Modified Composite-Flap Facelift Combined With Finger-Assisted Malar Elevation (FAME): A Cadaver Study

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Abstract

Background: Inadequate release of retaining ligaments during facelift surgery may lead to an unnatural appearance. However, most facelift surgeons are hesitant in transecting these ligaments to avoid possible injury to facial subbranches.

Objectives: In the authors' surgical practice for modified composite flap rhytidectomy, the authors employed the finger-assisted malar elevation (FAME) technique in order to enable safe release of the zygomatic cutaneous ligaments through the prezygomatic space under direct vision. The aim was to evaluate the anatomical basis and safety measures of this technique through a cadaveric dissection study.

Methods: Modified composite-flap facelift with the FAME technique was carried out in 22 fresh cadaver hemi-faces. All facial nerve subbranches were dissected thoroughly to assess for any evidence of injury during facelift, and to evaluate the safety of the operation. The relations among the facial nerve, zygomatic cutaneous and masseteric ligaments, orbicularis oculi muscle, and malar fat pad were investigated.

Results: Finger dissection of the prezygomatic space allows safe release of the zygomatic cutaneous ligaments as well as adequate entry to a proper surgical plane above the zygomatici muscles under direct vision, while leaving the malar fat pad and overlying structures attached to the skin without the need of a transblepharoplasty approach.

Conclusions: This study by the authors shows that a modified composite-flap facelift with FAME technique is a safe procedure that allows adequate and effective repositioning of an en-bloc composite flap that produces balanced and harmonious rejuvenation of the midface and lower face without the need of a separate midface lift.

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The superficial musculoaponeurotic system (SMAS) and malar fat pad (MFP) descend inferomedially with aging. The MFP is superficial to the SMAS layer that invests the zygomatic and superior levator lip muscles. To mobilize the descended malar fad pad, it is necessary to release all attachments ensuring complete en-bloc elevation of mid-facial descendent tissues from the zygomatic eminence. Inadequate release of these ligamentous attachments during facelift may lead to an unbalanced, unnatural appearance, and may potentially result in the lateral sweep phenomena.[1-3] SMAS techniques that involve plication or imbrication of the exposed surface of the SMAS do not include surgical release of the areas of ligamentous fixation and the mobilization of the MFP.[2,4-7] Although extended

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techniques such as deep plane,[4] composite plane,[5] extended SMAS, and high SMAS[7] have been described to release those ligaments in the mid-facial region, most facelift surgeons are hesitant to apply these techniques due to a potentially higher risk of zygomatic and buccal nerve injury. The authors employ the finger-assisted malar elevation (FAME) maneuver to enable safe visualisation for transection of the zygomatic cutaneous ligaments (ZCL) through the prezygomatic space (PZS) allowing entry into the proper plane under direct visualization leaving the MFP attached to the skin. This modified technique enables effective repositioning of an en-bloc composite flap consisting of the orbicularis oculi muscle (OOM), MFP, SMAS and skin in a vertical vector to their native position of youth, enhancing the volume of the midface, diminishing the nasolabial fold, and decreasing the lower lid cheek junction during rhytidectomy. The objective in this study was to evaluate the anatomical basis and the safety measure of the "Modified Composite-Flap Facelift Combined with FAME" technique in a cadaveric dissection study.

Video 1. Watch now at https://academic.oup.com/asj/article-lookup/doi/10.1093/asj/sjy062

METHODS

Twenty-two half faces of 11 fresh cadavers (6 women and 5 men; range, 35-69 years; mean, 52.8 years) were entered in the study. The dissections were performed in Acıbadem Mehmet Ali Aydinlar University (Ataşehir, Istanbul, Turkey) between June 2016 and May 2017, and all cadavers were acquired from the collection of Anatomy Department. The study was conducted according to the guiding principles of the Declaration of Helsinki.[8] Written informed consent was provided from the representative case to publish her images and operative video. All cadaver photographs were either cropped or blurred to make them unrecognizable.

Initially, a modified composite-flap facelift procedure with FAME was carried out by the senior author (O.C.) as described below in detail. The anchoring retaining ligaments, namely, ZCL and masseteric cutaneous ligament (MCL) were marked with a surgical pen before transection. Following facelift procedure, the location of these ligaments to topographical landmarks were meticulously measured with a digital caliper (0.01 mm precision) and noted. Superficial parotidectomy was performed after the operations to find the facial nerve trunk. Then, all subbranches were identified and evaluated for the safety of the operation. Facial nerve branches were followed to look for the evidence of any injury during the facelift dissection using (X2.5) loupes. The localization of the facial nerve, ZCL and MCL, OOM, zygomatic muscles, and MFP, and their relationships with each other were analyzed.

