Transtemporal Endoscopic Multiplanar Upper Midface Lift (MUM Lift)

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Background: Minimally invasive techniques have been successfully applied to aesthetic improvement of brow ptosis and forehead rhytids. Because the face tends to age vertically more than obliquely, it makes sense to perform the correction in a more vertical direction.

Objective: We introduce an endoscopic vertical multiplanar upper midface elevation (MUM lift) that avoids extensive lateral temporal and preauricular incisions.

Methods: Between 1996 and 2003, 53 patients (8 men and 45 women) underwent MUM lift, an endoscopic transtemporal sub-superficial musculoaponeurotic system (sub-SMAS) and subcutaneous upper midface tissue release with verticolateral repositioning and fixation, in combination with an endoscopic-assisted forehead lift and blepharoplasties.

Results: Use of the various planes of release in the midface produced less tension on each layer and provided natural and improved facial rejuvenation of the upper midface in conjunction with forehead rejuvenation. At 6 months postoperatively, significant rejuvenation of the nasojugal groove was achieved, although some drooping of the lateral brow position (mean, 2.3 cm) was observed.

Conclusions: A transtemporal sub-SMAS and subcutaneous upper midface lift (MUM lift) in combination with limited incision foreheadplasty, reduces unnecessary vascular compromise on any particular layer and can be safely and predictably performed over the zygomatic muscle. (Aesthetic Surg J 2005;25:471-480.)

Since the introduction of endoscopy into aesthetic surgery by Core et al1 in 1992, there has been increasing emphasis on the benefits of improving the midface and forehead of the aging face using minimally invasive techniques. Application of advances in surgical technology has resulted in the evolution of foreheadplasty techniques.2-47 In particular, the use of video-assisted endoscopy for forehead rejuvenation led to increased interest in improving the position of the eyebrow, as well as correcting the stigmata of long-standing contraction of the corrugator supercili, procerus, and orbicularis muscles.2,3,13,18,19,21-23,42 Facial rejuvenation using endoscopic techniques has also undergone substantial modifications during the last 10 years. This approach generally accesses the brow through either a subgaleal or subperiosteal approach but does not address the underlying deep ptotic anatomic structures in the upper midface. Most patients who benefit from a correction of eyebrow ptosis and glabellar frown lines also require correction of the upper and lower eyelids as well as the upper midface to improve the overall aesthetics of the aging face.2,8,12-14,48 Usually, the effort to improve the appearance of the aging midface has utilized classical open techniques for greater mobilization of the anatomic layers and repositioning of the superficial muscular aponeurotic system (SMAS).

We began performing the endoscopic technique for improvement of the midface in 1994, based on our interest in endoscopic techniques reported by several authors1,2,15,16,20,24-26,50,51 as well as on our own experiences with the use of video-assisted endoscopic techniques in facial rejuvenation. After starting with video-assisted endoscopic subperiosteal dissection of the midface, we later shifted to subcutaneous dissection, as in conventional open procedures, performing subperiosteal dissection only in selected cases. The reason for this change in concept was to avoid the prolonged periorbital edema that occurred subsequent to the subperiosteal approach.

For treating the upper midface ptosis by freeing the deep plane of the malar fat pad, we combined the endoscopic subcutaneous and sub-SMAS midface approach as
well as the subperiosteal dissection in the center of the forehead by using the temporal approach. This technique allowed performance of a multiplanar (subperiosteal, sub-SMAS, and subcutaneous) vertical upper midface dissection and elevation of different planes without extensive preauricular incisions. Tissues were then redraped vertically and fixed to the deep temporal fascia.

We have used this technique for minimally invasive upper midface rejuvenation for more than 7 years. We now want to introduce the modified video-assisted endoscopic multiplanar upper midface lift technique (MUM lift). This technique involves using various planes of release to place less tension on each layer and thus provide a natural and improved facial rejuvenation of the upper midface as well as the forehead.

