fat pad; *BM*, buccinator muscle; *DAO*, depressor anguli oris muscle; *LLS*, levator labii superioris muscle; *OOc*, orbicularis oculi muscle; *OOr*, orbicularis oris muscle; *PAF*, platysma auricular fascia. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

Fig. 5. (Continued). demonstrates the suborbicularis-oculi fat (*SOOF*), which is situated between the orbicularis oculi muscle (*OOc*) and the preperiosteal fat and features mille-feuille organization in the shape of a half circle ranging from the orbicularis retaining ligament (*ORL*) to the zygomatic ligament (*ZCL*) to allow mobility of the overlying OOc. (*D*) Artistic illustration of the prezygomatic anatomy in vivo. (*E*) Dissection image and (*F* and *G*) histology slide of the same area after opening of the space. The first of these dissection–histology images (*F*) demonstrates the upper and lower boundaries of the dissection plane, defined by where the connective tissue connects to the periosteum of the zygoma, superiorly the ORL and inferiorly the ZCL. (*G*) However, dissecting 2 smaller tunnels under the OOc can result in an extra septum between the 2 surgical spaces. (*H* and *I*) Micro–computed tomography scan in the axial plane of the area, demonstrating the multilaminated structure underneath the OOc. *LOT*, lateral orbital thickening; *ZMa*, zygomaticus major muscle; *ZMi*, zygomaticus minor muscle. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

is simply the retinacula cutis attaching to the platysma, DLI, and DAO at their insertion on the mandible, while the anterior border of the jowl is the result of the direct insertion of these perioral muscles into the dermis, as described previously.[34,35] Some pseudoligaments mark the border of the easily dissected mille-feuille deep fascia (spaces) where further blunt dissection is limited by the fibrofatty deep fascia. An example of this is the mandibular septum, which marks the end of the mille-feuille premasseter space and the start of the fibrofatty investing layer of the deep cervical fascia. Some pseudoligaments mark where the deep fascia curves deeper instead of its usual horizontal orientation. An example of this is the vertical row of masseteric

ligaments at the anterior border of the masseter that appears this way because the masseter fascia follows the anterior border of the masseter to go deep to the buccopharyngeal fascia (Fig. 7). Because a deep plane dissection is within this deep fascia, the row of masseteric ligaments marks the border of the deep plane, anterior to which only a subcutaneous plane exists. Some pseudoligaments result from surgical blunt dissection within the regular fibrofatty deep fascia because blunt dissection in a connective tissue matrix causes compaction of the connective tissue toward the walls of the dissection, making these walls stouter and septum-like. Examples of this are the mandibular septum and the cervico-mental angle suspensory ligament.

DISCUSSION

The History of Facial Stability and Mobility

Skoog,[36] who was the first to access the deep plane surgically, concluded: "The undersurface of the platysma is not fixed to the deeper structures, and a potential space is present between the smooth fascia of the platysma and the external cervical fascia. This anatomic configuration allows the superficial layers to glide with the platysma over the deeper, fixed structures." With this report, the idea that a space existed beneath the mimetic muscles was born. An early attempt to explain the complex facial mobility by Mitz and Peyronie[37] in the 1970s investigated the mimetic muscle layer and its connections to the skin. The description of the SMAS detailed the connectivity within the superficial fascia to the skin, but not its gliding over the deeper tissues.

With the introduction of the retaining ligaments, Furnas[12] proposed that a select group of retaining ligaments provided the retaining function of the face, stating "they restrain the facial skin against gravitational changes," suggesting that the areas between the retaining ligaments did not help in retaining the overlying soft tissues. This hypothesis, which rapidly gained popularity in the plastic surgery community, went against the general anatomic principle in which countless small retinacula cutis fibers retain the superficial tissues to the deeper structures, as is the case in the rest of the body.[38]

With the description of spaces by Mendelson et al.[5] in 2002, the aforementioned hypothesis of facial areas without attachments was strengthened, with spaces being described as part of the human facial anatomy, evolved to allow mobility of the overlying mimetic muscles. The first space described was deep to the orbicularis oculi, which also marked the area of a black eye and a malar mound: "For the prezygomatic space to function to allow a gliding movement of the overlying orbicularis, the roof itself must be mobile and not directly attached to the underlying deep fascia."[5] Later, the lower, middle, and upper premasseter spaces and the premaxillary space were described, followed by the deep pyriform space.[6–10] Recently, superior and inferior cervical spaces have been proposed.[11]

Pessa[4] criticized the concept of the spaces in 2016, stating that these spaces do not fulfill any of the following criteria for real anatomic spaces: (1) contain well-defined anatomic structures, (2) act as a pathway for the spread of infection, and (3) must have the capacity to expand and become a true space in the presence of edema, infection, or hematoma.[39,40] Instead, Pessa[4] argued that the facial spaces fulfill the criteria of dissection planes: (1) devoid of well-defined anatomic structures to allow dissection pathway, (2) not observed to serve as pathways for infection, and (3) do not become true spaces and expand unless surgically altered. These criteria independently add validity to these surgical dissection planes.