The surgery was performed as follows (Figures 1-9) (Video 1): Subcutaneous dissection was carried out following a facelift skin incision until the SMAS entry point was reached. Subcutaneous dissection included standard pre-platysmal dissection below the angle of the mandible. Following subcutaneous dissection, the SMAS entry line was marked starting from the lateral canthus superiorly and finishing at the angle of the mandible inferiorly. A SMAS incision was carried out with a no.15 blade along the line. A sub-SMAS dissection along the infrazygomatic portion of the SMAS incision line was performed anteriorly up to the vertically oriented strong ZCL and MCL that did not yield to blunt dissection. The sub-SMAS dissection was stopped at that moment and PZS dissection was performed before transection of anchoring ligaments. PZS dissection was initialized on the zygoma with vertical spreading movements to find the sub-OOM plane with blunt tipped scissors and continued with the FAME maneuver as defined by Aston.[9] Our modification was that, our point of entry to the PZS was on the SMAS entry line corresponding to the inferolateral part of the lateral canthus on the zygoma not to injure the temporal branches innervating the OOM, whereas it was lateral to the lateral canthus in the original description.[7] The FAME maneuver was carried out with the dominant hand's index finger with the palm facing towards the zygoma (this is the other modification/nuance to Aston's description) in a suborbicular plane. FAME occurs in an avascular and gliding plane between suborbicularis oculi fat (SOOF) and pre-periostal fat, which was later described by Mendelson et al[10] as the PZS. Finger dissection of this space is smooth and safe as there are no facial nerve branches, and the only

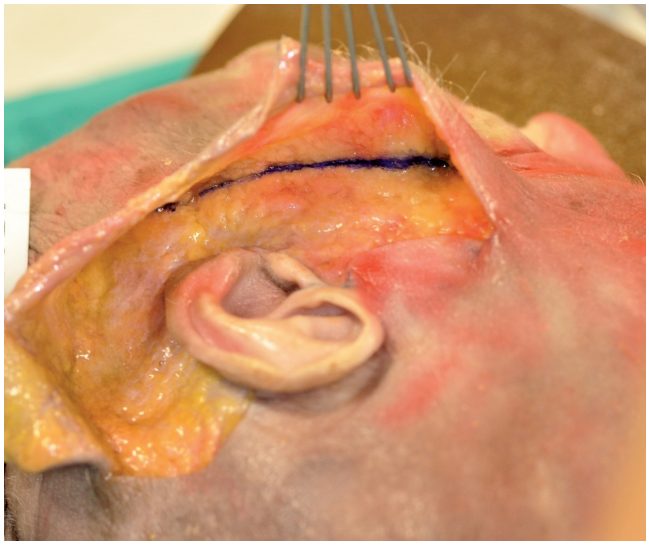

Figure 1. SMAS entry line is marked in an oblique fashion parallel and anterior to Pitanguy's line starting from the lateral canthus superiorly and finishing at the angle of the mandible inferiorly (demonstrated on this 50-year-old male cadaver).

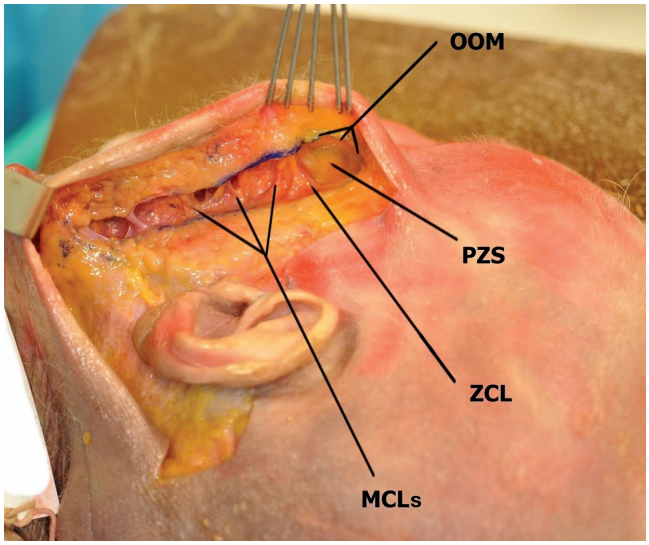

Figure 2. Sub-SMAS dissection along the infrazygomatic portion of the SMAS incision line was performed anteriorly via vertical spreading movements of blunt tipped scissors up to the vertically oriented strong ZCL and MCL that resisted blunt dissection (demonstrated on this 50-year-old male cadaver). OOM, orbicularis oculi muscle; PZS, prezygomatic space; ZCL, zygomatic cutaneous ligament; MCL, masseteric cutaneous ligament.

Figure 3. Modified FAME maneuver (blunt PZS dissection) is carried out in a suborbicularis plane with the dominant hand's index finger palm facing towards the zygoma (demonstrated on this 50-year-old male cadaver). The strong major ZCL behaves as a pivot point limiting inferior movement of the index-finger, and the tip of the finger (superficial to lip elevator muscles, and deep to OOM and MFP) is directed inferomedially to the nasolabial fold.

structure present is the zygomatic cutaneous neurovascular pedicle that is found at the superior border of the minor zygomatic muscle.

