

# The Outcome and the Influential Factors Involved in Levator Resection for Blepharoptosis Correction

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## Abstract

**Purpose:** To identify any factors that may predict successful levator resection in blepharoptosis correction

**Methods:** The hospital records of 52 consecutive patients undergoing anterior levator resection for unilateral congenital blepharoptosis were reviewed. Successful result was defined a lid level within 1 mm of the fellow eye 1 year after surgery. We studied the effect of levator function, the amount of ptosis and the kind of anesthesia on the surgical outcome.

**Results:** Twenty-eight patients (53.8%) were treated with a levator resection under local anesthesia (group 1) and 24 patients (46.2%) were treated with a levator resection under general anesthesia (group 2). The mean age was  $16.37 \pm 9.3$  (range 4-40) years. The overall success rate was 76.9% two months after surgery and 61.5% one year after surgery. The most common complication after one year was undercorrection (38.5%). Sever ptosis ( $P=0.002$ ) and decreasing preoperative levator function ( $P=0.007$ ) were associated with decreasing chance of success. The kind of anesthesia was not a predictor factor for surgical success ( $P=0.312$ ).

**Conclusion:** The preoperative levator function and the amount of ptosis were found to be the most significant predictors of surgical outcome. The surgery under local anesthesia was not associated with a higher success rate.

**Keywords:** Blepharoptosis, Levator Resection

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## Introduction

Blepharoptosis is a common complaint of eyelid malposition.<sup>1</sup>

The most effective procedures to correct ptosis must be done in accordance with the amount of levator function and the degree of ptosis.<sup>2</sup>

A levator resection is indicated for the correction of myogenic ptosis with levator function of 4 mm or greater.<sup>1</sup> A degree of unpredictability exists in the eyelid height obtained after anterior levator resection.<sup>3</sup> In the ptosis surgery under local anesthetic, most surgeons will set the height of the lid by intraoperative estimate and revision. It seems that the ptosis surgery under general anesthesia is less predictable.<sup>4</sup>

The purpose of this study is to evaluate the success rate of anterior levator resection and to identify any factors that may increase the predictability of this procedure.

## Methods

In a retrospective interventional case series, the hospital records of 72 patients with congenital blepharoptosis who underwent anterior levator resection in Nikookari Eye hospital (Tabriz) from 2003 to 2007, were reviewed. The indication for surgery was ptosis with levator function 4 mm or greater. Patients with bilateral ptosis, prior lid surgery and neurologic or muscular disease were excluded.

The intraoperative adjustment of eyelid height was performed in sitting position on patients who underwent local anesthesia with subcutaneous infiltration of 2% lidocaine and  $1/100000$  epinephrine. The intraoperative adjustment of eyelid height was performed in supine position on uncooperative patients and children who were treated with a levator resection under general anesthesia. The successful result was considered asymmetry 1 mm or less between MRD<sub>1</sub> of eyes.

The univariate and the multivariate logistic regression analysis were used to determine prognostic factors related to the surgical outcome.

## Results

There were 20 patients excluded from the study due to the loss of follow-up. Fifty-two

patients' data was analyzed. The minimum follow-up period was one year.

The mean age was  $16.73 \pm 9.3$  (range 4-40) years. Twenty-eight patients (53.8%) were treated with an anterior levator resection under local anesthesia (group 1) and 24 patients (46.2%) were treated with an anterior levator resection under general anesthesia (group 2).

The ptosis was moderate (2-3 mm) in 33 patients and severe ( $\geq 4$  mm) in 19 patients.

Mean levator function was  $8.4 \pm 2.6$  (range 4-13) mm.

Twenty-eight patients (53.8%) had fair-function ptosis (LF=4-9 mm) and 24 patients (46.2%) had good-function ptosis (LF>10 mm).

