

# Midcheek Lift Using Facial Soft-Tissue Spaces of the Midcheek

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**Background:** This article describes a preperiosteal midcheek lift technique performed by means of the midcheek soft-tissue spaces by precise release of the retaining ligaments that separate the spaces.

**Methods:** From November of 2009 to June of 2014, 184 patients underwent this procedure. A transcutaneous lower eyelid blepharoplasty incision was used to access the preseptal space. Medially, the orbicularis oculi origins and tear trough ligament are released sharply, connecting the dissection with the premaxillary space. More laterally, the orbicularis retaining ligament is released, connecting the dissection with the prezygomatic space. With this release, the entire midcheek can be effectively lifted. The fat pads were managed by transposition, excision, or with septal resets as indicated. Canthopexy is performed routinely to provide lower eyelid support. Superolateral traction on the orbicularis oculi elevates the entire midcheek, and this was secured to the lateral orbital rim periosteum. In patients with significant volume loss in the midcheek, structural fat grafting is performed.

**Results:** All patients demonstrated a significant rejuvenation of the midcheek with elimination of the eye bags and elevation of the lid-cheek junction and the cheek prominence and improvement of the nasolabial folds. The majority of the patients (96 percent) were satisfied with the procedure. Complication rates were low. Ectropion occurred in 1 percent of patients, and lower lid retraction occurred in 1 percent of patients.

**Conclusion:** The midcheek lift by means of the facial soft-tissue spaces is safe, effective, and long lasting. As the dissection is atraumatic, recovery is quick and complications are minimized. (*Plast. Reconstr. Surg.* 136: 1155, 2015.)

**M**idcheek aging is characterized by the progressive development of eye bags, tear trough deformity, and a prominent lid-cheek junction. The maxilla retrudes, and the midcheek soft tissues deflate and “descend.”<sup>2,3</sup> Collectively, these changes are responsible for the “tired” appearance that develops with aging.<sup>1,2</sup> Accordingly, addressing the eye bags alone cannot achieve the desired outcome of midcheek rejuvenation if other aspects of midcheek aging are not addressed concomitantly. To achieve optimal rejuvenation of the midcheek, incorporating a midcheek lift is a key aspect of treatment.<sup>4-8</sup>

When considering midcheek lifts, the subperiosteal technique remains popular and widely used.<sup>5,6,9-13</sup> The preperiosteal technique is not as

popular because of uncertainties in the anatomy and perceived risks of nerve injuries. A detailed description of the midcheek soft-tissue spaces and retaining ligaments has recently been published.<sup>22,23</sup> From a surgical perspective, the soft-tissue spaces are anatomically “predissected” gliding planes, providing an atraumatic and bloodless access to the midcheek. This conceptually offers an “ideal” plane of dissection. Using these spaces, with precise

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release of the key retaining ligaments separating them (Fig. 1),<sup>23</sup> safe and effective mobilization of the entire midcheek can be achieved. The technique, safety, and efficacy of this surgical approach are described in this article.

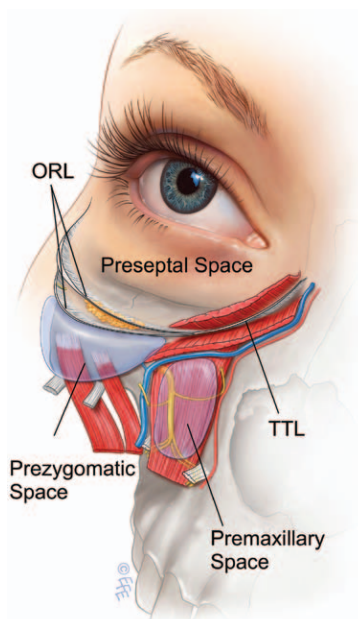
## PATIENTS AND METHODS

From November of 2009 to June of 2014, 184 patients underwent preperiosteal midcheek lift by means of a transcutaneous lower eyelid incision. Of these, 120 were primary cases and 64 were secondary or tertiary cases. Of the 184 patients, 166 (90 percent) had concomitant midcheek fat grafting performed. The midcheek lift was performed in isolation or in combination with other facial aesthetic procedures, such as upper eyelid blepharoplasty, face lift, or rhinoplasty.