The PZS is bounded by the orbital retaining ligament superiorly, the ZCL inferiorly, the SOOF, and the OOM superficially. On the floor of this space lie the pre-periosteal fat, the periosteum of the zygoma, and origins of the zygomatic major, minor, and levator labii superior muscles. The strong major ZCL behaves as a pivot point limiting inferior movement of the finger during creation of an anterior pocket, and the tip of the finger is directed inferiorly to release the MFP, staying just over the top of the levator labii superioris and zygomaticus minor muscles up to the nasolabial sulcus. The next step was releasing the main anchoring ligaments (ZCL and MCL) seen as an inverted L shape resistant to blunt dissection. The horizontal part of the inverted-L is formed by the major ZCL, and the vertical part is formed by the MCL. The posterior superior corner of the major ZCL was sharply transected with a no.15 blade from a superior (suborbicular plane) to inferior direction as superficial as possible for clear and safe entry into the exact plane superficial to the zygomatic major and minor muscles under direct visualization, leaving all fat attached to the skin. This maneuver prevented injuring facial nerve subbranches that entered the zygomatic musculature from inferior and deep, and also diving in the zygomatic major muscle. After weakening the ligamentous attachments with this initial sharp dissection, the dissection of MFP was easily maintained with blunt finger dissection in an oblique manner parallel to the zygomatic muscle fibers. Any attachments resisting finger dissection around the zygomatic muscles were released with sharp

Figure 4. The posterior superior corner of the major ZCL is sharply transected with a no.15 blade in a superior-to-inferior and posterior-to-anterior direction (demonstrated on this 50-year-old male cadaver). The advantage of sequencing ZCL transection following FAME (suborbicularis PZS) dissection is exposing zygomatic major muscle and entering the correct plane under direct vision consistently.

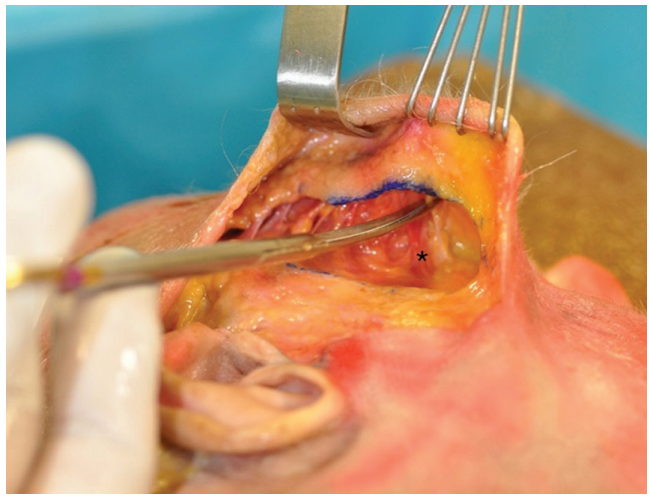

Figure 5. Direct visualization and entrance exactly to the correct dissection plane over the zygomatic muscles avoids diving in the zygomatic muscles and injuring facial nerve subbranches that enter the zygomatic musculature from inferior and deep (demonstrated on this 50-year-old male cadaver). The dissection is easily maintained with blunt finger dissection in an oblique manner parallel to the zygomatic muscle fibers. Any attachments resisting blunt finger dissection around the zygomatic muscles are released with additional sharp transections. The asterisk (*) shows the zygomatic major muscle.

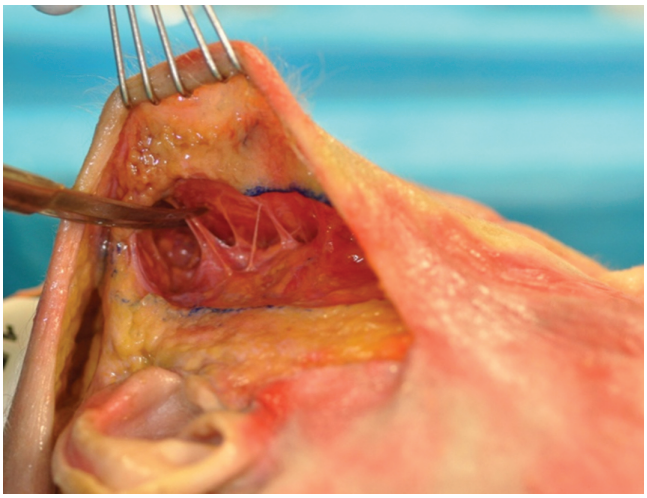

Figure 6. Superior MCL is transected superficially via sharp dissection (demonstrated on this 50-year-old male cadaver). Then the dissection is easily maintained with a blunt manner in a posterior-to-anterior direction to unify the prezygomatic and infrazygomatic pockets. Unlike superior MCL, inferior MCL fibers yielded to blunt dissection. All tiny ligaments resisting blunt dissection were divided superficially at all times in order to avoid injury to distal facial nerve subbranches.