**Indications**

The modified video-assisted endoscopic upper midface lift (MUM lift), performed in conjunction with an endoscopic-assisted foreheadplasty, is indicated in young or middle-aged patients with moderate skin elasticity, or for those patients who do not want more radical surgery or a preauricular scar. Patients who exhibit a vertical descent of the midface (malar flatness), characterized by an oval configuration to the orbit with elongation of the lower eyelid skin and concomitant ptosis of the composite flap, including skin, muscle, and fat, and a prominent nasolabial fold and early jowl formation, are ideal candidates for this procedure. Patients who have undergone previous blepharoplasty and who exhibit lid retraction (Figure 1). The center of the forehead at the region of the glabella was infiltrated, as were the corrugators and procerus muscle, to obtain adequate vasoconstriction in the area to be dissected. The anterior temporal crest was infiltrated to produce hydrodissection and improve visualization. The infiltration continued laterally over the superior lateral orbital rim to the lateral canthus into the upper midface.

For forehead and upper midface rejuvenation, 4 or 5 access incisions were used (the central incision is optional and depends on the case). The surgery was performed with a 4-mm, 30-degree down scope, with a protection sleeve and irrigation system to keep the field clean.

The forehead was elevated through three 2-cm sagittal incisions 1 cm behind the anterior scalp line, and a standard subperiosteal forehead lift was performed. Following the forehead lift, the upper midface was elevated over the deep temporalis fascia (fascia temporalis profunda) in the scalp via a 3- to 4-cm transverse temporal incision 4 cm behind the anterior scalp at an open angle of about 120 degrees toward the helical rim (Figure 2). The incision was not parallel to the temporal hairline and was slightly perpendicular to the vector of repositioning. The lateral dissection extended over the deep temporalis fascia covering the temporalis muscle (sub-SMAS plane). This fascial layer, along with the forehead tissue, was elevated by detaching it along the temporal crest, performing blunt dissection.

The midface was approached sub-SMAS from the temporal area over the deep temporalis fascia. Subperiosteal dissection was performed inferolaterally to the sentinel vein, then between the sentinel vein and the zygomatic-temporal nerve (sensitive sensory nerve), and over the anterior surface of the zygomatic arch, until the midface was entered between the orbicularis oculi muscle and the suborbicularis oculi fat (SOOF). After identifying the zygomatic major muscle at the malar bone, the dissection changed from subperiosteal to sub-SMAS. Utilizing a periosteal elevator, the sub-SMAS dissection was continued on top of the zygomatic muscles. Blunt dissection proceeded slowly and carefully from the deeper tissues laterally, sweeping the dissector lateral of the parotid fascia until the zygomatic ligaments (McGregor’s patch) were encountered. Using a straight, round-tipped periosteal elevator, the zygomatic ligaments were released and stretched to allow elevation of the malar fat pad in the deep plane (Figures 3 and 4). The sub-SMAS dissection was carried out to the medial edge of the parotid gland, although the degree of the dissection was tailored according to the patient’s requirements.

The dissection on the malar area was performed under the orbicularis oculi muscle, leaving the septum orbitalis, infraorbital rim, SOOF, and zygomatic major
muscle deep to the periosteal elevator. The malar fat pad was left attached to the overlying skin so that it could be mobilized upward and outward by repositioning the skin during closure (Figure 4).

After sub-SMAS dissection in the midface was complete, a subcutaneous dissection starting from the temporal region was performed. It extended from the temporal region of the anterior zygomatic arch superficially in a plane to the lateral orbital rim and superiorly below to the temporal fusion line, continuing inferiorly in the facial region down to the lateral extension of the malar fat pad. The lower portion of the subcutaneous dissection was marked by a horizontal line that extended from the tragus to the mid alae of the nose medially (see Figures 1 and 2).

Once the 2 planes between the temporal muscle and the skin were released, the mobilized flap that contains the frontal branch of the facial nerve (high mesotemporalis) was advanced in a verticolateral direction until identifying incisor show confirmed adequate mobilization. Traction from the mesotemporalis fascia in a superior vertical direction provided a lift of the deep tissues, which were maintained in the proper position by anchoring the flap to the deep temporal fascia. In addition, the frontotemporal skin was lifted in a vertical direction and was also anchored to the temporal fascia. Several interrupted sutures were secured to the temporal fascia at the level of the access incision, allowing an open knot-tying technique and secure fixation of...
the flap (Figure 5). This biplanar dissection allowed lifting of 2 planes—the deep and superficial lateral and upper midface.

