

# Ptosis Repair Using Preserved Fascia Lata with the Modified Direct Tarsal Fixation Technique

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**Purpose:** To evaluate the clinical outcome of frontalis sling operation using preserved fascia lata with modified direct tarsal fixation in congenital ptosis patients.

**Methods:** Forty-seven congenital ptosis patients (60 eyes) who underwent a frontalis sling operation using preserved fascia lata with modified direct tarsal fixation method between March 2001 and December 2008 with a mean follow-up time of 52 months (range, 26 to 122 months) were included in this study. The medical records were reviewed retrospectively.

**Results:** A retrospective chart review was conducted in patients who were diagnosed with congenital ptosis and underwent frontalis suspension surgery using preserved fascia lata with modified direct tarsal fixation from 2001 through 2008 at Dong-A University Hospital. The patients were 34 males and 14 females. The age of the patients ranged from 1 to 18 years with an average age of 4.51 years. At a mean follow-up of 60 months, good final results were achieved in 46 eyes (76.6%), fair in 8 eyes (13.3%), and poor in 6 eyes (10%). The poor results consisted of undercorrection of 1 eye and recurrence in 5 eyes. The accumulative survival rate was 87.2%, with all recurrences occurring within 12 months postoperatively.

**Conclusions:** Frontalis sling operation by preserved fascia lata with modified direct tarsal fixation appears to be an effective treatment for severe congenital ptosis, showing good long term results.

**Key Words:** Blepharoptosis, Congenital ptosis, Frontalis sling operation, Preserved fascia lata, Tarsal fixation

Frontalis sling surgery is the treatment of choice for congenital ptosis with poor levator function [1-3]. Autogenous fascia lata is the material of gold standard for this operation, but it requires a second incision and cannot be used in very young children [4,5]. In these cases, allograft fascia lata may be the ideal substitute. Surgical techniques for frontalis sling surgery include pentagonal pattern, double rhomboid pattern, triangular pattern, and modified double

triangular pattern [6-10]. In 1990, Spoor and Kwitko [11] invented a surgical technique of direct tarsal and frontalis fixation. With direct fixation, it is easier to create a lid crease and adjust the lid contour.

This paper describes the clinical results of frontalis sling operation using preserved fascia lata with modified direct tarsal fixation technique in congenital ptosis patients.

## Materials and Methods

We conducted a retrospective study of all patients who underwent frontalis suspension surgery using preserved fascia lata with modified direct tarsal fixation for congenital ptosis between March 2001 and December 2008. Patients with blepharophimosis syndrome and Marcus-Gunn

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jaw winking synkinesis were excluded. Data collected included age, gender, history of prior surgery, comorbidity, preoperative and postoperative digital or Polaroid photographs, ptosis assessment prior to surgery, post-surgical results, and related complications.

All operations were performed by one surgeon (HBA) assisted by a resident or fellow. All patients were evaluated postoperatively by the same surgeon. All surgeries were performed under general anesthesia. A lid crease line was designed and drawn with a marking pen above the lash line. Another two stab incision sites were marked just above the eyebrow. The upper eyelid and suprabrow tissue were infiltrated with a mixture of lidocaine 2% and 1 : 100,000 epinephrine. The lid skin was incised at the lid crease, and dissection was propagated through the orbicularis muscle in order to expose some of the tarsal plate. Two pieces of Tutoplast (Biodynamics International, Erlangen, Germany) a commercially available processed fascia lata allograft, were prepared. The ends of the two pieces of fascia lata were anchored to the upper tarsus with 6-0 nylon (Ethicon Inc., Somerville, NJ, USA) suture. Both ends of the anchoring suture were left uncut. A kelly was inserted into the suprabrow incision, through the tissues and out through the lower lid crease. Then, grabbing the free end of the sutured fascia lata by the kelly, it was pulled through the side of the suprabrow incision. The remaining fascia lata was performed in the same manner. The orbital septum was penetrated at the arcus marginalis, creating a passage directed toward the eyelid. After adjusting the proper lid height, the remaining ends of the fascia lata were cut off. Then, the ends were fixed and buried in the suprabrow incision with 6-0 nylon (Ethicon Inc.) suture. With the sutures left uncut, an eyelid fold was formed by fixing the skin incision to the tarsus. The lid crease was sutured with continuous technique, and the suprabrow incisions were closed with the vertical mattress technique using 6-0 plain gut (Fig. 1).