### Surgical Technique

The procedure can be performed under either local anesthesia or general anesthesia. The lower eyelid and midcheek are anesthetized with a mixture of 10 cc of 1% ropivacaine, 10 cc of 1% lignocaine, and 0.4 cc of 1:1000 adrenaline. The lower lid, midcheek, and lateral orbital rim are infiltrated with a total of 4 to 5 cc of the local anesthetic

mixture on each side. A transcutaneous approach is used. (See Video, Supplemental Digital Content 1, which demonstrates our surgical technique of midcheek lift using the facial soft-tissue spaces of the midcheek, available in the “Related Videos” section of the full-text article on PRSJJournal.com or, for Ovid users, at, <http://links.lww.com/PRS/B489>.) After the subciliary incision, a skin-only flap is raised. The skin is raised off the orbicularis oculi to an extent approximately 1 cm below the mid-pupillary line and approximately 1.5 cm below the lateral canthus. This is to provide a significant cuff of orbicularis oculi as a handle on which to elevate the midcheek and to facilitate later skin redraping and excision with elevation of the cheek. At approximately the level of the lateral canthus, with the orbicularis oculi tented up with skin hooks, a window is then created in the muscle with cutting cautery. A blunt tenotomy scissors is then introduced into the suborbicularis plane and the preseptal space opened with gentle spreading of the blades. The orbicularis oculi is then tented up and cut with cautery to approximately the level of the medial limbus of the pupil, ensuring preservation of approximately 5 to 7 mm of pretarsal orbicularis oculi. The preseptal space is a bloodless plane that can be fully developed bluntly with a cotton tip to its boundary, which is the orbicularis oculi origin medially and the orbicularis retaining ligament more laterally. Medially, over the maxilla, the origin of the orbicularis oculi (the palpebral and orbital parts of the orbicularis oculi) and the tear trough ligament located between them is sharply released with cutting cautery. Complete release

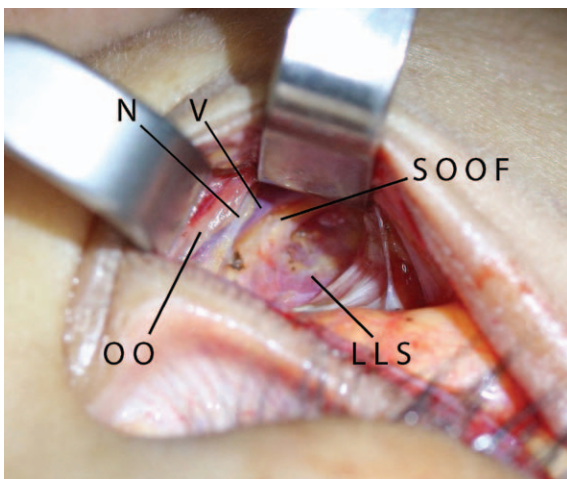


**Fig. 1.** The anatomy and key relations of the midcheek soft-tissue space and the retaining ligaments that separate them. TTL, tear trough ligament; ORL, orbicularis retaining ligament. (From Wong CH, Mendelson B. Facial soft-tissue spaces and retaining ligaments of the midcheek: Defining the premaxillary space. *Plast Reconstr Surg.* 2013;132:49–56. Published with permission from Dr. Levent Efe.)



**Video.** Supplemental Digital Content 1, which demonstrates our surgical technique of midcheek lift using the facial soft-tissue spaces of the midcheek, is available in the “Related Videos” section of the full-text article on PRSJJournal.com or, for Ovid users, at, <http://links.lww.com/PRS/B489>.