The Deep Plane Explained

In the layered system of the face, the layer deep to the superficial fascia and the mimetic muscles is the deep fascia.[30,31] Level 4 is essentially a potential dissection plane within the deep fascia, which, when dissected, opens readily at the areas of the mille-feuille surgical spaces and less readily elsewhere. Unless surgically opened, level 4 and spaces are not present as part of the human facial anatomy. Moreover, the deep fat compartments are not distinct from the deep fascia layer: they are simply local areas of increased fat interspersion.[30] Instead, the entire deep fascia features deep retinacula connecting the SMAS-platysma to the deeper structures, while also allowing significant mobility.[41]

Based on these findings, it is proposed to abandon the notion of true anatomic spaces (spaces that are present in vivo) and replace it with surgical spaces (potential dissection planes), thereby stressing the role of the multi-lamellated sheets of loose areolar tissue in surgical orientation and dissection. It is imperative to dissect at the correct depth within the deep fascia to protect the facial nerve. As the facial nerve travels within the deeper segment of the deep fascia in the cervical

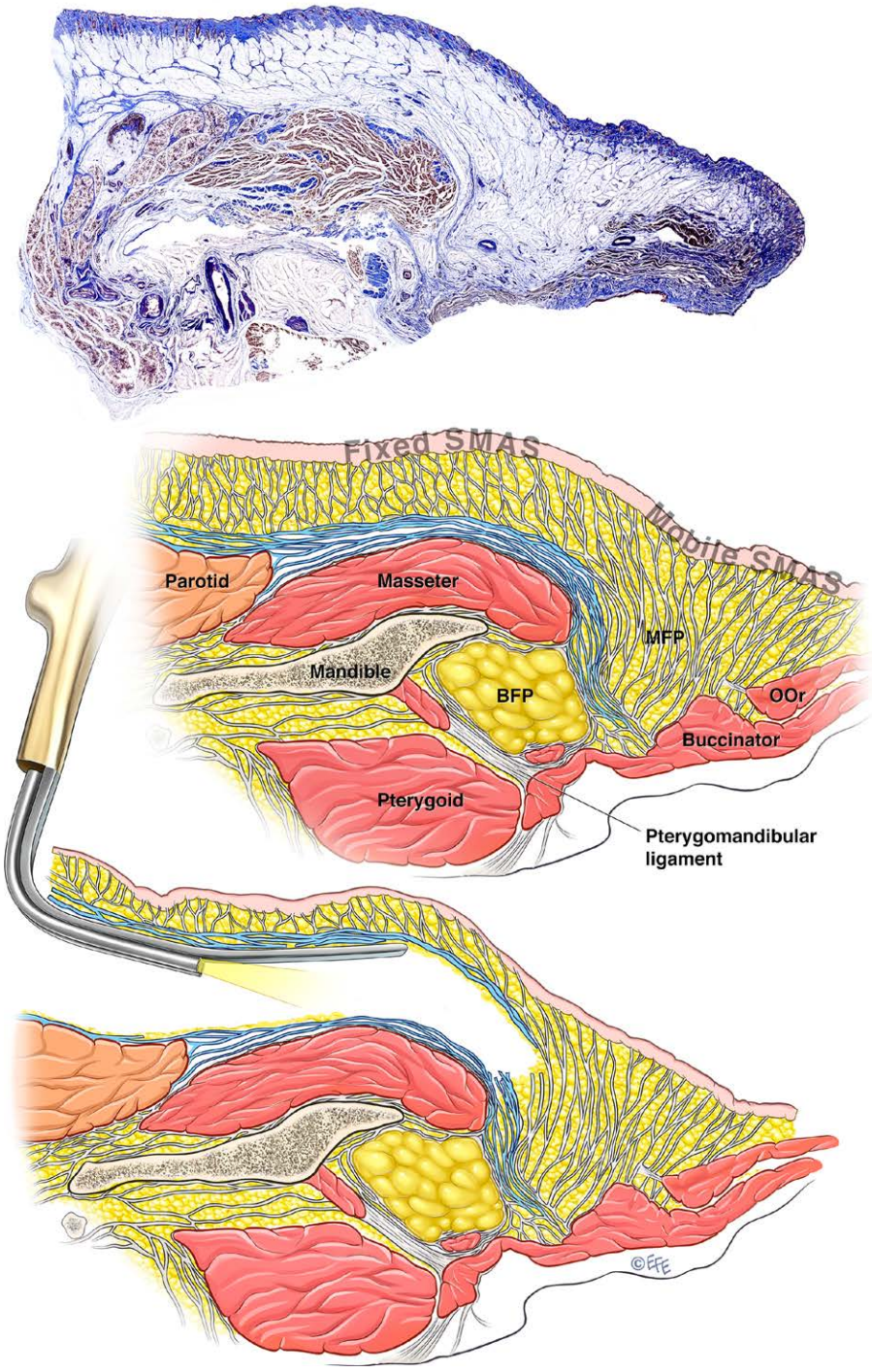


Fig. 7. Histologic image and accompanying illustration of an axial section demonstrating the premasseter anatomy and the transition from fixed SMAS over the masseter to mobile SMAS anterior to the masseter. For descriptive purposes, the deep fascia was enlarged in the illustration. Instead of a row of masseteric ligaments at the anterior border of the masseter separating these 2 regions, a surgical dissection needs to transition from the deep plane within the deep fascia (layer 5) to the subcutaneous plane that is in the malar fat pad (layer 2). It is this transition that creates the appearance of a row of ligaments here. *BFP*, buccal fat pad; *MFP*, melo fat pad; *OOr*, orbicularis oris muscle. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