The patients were subdivided by the degree of ptosis. Mild was defined as 2 mm (or less) drooping from its normal level, moderate was 3 mm drooping, and severe was 4 mm (or more) drooping. Twelve eyes with moderate ptosis and 35 eyes with severe ptosis were included in the study. Surgical outcome was graded on a three-point scale. Outcome was defined as good if margin reflex distance 1 (MRD1) was  $\geq 3$  mm, fair when MRD1 was 1.5 to 2.5 mm, and poor when MRD1 was  $\leq 1$  mm.

## Results

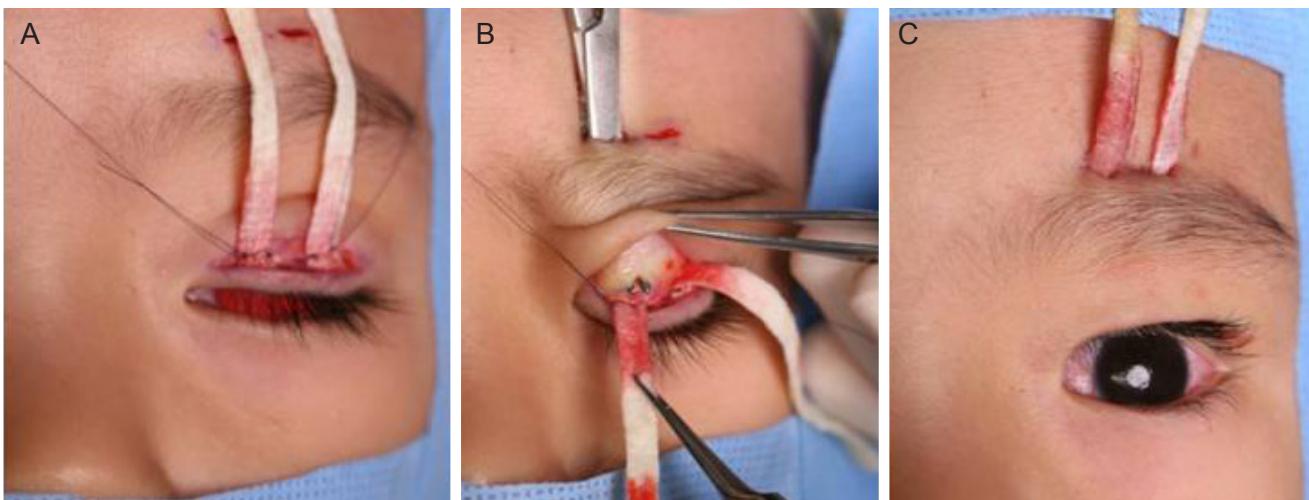
A total of 47 patients (60 eyes) were included in the study. The average age of the patients was  $4.5 \pm 3.6$  years (range, 1 to 18 years). Thirty-four of them (70.2%) were men. Thirty-two patients underwent unilateral surgery, and 14 had bilateral surgery. Eleven patients had epiblepharon and underwent epiblepharon correction along with the ptosis correction surgery. Three patients had undergone prior frontalis suspension with Supramid Extra II (S. Jackson Inc., Alexandra, VA, USA). Demographics of the study population are summarized in Table 1. The mean follow-up period was  $60 \pm 21$  months (range, 22 to 122 months).

Postoperatively, 46 (76.6%) of the operated lids were judged to have achieved good results, 8 eyes (13.3%) had fair lid results, and 6 eyes (10%) had poor results which included undercorrection (1 eye, 1.7%) and recurrence (5 eyes, 8.3%). One undercorrected case and 1 recurrent case underwent further surgery. Recurrence occurred after a mean of  $3.7 \pm 4.6$  months; all were within 12 months postoperatively (1 week to 11 months). The cumulative survival rate was 87.2%, and the cumulative survival curve is shown in Fig. 2. Fig. 3. shows one patient before and after the surgery.

