

The adjustable vector deep plane midface lift

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Those of us who perform cosmetic oral and maxillofacial surgery have lived through some interesting times. More technologic advances have been made in the past decade than in the previous century. We have seen exponential changes in biomaterials, instrumentation, anesthesia, and surgical technique. Laser technology, Botox, Gore-Tex implants, radiowave surgery, and endoscopic surgery are just some examples. This technology has provided increased rejuvenative options and mitigated healing and recovery. Simply put, it is easier to have cosmetic surgery now than it was 20 years ago.

Another paradigm shift in cosmetic surgery has been the age of the prospective cosmetic patient and the change in societal views regarding cosmetic surgery. Even 20 years ago, cosmetic surgery was a well-kept secret of the wealthy and usually was not discussed in public. Conversely, the aging baby boomers are demanding cosmetic surgery at a younger age in an effort to maintain youth and remain competitive in the workplace and social settings. More patients are having smaller procedures at a younger age. Many patients view cosmetic surgery as “appearance medicine” and wish to combat the aging process in the same manner as they would other health problems.

Finally, the popularity of the Internet has ushered in the information age, and the average patient easily can become well educated or, in some instances, “miseducated” on cosmetic rejuvenative options. Whereas the doctor was once the authority, it is not uncommon for patients to request a specific technique or procedures.

Midfacial aging

Extrinsic factors, such as actinic radiation, heat, wind, smoking, and alcohol consumption, contribute to the aging midface along with intrinsic factors. Facial aging is a process of deflation, much like the transformation from a grape to a raisin. Volume loss, skin damage, fat atrophy, and fat descent contribute to this process. The youthful midface is plump and rounded partly because of the position of the malar and buccal fat pads. As the midface ages, the fat pads can atrophy and migrate gravitationally. Ligament laxity, cutaneous elastosis, and muscular laxity contribute to malar fat pads becoming part of the jowl complex in the aging face. This also causes the heart-shaped face of youth to become a more squared face in senescence. As accurately stated by one of my patients, “My high cheeks have become my low jowls.”

Aging changes also cause formation of nasolabial folds, which are one of the most feared changes of aging and frequently requested areas of improvement. The malar fat pad is a pyramidal shaped structure, with the base of the triangle lying against the nasolabial area and the apex overlying the malar area (Fig. 1). As aging changes take place, the malar fat pad settles inferiorly and its base accentuates the nasolabial fold.

The lower eyelid complex also greatly contributes to midfacial aging. Dermatochalasis is the term for redundant and crinkly skin of the eyelids. Steatoblepharon is the herniation of the periorbital fat pads into the periorbital region. These conditions, combined with the descent of the malar fat pad, cause classic infraorbital and midfacial aging changes. The youthful midface



Fig. 1. The approximate position of the malar fat pad in the midface.



Fig. 2. The transition from the single convexity of youth to the double convexity of the aging face.



Fig. 3. By aligning soft tissues of the nasion point with the lacrimal caruncle midfacial oblique, photographs can be standardized easily.

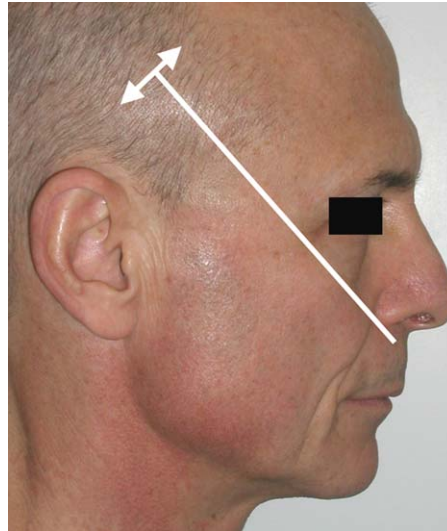


Fig. 4. A 2-cm incision (*solid line*) is made perpendicular to the alar-canthal line (*double arrow line*) several centimeters into the temporal tuft.

is a single convexity structure when viewed in profile from the lower lid down to the cheek. Aging changes in the skin, muscle, and fat cause a double convexity as the lower eyelid fat bags bulge (Fig. 2). The descent of the malar fat pad also contributes to an increased hollow from the lower lid to the cheek and accentuates the nasojugal fold, which is also called a “tear trough” deformity.

