Comparative Methods for Brow Lift

Editor's note: My thanks to the moderator, Felmont F. Eaves III, MD (board-certified plastic surgeon, Charlotte, NC), and to panelists Fritz E. Barton, Jr., MD (board-certified plastic surgeon, Dallas, TX), David M. Knize, MD (board-certified plastic surgeon, Englewood, CO), Malcolm D. Paul, MD (board-certified plastic surgeon, Newport Beach, CA), and Rod J. Rohrich, MD (board-certified plastic surgeon, Dallas, TX), for sharing their opinions and clinical experiences for this discussion.

Dr. Eaves: The first patient (Figure 1) has concerns about his high hairline and low, heavy brows, and he refuses any incisions in the scalp. Dr. Paul, would you explain your approach to treating this patient?

Dr. Paul: First I would judge how much excess upper eyelid skin is present after the brow is held at the correct level, and then perform the skin/muscle resection, taking out some of the preseptal muscle. Then I would work on the preaponeurotic fat pad. After that I would make an incision in the periosteum about 3 mm above the supraorbital rim, leaving a cuff of periosteum to sew to. I would then elevate the forehead subperiosteally all the way back to the hairline, scooping around behind the corrugator, to the medial aspect of the orbital rim, and just to the root of the nose. If you elevate subperiosteally first and then take out the corrugator, you are less likely to avulse the supra- trochlear nerve. Next I would resect the corrugator on both sides, and if the patient had a crease on the root of the nose, I would release the procerus. I would then fix the brow with a couple of Vicryl® sutures between the back surface of the composite flap and cuff of the periosteum.

Dr. Eaves: Dr. Knize, you’ve had extensive experience with the transpalpebral approach. Would you address this patient differently?
Dr. Knize: I wouldn’t approach this individual through an upper eyelid incision. When you perform subperiosteal dissection and flap elevation from the upper eyelid, it’s very difficult to create a forehead flap without avulsing the supraorbital nerve, which is fixed at its point of bony origin either at the orbital rim or 1.0 to 1.5 cm above the rim.

Most individuals, even men with male pattern baldness, will have some hair over their temporalis muscle and usually extending almost to the superior temporal line. I have found that I can work in the temporal hair pattern that does exist from a 4.0 to 5.0 cm long incision and develop a subperiosteal forehead flap. From the temporal scalp incision I can release the periosteum along the orbital rim with limited elevation of the overlying soft tissue and avoid avulsing the supraorbital nerve.

I would elevate this patient’s eyebrow laterally, without feminizing it, by advancing superficial temporal fascia over temporalis fascia. I would stabilize the superficial temporal fascia of the advanced flap to the deep surface of the superficial temporal fascia of the posterior scalp edge and also anchor the flap. Because galea from the forehead and superficial temporal fascia from the temporal fossa become confluent over a 6.0 mm wide zone just medial to the superior temporal fusion line, this zone functions almost like a “boot strap” that can pull up all these fused planes. I would then perform an upper blepharoplasty and remove some preaponeurotic fat; there could be some preseptal fat to remove as well.

This patient has some vertical glabellar lines produced by corrugator muscle action, and some oblique glabellar lines perpendicular to the medial head of the eyebrow produced by action of the medial-superior fibers of the orbicularis oculi muscle. I would resect the corrugator muscle through the upper eyelid incision. I would also resect some of the medial fibers of the orbicularis oculi muscle to weaken the action causing the oblique glabellar line and also to allow the medial head of the eyebrow to move cephalad somewhat.

Dr. Eaves: Dr. Barton, how would you treat this patient?

Dr. Barton: The heavier the tissues are, the more direct your lift has to be. If the patient has heavy tissues and if his hairline will allow it, I would prefer to perform an open brow lift. I would probably compromise in this patient, as I do in most men, by performing an endoscopic brow lift and telling him that it will be a less lasting and less dramatic lift but that we will compromise elevation for concealment of scars. I would not perform forehead lifts through the lid, because I’ve been relatively more successful in pulling tissues up from...
above than in pushing them up against gravity.

**Dr. Eaves:** Dr. Rohrich, you've had extensive experience with endoscopic approaches. Would you agree?

**Dr. Rohrich:** Male aesthetics are different from female aesthetics. This gentleman has heavy skin and more medial eyebrow ptosis. I want to under- rather than overcorrect the brows. I would do an endoscopic assisted brow lift. Generally, I use the endoscopic approach to treat dynamic wrinkle lines in the glabella and treat the static lines with laser abrasion or some type of skin resurfacing technique. This patient would not be a good candidate for resurfacing, because he appears to have Fitzpatrick type III or greater skin type.