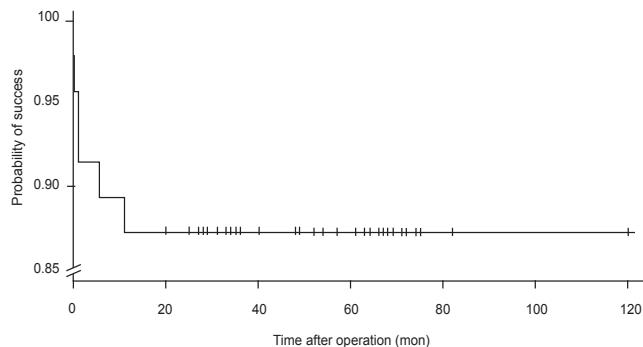
The correlation between the severity of the ptosis and surgical outcome was not statistically significant ( $p = 0.384$ , Mantel-Haenszel chi-square). The correlation between the bilaterality of the ptosis and surgical outcome was also not statistically significant ( $p = 0.64$ , Pearson chi-

**Table 1.** Demographics of the study population

Variables		Eyes
Gender	Male	33
	Female	14
Age (yr)	$\geq 5$	36 (45 eyes)
	6-10	8 (11 eyes)
	11-20	3 (4 eyes)
	Mean	4.51
Bilaterality	Unilateral	32
	Bilateral	14
Comorbidity	Epiblepharon	11
	Strabismus	12
Amblyopia		3



**Fig. 1.** (A) The ends of the two pieces of fascia lata were anchored to the upper tarsus with 6-0 nylon suture. (B) A Kelly was inserted into the suprabrow incision, grabbing the free end of the sutured fascia lata. (C) The ends of fascia lata were pulled through the sides of the suprabrow incisions.



**Fig. 2.** The cumulative survival curve. The cumulative survival rate was 87.2%. Recurrence occurred after a mean of  $3.7 \pm 4.6$  months.

square test). Three patients had amblyopia, and all of them underwent unilateral surgeries. One of them was in the recurrence group. The correlation between amblyopia and recurrence was not statistically significant ( $p = 0.19$ , Pearson chi-square test).

Eleven eyes (18.3%) had superficial punctate keratitis postoperatively, 12 eyes (20%) had poor lid contour (peaking in 2 eyes and temporal drooping in 10 eyes), but there were no cases of suture exposure, suture infection or pyogenic granuloma.

## Discussion

The treatment of choice for moderate to severe congenital ptosis with minimal or no levator function is frontalis



**Fig. 3.** Pictures of one patient before (A) and after (B) the surgery. The degree of ptosis was moderate and surgical outcome was good.

sling operation [1-3]. Suspensory materials for the frontalis sling operation can be divided into three categories: synthetic, autograft fascia lata, and allograft fascia lata. Auto-graft fascia lata is generally considered to be the best material [7,12-15] because it is not degraded and is believed to allow fibrovascular tissue ingrowth leading to biointegration without significant inflammation. Also, there is less chance of infection associated with this material. Autograft fascia lata has good long term results with maintenance of lid height [16,17]. However, Crawford [7] and Crawford [12] recommended using it only in children older than 3 years because there is difficulty in harvesting this material when

the leg is too short, and insufficient amounts of fascia lata are obtained. Also, the process requires a long operation time, and there is a cosmetic problem of postoperative leg scarring [7,18]. For these reasons, the use of allograft fascia lata as an alternative material has been promoted. Being a synthetic material, it carries some risk of potential infection, but it avoids the need for a second surgical site.

There have been several reports on the outcome of frontalis sling operation with allograft, i.e., preserved fascia lata. Many of them reported a higher rate of late ptosis recurrence [14,15,19-21]. Our results with preserved fascia lata were very encouraging. The success rate was 86.6%, and all recurrence occurred within 12 months.

The commonly used surgical techniques for frontalis sling operation are rectangular pattern or rhomboid pattern. However, in our study, we used direct tarsal fixation technique. This technique was invented by Spoor and Kvitko [11] in 1990 and is superior with regard to adjustment of eyelid height and ensures firm anchoring of the sling material. Blephroplasty is easily performed at the completion of this fascia lata slinging procedure [11]. In the original technique, two fascia lata strips are folded in half, and the closed loops of each fascia lata are sutured to the tarsus. The suprabrow incision is large (3 to 4 cm) and is further enlarged until the frontalis muscle is exposed. In our study, the method was somewhat different. We also used two pieces of long fascia lata but did not fold them in half. The suprabrow incisions were small (3 to 4 mm) and were not enlarged. Moreover, we passed the fascia lata strips through the retroseptal area separately, making a two-tunneled space. We believe this modified method is better than the original technique because it requires smaller incisions, thus leaving smaller scars. Also, because the retroseptal dissection is smaller and two strips are separately passed through the narrow tissue tunnel space, minimal trauma results to the adjacent tissue and incorporation and biointegration are improved. This can possibly decrease the postoperative complications and recurrence.