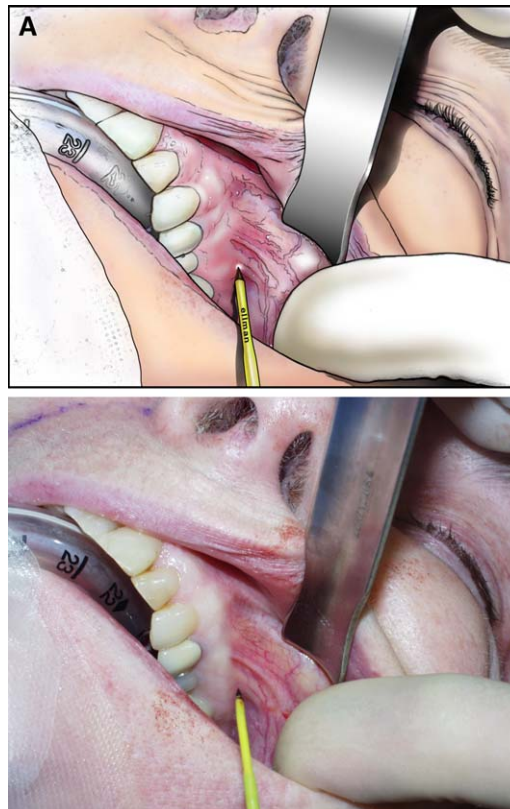


Fig. 5. (A) The Ellman microsurgical electrode is used to make a vestibular incision approximately 5 mm above the attached gingiva from the cuspid to the first molar region. (B) The dissected maxilla with the infraorbital nerve (*circle*).

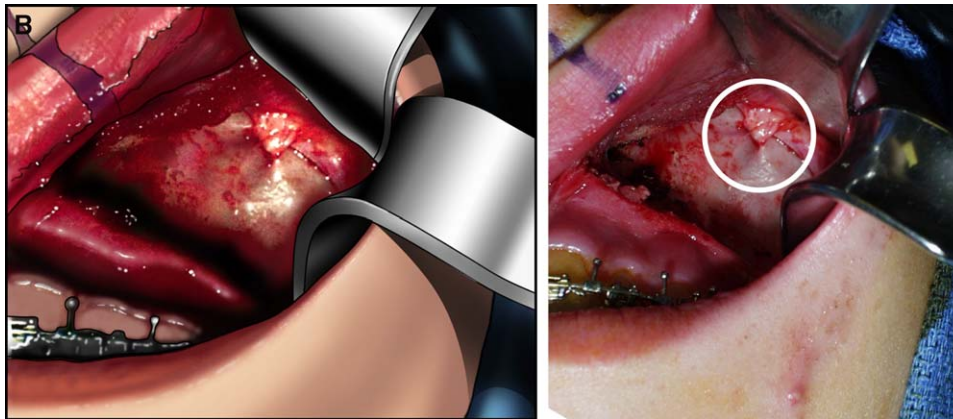


Fig. 5 (continued)

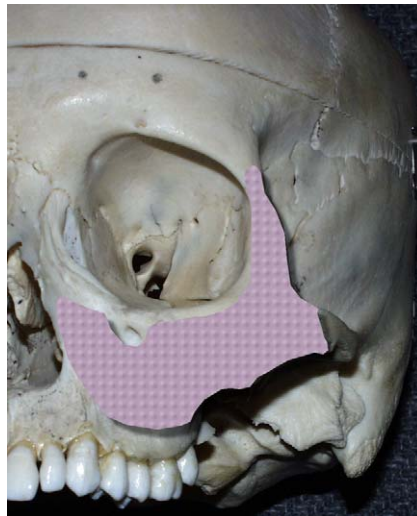


Fig. 6. The outlined area illustrates the area of subperiosteal dissection.



Fig. 7. (A) A 2-cm incision is made in the temporal tuft with a scalpel or the Ellman radiowave microneedle. (B) Blunt dissection is performed until the shiny superficial layer of the deep temporal fascia is located. This is the safe plane to protect the frontal branch of the facial nerve. (C) Instead of a straight line incision, an ellipse of scalp may be removed to provide more lift in the temporal and lateral orbital regions.