To elevate a patient's medial eyebrows, I do the central part subgaleally so that I can visualize the muscles and resect corrugator muscles as needed. I believe the procerus muscle in this patient doesn't need resection, as there is no transverse line in the radix of his nose, although most of the time in men I do a little more aggressive resection. Often I'm disappointed because I did not resect enough corrugator. When I do an open procedure I take more of the supra trochlear nerve branches than I leave. I don't know whether it's the nerve or the muscle resection that gives you the best long-term result. Probably we should do more denervation. Laterally, I would perform a temporal incision, as Dr. Knize said, specifically elevating the tissue subperiosteally to the supraorbital nerve. I release the arcus marginalis (periosteal release) and make sure to get the temporal fusion elevated. Next I use one or two spanning sutures from the temporal parietal fascia to the deep temporal fascia. Furthermore, I don't routinely resect head transverse skin excision and advancement, but only along deep crease lines. I have not been happy with the scar quality. I have not performed skin excision in the mid-forehead with later laser resurfacing; however, laser resurfacing might help camouflage the scars.

**Dr. Eaves:** The next patient is a 35-year-old woman who has had a previous trauma to the right brow region (Figure 2). She notices a mild asymmetry, especially when she is wearing her glasses. Dr. Rohrich, how would you treat the asymmetry of the brow in this patient?

**Dr. Rohrich:** A young woman with an average or slightly elevated hairline is an ideal candidate for an endoscopically assisted brow lift. Whether an asymmetry is congenital or results from trauma usually does not affect how you manage the patient endoscopically. It appears that this patient has very few static or dynamic frown lines.

When you analyze her brow asymmetry, she actually has a lack of brow apex, which I find difficult to reproduce in any situation, because that's really the attenuation of the lateral part of the frontalis; so her brows are not very aesthetic. I would have to be very careful in this patient to direct my attention to elevating the right lateral brow with subperiosteal elevation centrally with the endoscope, which is different from what I usually do. I would perform an endoscopic elevation because I wouldn't be

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**Figure 2.** A 35-year-old woman with mild brow asymmetry.

"A softened expression rather than a mask is my goal, so I would be reluctant to alter the muscles in a young person"

—Fritz E. Barton, Jr., MD
doing very much scalp resection. Then, I would perform a lateral temporal incision, making sure to preserve the sensory branches of the supraorbital nerve as Dr. Knize described, with suspension sutures used to elevate the brow. I would then perform a central galeal advancement to elevate the right medial eyebrow. I wouldn’t do anything on the contralateral side.

Dr. Eaves: Dr. Barton, do you mobilize the opposite side at all to address this asymmetry, and do you believe that modifying the procerus or corrugator will help with the medial portion of the brow lift? Is that necessary?

Dr. Barton: In a young person especially, we have to be aware that, as we are taking expression muscles out, we can be removing passion from a face. A softened expression rather than a mask is my goal, so I would be reluctant to alter the muscles in a young person. Otherwise, I agree completely with the operative plan that Dr. Rohrich described. I would perform a unilateral, subperiosteal procedure. The only change that I would make is that I have been more comfortable with the suspension by use of a screw fixation than with galeal plication. In young patients with a static as opposed to a dynamic asymmetry, I believe it’s a simple and fairly predictable procedure.

Dr. Eaves: Dr. Knize, how would you address this?

Dr. Knize: I would approach this patient unilaterally as well. As this young woman ages, she’s going to develop another form of asymmetry because that left eyebrow is going to descend faster than the right eyebrow. That’s the dilemma—whether you should do something to both sides just to stabilize them equally. I would elevate a right forehead flap at the subperiosteal level. Then I would raise the right eyebrow under direct vision (before I injected the eyebrow area) to match as closely as possible the left eyebrow level. I would fix the advanced flap position with sutures anchoring superficial temporal fascia to temporalis fascia.

My concern about using hardware fixation is that the vector you would have to use to support the lateral brow would place the screw just medial to the superior temporal line and temporalis muscle. The deep division of the supraorbital nerve could be injured by placement of a screw there. I believe the nerve is often injured in this way because its course is along the lateral-most surface of the frontal bone where the anchoring screw must be placed to get the most lateral vector to support the lateral eyebrow. Afterward, if this patient’s medial eyebrow didn’t move up enough with the temporal incision forehead lift approach, I would enter the upper eyelid and remove some of the medial-superior fibers of the orbicularis oculi muscle to allow the frontalis muscle to subtly raise the medial head of the eyebrow suspension and still anchor it to the bone.

Dr. Barton: For me, there is clearly a point of suspension to get the arch and the motion that is nearly over the lateral orbital rim line, right where you wish the nerve wasn’t. On the other hand, I find myself always trying to balance between safety of the nerve and effectivenes of the contour.