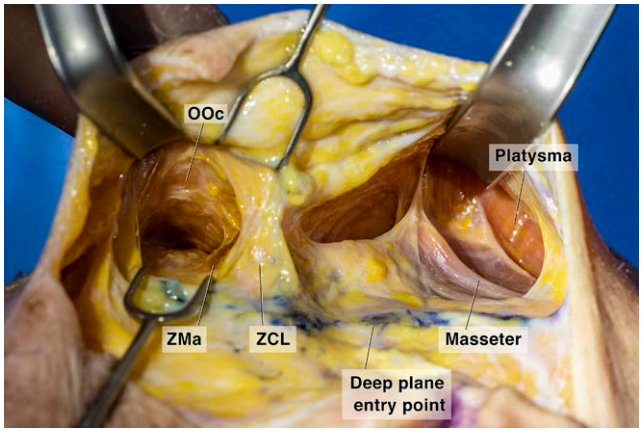


Fig. 8. Right side of a fresh cadaver demonstrating the dissected prezygomatic space and the premasseter space. The zygomaticus major can be exposed in the inferolateral floor of the prezygomatic space, which, following its superficial surface, aids safe dissection into the anterior midcheek. The platysma can be visualized in the premasseter space, which, following its deep surface, aids the safe dissection into the neck. These spaces are separated by an area of increased adhesions, including the zygomatic ligaments (*ZCLs*) in between. *OOc*, orbicularis oculi muscle; *ZMa*, zygomaticus major muscle.

and premasseter areas, a dissection in the superficial part of the deep fascia layer is warranted; as the facial nerve travels in the more superficial segment of the deep fascia in the prezygomatic, temporal, and frontal area, a dissection in the deep aspect of the deep fascia layer is warranted.[30] The prezygomatic space and the premasseter spaces are especially important deep-plane entry points that allow a safe judgment of the correct depth of dissection (Fig. 8). The prezygomatic space allows safe identification of the origin of the zygomaticus major muscle, providing a safe path to the midcheek, while the premasseter space allows the safe identification of the platysma muscle, providing a safe path into the neck.

Retaining ligaments can serve as landmarks during surgery as they tend to stand out from the surrounding tissues regardless of the dissection technique used. Pseudoligaments (surgical artifacts) provide less to no guidance as they can be created by blunt dissection in variable locations. It is important to understand these nuances during face-lift surgery.

