Anatomic Comparison of the Deep-Plane Face-lift and the Transtemporal Midface-lift

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Objective: To identify whether the deep-plane face-lift or the extended transtemporal subperiosteal midface-lift is more effective in correcting midfacial ptosis.

Methods: Five cadaveric dissections were performed with a unilateral transtemporal subperiosteal midface-lift followed by a deep-plane face-lift on the same hemi-head. Three suspension sutures were evaluated—transtemporal midface-lift, zygomaticofacial and melolabial sutures, and a deep-plane face-lift suture—to determine the degree of elevation on the nasolabial fold. Statistical analysis was performed to compare their effectiveness.

Results: The melolabial suture elevates the nasolabial fold 43.2% more than the deep-plane suture (P = .03) and 29.2% more than the zygomaticofacial suture (P = .10). At no point did the deep-plane suture offer more elevation than either the zygomaticofacial or melolabial suture.

Conclusions: Midface-lifting surgery is challenging owing to the difficulty of adequately releasing the soft tissues overlaying the zygomaticomaxillary region and re-suspending them effectively. A comparison of the extended transtemporal midface-lift and deep-plane face-lift demonstrates the statistically significant advantage of the transtemporal midface-lift on elevating the nasolabial fold, particularly the melolabial suspension suture.

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Patients commonly seek facial cosmetic surgery because of midfacial soft-tissue descent and deepening of the nasolabial folds (NLF). There have been many attempts to address these age-related changes to the midface, both surgically and nonsurgically. Effective aging face surgery is predicated on releasing the tissues to be repositioned and effective resuspension. Hamra initially described the deep-plane (DP) face-lift, offering an effective technique to elevate the soft tissues of the midface, including the cheek mound, while improving the NLF. Subsequently, he reported that these results did not last more than 2 to 3 years in a study that included 20 patients who were evaluated 2 to 12 years postoperatively. While this study offered additional information, demonstrating that the effect on the NLF was suboptimal over a long period of time compared with the effect on the jowls, there were no empirical data to accurately describe the precise length of correction to the NLF. As such, the DP face-lift is still one of the most effective techniques presently available for correction of the midfacial drop and improvement to the NLF.

The extended transtemporal subperiosteal midface-lift pioneered by Anderson and Lo and furthered by Ramirez offers a promising advancement in midface rejuvenation surgery with a complete subperiosteal midface dissection and an extended dissection over the zygomatic arch and masseter, widely mobilizing the masseteric fascia and connecting it to the subperiosteal dissection plane. The immediate effects on the midface previously reported are elevation of the ptotic tissues, improvement of infraorbital hollowing, effacement of the NLF, and restoration of youthful volume proportions over the zygoma and malar eminence. An intraoral incision can be included to directly access the NLF and add an additional melolabial fixation suture, in the melolabial mound just above the NLF, anchored to the deep temporal fascia. To our knowledge, there has been no long-term study to accurately assess the long-term effect of this technique on the midface and the NLF.

While there is a paucity of literature on the long-term results of the DP face-lift and the transtemporal subperiosteal midface-lift, to our knowledge there has been no direct comparison of their intraoperative...
efficacy. Combining these techniques in live patients presents a considerable technical challenge owing to the thin flap of orbicularis muscle and peristeum between the plane of the DP face-lift and the midface dissection. This study was performed to objectively quantify the effectiveness of the 2 techniques on NLF elevation and determine the technical feasibility of combining the 2 procedures.

Five cadaveric hemiheads were dissected in a bioskills laboratory with both the DP face-lift and the transtemporal subperiosteal midface-lift being performed on the same side. The midface dissection was performed first. The midface dissection was described by Quatela and Jacono with the addition of a gingivobuccal sulcus incision as an access point for placement of suspension sutures. The DP dissection was performed as described by Hamra. Three points of fixation were assessed: the zygomaticofacial (ZF) and melolabial (ML) fixation sutures of the midface-lift and a DP suspension suture (Figure). The ZF fixation point is approximately 1 cm lateral to the inferior orbital rim, just lateral to the location of the ZF sensory nerve. The ML fixation suture is in the melolabial mound just above the NLF. The DP fixation suture is at the superior edge of the DP entry point. A reference point was created on the NLF using an indelible marker, and the NLF was positioned to its most inferomedial resting position. Each individual fixation suture was pulled in a vector native to the orientation of its anchoring point to deep temporal fascia to maximally distend the NLF. Measurements were made and recorded for each suture, and statistical significance was determined using a paired t test directly comparing each of the 3 points of fixation. The measurements for the midface fixation sutures were performed prior to the DP face-lift dissection and suspension.

RESULTS

During the DP face-lift dissection, 3 of the 5 orbicularis muscle/peristeal flaps (60%) sustained small perforations. The average elevation of the NLF with the ML suture was 10.6 mm, while the average elevation of the DP suture was 7.4 mm, with the ML suture elevating the NLF an average of 43.2% more (3.2 mm). This difference was statistically significant (P = .03). When comparing the ZF fixation suture to the ML suture there were average elevations of 8.2 mm and 10.6 mm, respectively, on the NLF, with the ML suture elevating the NLF an average of 29.2% more (2.4 mm) (P = .10). The ZF suture elevated the NLF 0.8 mm more, on average, than the DP suture (8.2 mm vs 7.4 mm; P = .32). There was no data point where the DP suture elevated the NLF more than either the ZF or ML midface sutures. In all subjects the ML, DP, and ZF sutures resulted in effacement of the NLF.