**Patients**

Between 1996 and 2003, 53 patients (8 men and 45 women, ranging in age from 41 to 53 years) underwent MUM face lift, including video-assisted transtemporal subperioseal, sub-SMAS, and subcutaneous tissue release, foreheadplasty and upper and lower blepharoplasties. All patients underwent a thorough, individualized preoperative evaluation to establish a correct diagnosis, evaluate asymmetries, estimate the desired degree of tissue repositioning, and decide on the level of fixation. In all patients, the distances of the nasojugal grooves and eyebrows (Figures 6 and 7, respectively) between defined points were measured preoperatively, and at 6 months and 12 months postoperatively. To analyze the position of the eyebrows, point A was located at the alar crease of the nose, in the intersection between a line through the lower part of the base of the nose and a perpendicular line crossing the most lateral part of the ala nasi; point B was located at the lateral end of the eyebrow; and point C was defined at the highest point of the mid-eyebrow.

**Results**

There were no complications, adverse reactions or side effects in the immediate postoperative period. The median follow-up was 14 months. No patients required a second procedure or prolonged drainage. No alopecia, swelling or seromatous fluid collection occurred.

The surgical outcome was evaluated according to the analysis of photographs obtained before and after surgery, and the analysis of pre- and postoperative measurements.

Significant brow elevation and rejuvenation of the nasojugal groove was achieved, although we observed some drooping of the lateral brow position (mean, 2.3 mm) 6 months postoperatively (Tables 1 and 2). Figure 8 illustrates the indications and results.

**Discussion**

Signs of aging of the upper third of the face include brow ptosis, redundant upper eyelid skin, herniated perilobital fat pads, hypertrophy of the orbital portion of the orbicular muscle, and suborbital fat. Aging in the midface area is characterized by ptosis of the malar tissues, hollowing of the infraorbital area, deepening of the nasolabial and malar labial folds, and increased jowling.

In recent years, minimally invasive procedures to improve brow ptosis and forehead rhytids have been successfully performed. Facial rejuvenation, and in particular forehead rejuvenation, has benefited from the incorporation of endoscopic-assisted techniques that eliminate the need for extended excisions and concomitant skin excision. Endoscopic facial surgery is gaining wide acceptance because it provides results comparable, if not superior, to the standard

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**Table 1. Preoperative and postoperative evaluation of the eyebrow position after endoscopic forehead surgery (N = 53)**

<table>
<thead>
<tr>
<th>Distance</th>
<th>Preoperative</th>
<th>6-Month postoperative</th>
<th>12-Month postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>6.7 cm ± 0.6 cm</td>
<td>7.4 cm ± 0.7 cm</td>
<td>7.0 cm ± 0.5 cm</td>
</tr>
<tr>
<td>AC</td>
<td>6 cm ± 0.5 cm</td>
<td>7.0 cm ± 0.5 cm</td>
<td>6.8 cm ± 0.9 cm</td>
</tr>
<tr>
<td>AD</td>
<td>6.7 cm ± 0.2 cm</td>
<td>6.8 cm ± 0.6 cm</td>
<td>6.6 cm ± 0.8 cm</td>
</tr>
</tbody>
</table>

*AB*, Distance between the alar base and the lateral eyebrow position; *AC*, distance between the alar base and the mid eyebrow position; *AD*, distance between the alar base and the medial eyebrow position.

**Table 2. Preoperative and postoperative evaluation of the position of the nasojugal groove after endoscopic upper midface lift (MUM lift) (N = 53)**

<table>
<thead>
<tr>
<th>Distance</th>
<th>Preoperative</th>
<th>6-Month postoperative</th>
<th>12-Month postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>5.8 cm ± 0.4 cm</td>
<td>6.3 cm ± 0.3 cm</td>
<td>6.0 cm ± 0.3 cm</td>
</tr>
</tbody>
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*AB*, Distance between the oral commissure and the nasojugal groove position.
SMAS rhytidectomy, with minimal scarring. Several authors have described techniques for correcting facial aging changes in the midface through an endoscopic approach.20,50-52,57-63