would bring the dissection into the premaxillary space, heralded by the visualization of the sub-orbicularis oculi fat adherent to the underside of the orbicularis oculi muscle fascia in the roof and the levator labii superioris muscle in the floor (Fig. 2). This would ensure that the tear trough ligament is completely released. This maneuver would eliminate the tear trough deformity and allow mobilization of the midcheek with the concomitant release of the orbicularis retaining ligament. The orbicularis retaining ligament is completely released with cutting cautery in the preperiosteal plane. The orbicularis retaining ligament is bilamellar, with a distance of 5 to 7 mm between the upper and lower lamella. Laterally, over the body of the zygoma, complete release of the orbicularis retaining ligament will take the dissection into the prezygomatic space. The zygomaticofacial nerve (and its associated blood vessels), emerging from a foramen in the body of the zygoma, is closely associated with the inferior lamella of the orbicularis retaining ligament. Accordingly, seeing this nerve would herald entrance into the prezygomatic space and complete release of the orbicularis retaining ligament. More laterally, the orbicularis retaining ligament continues as the lateral orbital thickening, and the inferior part, up to the level of the lateral canthus, needs to be released to allow free elevation of the midcheek. With this release



**Fig. 2.** Entrance into the premaxillary space is achieved by complete release of the orbicularis origin (OO) (with concomitant release of the tear trough ligament). This is confirmed by visualization of the levator labii superioris (LLS) in the floor and the sub-orbicularis oculi fat (SOOF) in the roof. Note the close association of the angular vein (V) and terminal branches of the zygomatic nerve (N) with the orbicularis oculi muscle medially. Injury to these structures can be avoided during the preperiosteal release of the muscle by staying very close to the bone.

(surgically connecting the three facial soft-tissue spaces of the midcheek, the preseptal, premaxillary, and prezygomatic spaces), upward traction on the orbicularis oculi would allow free and unhindered elevation of the entire midcheek. As an endpoint for surgical release, free elevation of the upper part of the nasolabial fold and the malar fat pad with traction on the orbicularis oculi signals sufficient release of the midcheek retaining ligaments.

To address the eye bags and tear trough deformity, depending on the patient's anatomy, one of two maneuvers may be selected. In patients with a tear trough deformity without a significant palpebromalar groove, transposition of the medial and middle fat pads over the medial orbital rim, onto the anterior maxilla, is performed. The orbital septum is opened and the fat pads transposed over the rim and secured with 6-0 Vicryl sutures (Ethicon, Inc., Somerville, N.J.). In patients presenting with more advanced aging changes with a deep lid-cheek junction, a septal reset is performed. Fat removal is performed conservatively, only in patients with a true excess of retro-orbital fat, usually from the lateral compartment. Canthopexy is routinely performed for all patients with a 4-0 double-arm Mersilene suture (Ethicon), generally at the level of the inferior edge of the pupil for patients with normal eye prominence but carefully adjusted superiorly or inferiorly, depending on eye prominence and ensuring symmetry and good lower eyelid posture and position after tying the suture.<sup>7</sup>

The midcheek lift is achieved by orbicularis suspension. This is performed in a more superior vector with 3-0 Ethibond sutures (Ethicon) secured to the lateral orbit periosteum at or just slightly below the level of the canthopexy. Two of these sutures are placed. This achieves the midcheek lift, ensuring that the malar eminence and the upper nasolabial fold lifts sufficiently with tightening of the sutures. Excess orbicularis is trimmed laterally. Bunching is usually observed in the skin below the lateral canthus with this maneuver. This can be addressed by further mobilizing the skin off the orbicularis oculi and redraping the skin in a more vertical direction. The excess skin is then trimmed conservatively and the incision closed. Midcheek fat grafting is then performed using the Coleman technique in selected patients to correct deflation of the midcheek with aging present with many patients.<sup>24–26</sup> The fat is placed in tiny aliquots in a multiplanar manner. The volume of fat injected ranges from 1.5 to 3.5 cc per side of the cheek, depending on the degree of deflation present.



### Postoperative Care

The midcheek is taped with Steri-Strips (3M, St. Paul, Minn.) for 5 days; sutures are taken out after approximately 6 days. Lower eyelid massaging is started 2 weeks after the operation. This is performed by gently pushing the lower eyelid superomedially against the globe and holding it in position for 1 minute for up to five times per day. This is generally continued for approximately

1 month. Patients are seen weekly in the initial postoperative period to check on the lower eyelid position and healing in general.

