LUMEN ET VIRTUS

Approach to eyelid ptosis in a federal hospital in Rio de Janeiro in 2023

https://doi.org/10.56238/levv15n38-054

Felipe Eduardo de Oliveira Santos[1]
Camila Branco Lobato[2]
Nasareno Costa da Silva Filho[3]
Gérson Guilherme Sápiras[4]
Vanessa Baioco[5]
Matheus Camuzi Rodolfo[6]
Vitor Pereira Scarpette[7]
Michelle Gonçalves Maués[8]

ABSTRACT

Introduction: The upper eyelid has complex anatomy, which is essential for an aesthetic appearance and proper function. Its normopositioning contributes to pleasant lines and is related to the eyebrow. The levator palpebrae and muller muscles maintain their height and excursion, along with the frontalis muscle. Ptosis can be congenital (myogenic or neurogenic) or acquired (myogenic, neurogenic, traumatic, mechanical, aponeurotic). The aesthetic evaluation considers the symmetry, shape and height of the eyelid. Ptosis is diagnosed when the upper eyelid margin to the reflex margin distance from the cornea is abnormally low. Eyelid fold asymmetry is associated with blepharoptosis and may require surgical correction. Methods: A total of 13 cases operated at the HFA from January to December 2023 were analyzed. All patients were approached anteriorly, with shortening of the aponeurosis of the eyelid levator muscle, after the aponeurotic defect was identified. Results: Of the cases approached (13), there were 7 men and 6 women. 11 bilateral cases and 2 unilateral cases. 1 case already operated on another service. 8 cases were elderly over 60 years old, of which 3 had a history of cataract correction (37.5%). Conclusion: The identification of ptosis in the preoperative evaluation with its consequent correction presented a better overall result, not only aesthetically, but mainly functionally. The MEPS aponeurosis shortening technique demonstrated a low complication rate, which was effective, meeting the needs of the patients and satisfying the surgeon.

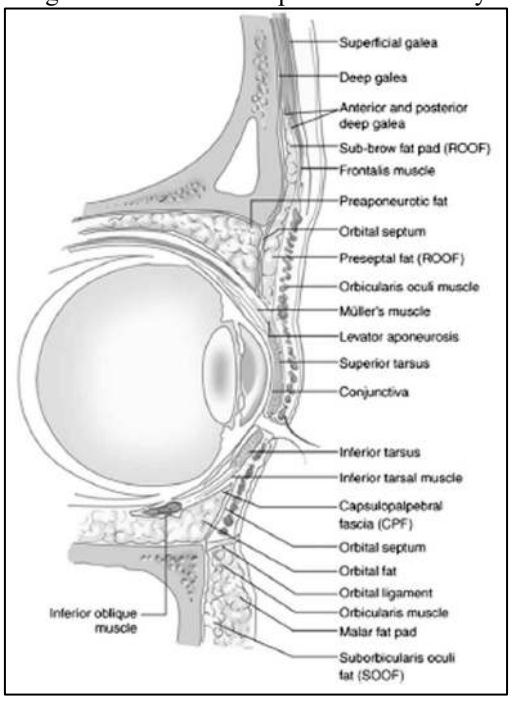
[1] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[2] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[3] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[4] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[5] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[6] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[7] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. Hospital Federal do Andaraí, Rio de Janeiro, RJ, Brazil.
[8] Brazilian Society of Plastic Surgery, Rio de Janeiro, RJ, Brazil. State University of Rio de Janeiro, RJ, Brazil.

Keywords: Reconstructive surgical procedures, Eyelid Ptosis, Blepharoplasty, Oculoplastics.

INTRODUCTION

The upper eyelid has a complex anatomy, its normopositioning contributes to aesthetically pleasing lines of the eyelid margin and eyelid crease, and its relationship with the eyebrow. The function of the upper eyelid is eye protection and the dispersion of tears over the eye. The Upper Eyelid Levator Muscle (MEPS) and Miller's Muscle are called upper eyelid retractors, together they work to maintain height and excursion of the eyelid, with the help of the frontal muscle (Fig. 1). MEPS, which is primarily responsible for the height and excursion of the upper eyelid, is innervated by the oculomotor nerve (III pair) after its origin in the sphenoid bone in the posterior orbit.

