182 Ten Steps to Making External Levator Ptosis Surgery More Predictable

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There is many a boy here today who looks on war as all glory, but, boys, it is all hell.
— General William Tecumseh Sherman
August 11, 1880
Columbus, Ohio

Ptosis is hell.
— Richard K. Dortzbach, MD
Summer of 1981
Madison, Wisconsin

In training, I did not fully appreciate the words of my mentor, Richard K. Dortzbach, M.D., when he first uttered this concise description of one of the most common operations we perform. Now, several thousand procedures later, I understand what he was saying.

At one time, I was sure a precise, mathematical model for external levator ptosis repair existed: take this much ptosis, this much levator function, this set of anatomic parameters, and perform this degree of surgery to get this result. Now I doubt such an equation exists. What is more, the pursuit of such a mathematical model is more likely than not to result in disappointing results. External levator surgery is not complicated; it is *complex*, and the distinction is paramount (Plsek and Greenhalgh 2001). Complicated problems are amenable to a reductionist formulaic solution (Snowden and Boone 2007). In merely complicated problems, one *can* find an algorithm that will produce reproducible results in most instances, and experience leads to better and better results. Perhaps this is part of the lure of Müller's muscle-conjunctival resection.

External levator surgery, on the other hand, has a certain degree of *inherent* unpredictability. It is a dance between three partners: the surgeon, the patient, and the procedure. Anatomy and physiology are modified by levels of sedation and intraoperative bleeding. The result is an emergent property produced by the intertwining of structure and process (Gonnering 2011).

For these reasons, it is very difficult to fully teach external levator repair. While one can teach a resident to become competent in the surgical techniques, competency is not enough to insure success. The surgeon must also develop *capability* or the ability to apply competency in novel situations (Hase and Kenyon 2007). Results have a degree of predictability, but total predictability would be dependent upon duplicating the exact starting point of a given anatomy and physiology and duplicating, again exactly, a multitude of steps, some of them unconsciously performed. For this reason, it is not surprising that one can read a description of an operative technique, attempt to duplicate it, and then be disappointed when the results are very different from those described by the author. The surgeon needs to understand the dance and how their own individual actions contribute to the emergent outcome.

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With that caveat, the following maneuvers have proven to be helpful to me in external levator surgery:

1. In virtually all cases, I confine my surgery to the aponeurosis. I do not like the idea of sacrificing sarcomeres for shortening an already weakened muscle (Wouters et al. 2001). I want all of those elements lifting the eyelid. For levator function of less than 6 mm, I often use a frontalis sling instead of a maximum levator recession.
2. Note the position of the lid margin relative to the corneal limbus and levator function with the patient supine on the operating table before any sedation is given. Also assess the position of the lid margin in downgaze and if there is any lagophthalmos. Periodically retest at points during the surgery, to assess how the sedation and the local anesthetic have affected the baseline measurements.
3. Use a small amount of local anesthetic—usually a 1: 1 mixture of 0.75 % bupivacaine with 2 % lidocaine with 1: 100,000 epinephrine—to produce a final epinephrine concentration of 1: 200,000. I inject approximately 1 cc in the eyelid directly under the incision. I prep, then mark, and inject.
4. Make the incision slightly below the intended upper eyelid crease. In an Asian eyelid, this may only be a few millimeters above the lid margin.
5. After waiting at least 5 min, I make my incision with the fine point electrocautery needle. Put the lid on downward stretch with a traction suture, and then dissect with scissors, in both a sharp and spreading fashion, until the orbital septum is reached. If there is a levator disinsertion, I can see it before I open the septum.
6. Mobilize the levator as gently as possible to avoid bleeding and use the bipolar cautery to limit hematoma formation. If a hematoma forms, take this into account when setting the lid position.
7. I use a 5-0 suture, most often nylon on a $^1/_4$ circle spatula needle, and pass it first in a partial thickness bite of the tarsus, approximately 2 mm inferior to the superior border. Then pass it up through the aponeurosis and then down through the aponeurosis, so the knot will be covered by the aponeurosis. Tie in a slipknot, and assess height and contour. This is the most difficult part of the operation. In most instances, I do not try for an "overcorrection," as the lid usually stays where I set it, using this technique. If the levator function is markedly diminished from sedation, local, bleeding, or some other cause, I may set it a bit higher but then look at where the lid margin is in downgaze to make sure the ptosis is not overcorrected.
8. When performing bilateral surgery, open both sides until reaching the step above, and then correct the dominant eye first, as this can affect the position of the nondominant eye.
9. I may then add a suture either medial or lateral to my central suture, more to aid in obtaining a strong attachment more than to get additional lift.
10. Once satisfied with the lid position, trim off the redundant aponeurosis, taking care to leave enough behind so the sutures do not "cheese wire" through. Closure involves a few absorbable sutures, taking inferior orbicularis to levator to superior orbicularis to reform the lid crease. Use orbicularis rather than skin so the crease is normally effaced in downgaze. I then run the skin, usually with a 6-0 fast-absorbing plain suture.

References

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