The preserved fascia lata used in the operation showed a good safety profile with no infection or exposure over the follow-up period. Our study had a relatively long period of follow-up, with few complications and recurrence. The results are quite encouraging.

We believe our report supports the long term stability of the procedure. Thereby, we conclude that frontalis sling operation by preserved fascia lata with modified direct tar-

sal fixation is a relatively simple procedure showing a good long term result and should be considered as a good surgical solution for severe congenital ptosis.

## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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## References

1. Beard C. *Ptosis*. 3rd ed. St. Louis: Mosby; 1981. p. 169-73.
2. Mustarde JC. *Repair and reconstruction in the orbital region*. 2nd ed. Edinburgh: Churchill Livingstone; 1980. p. 325-8.
3. Fox SA. Congenital ptosis II. Frontalis sling. *J Paediatr Ophthalmol* 1966;3:25.
4. Song R, Song Y. Treatment of blepharoptosis: direct transplantation of the frontalis muscle to the upper eyelid. *Clin Plast Surg* 1982;9:45-8.
5. Crawford JS. Recent trends in ptosis surgery. *Ann Ophthalmol* 1975;7:1263-7.
6. Fox SA. A new frontalis skin sling for ptosis. *Am J Ophthalmol* 1968;65:359-62.
7. Crawford JS. Repair of ptosis using frontalis muscle and fascia lata. *Trans Am Acad Ophthalmol Otolaryngol* 1956;60:672-8.
8. Goldberger S, Conn H, Lemor M. Double rhomboid silicone rod frontalis suspension. *Ophthal Plast Reconstr Surg* 1991;7:48-53.
9. Seider N, Beiran I, Kaltreider SA. One medial triangular Tutooplast sling as a frontalis suspension for adult myogenic blepharoptosis. *Acta Ophthalmol Scand* 2006;84:121-3.
10. Mauriello JA Jr, Abdelsalam A. Effectiveness of homologous cadaveric fascia lata and role of suture fixation to tarsus in frontalis suspension. *Ophthal Plast Reconstr Surg* 1998;14:99-104.
11. Spoor TC, Kvitko GM. Blepharoptosis repair by fascia lata

- suspension with direct tarsal and frontalis fixation. *Am J Ophthalmol* 1990;109:314-7.
12. Crawford JS. Repair of ptosis using frontalis muscle and fascia lata: a 20-year review. *Ophthalmic Surg* 1977;8:31-40.
  13. Crawford JS. Frontalis sling operation. *J Pediatr Ophthalmol Strabismus* 1982;19:253-5.
  14. Wagner RS, Mauriello JA Jr, Nelson LB, et al. Treatment of congenital ptosis with frontalis suspension: a comparison of suspensory materials. *Ophthalmology* 1984;91:245-8.
  15. Wasserman BN, Sprunger DT, Helveston EM. Comparison of materials used in frontalis suspension. *Arch Ophthalmol* 2001;119:687-91.
  16. Kemp EG, James CR, Collin JR. Brow suspension in the management of ptosis: an analysis of over 100 cases. *Trans Ophthalmol Soc U K* 1986;105(Pt 1):84-7.
  17. El-Toukhy E, Salaem M, El-Shewy T, et al. Mersilene mesh sling as an alternative to autogenous fascia lata in the management of ptosis. *Eye (Lond)* 2001;15(Pt 2):178-82.
  18. Leibovitch I, Leibovitch L, Dray JP. Long-term results of frontalis suspension using autogenous fascia lata for congenital ptosis in children under 3 years of age. *Am J Ophthalmol* 2003;136:866-71.
  19. Beyer CK, Albert DM. The use and fate of fascia lata and sclera in ophthalmic plastic and reconstructive surgery. *Ophthalmology* 1981;88:869-86.
  20. Wilson ME, Johnson RW. Congenital ptosis: long-term results of treatment using lyophilized fascia lata for frontalis suspensions. *Ophthalmology* 1991;98:1234-7.
  21. Broughton WL, Matthews JG 2nd, Harris DJ Jr. Congenital ptosis: results of treatment using lyophilized fascia lata for frontalis suspensions. *Ophthalmology* 1982;89:1261-6.