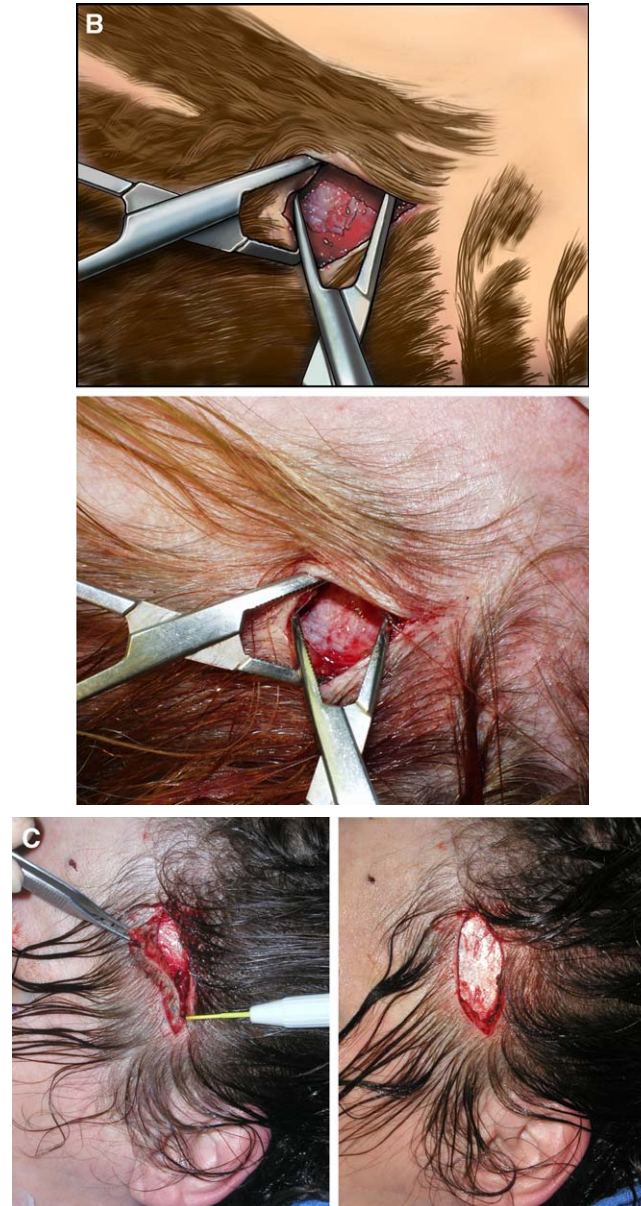


Fig. 7 (continued)

Although these aging changes are visible on virtually every patient over 40 years of age, the midface is often overlooked in total facial rejuvenation. Many surgeons may perform five or six concomitant procedures in an all-day operation without ever addressing the midface. Failure to address the midface shortchanges a patient on rejuvenation and, more importantly, can contribute to the “operated look” too often seen with facial rejuvenation. Many surgeons do not address the importance of midface rejuvenation unless a patient has a specific request (eg, “cheekbones”). Moderate enhancement of malar and midfacial volume, in the author’s opinion, amplifies rejuvenation in a large segment of the cosmetic population.

Diagnosis

Diagnosis of midfacial aging simply involves examining the aging changes previously described. A ptotic midface is usually the result of malar fat pad descent and skin wrinkling with or without lower eyelid changes. Deepened nasolabial folds and vertical lip rhytides are

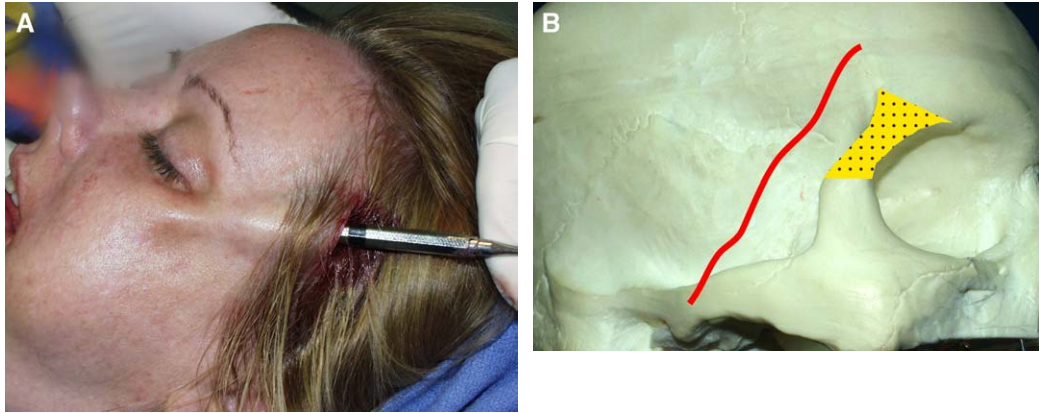


Fig. 8. (A) A periosteal elevator is used to enter the subperiosteal plane over the frontozygomatic area of the lateral orbital rim. (B) The approximate course of the frontal branch of the facial nerve is shown as it traverses the temple. The highlighted area shows the safe area of dissection over the lateral orbital rim to avoid the frontal branch.

frequently seen. Malar hypoplasia—although not a result of aging—also can be addressed with midface lift. Many patients request malar enhancement, even in the youthful population, to augment the hypoplastic midfacial area. Although digital imaging may be used to illustrate surgical prediction, having a patient smile can give the patient and surgeon an idea of what a potential augmentation may look like.

Surgical options for midface rejuvenation

As with any anatomic area, multiple options exist to assist with midface rejuvenation. Malar implants have been a staple for enhancing the hypoplastic or senescent midface. They are easily

