

# Comparison Of Frontalis Sling With Or Without Tarsal Fixation Sutures For Severe Ptosis With Poor Levator Function

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## Abstract

**Objective:** To compare the outcomes of frontalis sling with tarsal fixation or without tarsal fixation suture in patients of severe ptosis with poor levator function.

**Methods:** This QUASI-experimental study was conducted at the College of Ophthalmology & Allied Vision Sciences/King Edward Medical Study after obtaining ethical approval vide no 2162/22. Ten Patients above 10 years of age and having levator muscle function of less than 4mm were selected by probability consecutive sampling. Those patients who were diagnosed with Blepharophimosis, Marcus Gun phenomenon, CN III palsy and other lid or facial deformities were excluded. Patients were equally divided into two groups A and B. Group A patients underwent fascia lata sling with tarsal fixation while Group B patients underwent simple fascia lata sling without tarsal fixation. Postoperatively (1 week) surgical success including marginal reflex distance (MRD) and complications including slippage of the sling, exposure keratopathy, recurrence and lid margin deformity were evaluated. Paired t-test and Independent sample t-test were applied to check for statistical significance.

**Results:** Eight out of ten patients had bilateral ptosis with poor levator muscle function while the other two patients had unilateral ptosis. Changes in the marginal reflex distance and palpebral fissure height after surgery were statistically significant. Both marginal reflex distance and palpebral fissure height were statistically better in group A as compared to group B (0.001 & 0.003) respectively.

**Conclusion:** Cosmetic results are better when a fascia lata sling is done with tarsal fixation sutures.

**Keywords:** Ptosis, Fascia lata, Patients.

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## 1. Introduction

The frontalis sling is a widely preferred technique for patients with moderate-to-severe ptosis and poor levator muscle function (LMF). It is used primarily for congenital ptosis, but also chronic progressive external ophthalmoplegia, third cranial nerve paralysis & laxity of orbit.<sup>1,2</sup> Frontalis suspension surgery using synthetic sutures was first introduced in 1880. Since then a variety of procedures have been advocated to improve eyelid appearance using different surgical incisions including supra-lash stab incisions (closed approach) classic skin crease incisions (open approach) and various autologous (palmaris longus tendon and temporalis fascia) and synthetic (nylon, polytetrafluoroethylene, Gore-Tex and silicone) suspension materials.<sup>3,4</sup> Proper evaluation of ptosis involves taking quantitative measurements including the margin to reflex distance (MRD), levator muscle function (LMF), palpebral fissure (PF) and the superior lid crease in addition to qualitative analysis as upper eyelid contour.

Autogenous fascia lata,<sup>5</sup> remains the time-tested material over the years with the best biocompatibility. The technique for making a sling has also been quite varied. Some surgeons use a lid crease incision with tarsal fixation of the fascia lata compared to others who use supra-lash stab incisions to pass the fascia lata beneath the orbicularis without anchorage.<sup>6</sup> Fox Pentagon<sup>7</sup> or Crawford double triangle<sup>8</sup> are the two different methods of passing the fascia lata. In our study, we report a comparison of modified fox pentagons with or without tarsal fixation to correct poor function congenital ptosis.

Sendul SY et al.<sup>9</sup> compared two different frontalis sling approaches, tarsal fixation and orbicular muscle fixation, using a silicone rod in terms of postoperative upper eyelid. The study concluded that the frontalis sling approach with tarsal fixation using a silicone rod might provide improved cosmetic results including more symmetrical upper eyelid contour compared with the orbicularis muscle fixation approach. Moin M.<sup>10</sup> evaluated the results of tarsal fixation of fascia lata in frontalis sling ptosis surgery in a retrospective interventional case series. It concluded that tarsal fixation of the fascia lata sling produces a deep lid

crease with reliable correction of poor function ptosis. The rationale for doing this study is the absence of local literature comparing the two techniques of frontalis sling with tarsal fixation or without tarsal fixation.

## 2. Materials & Methods

This QUASI-experimental study was conducted at the College of Ophthalmology & Allied Vision Sciences/King Edward Medical University from 20th December 2022 to 31st July 2023 after obtaining ethical approval vide no 2162/22. A sample size of 14 was calculated by taking a 5% level of significance, 90% power of the test, post-operative MRD of 3.5 in group 1 and 4.2 in group 2.<sup>11</sup> Patients above 10 years of age and having levator muscle function of less than 4mm were selected by Non-probability consecutive sampling. Those patients who were diagnosed with Blepharophimosis, Marcus Gun phenomenon, CN III palsy and other lid or facial deformities were excluded. Patients were equally divided into two groups A and B. Group A patients underwent fascia lata sling with tarsal fixation while Group B patients underwent simple fascia lata sling without tarsal fixation. Postoperatively (1

week) surgical success including marginal reflex distance (MRD), Palpebral fissure height and cosmetic outcome were evaluated. Cosmetic outcome was graded as excellent, good or poor when the lid crease was symmetrical, asymmetrical and poorly defined respectively. All ethical guidelines regarding patient confidentiality were adhered to as put forth in the Declaration of Helsinki. Data was entered in SPSS and analyzed. Comparisons between groups were done using chi-square tests for qualitative variables and independent sample T test for quantitative value. The paired t-test was used to compare pre/postoperative MRD and pre/postoperative PFH. Intergroup differences were analyzed using the independent sample T-test.

## 3. Results

Eighteen eyes of ten patients (6 male & 4 female) were included. Eight out of ten patients had bilateral ptosis with poor levator muscle function while the other two patients had unilateral ptosis. With regards to marginal reflex distance and palpebral fissure height, both within the groups and between the groups comparisons revealed statistically significant results (Table 1 & 2).