When dealing with asymmetry we tend to go back to a dictum of plastic surgery that symmetry is beauty, and I don’t believe that’s true. We like to have patients look better—not necessarily look different. But if the patient has a genetically determined asymmetry, I would be very careful about altering it too much, because I believe she might look symmetric and different, and that’s not necessarily better.

Dr. Paul: This patient has a high anterior hairline and a normally positioned left eyebrow. In a patient who only requires unilateral correction I would not use a transpalpebral approach. I would only use this approach if the patient desired correction of upper eyelid aesthetics bilaterally. The endoscopic approach, in my judgment, would allow optimal control of brow position without significantly raising the anterior hairline. When I use the transpalpebral approach, I tend to overcorrect brow height, expecting that it will come down. I judge the extent of elevation by how it looks on the operating table, but I also rely on where I believe the brow should be according to preoperative measurements and computer imaging.

Dr. Eaves: Perhaps the panelists would comment on the methods that they would use to position the brow. Is this based on measurements or simply a sense that you need to overcorrect? Also, how long do we need to be holding fixation?

Dr. Knize: My fixation is done with 2-0 Vicryl®, which stabilizes tissues for a month. I learned of a technique from Sam Hamra [Sam T. Hamra, MD] wherein a 2 x 2 cm window of temporalis fascia is removed to expose the temporalis muscle. I have found, by going back in on these cases, that there is firm adherence between superficial temporal fascia...
of the advanced forehead flap and the muscle. In contrast, if I separate superficial temporal fascia from temporal fascia, advance a forehead flap, and then return to that area to harvest temporalis fascia, for example, there's very little adhesion between the planes. Therefore I find that absorbable sutures such as the 2-0 Vicryl® will work a sufficiently long period of time to allow a long-term bonding effect between muscle and the flap.

**Dr. Eaves:** Dr. Rohrich, you often use a subgaleal approach to the brows where you actually can suture and hold the muscle permanently. When you're going to use a subperiosteal approach, how do you address fixation, and how long do you believe that this needs to be maintained?

**Dr. Rohrich:** I don’t know that any fixation is permanent regardless of whether you use a screw, because it’s not really dependent on the wound healing process, which takes 42 to 60 days to plateau. The problem is that the tissue gives way around the fixation device. If it were the screw alone that secured the brow, I would use that in every case, but the tissue that it’s holding is what usually gives way. Centrally, I use a subgaleal approach for access to the corrugator muscles; then I’ll use a galeal advancement flap, a modification of what Bob Hamas [Robert S. Hamas, MD] has described for the central part of the face, and I use 4-0 PDS. Some people advocate subperiosteal screw fixation for 3 to 7 days and believe that then you’ll have permanent fixation. Laterally, I use temporal suspension sutures to prevent injury to the sensory branch of the supraorbital nerve, which is located right where you want to put your vertical vector. I’d compromise and perform central subgaleal elevation as previously described. Vector-oriented sutures permit lateral brow elevation. As far as asymmetry is concerned, I believe I have never totally corrected an asymmetry. It’s like the deviated septum, which is more normal than the straight septum.

**Dr. Eaves:** Do you overcorrect?

**Dr. Rohrich:** I do overcorrect slightly in most cases, but there’s no doubt that brows come down regardless of whether you treat them with direct excision or endoscopy.

**Dr. Knize:** The early endoscopic forehead lift procedures were criticized for having too much medial brow elevation, and many of those particular cases were supported with external-type fixation for about a week. We got good stable medial eyebrow elevation, and from that experience I assume that there probably was quick adherence between periosteum and bone, because a lot of those procedures were performed at the subperiosteal level. However, that eyebrow support only extended as far laterally as the frontalis muscle extended, which in many cases, was to the junction of the middle and lateral one third of the eyebrow. Therefore I believe that medial brow fixation is less of an issue than lateral brow fixation. I believe some type of fixation is needed over the temporal fossa area rather than over the frontal bone area.

**Dr. Eaves:** I agree entirely, and that’s a criticism I would make of some of my own cases. In fact, we have evolved over the last few years to doing no fixation medially, and I often leave some medial periosteal attachments intact, which is one of the nice features of the transpalpebral approach—you don’t risk excess medial brow elevation and change in brow shape.

**Dr. Barton:** I believe we would all agree that the tendency is to try to restrict the amount of uncontrollable medial brow elevation and to empower the lateral elevation, which is more consistent. But my experience has been that you have to get anterior to the temporal crest, up over the top of the brow to get adequate lateral brow elevation; that true temporal fascial sutures are too horizontal, and these will not give adequate elevation. And if you aren’t careful, you will end up with a very distorted, horizontally distracted lateral canthus in trying to elevate medially. I believe the vector has got to be vertical.