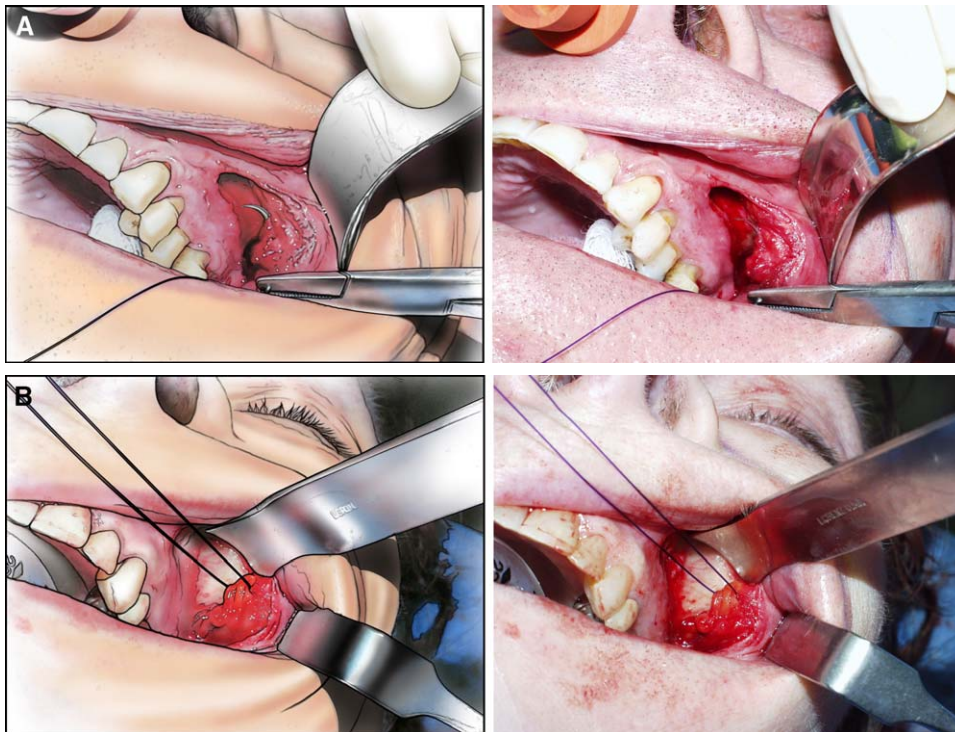


Fig. 9. (A) The malar fat pad tissue is secured with a 2-0 PDS suture. (B) The malar fat pad and surrounding tissues are secured in preparation to pass through the temporal incision.

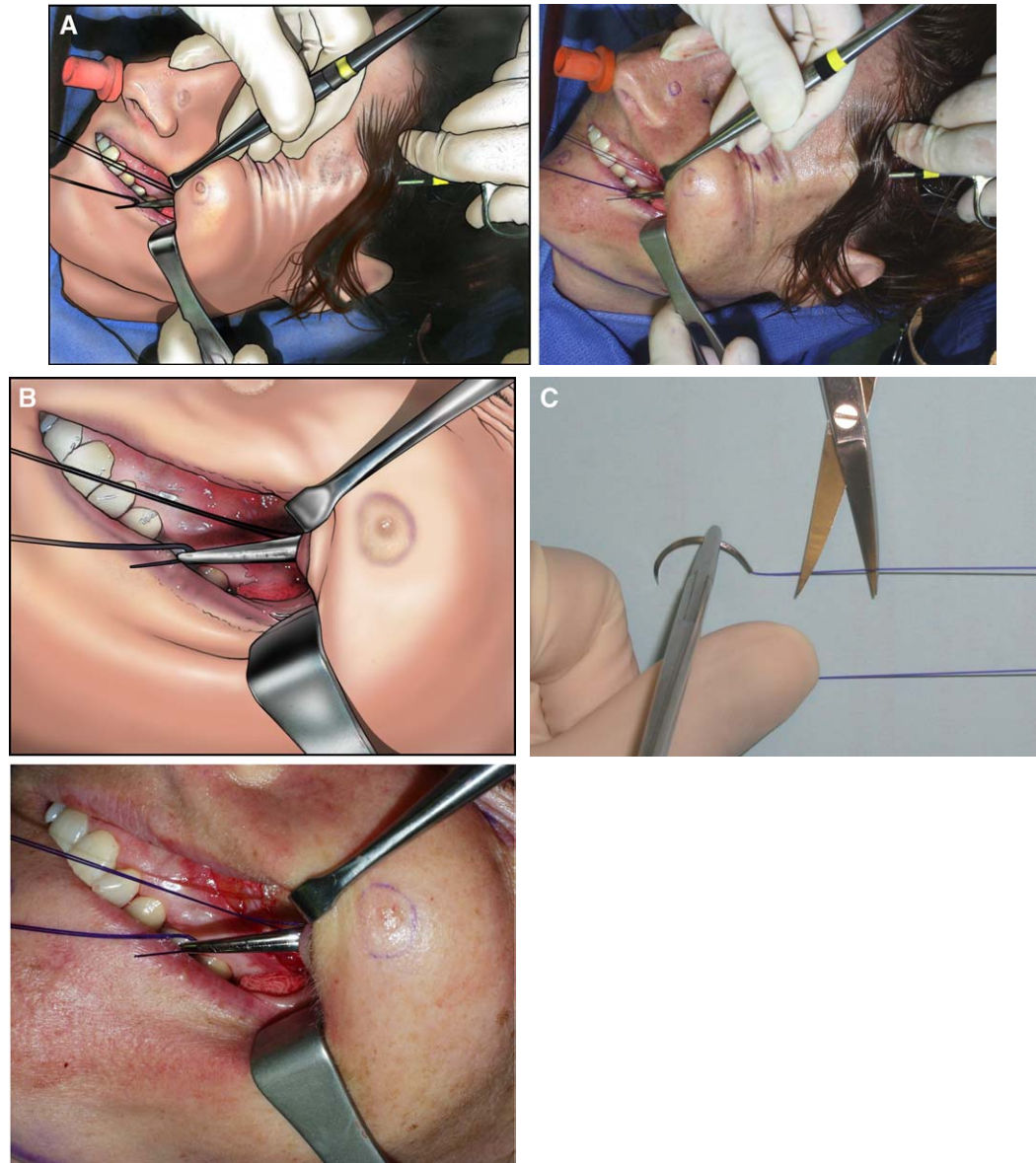


Fig. 10. (A) A tonsil clamp is passed through the dissection tunnel and into the mouth. (B) A close-up view of the tonsil clamp securing the intraoral suture. (C) The needle is cut from the suture to pass atraumatically through the temporal dissection tunnel.