### RESULTS

The mean operative time was 135 minutes (range, 95 to 180 minutes). The mean follow-up was 16 months (range, 3 to 56 months). Figures 3 through 7 show the long-term results



**Fig. 3.** Photographs obtained (*left*) before surgery and (*right*) 1 year postoperatively showing a 59-year-old woman who presented for facial rejuvenation. The lower blepharoplasty with midcheek lift by means of the facial soft-tissue spaces was used to address the midcheek aging. Concomitantly, a composite face lift was performed with facial fat grafting.

of patients with a range of anatomy treated with this technique. (See **Figure, Supplemental Digital Content 2**, which shows a 54-year-old woman with midcheek aging, before surgery and at 1 year after surgery. She underwent lower lid blepharoplasty with midcheek lift. The medial and middle fat pads were transposed over the orbital rim, and midcheek fat grafting was performed. An upper eyelid blepharoplasty was also performed. She is shown here at 1 year postoperatively, <http://links.lww.com/PRS/B490>. See **Figure, Supplemental Digital Content 3**, which shows a 64-year-old man who presented with a tired appearance and prominent eye bags before and after surgery. A midcheek lift, septal reset, and midcheek fat grafting were performed. He is shown here at 18 months postoperatively, <http://links.lww.com/PRS/B491>. See **Figure, Supplemental Digital Content 4**, which shows a 38-year-old woman who underwent a midcheek lift and composite lower face lift. No facial fat grafting was performed. She is shown here at 4 years postoperatively. Note the longevity of the midcheek lift, the correction of the tear trough deformity, and improvement of the nasolabial folds, <http://links.lww.com/PRS/B492>.) The midcheek lift by means of the facial soft-tissue spaces is effective and long lasting and may be used to address midcheek aging in isolation or in combination with other procedures such as a face lift. After at least 6 months following surgery, patients were asked to complete a simple questionnaire regarding their satisfaction with the operation. The great majority of patients [176 of 184 (96 percent)] were satisfied or very satisfied with the procedure. All patients demonstrated a significant improvement of the midcheek, with elimination of the eye bags and elevation of the lid-cheek junction, cheek prominence, and softening of the nasolabial fold. The revision rate was 2 percent (one for correction of the ectropion, one for removal of a stitch granuloma, and three for removal of residual lateral fat pads).

### COMPLICATIONS

Lower eyelid malposition or lower lid retraction and ectropion are the most worrying complications of midcheek lift performed by means of the lower eyelids. In this series, lower lid retraction occurred in three patients (1 percent) and ectropion occurred in two patients (1 percent). Prolonged chemosis (>3 weeks) occurred in 12 patients (7 percent). Chemosis occurred more commonly when this procedure was combined with upper eyelid blepharoplasty. Significant bleeding requiring evacuation was not seen in this series.

### DISCUSSION

To effectively rejuvenate patients with significant midcheek aging, three aspects of the aging midcheek would need to be addressed: first, the prominent eye bags; second, the sagging and laxity of the cheeks; and finally, the deflation or volume loss that occurs with aging.<sup>28–31</sup> Accordingly, incorporating a midcheek lift into the lower eyelid blepharoplasty will deliver the most optimal cosmetic result. This article describes an anatomical, preperiosteal approach to effectively mobilize the midcheek by using the facial soft-tissue spaces of the midcheek by precisely releasing the retaining ligaments (the tear trough/orbicularis retaining ligament complex) that separates them.<sup>22,23</sup> Because the facial soft-tissue spaces are anatomical gliding planes, dissection is bloodless and atraumatic. Recovery is quick, swelling and bruising are minimized, and complication rates are kept low.

Patient selection for this procedure includes patients with significant midcheek aging (i.e., laxity and drooping of the midcheek, deflation of the midcheek, and prominent nasolabial folds). The procedure has essentially three components, each of which plays a different role in addressing different aspects of midcheek aging. The relative importance of each of these maneuvers in individual patients varies depending on the individual anatomy. For the eye bags, fat excision (for true fat excess), fat transposition (to correct the tear trough deformity), or septal reset (for patients with a very prominent lid-cheek junction) was performed as indicated.<sup>27</sup> The preperiosteal midcheek lift as described here is used to manage the sagging or laxity in the midcheek. Finally, deflation of the midcheek with aging is managed with fat grafting (as needed). Fat grafting was needed in the majority of our patients (90 percent). Although it is difficult to qualitatively analyze how much the midcheek lift contributes to the overall result of this procedure, it is our conviction that the preperiosteal midcheek lift undoubtedly has a very profound effect on the overall results. Figure 7 shows long-term results of one patient who has had the midcheek lift and orbital fat transposition only, with no midcheek fat grafting (eliminating the confounding effect of the midcheek fat grafting on the overall results attained) (see also **Figure, Supplemental Digital Content 4**, <http://links.lww.com/PRS/B492>). The effectiveness and longevity are particularly evident in the thick heavy skin of Asian patients, with the long-lasting beneficial effect seen consistently on long-term follow-up as demonstrated here.