Figure 1. Illustration of periorbital anatomy



MEPS transitions to aponeurosis after passing through Whitnall's ligament in the upper orbit. Traditionally, the upper eyelid fold is believed to derive from the insertion of the fibers of the levator aponeurosis into the anterior lamellae of the eyelid. The Muller muscle is an involuntary, sympathetically innervated smooth muscle that originates on the inferior surface of the levator muscle and inserts on the superior border of the tarsus. The peripheral arch of the eyelid is an excellent reference point as it sits just above the tarsus, sandwiched between the levator aponeurosis and the Muller muscle. The orbicularis muscle is a sphincter within the anterior lamellae and is responsible for the protraction of the eyelids.

The ideal upper eyelid exhibits a smooth curve with acute medial angle, peaks as it extends laterally beyond the pupil, and tapers smoothly as it extends temporally.1–3 Centrally, the upper

eyelid margin is usually just below the upper limbus. but still well above the central visual axis. The healthy upper eyelid is full, with no significant fat protrusion.4,5 The complex relationship of the upper eyelid involves not only the height of the margin in relation to the visual axis, but also the stature of the pretarsal platform. Classically, in most anatomy textbooks, the insertion of fibers of the levator aponeurosis into the orbicularis muscle and skin is responsible for the formation and maintenance of the eyelid fold. Functionally, the upper eyelid fold is formed at the "point of curvature" of the upper eyelid skin, where the unfixed preseptal and orbital skin meets the well-fixed anterior pretarsal lamellae.6 Due to differences in the amount of excess eyelid skin and fat, in addition to the architecture of the eyebrows, the anatomical fold of the upper eyelid does not always correspond to the height of the pretarsal platform. The eyelid folds and, secondarily, the pretarsal platform can take on various shapes, including conical, semilunar, and parallel.

Regarding etiology, ptosis can be divided into congenital and acquired causes. The congenital one, in turn, has a myogenic origin (deficiency of MEPS or Miller function) or Neurogenic (deficiency innervation of the III cranial nerve, e.g. Horner's syndrome, paralysis of the III nerve). Congenital Horner's syndrome is the interruption of sympathetic innervation, causing decreased iris pigmentation, ptosis, miosis and hemifacial anhidrosis, ptosis occurs due to the non-innervation of Miller's muscle. Acquired ptosis can have several causes, being myogenic, neurogenic, traumatic, mechanical, aponeurotic. It is important to distinguish true ptosis from pseudoptosis, or conditions that mimic it.[7]

Compensatory eyebrow elevation is commonly seen in patients with acquired blepharoptosis and can be noted not only as eyebrow asymmetry but also as stimulation of the frontal muscle on the elevated side. Often, the eyebrow will reach normal height after eyelid ptosis is repaired. Symmetry is the key to an aesthetically appealing upper eyelid. Not only is the uniformity of the upper eyelid height crucial, but the shape, the height of the pretarsal platform, the curvature of the eyelid crease, and the position of the eyebrow are equally important in the aesthetic evaluation of the eyelid.[8.9]

Upper eyelid ptosis is diagnosed when the upper eyelid margin to the reflex margin distance (MRD) from the cornea is abnormally low and can occur in one eye or both eyes.[10,11] Ptosis is commonly secondary to senile involution, but in some cases it may have myogenic, neurogenic, or mechanical secondary causes. Dehiscence of the levator aponeurosis causing ptosis may occur as an age-related involutional change, but is more prevalent in contact lens wearers and patients undergoing ocular surgery. Measurement of eyelid levator function remains one of the best differentiating factors for ptosis etiologies. Unlike other etiologies, levator levator function is normal in patients with involutional ptosis, despite aponeurotic levator detachment.

Eyelid fold asymmetry is commonly associated with blepharoptosis, but may have other congenital, anatomical, or ethnic etiologies.[11] Usually in levator dehiscence, the pretarsal platform

will expand secondary to the elevation of the eyelid fold. Despite normal MRD, congenital and anatomical asymmetries of the eyelid folds are common and may require surgical correction. Aesthetically, the symmetry of DRM and eyelid contour are important; however, the height of the pretarsal platform may be more important for some patients.[12.13]

PREOPERATIVE PLANNING AND PREPARATION

Ptosis repair may be desired for a variety of reasons, including visual obstruction, a feeling of heaviness, contact lens fitting, and cosmetic improvement. Optimal surgery outcomes depend on proper surgical candidate selection, preoperative planning, and surgical technique. Consideration of the patient's concerns, the etiology of complaints, anatomical findings, systemic or ocular comorbidities, and the goals of surgery should be interlinked to develop a surgical plan. A clear understanding of patients' concerns will allow the surgeon to assess the likelihood of achieving the desired goals. Patients may complain of visual obstruction, eyelid heaviness, or even drooping eyelid, which may be related to a low MRD, excess eyelid skin, or even asymmetry of the pretarsal platform. A mutual understanding must be reached between the patient and the surgeon with a clear expectation of the expected surgical outcomes. If possible, poor surgical candidates, those with unrealistic expectations, and patients with worrisome secondary diagnoses that induce ptosis, should be avoided.