The overall success rate was 76.9% ( $^{40}/_{52}$ ) two months after surgery and 61.5% ( $^{32}/_{52}$ ) one year after surgery (Table 1). The undercorrection rate was 38.5% ( $^{20}/_{52}$ ). There was a considerable trend of eyelid dropping two months after surgery ( $P < 0.001$ ). We observed the ptosis recurrence in 10 patients (19.2%) within one year.

**Table 1.** Outcome of levator resection

Duration	Desired eyelid position	Undercorrection	Overcorrection
After two months	76.9% (40/52)	19.2% (10/52)	3.8% (2/52)
After one year	61.5% (32/52)	38.5% (20/52)	No case

The most frequent complication during the first year was undercorrection (38.5%).

Two patients with conjunctival prolapse in group 2 had been treated without surgical intervention.

Lagophthalmos and upper lid lag in down gaze were significant in 5 patients after one year. These patients were dissatisfied despite successful outcome.

The univariate logistic regression was performed to identify any possible prognostic factor for treatment failure. The amount of ptosis was an important predictor and undercorrection in severe ptosis was more frequent than moderate ptosis (OR=17.22,

95% CI: (3.18-93.32),  $P < 0.001$ ). In group 1, the success rate in severe ptosis (33.3%) was significantly lower than moderate ptosis (84.2%) ( $P = 0.013$ ). In group 2, the success rate in severe ptosis (no success) was also notably lower than moderate ptosis (92.9%) ( $P < 0.001$ ).

The other prognostic factor was the degree of levator function (OR=0.051, 95% CI: (0.01-0.261),  $P < 0.001$ ). Patients with fair-function ptosis appeared to have an increasing risk of undercorrection. In group 1, the success rate in the patients with fair levator function (30%) were significantly lower than patients with good levator function (88.9%) ( $P = 0.003$ ). In group 2, the success rate in the patients with fair levator function (38.9%) was also significantly lower than patients with good levator function (100%) ( $P = 0.016$ ).

Although the success rate in group 1 (67.9%) was higher than group 2 (54.2%), the univariate regression found no significant relationship between kind of anesthesia and the surgical outcome ( $P = 0.312$ ).

There is a significant difference between the mean age in group 1 ( $23.3 \pm 7.03$  years) and group 2 ( $8.9 \pm 4.31$  years).

The mean levator function in group 1 ( $9.5 \pm 2.7$  mm) was significantly ( $P = 0.004$ ) more than group 2 ( $7.2 \pm 2.1$  mm).

The statistical analysis ( $\chi^2$ ) found no significant increase or decrease in success rate with kind of anesthesia in patients with good-function ptosis ( $P = 0.394$ ) and fair-function ptosis ( $P = 0.635$ ).

The multivariate logistic regression found that the amount of ptosis ( $P = 0.002$ ) and preoperative levator function ( $P = 0.007$ ) were the most considerable and independent predictors of the surgical outcome of the anterior levator resection. Severe ptosis and decreasing preoperative levator function were associated with decreasing chance of success.

## Discussion

The challenge of accurately predicting eyelid height after blepharoptosis surgery is a well-known problem even in competent hands.<sup>2</sup> The success rate of levator resection procedure ranged between 45% and 74% of cases.<sup>5</sup> The overall success rate in our study

was 76.9% ( $^{40}/_{52}$ ) after 2 months and 61.5% ( $^{32}/_{52}$ ) after one year.

Cates et al reported anterior levator resection outcome in 100 patients with congenital blepharoptosis. 76% of all unilateral cases had a successful outcome six weeks following the surgery, falling slightly to 74% by six months.<sup>6</sup>

Although the success rate of our study at two months is as the same but we had a significant decrease in successful result later.

Tucker et al found that the maximal eyelid height was achieved almost universally by six weeks, after which 18% of eyelids subsequently dropped a mean of 0.8 mm.<sup>3</sup>

In our study, the ptosis recurrence rate was also 19.2% ( $^{10}/_{52}$ ).