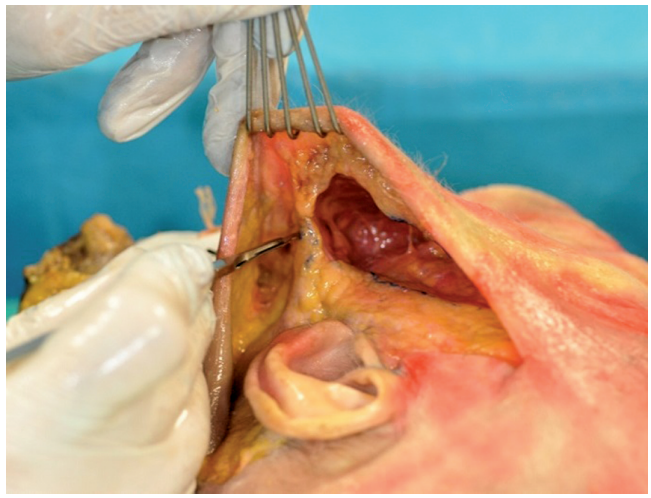

Figure 7. Sub-SMAS dissection is extended 3 to 4 cm inferior to the angle of the mandible, and SMAS entry incision is continued towards the neck (demonstrated on this 50-year-old male cadaver). The most inferior part of the SMAS entry incision is continued posteroinferiorly towards the neck to release the anchoring attachments between the platysma and sternocleidomastoid muscle.

dissection under direct visualization. The MCL standing like a vertical strap between the sub-SMAS facelift dissection and anterior pocket was dissected superficially via sharp dissection. After initial sharp dissection of the superior MCL, the dissection was easily maintained in a blunt motion in a posterior to anterior direction until unification

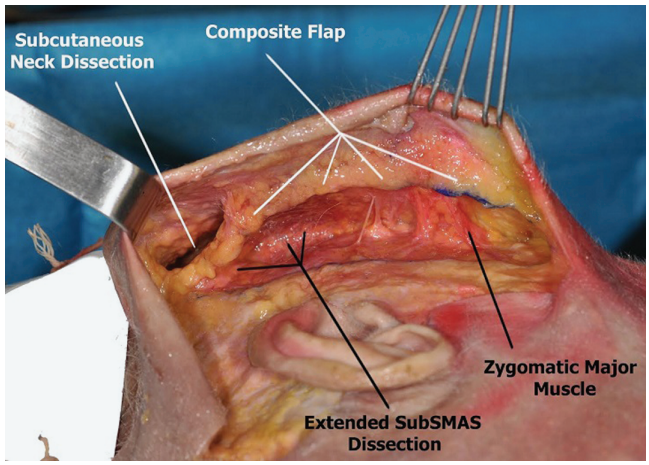

Figure 8. The composite flap consists of the orbicularis oculi muscle, platysma, SMAS, malar fat pat, and skin (demonstrated on this 50-year-old male cadaver).

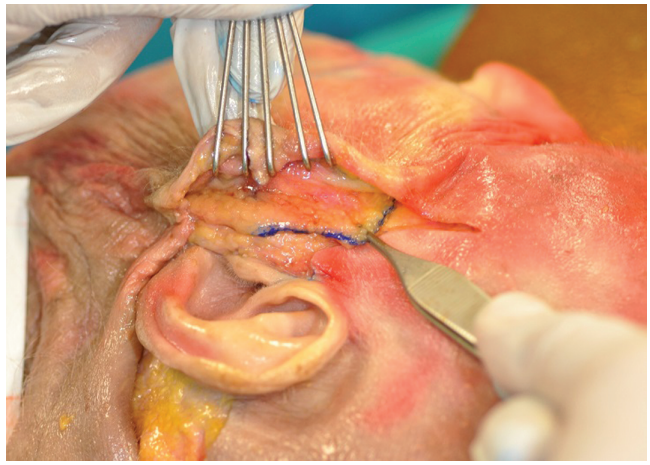

Figure 9. The composite flap is pulled in a supero-lateral vector perpendicular to the nasolabial fold (demonstrated on this 50-year-old male cadaver).