One goal of the evaluation of patients with upper eyelid ptosis is to exclude secondary causes of concern that may affect the patient's health or surgical indication. In addition to an in-depth evaluation of the patient's complaints and systemic evaluation, several ophthalmologic findings should be evaluated, including MRD, levator levator excursion, skinfold, eyelid height variability, orbicularis strength, and Bell's phenomenon.14 MRD is best measured in primary gaze with a millimeter ruler and a weak flashlight. Fixing the patient's gaze on the light allows for a more accurate assessment. The lifter's excursion is the most clinically useful assessment of lifter's health, and the measurement is taken for the amount of eyelid margin movement from the extreme downward gaze to the extreme upward gaze. Isolation of the eyelid with immobilization of the eyebrows and avoidance of head movement will provide the best assessment. The normal excursion ranges from 12 to 18 mm. Suspicion of a secondary cause of ptosis should be considered if the levator motion of the levator is less than 12 mm or significantly different between the eyes (Fig. 2).

Figure 2. Measurement of MEPS function, with frontal muscle block.



The anatomical and visible eyelid crease should be measured, in addition to the amount of excess skin and fat. Typical eyelid wrinkles in Western adults range from 6 to 8 mm in men and 8 to 10 mm in women. Raised folds in the upper eyelids are commonly seen with ptosis caused by aponeurotic dehiscence. Absence, excess reduction, or multiplication of the eyelid fold may be seen in Asian patients.

It is important to observe the position of the eyebrow before surgical intervention on the eyelids. Significant variability in eyelid height, either historically or during examination, may signify an underlying medical cause, including myasthenia gravis. Patients with low orbicular strength, lagophthalmos, limited ocular motility, or severe dry eyes are not likely to be ideal candidates for ptosis repair or upper eyelid surgery. A thorough ophthalmologic evaluation is required before considering repair of upper eyelid ptosis. Evaluations of tear film, corneal dryness, previous surgeries (including refractive surgery), and other ophthalmologic pathologies are necessary to avoid complications. Patients with normal levator function, normal or elevated eyelid folds, good Bell's phenomenon, good orbicular function, normal eye alignment, and healthy tear films are typically good candidates for surgery.

Instillation of phenylephrine (2.5% or 10.0%) into the eye, twice in 5 minutes, is critical for patients you would consider for conjunctival resection of the Muller muscle (MMCR) (Fig. 3). Phenylephrine stimulates contraction of the sympathetically stimulated Muller muscle and thus causes elevation of the eyelid margin. After phenylephrine administration, the DMR is re-evaluated and, if it is observed to have increased to a normal or higher level, they may be good candidates for MMCR. The degree of ptosis and the level of response may allow the surgeon to algorithmically plan the amount of resection during surgery. Patients who do not elevate or do not elevate sufficiently after phenylephrine instillation would likely be better candidates for MEPS advancement.

Figure 3. Elevation of the right eyelid after instillation of 2.5% phenylephrine.



Herring's law explains that the extraocular muscles, including the levator muscle, are innervated with equal intensity by the brain. In some patients with ptosis, elevation of the upper eyelid, either in unilateral ptosis or in those with asymmetric ptosis, will induce ptosis on the contralateral side.[14] Preoperatively, this may occasionally be predicted during manual or phenylephrine-induced elevation of the ptoptic eyelid. (Fig. 4). If the contralateral eyelid droops significantly during the preoperative evaluation, the patient should be advised of this possibility postoperatively and an adjustment should be made intraoperatively or bilateral surgery should be considered. In one study, it was shown that this occurs in up to 10% of patients evaluated and treated for ptosis.[15]

Figure 4. Herring's Law – Drooping of the contralateral eyelid after elevation of the side with ptosis.



METHODS

13 cases operated on at the HFA were analyzed, from January to December 2023.

All of them were approached anteriorly, with shortening of the aponeurosis of the eyelid levator muscle, after the identification of the aponeurotic defect (Fig. 5). Used for prolene fixation 5-0. Intraoperatively, it was decided to position the eyelid at the edge of the eyelid or 1 mm below the upper limbus, given the tendency to sag in the postoperative follow-up. Joint blepharoplasty was performed when indicated. Procedures performed in the operating room, under local anesthesia and light sedation, to evaluate intraoperative ptosis (Fig. 6). They were maintained in the immediate postoperative period with cold compresses with 0.9% saline solution. Hospital discharges at the end of the day without any complications. Eye lubrication with preservative-free eye drops was prescribed in the postoperative period. Outpatient follow-up for reassessment in 7 days, with removal of skin sutures.

