FRONTALIS SUSPENSION IN ADULTS
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Ptosis in adults is a localized anatomic problem with a wide range of possible etiologies and several different techniques to address its manifestations. In order to determine the most appropriate treatment, the exact nature of the ptosis needs to be defined before deciding on a surgical procedure.

The first question that must be answered is whether the ptosis is congenital or acquired. Congenital ptosis is typically due to dysgenesis of the levator muscle. The muscle is underdeveloped and fibrous. Not only does the muscle contract poorly causing the ptosis, but also it relaxes poorly resulting in lid lag on downgaze and lagophthalmos. Not all patients have their congenital ptosis repaired in childhood. Some who have had surgery may have been undercorrected or the ptosis may have recurred.

Acquired ptosis in adults is most often due to levator aponeurotic dehiscence or detachment. Except in cases of trauma, ptosis develops over an extended period of time. Patients may only have become aware of it recently, but looking at old photographs, and the findings of an elevated lid crease, thin upper lid, and good levator function all point to an involutional etiology. More acute onset of ptosis requires looking for other causes such as a third nerve palsy or myasthenia. Oculopharyngeal dystrophy and myotonic dystrophy both progress over time, but there are usually other associated findings, a positive family history, or abnormalities on genetic testing.

The next consideration is amount of levator function or excursion. This is a measure of the excursion of the upper lid from extreme downgaze to extreme upgaze with the brow immobilized. Patients with levator dehiscence or detachment often have normal excursion. Paretic or dystrophic muscles have diminished excursions, and scarring from previous surgery may also limit eyelid movement.

Once the nature of the ptosis is determined, choosing the proper surgical treatment depends on additional factors. Ocular protective mechanisms must be assessed. These include tear production, corneal sensitivity, ocular motility, Bell's phenomenon, orbicularis strength, and lagophthalmos. Patients with pre-existing corneal disease, corneal hypoesthesia, dry eyes, poor or absent Bell's, or paresis or scarring of the lids causing lagophthalmos need to be carefully counseled before undergoing ptosis surgery, and may have to settle for very conservative and potentially reversible procedures.

Most adult ptosis surgery is aimed at advancing, shortening, or reattaching the levator aponeurosis. These procedures work when there is reasonable levator muscle function. Once the levator excursion falls below 5 mm, aponeurotic surgery is no longer effective. In these cases frontalis suspension is necessary.

Frontalis suspension does not rely on the levator muscle. In this procedure the lids are literally suspended from the brow with autogenous tissue, donor tissue, or synthetic material. Contraction of the frontalis then lifts the lid to clear the pupil. The choice of material depends on the presence or absence of ocular protective mechanisms, as well as patient's and surgeon's preferences. The materials used in frontalis suspension are the same ones available for pediatric cases. They include autogenous fascia lata, banked

fascia lata, and synthetic materials, most commonly silicone, ePTFE (expanded polytetrafluoroethylene), and Supramid (nylon cable suture).

The advantage of autogenous fascia lata is that it is the patient's own tissue, so it is the mot biocompatible. Fascia lata is also durable, so the results are typically long lasting. The disadvantages include a second surgical site, prolonged anesthesia time, and donor site morbidity. In adults, especially with compromised ocular protective mechanisms, fascia lata is not distensible, so lagophthalmos can be a significant problem. Also, since it is so easily incorporated into surrounding tissue, it can be difficult to reverse. Banked fascia works almost as well as autogenous fascia, without issues with a second surgical site or prolonged operating time, but it carries at least the risk of disease transmission, and at least anecdotally it may not last as long as autogenous fascia.

Of the synthetic materials, silicone is the most widely used. It is easy to insert, adjustable and easily reversible. Silicone has been used as an implant material for decades with a long record of safety and biocompatibility. The biggest advantage for adults, especially with poor ocular protective measures, is that it is elastic enough that with only little extra effort it will stretch enough to allow the eye to close. This doesn't necessarily occur during sleep, but it is certainly a benefit during waking hours. ePTFE is a porous material that is well tolerated but does not stretch, and with vascular ingrowth can be difficult to remove. Supramid is a braided nylon suture wrapped in a nylon shell. It was commonly used for ptosis repair in very young infants who were at risk for deprivation amblyopia. The problem with this material is that most ptosis recurred after several years due to degradation of the material. Suture granulomas were also common.

One of the biggest advantages of silicone is that it is adjustable. At any time postoperatively, the sling can be tightened or loosed to allow the lid to be raised or lowered as needed. This is especially important for patients with corneal exposure.

Silicone rods are most commonly used in adults with severe ptosis because of its ease of insertion, elasticity, adjustability, and reversibility. Regardless of the material chosen, patients must be counseled that they will have lagophthalmos, at least early on, and that they will require frequent lubrication. If the cornea becomes compromised, the lid may need to be lowered or the procedure may need to be completely reversed. They must also accept that the lid will not blink normally, and that the eye will be more open on downgaze. This is especially important with unilateral slings. Take the time with patients preoperatively to discuss the risks, benefits, and limitations of frontalis suspension so that they understand that there is a trade off with this procedure, but if done correctly and the patient participates in the postoperative management, frontalis suspension can restore an individual's ability to function comfortably.