**Fig. 4.** Photographs obtained (*left*) before surgery and (*right*) 18 months postoperatively showing a 41-year-old man who presented with periorbital aging. A midcheek lift with eye bag fat pad transposition was performed. Facial fat grafting was performed at the same time. An upper eyelid blepharoplasty was also performed at the same time.

When considering midcheek lifts done through the lower eyelids, two planes of dissection are generally used, namely, the subperiosteal and the preperiosteal planes of dissection. The subperiosteal plane is popular for its simplicity and, when properly applied, is effective in lifting the midcheek.<sup>9–13</sup> However, the subperiosteal plane is often plagued with the problem of prolonged swelling and has significant potential complications.<sup>6,11</sup> The preperiosteal approach has been used by several authors,<sup>4,8</sup> but the anatomy is

complicated and not well described and thus the exact dissection approach is poorly understood. With recent advances in the understanding of the midcheek anatomy—particularly the anatomy<sup>14–21</sup> medially, that of the tear trough ligament and the premaxillary space<sup>22,23</sup>—we can now harness this knowledge in safely and effectively mobilizing the midcheek. The preperiosteal plane has some advantages over the subperiosteal technique in that, first, division of the ligament at the preperiosteal level allows the superficial fascia (consisting





**Fig. 5.** Photographs obtained (*left*) before surgery and (*right*) 1 year postoperatively showing a 53-year-old woman who presented with complaints of appearing tired and difficulty opening her upper eyelids. A midcheek lift and upper eyelid blepharoplasty with levator advancement were performed. The medial and middle fat pads were transposed over the orbital rim and the lateral fat pads conservatively excised. The excised fat from the upper eyelid and eye bags were grafted into the premaxillary space. Midcheek fat grafting was also performed.

of the composite of skin, subcutaneous tissue, and orbicularis oculi) to redrape and lift more effectively to tighten the superficial fascia. Second, as division permanently separates the superficial fascia from the deep fascia, recurrence is less likely (in contrast to the subperiosteal dissection which would, in essence, leave the tear trough/orbicularis retaining ligament complex from the

periosteum to the dermis intact). Lastly, swelling and bruising are much less than with the subperiosteal dissection.

Anatomically, like in other areas of the face, the retaining ligaments function to bind the layers of the facial soft tissues together and to stabilize the soft tissues to the facial skeleton.<sup>32</sup> The prezygomatic and premaxillary spaces in the midcheek



**Fig. 6.** Photographs obtained (*left*) before surgery and (*right*) 1 year postoperatively showing a 58-year-old woman who presented with difficulty opening her upper eyelids and eye bags. An upper eyelid blepharoplasty with levator advancement and a lower blepharoplasty with midcheek lift and fat grafting were performed. The medial and middle fat pads were transposed over the orbital rim. No fat was excised.

function as gliding planes to allow the superficial fascia (orbicularis oculi) to move independent of the deep fascia (lip elevators, zygomaticus major and minor, and levator labii superioris) during animation and communication. Because it is a gliding plane, it is avascular and “predissected.” This offers an atraumatic bloodless access to the midcheek soft tissues. To mobilize the midcheek at the level of the facial soft-tissue spaces, the key is in precise

release of key retaining ligaments of the midcheek; this is the tear trough/orbicularis retaining ligament complex. Conceptually, the release of the retaining ligaments is performed at the sub-superficial musculoaponeurotic system (SMAS) level, raising a composite flap.<sup>33</sup> From the preseptal space, upward traction of the roof of the space (i.e., the orbicularis oculi) is firmly applied while the orbicularis origins and retaining ligaments are