placed and predictable, but their position and size are critical in a natural appearance. Injectable fillers, including fat, bovine and human collagen, hyaluronics, and synthetic substances, may be used exclusively or in conjunction with other procedures. Skin resurfacing of various modalities can assist by effacing rhytides. Techniques of suture suspension of the midfacial structures also have been used.

Midface lifting by various modes has been used by surgeons for decades. Surgical elevation of the midfacial structures has been described with temporal, transblepharoplastic, intraoral, and superficial skin incisions. Each of these approaches has benefits and drawbacks. The author believes that lower blepharoplasty approaches for midface lifting are problematic because they are more complicated and can result in lower eyelid malposition. The remainder of this article is dedicated to describing the midface lift technique used by the author for the past 6 years with excellent success. This technique involves a small superficial temporal incision similar to temporomandibular joint temporal access and a small intraoral incision similar to dentoalveolar procedures. Familiarity with these surgical approaches makes the described technique of

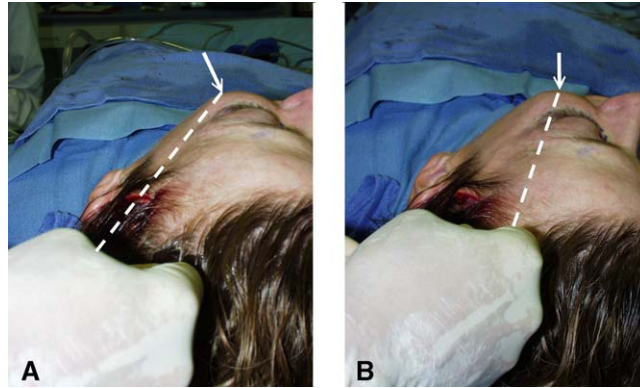


Fig. 11. (A) The zygomatic elevation from securing the fat pad in the first molar region. (B) The more infraorbital elevation from grasping the fat pad in the cuspid area. Adjustability in this procedure is determined by where the fat pad is secured on the intraoral flap.

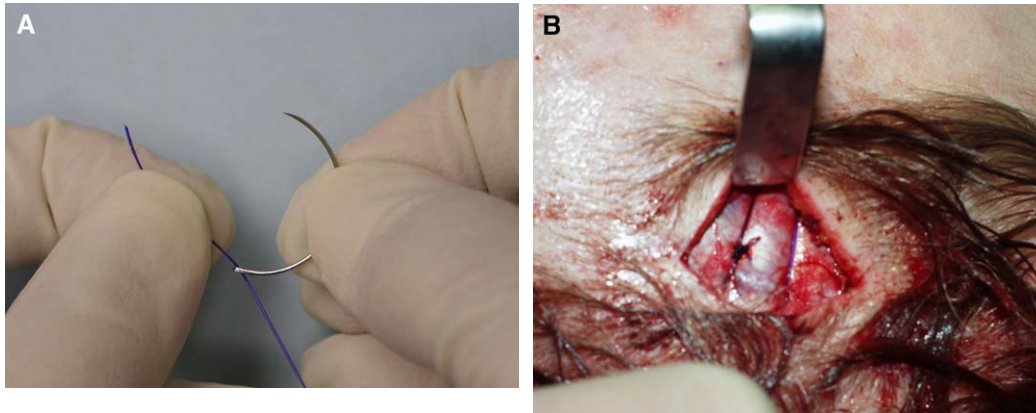


Fig. 12. (A) A passing needle is threaded over one of the suture ends to enable suturing to the temporalis fascia. (B) The suture is rethreaded on a needle and sewn to the superficial layer of the deep temporal fascia.



Fig. 13. A typical intraoperative result. The midface frequently appears overcorrected because of supine patient positioning and edema, but overcorrection is rare in the author's experience.