Both the DP face-lift and the transtemporal extended midface-lift offer valuable techniques for elevating the midface soft tissues and effacing the NLF. The permanence of these procedures has yet to be fully determined. Hamra commented that he thought that the effect of the DP face-lift on the NLF was relatively short compared with the result of the superficial musculoaponeurotic system (SMAS) lift on the jowls and jaw line. This conclusion was made after reviewing patients 2 to 12 years after their surgery and was retrospective and subjective in nature. Hamra stated that because the vector of pull on the midface by the DP face-lift is more lateral than vertical, there is a relatively short duration of effect. In addition, he concluded that to get a more permanent correction in the NLF, the skin, malar fat pad, and musculature (orbicularis and zygomaticus) need to be repositioned as a composite flap. Additional modifications made by Hamra to the DP face-lift with the composite rhytidectomy and the zygo-bucellar dissection plane were to address the malar crescent deformity, improve the longevity of the result, and improve prolonged postoperative periorbital edema, respectively, with no increased effect on the NLF. The transtemporal extended midface-lift repositions the midface and NLF as a composite flap in a more vertical vector with its fixation sutures being anchored more superiorly to the deep temporal fascia. The vector for the DP face-lift requires a more superior and lateral vector to allow for redraping of the skin around the ear (Figure 1).

In addition, Hamra discussed flap biomechanics in his review of the DP and the long-term effects on the NLF, stating that a point of fixation farther from the area of desired effect moves less of a distance than a point closer to the area of effect and, conversely, that the closer the point of fixation on the flap is to the area to be addressed, the higher the likelihood for long-term reposi-

Figure. Illustration of all 3 points of suspension and their vectors of suspension. DP indicates deep plane; ML, melolabial; ZF, zygomaticofacial.

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tioning. In the DP face-lift, the point of fixation is a line between the angle of the mandible and the lateral canthus to the lateral aspect of the face-lift incision line and is relatively distant from the NLF. In the transtemporal subperiosteal midface-lift, the points of fixation are the ZF and ML sutures that are anchored to the deep temporal fascia, with the ML suture directly adjacent to the NLF.

In the present study, several of the principles previously described by Hamra hold true, illustrating the advantage of the transtemporal midface-lift over the DP face-lift on the NLF. The ML fixation suture resulted in a statistically significant greater elevation of the NLF over the DP suspension suture of 43.2% (3.2 mm) (P = .03). The placement of this suture above the NLF in the melolabial mound also helped efface the NLF, not deepen it, as might be expected if placed in the NLF. First, the midface-lift is a wide subperiosteal dissection that allows for the midface to be positioned as a composite flap of skin, malar fat, muscle, and periosteum in a more vertical orientation. Second, the ML suture is immediately adjacent to the NLF and, based on the amount of movement and principles of flap biomechanics, offers a clear advantage over the DP suspension suture while potentially offering a more long-term effect. Although the average improvement in the elevation of the NLF was higher when comparing the ML suture with the ZF suture and the ZF suture with the DP suture (2.4 mm and 0.8 mm, respectively), the difference was not statistically significant (P = .10 and P = .32, respectively). This is most likely due to the low power of the study, and both of these trends would most likely reach statistical significance with a larger series. Despite the low power of the study, the effect of the ML suture over the DP suture was significant, speaking to the enormous advantage the ML suture offers in elevating the midfacial mound and NLF.

While long-term data on the effect of the transtemporal midface-lift and DP face-lift have yet to be fully described, it is clear that the transtemporal midface-lift offers a considerable advantage in the amount of elevation achieved on the NLF. Additional data have demonstrated that long-term effects by the transtemporal subperiosteal midface-lift are sustainable, with a statistically significant average decrease of 2.5 mm of the vertical height of the lower eyelid at 1 year (A.A.J. and B.C.S., unpublished data). Keeping in mind biomechanical principles affecting flap movement, it is hardly surprising to observe the improved effect of the ML suture on the NLF. During this procedure the entire midface is degloved and resuspended in a higher position while the periosteum heals to the bone of the maxilla and zygoma, theoretically increasing the likelihood of affecting a more permanent result.

Initially, this study was designed to determine if the 2 procedures could be performed simultaneously on patients in a safe manner. The flap of orbicularis oculi muscle and periosteum between the 2 planes of dissection was thin, and perforation occurred in 60% of the dissections. The results of this study demonstrate that adding a DP face-lift to the procedure offers little additional advantage to the NLF elevation over the midface-lift as an isolated procedure, particularly when adding the intraoral incision and ML suspension suture. In addition, the viability of the flap of muscle and periosteum would be tenuous, particularly with the tendency to perforate the flap during the procedure.

Following principles of flap biomechanics previously discussed by Hamra, the ideal procedure to elevate the soft tissues of the midface and NLF should be a procedure that has a fixation point adjacent to the tissue to be elevated with a vector of pull that elevates the tissues as a composite flap. While there is no perfect procedure to address the midface and NLF, the extended transtemporal subperiosteal midface-lift offers the characteristics mentioned herein, with a clear advantage over the DP face-lift in its ability to elevate the NLF while providing potentially long-lasting results.

As an isolated procedure, the deep-plane face-lift is more comprehensive in its rejuvenation because it addresses not only midface ptosis but also that of the jawline and neck. It seems from this study, however, that a combination of a transtemporal extended midface-lift with an extended SMAS flap rhytidectomy yields better results in the midface while also addressing the jawline and neck.

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