**Fig. 7.** This 42-year-old woman presented with the complaints of eye bags and appearing tired. A midcheek lift and fat transposition were performed. No fat grafting was performed. She also underwent upper blepharoplasty with levator advancement. She is shown here at 4 years postoperatively. Note the longevity of the midcheek lift, the correction of the tear trough deformity, and improvement of the nasolabial folds.

released with cutting cautery. This would take the dissection from the sub-SMAS preseptal space into the (sub-SMAS) premaxillary and prezygomatic spaces (medially and laterally, respectively). Direct visualization under loupe magnification is important during the release, with constant readjusting of the retractor inferiorly as the dissection progresses inferiorly, and staying close to the bone during the dissection. Small nerve branches (transitioning from deep to superficial) and blood vessels will come into view of the dissection during the release and can be safely retracted out of the dissection with the retractor. Specifically, named structures to look out for during the release include the angular vein medially and the zygomaticofacial nerve laterally when connecting the dissection with the premaxillary space and prezygomatic space, respectively.<sup>18,23</sup> The release is performed progressively, to the extent that the entire midcheek (with the nasolabial fold being the reference point) elevates freely with traction on the orbicularis oculi.<sup>34</sup> The midcheek lift is then fixated to the lateral orbital rim periosteum.<sup>35</sup> Of note, the maxillary and zygomatic ligaments are not released in this procedure. Release of maxillary and zygomatic ligaments is not necessary as aging of the midcheek occurs primarily at the roofs of the premaxillary and prezygomatic spaces, with laxity developing

here. Tightening the roofs of the premaxillary and prezygomatic spaces would effectively correct this. Leaving the maxillary and zygomatic ligaments intact is in fact advantageous as it minimizes the risks of morbidity and provides a stout fixation point across which the tissues cephalad to it (the roofs of the premaxillary and prezygomatic spaces, respectively) may be effectively tightened while maintaining support of tissues caudal to it (in the lower face).

Complication rates are low with this operation. To support the lower eyelid in the early recovery period, canthopexy was routinely performed for all patients.<sup>7</sup> As highlighted previously by other authors, patients with certain anatomy such as a negative vector orbit, preexisting scleral show (the so-called polar bear syndrome), and laxity and poor recoil of the lower eyelids are at greater risk of complications.<sup>36,37</sup> Particular care should be taken to ensure the lower eyelid is supported in a good position and posture at the end of the procedure with correct placement of the canthopexy suture.<sup>7</sup> In this series, ectropion occurred in two patients (ectropion rate, 1 percent). In one patient with previous lower eyelid surgery, the tarsoligamentous support of the lower eyelid was weakened by previous operations. Despite good lower eyelid position initially, ectropion developed after

2 weeks. Massaging was performed for 6 months, and a canthoplasty performed after 6 months corrected the problem. The second patient was a primary case and the ectropion was caused by a technical error in not placing the canthopexy suture posterior enough in the lateral orbital rim. This resolved after 3 months of lower eyelid massaging. Lid retraction occurred in three patients. This is caused by middle lamella contracture. The lower eyelid stiffened and was unable to elevate freely to at least the level of the pupil. Massaging and intralesional injection of a mixture of triamcinolone and 5-fluorouracil into the orbital septum was used with effective resolution of the problem. Prolonged chemosis occurred in 7 percent of patients. This usually resolved with conservative treatment of eye lubrication and lower eyelid massaging.<sup>38,39</sup>

## CONCLUSIONS

Using the midcheek facial soft-tissue spaces to mobilize the midcheek is a safe and effective technique. As the spaces are anatomical gliding planes, dissection is easy, atraumatic, and bloodless. The key is in precise release of the retaining ligaments that separate the spaces. Using this anatomy, recovery is quick and the results long lasting, with low complication rates.

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## PATIENT CONSENT

*Patients provided written consent for the use of their images.*

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The goal of *Plastic and Reconstructive Surgery*® is to inform readers about significant developments in all areas related to reconstructive and cosmetic surgery. Significant papers on any aspect of plastic surgery—original clinical or laboratory research, operative procedures, comprehensive reviews, cosmetic surgery—as well as selected ideas and innovations, letters, case reports, and announcements of educational courses, meetings, and symposia are invited for publication.