In contrast to subcutaneous rhytidectomy, which involves elevating a small amount of subcutaneous tissue and simply redraping the skin, transtemporal video-assisted endoscopic release of the 2 anatomic planes of the upper midface addresses the underlying deep ptotic anatomic structures. In this article, we describe new innovations in the endoscopic treatment of the ptotic brow, temple, and midface using minimally invasive techniques. Extensive release of midface ligamentous structures and wide undermining of the orbicularis oculi muscle and
entire upper and lateral midface are maneuvers that have been added to the standard endoscopic forehead approach, similar to the subperiosteal midface approach of Ramirez.34

By using the various planes of release (subperiosteal in the forehead, lateral orbital rim and anterior surface of the zygomatic arch, sub-SMAS and subcutaneous in the midface) the soft tissues of the cheek, forehead and lateral canthus, and the eyebrow can be repositioned in their youthful relationship with the underlying skeleton. Following video-assisted endoscopic redraping of different layers, less tension is placed on each layer. In addition, by comparison to open approaches, this modified video-assisted endoscopic multiplanar upper midface lift (MUM lift) releases the various anatomic planes without unnecessary vascular compromise of any particular layer. Suspension is achieved superolaterally to the deep temporal fascia, and this technique repositions the malar fat pad, SOOF, retroorbicularis oculi fat, and soft tissue overlying the periorbital and midface region. Because the face tends to age vertically more than obliquely, it makes sense to perform the correction in a more vertical direction. This correction of the upper midface will provide harmonization of the upper and lower thirds of the face and neck without a preauricular incision and/or laterally retracted lower lids. It addresses the underlying deep facial ptotic anatomic structures by redraping them in a more vertical direction. This is in accordance with the modified approach to the midface by Fuente del Campo.64 Through a temporal incision, Fuente del Campo dissected between the parietemporal fascia and the superficial layer of the temporal aponeurosis, as described in our technique, but then used a small incision in the auricular triangular fossa for dissection of the zygomatic arch subperiosteally, and approached the midface and released the SMAS by a preauricular vertical incision through the temporal approach. This procedure seemed to us more invasive and involved a greater risk of injury to the frontal branch of the facial nerve by subperiosteal dissection of the zygomatic arch and transection of the preauricular temporal vessels.

Until now, there were no valid and comparable data available in the literature concerning long-term results of transtemporal video-assisted multiplanar midface lift procedures. Such discussion of the long-term results and complications of these procedures is needed. Nevertheless, it now appears that in some patients, particularly those with heavy foreheads and cheeks, there is a tendency for the brow elevation to relax following endoscopic forehead lift.13 This relaxation is caused by gravitational and intrinsic factors (which also affect results obtained with open approaches). To minimize a relapse following adequate dissection and tissue release, we believe the suspension should be located between the

Figure 5. Intraoperative view of a patient undergoing an upper midface lift (MUM lift). After mobilizing the midface tissues and the SMAS fascia, the mesotemporalis fascia is repositioned, suspended, and fixed to the deep temporalis muscle fascia.
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SCIENTIFIC FORUM

Figure 6. Schematic drawings illustrating evaluation of the position of the nasojugal groove. Measurements were taken along a perpendicular line from the nasojugal groove (B) to the intersection (A) between the horizontal line of the oral commissure and the vertical line perpendicular to the lateral limbus. A, Preoperative analysis. B, Postoperative evaluation.

Figure 7. Schematic drawings illustrating the estimation of the position of the eyebrows. Measurements were taken from the alar base (A) to the lateral portion (B), the mid portion (C), and the medial portion of the brow (D). A, Preoperative measurement. B, Postoperative evaluation.

temporoparietalis fascia and the temporal fascia, with extensive tension and probably combined with the use of an Endotine midface device (Coapt Systems, Palo Alto, CA).

Conclusion

Limited incision foreheadplasty techniques in combination with the MUM lift reduce unnecessary vascular compromise on any particular layer and can be safely and pre-
Figure 8. A, C, E, Preoperative views of a 56-year-old woman with ptosis of the eyebrows, periorbicular wrinkles, and deep nasojugal grooves. B, D, F, Postoperative views 6 months after endoscopic-assisted forehead suspension, upper blepharoplasty, and upper midface lift (MUM lift). Note the reduction of the periorbicular wrinkles, the reduction of the nasojugal groove, and the repositioning of her eyebrows at a more youthful position.
dictably performed over the zygomatic major muscle. The incisions can be nicely concealed within the hairline.

References


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