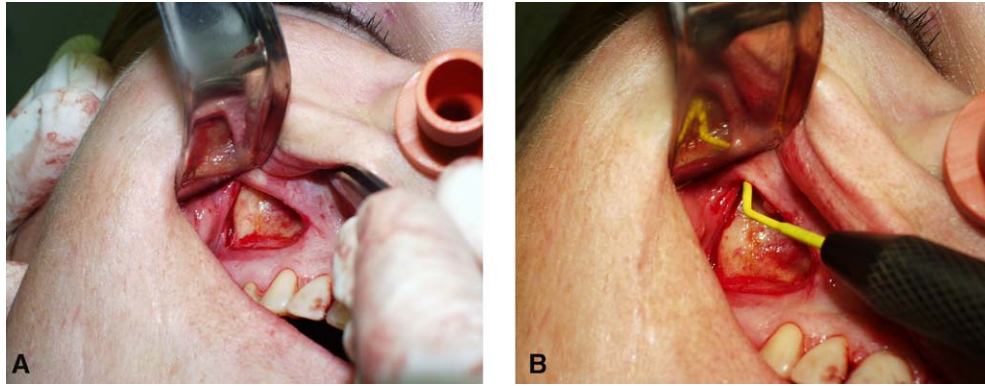


Fig. 14. (A) A tethered incision that will not close primarily because of elevating various tissue layers with the suspension suture. (B) The Ellman radiofrequency microneedle releases the tethered tissue to enable primary closure.



Fig. 15. (Left) Decreased ability to pucker and smile immediately after midface lift. (Right) This situation spontaneously resolved over several weeks.



Fig. 16. Wound dehiscence in a cigarette smoker that persisted for 4 weeks and required closure.



Fig. 17. A 43-year-old woman before (*left*), 3 months after (*middle*), and 6 months after (*right*) midface lift, lower transconjunctival blepharoplasty, and full-face CO₂ laser resurfacing.

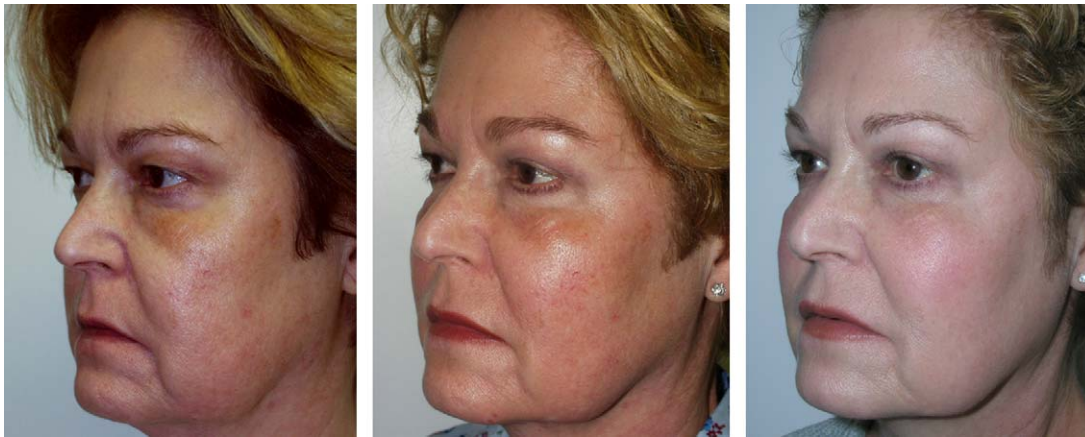


Fig. 18. A 56-year-old woman before (*left*), 4 months after (*middle*), and 8 months after (*right*) midface lift only.



Fig. 19. A 47-year-old woman before (*left*) and after (*right*) midface lift, mini facelift, and full-face CO₂ laser resurfacing.



Fig. 20. Midfacial augmentation before (*left*) and 4 months after (*right*) maxillary and mandibular osteotomy and midface lift for further midfacial volume.

midface simple in the hands of most oral and maxillofacial surgeons. This technique may be performed as an isolated procedure or in conjunction with other facial surgeries. It is most often used to lift the ptotic aging midface, but it may be used as an adjunct for malar augmentation in maxillary osteotomy surgery and to restore symmetry in some trauma cases.

Patient selection

This procedure is designed to elevate normal anatomic structures (namely the malar fat pad and surrounding tissues) to a more youthful position. This procedure is much less advised or contraindicated in catechetic patients or patients with an atrophic midface or facial wasting from disease. The key to this procedure is to elevate the ptotic malar fat pad (and surrounding tissues); if the patient has no fat pad or a small or atrophic one, then there is nothing to lift. Paying close attention to this fact may prevent disappointing results and disappointed patients. Smokers should be educated on the possibility of wound dehiscence, and denture wearers may not be able to wear their prosthesis for several days because of impedance of the suture line.

As with any procedure, failure to use preoperative informed consent can turn a sequela into a complication. Three significant but transient postoperative sequelae occur with this procedure: infraorbital paresthesia, midfacial swelling, and dysfunctional perioral animation.

Temporary numbness of the distribution of the infraorbital nerve occurs in most cases and is a result of dissection and manipulation of the tissues adjacent to the infraorbital nerve. This is the same phenomenon that can occur with maxillary osteotomy and Caldwell-Luc procedures



Fig. 21. A 60-year-old woman before (*left*), 3 months after (*middle*), and 1 year after (*right*) midface lift, endoscopic browlift, four-quadrant blepharoplasty, and full-face CO₂ laser resurfacing. This case is a good example of how a midface lift can fit in the scheme of total face rejuvenation.