Whitehouse et al showed 16.7% ptosis recurrence in 30 cases that underwent levator resection procedure.<sup>7</sup>

It seems that the eyelid height can still change later.<sup>9</sup>

All patients with ptosis recurrence had a fair preoperative levator function. It seems that the decreasing effect of levator resection with time depends on the preoperative levator function. We found that the preoperative levator function is the significant and independent predictor of the surgical outcome ( $P = 0.007$ ). The decreasing levator function is associated with increasing chance of undercorrection.

Tucker et al also showed that the preoperative levator function was the most important factor in the surgical outcome.<sup>4</sup>

Press et al showed a satisfactory eyelid elevation in 81.8% ( $^{36}/_{44}$ ) cases with poor levator function blepharoptosis following levator resection procedure but in this study 80% of patients had moderate ptosis.

There is no direct correlation between the levator function and the amount of ptosis.<sup>9</sup>

Our study demonstrated that the amount of ptosis was the independent predictor of the surgical outcome ( $P = 0.002$ ) and the severe ptosis was associated with decreasing chance of success.

Several techniques have been developed to achieve good postoperative outcomes.<sup>3-10</sup> An adjustable suture technique can allow for an additional correction,<sup>8</sup> but there are various opinions about when postoperative adjustment must be done.<sup>2</sup>

Takahushi et al showed the MRD-1 during intraoperative quantification in the sitting position predicted postoperative MRD-1 more accurately compared with the supine position.<sup>8</sup> In local anesthesia the surgeon can set the height of lid in the sitting position.

Although the success rate in group 1 was higher than group 2, the surgery under local anesthesia had no increasing effect on the surgical success ( $P=0.312$ ). There was a significant difference between mean levator function in group 1 and group 2 ( $P=0.004$ ).

The present study also showed; that the kind of anesthesia had no effect on surgical outcome not only in patients with fair levator

function but also in patients with good levator function.

Due to relatively small sample size, conclusions regarding clinical characteristics, which identify patients with more unfavorable surgical results, have been limited in most series.

### Conclusion

The amount of ptosis and preoperative levator function determine the final upper lid level following levator resection procedure. The intraoperative adjustment under local anesthesia was not associated with a higher success rate.

### References

1. Shields M, Putterman A. Blepharoptosis correction. *Curr Opin Otolaryngol Head Neck Surg* 2003;11(4):261-6.
2. Park DH, Jung JM, Choi WS, Song CH. Early postoperative adjustment of blepharoptosis. *Ann Plast Surg* 2006;57(4):376-80.
3. Tucker SM, Verhulst SJ. Stabilization of eyelid height after aponeurotic ptosis repair. *Ophthalmology* 1999;106(3):517-22.
4. Collin JR, O'Donnell BA. Adjustable sutures in eyelid surgery for ptosis and lid retraction. *Br J Ophthalmol* 1994;78(3):167-74.
5. Meltzer MA, Elahi E, Taupeka P, Flores E. A simplified technique of ptosis repair using a single adjustable suture. *Ophthalmology* 2001;108(10):1889-92.
6. Cates CA, Tyres AG. Outcomes of anterior levator resection in congenital blepharoptosis. *Eye (Lond)* 2001;15(Pt 6):770-3.
7. Whitehouse GM, Grigg JR, Martin FJ. Congenital ptosis: results of surgical management. *Aust N Z J Ophthalmol* 1993;23(4):309-14.
8. Takahashi Y, Kakizaki H, Mito H, Shiraki K. Assessment of the predictive value of Intraoperative eyelid height measurements in sitting and supine positions during blepharoptosis repair. *Ophthal Plast Reconstr Surg* 2007;23(2):119-21.
9. Press UP, Hübner H. Maximal levator resection in the treatment of unilateral congenital ptosis with poor levator function. *Orbit* 2001;20(2):125-9.
10. Liu D. Ptosis repair by a single suture aponeurotic tuck. *Ophthalmology* 1993;100(2):251-9.