of the pockets. All tiny ligaments accounted for during dissection were always divided superficially avoiding any trauma to the muscle or motor nerve branches. The inferior MCL and the rest of the sub-SMAS dissection of the lower face up to 1-2 cm in front of the facial grove were easily accomplished with blunt dissection. The subplatysmal blunt dissection was easily extended 3-4 cm inferior to the angle of the mandible. However, we do not extend the subplastysmal dissection into the neck medially, since this area is relatively mobile without having collagenous attachments.[11] Then, the most inferior part of the SMAS entry incision was carried on slightly posteriorly and a few centimeters inferiorly through the neck along the anterior border of the sternocleidomastoid muscle, and the attachments between the platysma and sternocleidomastoid muscle were released with sharp dissection to allow the neck flap to be advanced posteriorly. At the end of extended dissections, a unibody composite flap including the OOM, platysma, MFP, and skin was ready for adequate and unopposed repositioning and anchoring (Figures 1-9). Inferior portion of the orbicularis muscle, the malar fat pad, and the platysma at the edge of the SMAS entry line were pulled in a supero-lateral vector perpendicular to the nasolabial fold to neutralize the infero-medial aging pattern seen within the mid and lower face; and fixated with 4 to 5 sutures to the deep temporal fascia and parotid fascia along the edge of the facelift incision. Since the sutures are anchored at a safe distance posterior to the Pitanguy's line, they do not carry risk for facial injury. Then, a horizontal myotomy was performed below the ear lobule, and the lateral platysma was pulled in a posterior vector to achieve the maximum improvement of the neck and mandibular contours, and suspended with a few sutures to the mastoid periosteum and the sternocleidomastoid muscle fascia. Please see the intraoperative video (Video 1), and the preoperative and posttreatment photographs (Figure 10) of a demonstrative patient operated with the above-mentioned surgical technique.

RESULTS

Following detailed scrutiny of the cadaver halves, none of the subbranches of the facial nerve were injured following the abovementioned standardized algorithmic surgical approach.

In accordance with the literature, PZS is bounded by the orbital retaining ligament superiorly, the ZCL inferiorly, SOOF, and OOM superficially. On the floor of this space lie the pre-periosteal fat and the periosteum of the zygoma and origins of the zygomatic major, minor, and levator labii superioris muscles (Figure 11).

Outermost OOM fibers always extended beyond their predicted location; they were often limited inferiorly by the major ZCL ligament (Figure 12). OOM fibers covered the origins of the zygomatic muscles. The malar fat pad was superficial to the OOM and lip levator (zygomatic and levator labii) muscles (Figures 11 and 12).

As first described by Yousif and Mendelson,[12] the inverted-L scheme of the ZCL and MCL were present. However, this anatomy was variable and the ligaments took on a wide variety of geometric designs as emphasized by Alghoul et al.[13] The zygomatic ligaments were located along the transverse line of the inferior zygoma a few centimetres from the lateral border of the zygomatic major muscle to the medial border of the zygomaticus minor muscle. In all cadavers ZCL were located both laterally and medially to zygomatic muscles. The attachments were stronger and denser posterior to the zygomatic major muscle (major ZCL) and always required sharp dissection, whereas the anterior parts were scattered (minor

Figures 10. (A, C, E) Preoperative and (B, D, F) 18-month postoperative photographs of this 60-year-old woman who underwent modified composite-flap facelift combined with FAME (Video 1), subcilliary skin-muscle flap lower eyelid blepharoplasty, rhinoplasty, and TCA peeling.

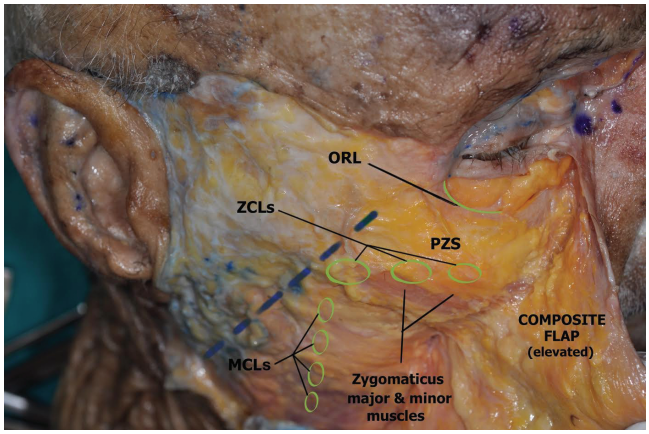

Figure 11. Detailed anatomy underlying the composite flap (demonstrated on this 63-year-old male cadaver). The pre-zygomatic space is bounded by the orbital retaining ligament superiorly, the ZCL inferiorly, sub orbicularis oculi fat and MOO superficially. On the floor of this space lie the pre-periosteal fat covering the periosteum of the zygoma and origins of the zygomaticus major, minor, and levator labii superioris muscles. Blue dashed line shows the SMAS entry line. The locations of ZCL and MCL are shown as green circles. (In addition to standard pre-auricular facelift incision, additional horizontal temporal and infraorbital incisions are carried out for demonstrative purposes). MCL, masseteric cutaneous ligament; ORL, orbital retaining ligament; PZS, pre-zygomatic space; ZCL, zygomatic cutaneous ligament.