Fig. 22. Close-up view of the same patient in Fig. 21 shows the improvement of the lower eyelid complex from midface lift and related cosmetic procedures. The lower eyelid complex and malar area maintained improvements at 3 months and 1 year after the operation.

and always has been temporary in the author's experience. Postoperative swelling, as with most maxillary or midfacial procedures, can be significant and may persist for several weeks. Finally, dissection of the periosteum from the midface (similar to maxillary osteotomy) results in a temporary disruption of the lip elevators. The patient should expect 1 to 2 weeks of dysfunctional animation, especially when smiling or puckering. In the author's experience, none of these sequelae has persisted postoperatively in any patient.

By elevating the cheek, some patients are left with redundant lower eyelid skin and wrinkles caused by increased tissue volume of the lifted cheek. These patients usually are concomitantly treated with periorbital CO₂ ultrapulse laser resurfacing or lower transconjunctival blepharoplasty and must be advised of this preoperatively. If concomitant lower blepharoplasty is planned, the midface lift should be performed first because it may contribute to an increase in the soft tissues of the lower eyelid.

Surgical technique

Before surgery, a full-face frontal photograph is taken, a lateral full-face photograph is taken on both sides with Frankfurt horizontal parallel with the ground, and oblique views are taken on both sides. To standardize the oblique views properly, nasion point should be adjacent to the lacrimal caruncle for repeatable positioning (Fig. 3).

The patient is marked with a surgical pen while in the upright position. The area of maximum desired augmentation is noted and marked. A temporal tuft incision is marked in a similar



Fig. 23. A 35-year-old man preoperatively (*left*), 4 weeks after (*middle*), and 8 months after (*right*) midface lift, fat injection to the nasolabial folds, and CO₂ laser resurfacing to the nasolabial folds. This patient has somewhat atrophic malar fat in the preoperative photograph; therefore, he was a marginal candidate for midface lift alone.



Fig. 24. Preoperative (A) and 1 month postoperative (B) photographs of a patient treated only with midface lift. Note the improvement of the malar and infraorbital areas.

manner as for endoscopic brow lifting. A 2-cm incision is marked several centimeters posterior to the hairline, perpendicular to a line that connects the lateral ala and the lateral canthus of the orbit (Fig. 4).

The author has performed this procedure with local anesthesia but most commonly uses intravenous sedation. The hair is prepared, and several milliliters of 2% lidocaine, 1:100,000 epinephrine, is infiltrated subcutaneously at the planned temporal incision. Several milliliters of the same local anesthesia are also infiltrated subperiosteally over the lateral orbital rim above and below the frontozygomatic suture. Intraorally, the anterior maxilla is infiltrated with the same local anesthesia from the piriform aperture medially to the origin of the masseter tendon overlying the malar eminence. Superiorly the local anesthesia is infiltrated to the level of the infraorbital rims bilaterally.

After waiting sufficient time for vasoconstriction, a vestibular, full-thickness subperiosteal incision is made approximately 5 mm superior to the attached gingiva from the cuspid area to the maxillary first molar area (Fig. 5A). Using a #9 periosteal elevator, a subperiosteal dissection is performed from the piriform aperture medially to the area where the masseter tendon is visualized laterally at the beginning of the zygomatic arch. Superiorly the dissection is made just inferior to the inferior orbital rim, with extreme caution exercised to protect the infraorbital nerve (Fig. 5B). This is essentially the same incision and dissection used on a single side of a maxillary osteotomy. Occasionally, the zygomaticofacial nerve may be seen laterally; this is also preserved.

Next, the periosteal elevator is angled superolaterally to dissect in the subperiosteal plane along the lateral orbital rim and over the frontozygomatic suture (Fig. 6). It is imperative to the protection to the facial nerve to remain subperiosteal along this area to stay safely below the frontal nerve. After passing over the lateral orbital rim, the elevator is advanced just past the rim into the temporal recess. This is a safe area when approached from the subperiosteal plane and is the same area exposed when treating zygomaticomaxillary complex (ZMC) fractures. The dissected periosteum over the anterior maxilla is then stretched by placing a finger or elevator under the intraoral flap and distending it to ensure maximum freedom.

Attention then focuses on the temporal incision marking. Using a radiofrequency micro-electrode (Ellman International, Hewlett, NY) on pure cutting current (or a scalpel), the incision is made just through the subcutaneous plane (Fig. 7A). Using a hemostat, the fine layers of the temporoparietal fascia are bluntly dissected until the superior layer of the deep temporal fascia is identified (Fig. 7B). (This layer contains the frontal branch of the facial nerve inferior to this incision.) Instead of a straight line incision, a skin ellipse of several centimeters may be excised to affect more lift in the temporal and lateral orbital region (Fig. 7C).

The periosteal elevator is then directed (while staying intimate to the superficial layer of the deep temporal fascia) to meet the tunnel from the intraoral incision (Fig. 8A). When the broad tip of the periosteal elevator contacts the lateral orbital rim, it is scraped along the bone to enter the subperiosteal plane. Staying on the superficial layer of the deep temporal fascia in the temporal region and under the periosteum over the orbital rim protects the frontal branch of the

facial nerve in this area (Fig. 8B). This completes the tunnel that connects the intraoral and temporal areas.