Early Recurrence after No-Release Lifting Techniques

No-release lifting techniques can obtain a quick and effective lift in the short term. A prime example is the thread lift, which is placed in the most superficial part of the subcutaneous tissues and can hence profit from mobility not only of the subcutaneous plane, but also of the mimetic muscle, and deep fascia planes to lift the tissues. Experience has taught that no-release lifting techniques do not yield as long-lasting results as do extensive-release techniques, although this has only been investigated and hence proven for thread lifts.[42–44]

The structures of the deep and superficial fasciae explain how only areas undermined obtain true tissue redraping. No-release lifting results in a pulled upward tensioned state, as explained previously. Lifting unreleased tissues reorients the retinacula from a downward-hanging into an upward-pulled position (Fig. 9). In this position, the fibers are unable to exert their antigravitation function. The weight of the lifted tissues therefore becomes dependent on the sutures keeping the lifted tissues in place. Stress on the sutures by gravity, but also by mastication and head and neck movements, will cause cheese-wiring of these sutures as well as stretching of the pulled superficial tissues and skin until the retinacula are back into their original oblique-down (anatomic) position, resulting in early recurrence of tissue laxity.

Surgical release and lift, on the other hand, brings the superficial layer to a higher position relative to the deeper layer (ie, a positional change between 2 sheets of the mille-feuille), which only need to be held in place by sutures until postoperative healing has occurred. From the moment the superficial layer has reattached to the deeper layer (in a higher position), there will be no more need for a permanent suture to hold up the lifted tissues. Based on these mechanical principles, a complete undermining of the target area would provide the most longevity, even if a simple pull of the distal tissues without release could provide sufficient lift in the short term. Ultimately, it is up to the surgeon to find a balance between the extent of release on the one hand, and the vascular and nervous risks on the other hand.

This mechanical principle may be part of the explanation for the lateral sweep phenomenon after face-lift surgery: recurrence of the sagging of the medial (nonreleased) tissues while the lateral (released) tissues remain lifted.[45] The same principle of release-redraping is demonstrated in the subcutaneous plane by the recently reported gliding brow lift.[46] Our study provides arguments for wide release but not for the plane in which to perform the release. Suggestions that the SMAS can withstand larger forces without stretching as compared with the skin were not objectively verified.[47,48] While we are advocates of the deep plane