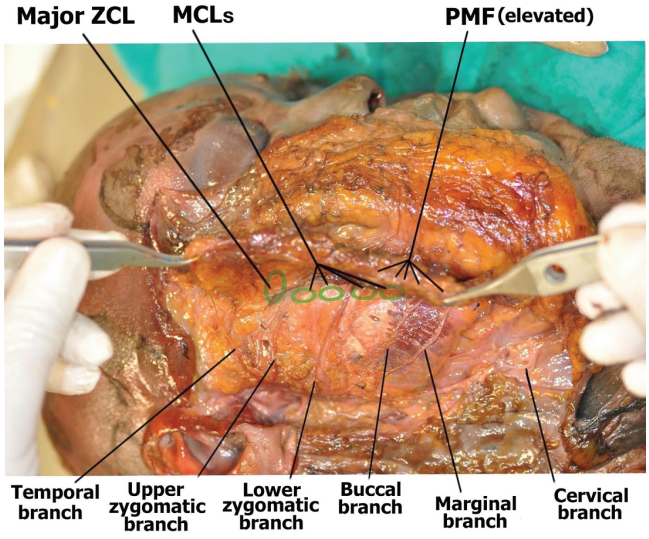

Figure 13. Relations of facial nerve branches with neighboring structures (demonstrated on this 54-year-old male cadaver). Parotidomasseteric fascia is dissected additionally for demonstrative purposes. The locations of ZCL and MCL are shown as green circles. The upper zygomatic branch of facial nerve passes between the ZCL and upper most MCL. The lower zygomatic nerve is located inferior relative to the location of superior MCL. The temporal branch of the facial nerve is located outside of the dissected area. PMF, parotido-masseteric fascia; MCL, masseteric cutaneous ligament; ZCL, zygomatic cutaneous ligament.

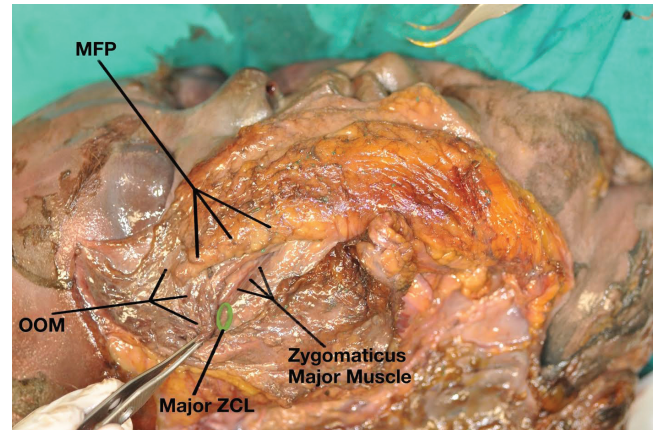

Figure 12. Pertinent anatomy of the orbicularis oculi muscle (demonstrated on this 54-year-old male cadaver). Additional meticulous skin and subcutaneous fat (overlying the MOO) dissection is performed for demonstrative purposes. Forceps hold the outermost circular layer of MOO. The MOO overlies the origin of the levator lip muscles and is deep to the MFP. The location of major ZCL is shown as a green circle. MFP, malar fat pad; OOM, orbicularis oculi muscle; ZCL, zygomatic cutaneous ligament.

ZCL) and yielded to blunt dissection. Parallel to the previous studies in the literature,[1,2,10,13-26] the mean distances between tragus and ZCL; tragus and MCL; ZCL and MCL; ZCL and the upper zygomatic branch of the facial nerve; MCL and upper zygomatic branch of the facial nerve; and postero-anterior length of the major ZCL were 45 mm; 48 mm; 12 mm; 6 mm; 4 mm; and 23 mm, respectively. Measurements are further detailed in Table 1. The upper zygomatic subbranch of the facial nerve passed between ZCL and MCL (Figure 13). The lower zygomatic nerve was located inferior to the upper MCL (Figure 13). Similar with the findings of Alghoul et al[13] who reported 2/22 hemiface (9.1%); we found 1/22 (4.5%) of hemifaces had upper zygomatic subbranched innervated zygomatic muscle superficially.

MCL was a nearly vertically shaped structure located parallel to the anterior border of the masseteric muscle, with a slight tilt medially in a superior-to-inferior direction (Figures 11 and 13). Superior MCL fibers were resistant to blunt dissection but release with blunt finger dissection was possible for inferior MCL.

Since the zygomatic branches to the OOM course from deep to superficial immediately outside the PZS, most of these subbranches were inevitably injured during transection of the ZCL whilst unifying the PZS dissection with infrazygomatic dissection. However, subbranches to the OOM from the temporal nerve were located far from the dissection site and always found intact (Figure 13).