At this point a 2-0 polydioxanone (PDS) suture is used to secure the malar fat pad in the area of the first molar. (To be anatomically correct, this suture engages malar fat tissue, periosteum, and possibly muscle fibers from adjacent structures.) A double bite is performed to engage securely the soft tissue (Fig. 9A). Fig. 9B shows the malar fat pad and associated tissues secured with the 2-0 PDS suture in preparation for passing.

The next step involves passing the suture from the intraoral to the temporal dissection, which can be done with passing needles, awls, or wire passers. The author prefers the use of a narrow tonsil clamp with fine tips, however. A thin, fine, blunt instrument helps prevent damage to the frontal nerve. The instrument is passed through the temporal incision over the bony lateral orbital rim and across the malar eminence and exits intraorally through the vestibular incision (Fig. 10A, B). The needle is cut off of the suture (to avoid tissue damage when pulling through the tunnel) (Fig. 10C), and the two suture ends are pulled through the dissection tunnel and exit the temporal incision.

The final step is to elevate the midface by placing traction on the suture ends. If the dissection is performed properly, impressive augmentation of the unilateral midface is apparent when pulling the suture ends. The more tension placed on the suture, the greater the bulge of the augmentation over the zygomaticomaxillary area. If the symmetry of the lift is acceptable, the suture is secured. If the area of augmentation is not as desired by the surgeon, the same suture is placed in the same manner, but at the level of the cuspid instead of the first molar. This placement provides a more infraorbital and less malar augmentation (Fig. 11). The author then decides which suture provides the desired vector and removes the other suture. Occasionally, both sutures are left in place to provide maximum augmentation.

The suture then must be secured to the superficial layer of the deep temporal fascia. A curved, threadable needle (#14 MS192 1/2 circle, HenrySchein Inc., New York, www.henryschein.com) is threaded on one end of the PDS suture (Fig. 12A), a deep bite is taken through the temporal fascia, and the suture secured and tied (Fig. 12B).

The same procedure is performed on the contralateral side. It is imperative at this point to ensure that both sides are symmetric. If the second side is not symmetric, then the suture is repositioned and tensioned to emulate the previous side. Because the patient is in the supine position, the augmentation usually appears overcorrected, but it is usually pleasing in the upright position after healing (Fig. 13).

The temporal incisions are closed in two layers with 4-0 gut suture and the intraoral incisions are closed in a routine manner with the same suture. In some cases, because of the degree of tissue elevation, the intraoral incision may not approximate because of the tethered tissues (Fig. 14A). In this case, the mucosa is released from the deeper structures with the radiofrequency microelectrode until enough laxity is achieved to close the mucosa (Fig. 14B). No special dressings or bandages are placed. The patient is placed on appropriate antibiotics, analgesics, and a tapering dose of oral steroids.

Postoperative course

Most patients resume normal activity after 48 hours but remain swollen in the midfacial area. The patients must be reassured that the swelling is postoperative in nature, will resolve, and does not represent the final augmentation. Most of these patients also have some degree of paresthesia of the region innervated by the infraorbital nerve. Most patients also have some degree of perioral muscular dysfunction, which occurs from the dissection of the muscle origins or the lip elevators and periosteum from the underlying bone. The patient should have been informed of this preoperatively and must be reassured that it will return to normal over the next 1 to 2 weeks. This is the same phenomenon seen after maxillary osteotomy.

Sequelae and complications

In a series of 40 midface procedures, no significant permanent complications have been seen by the author. As stated, all patients experience extended (2–4 weeks) swelling and a shorter

duration of infraorbital paresthesia. Altered perioral animation is seen from dissection of the periosteum and lip elevators (Fig. 15). This occurrence presents altered animation in smiling and puckering that usually resolves in several weeks; some surgeons have mistaken it for facial nerve palsy.

The author has had three incidents that involved wound dehiscence in cigarette smokers. Two of these wounds granulated by secondary intention, and the third required delayed closure (Fig. 16). One unilateral infection was encountered in the lateral orbital rim area and was attributed to a suture infection, which responded to antibiotics. Periorbital bruising and subconjunctival ecchymosis are sometimes seen postoperatively.

Figs. 17 to 24 show various before-and-after results of procedures described in this article.

Summary

Midface lifting is a valuable rejuvenative option for many patients and can provide a more youthful and balanced face. This procedure is well suited for the oral and maxillofacial surgeon because of familiarity with the intraoral and temporal surgical approaches, and it does not require any specialized equipment. This procedure has minimal postoperative recovery and a low complication rate. The results of this procedure have remained stable in the author's cohort of patients approaching 2 years. Contraindications include atrophic or minimal malar fat, in which case there is nothing to elevate. The midface lift can be adjusted for optimal positioning of the malar augmentation by controlling suture placement, and it can be performed as an isolated procedure or as part of multiple facial procedures. The astute surgeon considers midface rejuvenation in all cosmetic cases.

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