**Dr. Paul:** I like lateral spanning sutures for lateral brow elevation. I also believe that there are many patients with relatively thin tissue who don’t have a lot of gravitational affect to the forehead. They get satisfactory elevation with periosteal release alone with Coban® dressing for 5 to 7 days, and they stick at a higher level. For many people, especially men, that’s enough, because they only need a couple of millimeters to make them look refreshed as opposed to high brow elevation where some sort of fixation is needed.

**Dr. Knize:** Dr. Barton brought up an important point in talking about the actual direction of the vector that supports the lateral eyebrow. I believe it should be as vertical as possible. I’ve found that as I perform the forehead lift from a temporal incision, I try to make the suspension vector essentially parallel with and very close to the superior tem-
Figure 3. An older woman with a high hairline. A, Front view of face in repose. B, Front view of face when frowning.

Dr. Rohrich: I use the combined central subgaleal advancement for medial brow elevation and corrugator alteration and subperiosteal lateral elevation with at least two lateral vector sutures of 3-0 PDS® along the alar lateral canthal vector and alar central malar vector.

Dr. Eaves: I agree. Fixing the brow directly superior at about the junction of the middle and lateral thirds with the fixation that you’ve mentioned, to pull out the hooding, is a very nice combination. I usually place the more medial screw fixation first and then undertake the suture fixation more laterally.

Dr. Knize: The more you can free the periosteal attachments along the orbital rim, including the ligamentous structure correcting the zygomaticofrontal suture line and superficial temporal fascia, the more you get a subtle transfer of the force of the lateral suspension vector toward the more medial part of the eyebrow. You don’t just get an isolated lateral pull.

Dr. Eaves: Dr. Barton, for this older patient (Figure 3) who wants to have her high hairline addressed, how do you incorporate that into your decision-making, and do you believe there’s a role for a subcutaneous approach?

Dr. Barton: The older patient with more redundancy and deeper lines and a high hairline needs a hairline-beveled incision brought back at the temporal recess to join the coronal line. I would just accept some scalp hypesthesia. I would treat this patient with an open technique because the biggest problem in this type of patient is lateral hooding over the lateral canthus. In the older patient this is often the most important element of forehead improvement.

Dr. Eaves: One thing I’ve found helpful in patients with a high hairline who do not require rejuvenation in the midfacial region is to use a limited prehairline approach, not to transition back through the temporal scalp, but to use the endoscope or retractor to address the muscles as necessary. This leaves a broad exposure of the galeal-frontalis layer, which can be widely plicated for fixation, leaving a tension-free beveled skin closure of the central prehairline.

Dr. Paul, if this patient is also interested in skin resurfacing, would you make any adjustments to your approach?

Dr. Paul: Yes, I would. First, I would remove the corrugators from above. Then I would probably put in a piece of AlloDerm® that would span the origin of the corrugator muscles across the midline to prevent it from reattaching. The patient has a very deep glabellar rhytid, and almost all patients of this age who look like this have a little bit of bone loss in the glabellar region. They look better and more youthful if they’re more rounded. I would resurface at the same time. I think it would really help with this patient’s lines.

Dr. Eaves: Dr. Knize, do you agree, and in your approach would you do simultaneous resurfacing?

Dr. Knize: If you do subperiosteal resection, you could very safely laser-plane the surface of that skin.
In this woman's case, she does have some vertical glabellar lines. I don't believe that laser-planing alone would satisfactorily treat those lines. I would use the upper eyelid approach to remove her corrugator muscles and then laser-plane the skin for optimal smoothness.

**Dr. Rohrich:** I use the CO$_2$ laser routinely with my technique of endoscopic-assisted forehead rejuvenation to correct the residual static lines after endoscopic correction of the dynamic lines, especially in the glabella. It is a safe technique if you abide by the two rules of laser ablation end points. The cosmetic end point is correction of all frown lines. The safety end point is when you obtain a yellow or chamois color to the laser-braded area.

**Dr. Barton:** I would like to hear a little more discussion about how to position the lid. I put it about one third higher than I believe it ought to be and hope.

**Dr. Eaves:** Dr. Barton, I agree entirely. With endoscopic brows, I elevate as much as I can, knowing that they're going to come down and seeing, at the second pass, 1 or 2 mm of retraction of the brow. Occasionally, I've had to release the brow fixation suture because it was now too high.

**Dr. Knize:** Actually, the best micrometer we have is our eyes, because the eyes take into consideration all the other asymmetric features of the face, and our mental computer adjusts for them.

**Dr. Eaves:** I believe that's true; that's what we all do. As much as we would like to reduce soft tissue surgery to hard science engineering and geometry, it just can't be accomplished most of the time. Indeed, perhaps that is the most enjoyable aspect of our work—it truly is more art than science.