None of the cadavers in our series had injury to either the zygomaticus or buccal nerve branches in the lower

Table 1. Cadaveric Measurements in Comparison to Literature

Measurement	Furnas[1] (1989)	Perry et al[18] (2013)	Alghoul et al[13] (2013)	Ozdemir et al[16] (2002)	Hwang et al[15] (2011)	Lucarelli et al[14] (2000)	Findings of the present study
No. of dissected Hemifaces	30	20	22	22	9	14	22
Tragus ↔ ZCL	45	50 (43-55)	45	39-48 42-48 (m) 39-45 (f)	NA	44	45
Tragus ↔ MCL	NA	48 (37-52)	46	NA	NA	NA	48
ZCL ↕ MCL	NA	11 (8-16)	11	NA	NA	NA	12
ZCL ↕ UZN	NA	NA	4.1	NA	NA	NA	6
UZN ↕ MCL	NA	NA	5.8	NA	NA	NA	4
Frankfort vs ZCL	NA	NA	NA	NA	NA	NA	-11
Frankfort vs MCL	NA	NA	NA	NA	NA	NA	-22
Width of ZCL	3	NA	14.5	18-34 (m) 16-30 (f)	8.1	14.6	23
UZN branch lies superficial to Zygomaticus Major Muscle	NA	NA	2 / 22	NA	NA	NA	1 / 22

All values are expressed as mean value: millimeters. Frankfort, frankfort line; MCL, masseteric cutaneous ligament; NA, not available; UZN, upper zygomatic subbranch of facial nerve; ZCL, zygomatic cutaneous ligament. (-) values represent relatively inferior localization, (m) male, (f) female. ↔ indicates horizontal distance, ↕ indicates vertical distance between two anatomic locations.

face. Laterally, the parotidomasseteric fascia covers subbranches of the facial nerve, this layer can be clearly observed, but these nerve fibers become more visible and exposed as the surgeon goes more medially. Nevertheless, delicate vertical spreading action of the blunt tipped scissors never resulted in injury to these nerve fibers. Extended sub-SMAS dissection with a vertical spreading action of blunt tipped scissors 3 to 4 cm below mandible, and 1 to 2 cm anterior to the facial grove did not result in any injury to the distal marginal subbranches of the facial nerve in any cadaver.

DISCUSSION

Strong anchoring ligamentous attachments (e.g., ZCL) prevent the transmission of traction to the malar portion of the dissection and counteract the upward redraping of mid-facial descended soft tissues during traditional low SMAS facelift techniques.[2-7,19] In 1990, the deep plane facelift published by Hamra[4] described the release of these ligaments and repositioning of the superficial fascia, overlying subcutaneous fat, skin, and platysma as a single unit to reposition the ptotic midface and diminish the nasolabial folds. The deep plane facelift technique involved dissection of the subcutaneous cheek fat from underlying orbicularis oculi and zygomatic muscles. Later, Hamra[20] published the results of a study that MFP repositioning (in the supra-orbicular level) of nasolabial folds in "deep-plane facelift" patients did not yield long-term satisfaction contrary to a defined jawline, which maintained the results. In 1992, Hamra[5] revised his technique to incorporate the OOM in his article entitled "Composite Rhytidectomy." This modification entailed undermining of the OOM via a medial transblepharoplasty approach and joining this with the facelift dissection as a composite flap containing the OOM, SMAS, cheek fat, and platysma muscle. According to Hamra, superolateral traction of the composite flap and especially anchoring the midcheek to the periosteum of the zygoma lifted the midface and supported the lower lid while narrowing the lid-cheek distance. He classified all other facelift techniques as "conventional" "lateral vector" facelifts that fell short of accomplishing these goals.[2]

Including the OOM in a composite flap can disrupt its motor nerve supply and may potentially lead to functional impairment. The OOM has plexiform innervation by the temporal (at 8 and 9 o'clock), and zygomatic branches (at 4, 6, and 8 o'clock) of the facial nerve[15,21] Hamra[5] in his original composite rhytidectomy article, combined OOM dissection through a transcutaneous blepharoplasty with the facelift dissection, and performed routine lateral canthoplasty. He elevated the OOM from five to nine o'clock and reported it as a safe procedure.[5] Later, he defined the zygoorbicular midface dissection with routine canthopexy and stated that facelift dissection must never communicate with a zygoorbicular pocket to prevent temporary dystonia from nerve injury observed in the early postoperative period.[22] On the other hand, Tremolada et al[23] reported in their clinical series that they

extended their OOM dissection through a transcutaneous blepharoplasty and combined this with a facelift dissection without any impairment in OOM function. Similarly, in a recent clinical study by Ryu and Moon[24] combining OOM and facelift dissections did not report any lower lid morbidity. Although injury of the OOM branches cannot be disregarded merely by dissection without functional assessment, the abovementioned studies and our clinical experience show that, dissection of the OOM does not cause noteworthy impairment of its function due to its having a plexiform innervation.[5,15,21,23,24] Moreover, the malposition or deformities of the lower eyelid mentioned in the literature would be more likely to occur due to the combined lower blepharoplasty operation, which leads to denervation of the pretarsal OOM during subciliary incision, with or without combination of excessive skin excision, septal (middle lamella) scar contraction and requires lower-lid reinforcing maneuvers such as orbicularis muscle suspension, lateral canthopexy or canthoplasty.[21] As an important notice, the term "modified" composite flap facelift in our manuscript refers to incorporation of the suborbicularis dissection along with the SMAS, MFP, and skin and does not mandatorily entail adjunctive maneuvers (transcutaneous lower blepharoplasty, arcus marginalis release, lateral cantopexy, zygoorbicular dissection, septal reset, orbicularis muscle suspension, orbicularis muscle repositioning, and forehead lift) suggested by Hamra.[2,25,26]