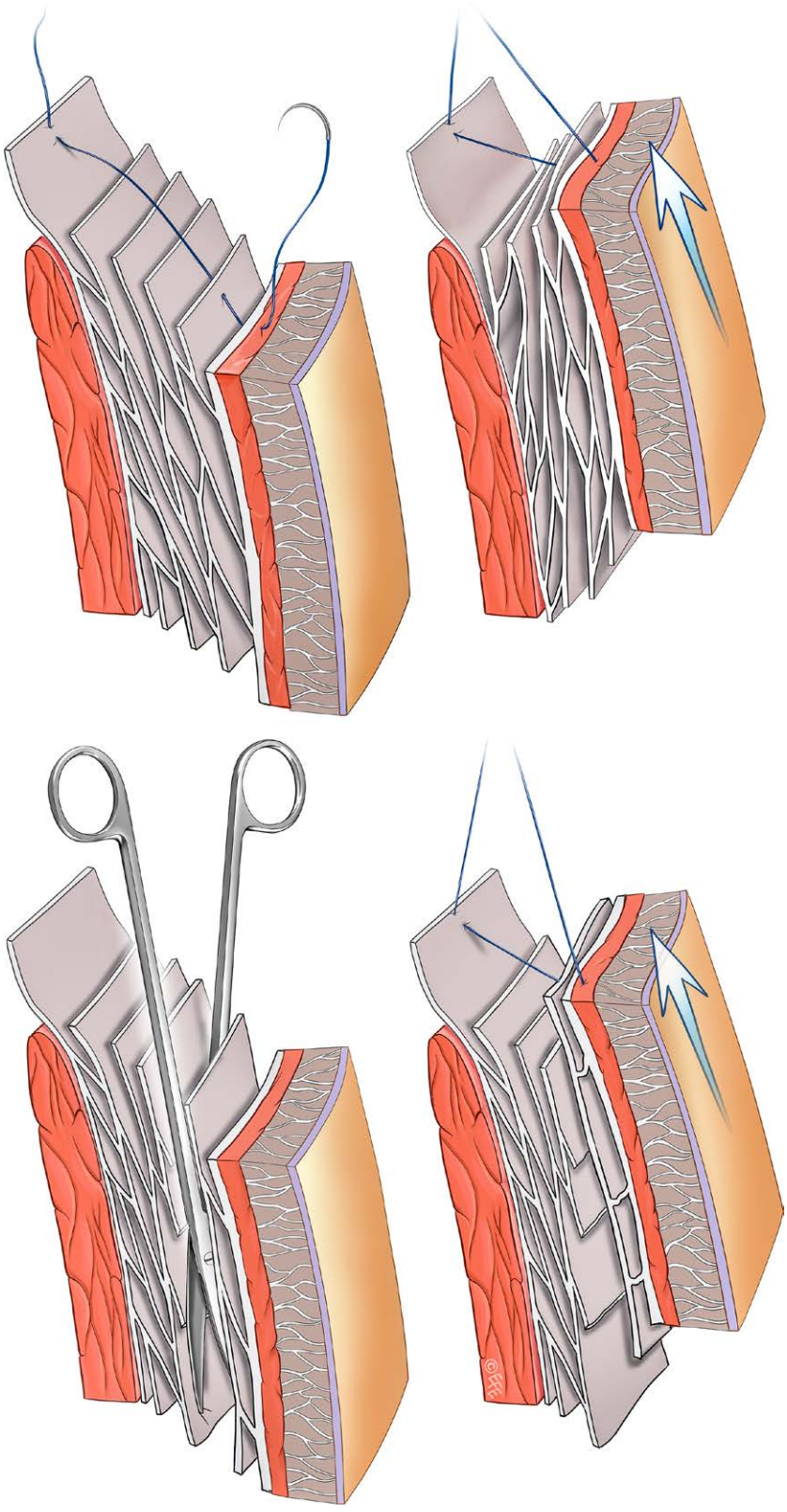


Fig. 9. The effect of a SMAS lift without release (*above*) and with release (*below*). (*Above*, *left*) Before lifting the flap, the deep retinacula are in an anatomic downward position opposing gravity. (*Above*, *right*) After lifting the flap, the deep retinacula are in a nonanatomic upward oriented position not opposing gravity. (*Continued*)

face lift, it is possible that more superficial dissection planes (eg, extended supraplatysmal plane, gliding plane) can yield similar results with a similar amount of release; that is, of course, if the soft-tissue volumes (eg, jowls, malar fat pad, buccal fat pad, submandibular glands, subplatysmal fat, anterior digastric muscles) are adequately managed separately.

CONCLUSIONS

The layer of spaces and ligaments, traditionally described as layer 4, is not a separate anatomic layer but a potential dissection plane in specialized areas of deep fascia (layer 5). The change in concept of spaces, from anatomic entities to safe potential dissection planes, stresses their importance in safe surgery through the multiplanar structure of the face.

The deep fascia connective tissue allows mobility of the superficial tissues of the face. Whereas these connections are usually fibrofatty, in some areas of the face, they have a mille-feuille aspect of multi-lamellated sheets that separate easily, which is where spaces have previously been described. The mobility of the deep fascia allows important functions, as well as lifting of superficial tissues without having to perform a wide release. However, although it may appear unnecessary to release these small fibers to obtain a significant lift of sagged facial tissues (eg, by performing a no-release lift), not releasing them results in a "pulled upward" architectural deep fascial tissue organization, in which position their antigravitational function is no longer being exerted. In this way, the tension is maintained only by the fixation, and not by reattachment of a released flap, which may explain the poor longevity of no-release lifting procedures. If longevity is pursued, the area that is lifted should be undermined and repositioned with minimal tension to allow the superficial tissues and deep tissues to reattach in a stable manner in the lifted position. However, a balance needs to be found between release (for longevity) and preservation (for safety) of the flap.

Fig. 9. (Continued). The weight of the flap will be on the fixation alone, compromising the longevity of the face lift result. (*Below*, *left*) In contrast, dissection of the deep plane releases the deep retinacula connecting to the SMAS. (*Below*, *right*) As a result, an unopposed lift and secondary reattachment of the retinacula is established upon healing, which then will continue their natural function opposing gravitational pull, providing for a stable and lasting result. Published with permission from Dr. Levent Efe. Copyright © 2023 Levent Efe, MD, CMI.

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DISCLOSURE

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COMPLIANCE WITH ETHICAL STANDARDS

Ethical approval for this project was granted by the Human Ethics Advisory Groups of the University of Melbourne for the exploratory study; the Queensland University of Technology for the definitive study, including histologic analysis and plastination; and the Yonsei University College of Medicine for the micro–computed tomography study (project nos. 14243, LR2021-4306-4761, and YSAEC22-004).

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