**Table 1: Comparison of Palpebral fissure height**

	Mean Palpebral fissure height		Paired-t test	p
	Before surgery	After surgery		
<b>Group A</b>	3.33±0.50	8.89±0.60	-18.898	0.000*
<b>Group B</b>	3.33±0.50	7.78±0.83	-11.795	0.000*
<b>Independent t-test</b>	NA	3.244		
<b>p</b>	NA	0.006		
<b>Mean Change</b>	Group 1	Group 2	0.003*	
	-5.55	-4.33		

**Table 2: Comparison of margin reflex distance**

	Mean Margin Reflex Distance		t	p
	Before surgery	After surgery		
<b>Group A</b>	-1.11±0.78	3.78±0.67	-12.57	0.000*
<b>Group B</b>	-1.00±0.71	3.33±0.50	-11.79	0.001*
<b>Independent t-test</b>	-0.316	1.600		
<b>p</b>	0.756	0.129		
<b>Mean Change</b>	Group 1	Group 2	0.001*	
	-4.89	-4.44		

**Table 3: Cosmetic outcome**

Cosmetic outcome	Group	Group	Total (N)
	A	B	
Poor		2	1(5.55%)
Good	1	4	5(27.77%)
Excellent	8	3	11(61.11%)
Total	9	9	18

#### 4. Discussion

Our quasi-experimental study revealed statistically significant results when the fascia lata sling was done with its fixation to the tarsal plate. Both margin reflex distance and palpebral fissure height were significantly improved when surgery was augmented with tarsal fixation as compared to when done without it. In a retrospective analysis of patient records, Singh P and associates,<sup>12</sup> concluded that in patients with Marcus gun jaw winking ptosis, both Tarso-frontalis sling and Tarso-frontalis sling combined with levator muscle resection significantly reduce excursion due to jaw winking, results similar to this study. In a randomized controlled trial, Bagheri A and colleagues,<sup>13</sup> compared mono-triangular versus bi-triangular techniques of fascia lata ptosis surgery. Postoperatively, elevation in the height of the palpebral fissure was higher in patients who underwent mono-triangular technique surgery as compared to bi-triangular. Also, the mono-triangular technique was associated with minimal scarring. Galindo-Ferreiro A et al,<sup>14</sup> did a non-randomized retrospective view of patient records and compared two different techniques of silicone frontalis sling surgery. In one method, a silicone band was stitched with a tarsal plate after making an incision while it was passed through stab incisions in another technique. Success of surgery was defined as an increase in MRD score by at least 2. Good outcome was achieved in 50% patients of incision group and 51.8% patients of stab group. Moreover, MRD was further improved in 71.8% patients of incision group and 75% in the stab group. Contrary to the above study results, this study reports significant results when the fascia lata sling was done with incision. Molinari A and associates,<sup>15</sup> compared the pentagon and base down techniques of frontalis suspension when done with braided polyester. Margin reflex distance increased by 2.51mm in the base down technique as compared to

1.70mm in the fox pentagon technique. Similarly, the increase in the height of the vertical palpebral fissure was statistically significant in the base-down group.

Sendul SY and colleagues,<sup>16</sup> carried out a retrospective comparative case series evaluating tarsal fixation and orbicularis fixation with a silicon band. Margin to nasal (MTD) & temporal (MND) limbus and pupillary centre (MCD) distance were compared between two groups as well as a control group. The ratio of MTD/MCD was high in the control group as compared to group 1 while the MND/MCD ratio was lower in the control group as compared to group 1 who underwent tarsal fixation. It was concluded that silicone sling with tarsal suturing was associated with better lid contour and bilateral symmetry. These results also confirm current study findings.

Buttanri IB et al,<sup>17</sup> compared the impact of stitching the silicone band with tarsus and also the outcome when using two different types of sutures. Successful surgery was defined as a post-operatively eyelid position within 1mm of the superior limbus. Failure was documented in 50% of patients who underwent silicone rod sling without sutures, 20.8% of patients who underwent sling with tarsus suturing by polypropylene suture it was 13% in cases in which band was stitched to tarsal plate with braided polyester suture. The difference was statistically significant between the un-sutured and sutured groups. Johnson ER and fellows,<sup>18</sup> compared the success and requirement of revision when levator muscle advancement was done by two different types of sutures for the treatment of senile ptosis. Sutures compared were 5-0 polyglactin and 6-0 silk while direct connection and hang back technique were evaluated. Silk direct connection stitches were equivalent to silk hangback sutures and were statistically significant in terms of success against polyglactin hangback ( $p=0.035$ ).

Manasseh GS and team,<sup>19</sup> compared the long-term success rate and need for reoperation when ptosis repair was done with polyglactin versus ethibond sutures. In the polyglactin group, 13.9% of patients required reoperation as compared to 5.9% in the ethibond group. It was concluded that the use of ethibond sutures in ptosis surgery is associated with a better success rate and reduced complications.

Elsamkary MA and associates,<sup>20</sup> studied the outcome of autogenous fascia lata sling (AFLS) versus Gore-Tex suspension (GTS) when treating patients with bilateral congenital ptosis. Failure rate (recurrence and complications) was low in AFLS ( $P=0.035$ ). Similarly,

comparable lid height and good position were more frequently achieved by AFLS (P=0.007 and 0.047, respectively).

## 5. Conclusion

Fascia lata sling produces better cosmetic and functional results when done by tarsal fixation of fascia lata.

## CONFLICTS OF INTEREST- None

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## Contributions:

A.R - Conception of study

A.R, M.S - Experimentation/Study Conduction

A.R, M.S, U.R - Analysis/Interpretation/Discussion

M.S - Manuscript Writing

A.R, M.S, U.R - Critical Review

U.R - Facilitation and Material analysis

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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