Since the SMAS invests the zygomatic muscles, extending the sub-SMAS facelift dissection to elevate the MFP tends to go deep into these muscles, and can injure zygomatic and buccal branches of the facial nerve. It is also difficult to distinguish ligamentous attachments from nerve branches. Since the complete release of retaining ligaments carry the risk of zygomatic and buccal nerve injury, most surgeons either inadequately release these ligamentous attachments or prefer applying alternative surgical techniques without any sub-SMAS dissection, which may lead to an unbalanced, unnatural appearance, and the lateral sweep phenomenon.

Aston[9] introduced the FAME maneuver ,which involved detaching and repositioning of the MFP from the underlying SMAS, by releasing anteriorly located ZCLs. Then the FAME technique was combined by different authors with traditional SMAS,[9,18,27-29] extended SMAS,[26] high SMAS,[23] and deep plane[29] facelift techniques. The published surgical-technique video and papers by Aston shows very clearly that (1) blunt finger dissection happens deep to the OOM and (2) the index finger is at-all-times superior to the level of the zygomatic ligament.[27,30,31] There have been different modifications between Aston's original FAME and later publications referring to this technique. In 2006 Ferreira et al[29] carried out a cadaver study with an effort to describe the anatomy and technique of FAME. However, the technique presented differed from Aston's original FAME in that the inferolateral fibers of the OOM was the upper limit of their dissections, so their dissection was below the ZCL level.[29] Recently, Jacono et al[32] in their article described a "prezygomatic space" blunt finger dissection as superficial to the OOM, while both the original FAME dissection technique and the PZS are under the OOM.

PZS defined by Mendelson et al[10] is a gliding plane overlying the body of the zygoma ideal for release of the OOM and MFP. The space is located between the OOM and SOOF superficially, and pre-periostal fat—periosteum deeply. The anatomic boundaries of PZS are the orbicularis retaining ligament superiorly, and the ZCL inferiorly, which correlate with its triangular shape.[10,33] Amedeo et al[34] reported that the deep fascial layer of the SMAS separates the SOOF and pre-periosteal deep fat, and continues adherent to lip elevator (zygomaticus major and minor) muscles inferiorly. This deep fascial plane corresponds to the floor of the PZS described by Mendelson.[10,33] The importance of PZS dissection is that the OOM overlies the origin of the lip elevator muscles (zygomaticus major, zygomaticus minor, and elevator labii superior), and the pre-periostal fat layer covers the bellies of these muscles.[9,31] Tremolada et al[23] reported in their clinical series that extending suborbicular dissection inferiorly and laterally through a transcutaneous blepharoplasty allowed easy and safe access to correct deep subcutaneous plane just above the zygomaticus major, zygomaticus minor and levator muscle complex.

The complete en-bloc elevation of midfacial descendent tissues with release of all ligamentous attachments from the zygomatic eminence prevents unbalanced, unnatural appearance, and the lateral sweep phenomenon of the facelift. However, the course of the facial nerves zygomatic branches and their close relationship with ligamentous structures is a hassle for the novice surgeon for all extended techniques such as high SMAS, extended SMAS, deep plane, and composite plane rhytidectomies. Our modified composite flap rhytidectomy with FAME technique may be preferred to produce a combined, balanced, and harmonious rejuvenation of the midface, cheek, and lower face without the need of a separate midface lift procedure. In accordance with the anatomical facts of above mentioned studies;[10,23,33,34] our study shows that FAME maneuver allows a clear and safe passage for transection of the ZCL under direct vision, with entry into the proper plane, and unopposed repositioning of a unibody composite flap including the OOM, platysma, MFP, and skin without requiring an additional transblepharoplasty approach.

As a drawback, one may argue that most of the injury to the zygomatic and buccal branches of the facial nerve during facelift surgery are neuropraxia, and a cadaver study does not tell us much about neuropraxia injury in live patients. On the other hand, cadaver studies can give

reliable information on the safety of the technique if the nerves were physically intact along their entire course after dissecting out all branches. Although we have presented this as a cadaveric study, the senior author (OC) uses this technique routinely in his practice and results will be presented in a future article.

CONCLUSION

This cadaveric study shows that our modified composite flap rhytidectomy with FAME technique allows safe release of ZCLs from the PZS and safe entry into the proper plane under direct vision while leaving all MFP attached to the skin in the absence of the transblepharoplasty approach. Additionally, this technique enables effective reposition of an en-bloc composite flap consisting of the MOO/MFP/SMAS/skin in a vertical vector to their native position of youth, enhancing mid-facial volume, diminishing the nasolabial fold, and decreasing lower lid cheek junction during rhytidectomy.

Supplementary Material

This article contains supplementary material located online at www.aestheticsurgeryjournal.com.

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