Figure 5. Aponeurotic insertion defect of MEPS in the tarsus.

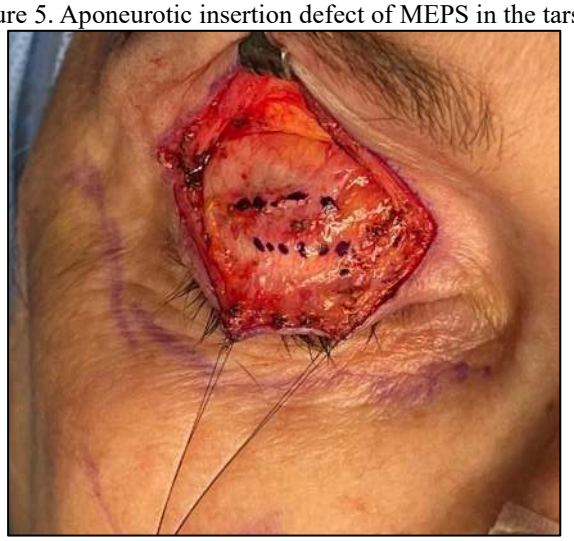


Figure 6. Intraoperative evaluation of eyelid positioning.



RESULTS

Of the cases addressed (13), there were 7 men and 6 women. 11 bilateral cases and 2 unilateral cases. 1 case already operated on another service. 8 cases were elderly over 60 years old, of which 3 had a history of cataract correction (37.5%).

A comparison was made between 30 and 45 days after surgery, which was satisfactory for the patients. 1 patient developed postoperative keratitis, treated without complications. 2 patients had mild unilateral undercorrection.

Patient 1. 51 years old, history of trauma, secondary correction.



Patient 2. 20 years old, congenital ptosis on the left.



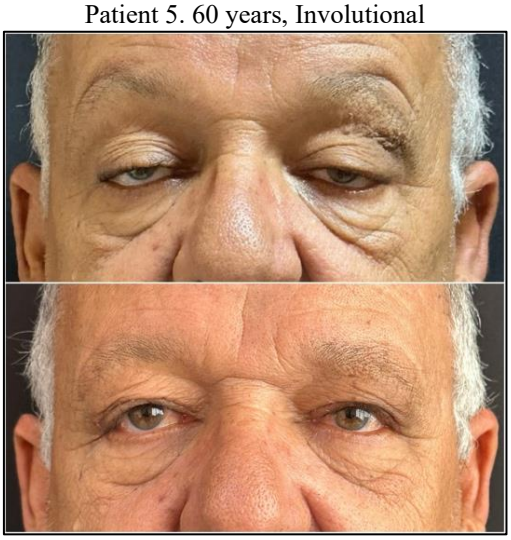
Patient 3. 68 years old, Ptosis after cataract correction.



Patient 4. 69 years old, Involutional.



Patient 5. 60 years, Involutional



Patient 6. 70 years, Involutional



Patient 7. 72 years old, Ptosis after cataract correction. Slight undercorrection on the right



Patient 8. 44 years old. Ptosis after facial trauma.



Patient 9. 54 years old. Involutional



Patient 10. 70 years, Involutional



Patient 11. 72 years old, Involutional, Mild hypocorrection on the left



Patient 12. 53 years old, Involutional



Patient 13. 67 years old, Ptosis after cataract correction.



DISCUSSION

Eyelid ptosis is a frequent disease of multiple origins, cases of mild ptosis may be underdiagnosed, leading to insufficient results if not treated together with blepharoplasty.

Correction techniques vary according to the case, function of the Upper Eyelid Levator Muscle and surgeon's experience.

Jones and Beard described the technique of shortening the aponeurosis of the MEPS, without resection of the same, with the advantage of being reversible. [16]

In order to avoid overcorrection and lagophthalmias, no shortening of more than 10 mm was performed, since several authors claim that this is the maximum safe limit. [17]

One difficulty encountered was the measurement of skin to be resected in joint blepharoplasty, due to the preoperative compensation performed by the frontalis muscle, distorting the excess amount of skin in the eyelid.

CONCLUSION

The identification of ptosis in the preoperative evaluation with its consequent correction presented a better overall result, not only aesthetically, but mainly functionally. The MEPS aponeurosis shortening technique demonstrated a low complication rate, which was effective, meeting the needs of the patients and satisfying the surgeon.

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