

New autologous material for the frontalis suspension technique: superficial temporal fascia

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INTRODUCTION

The frontalis suspension technique, which is a well-known surgical procedure, has been used for congenital ptosis for many years [1]. Several autologous and foreign grafts or materials have been preferred for this suspension, such as collagen, tensor fascia lata, palmaris longus tendon, deep temporal fascia, catgut, prolene, silicone, stainless steel, and supramid suture [2-3]. Each of these have their own advantages and disadvantages; however, the superficial temporal fascia has not been used for the frontalis suspension method before.

This article reports the case of a child with congenital blepharoptosis, who was treated with the superficial temporal fascia, which is a new autologous graft for the frontalis suspension technique.

CASE REPORT

A 4-year-old child, who was diagnosed with congenital blepharoptosis, was admitted to our clinic for reconstructive surgery. She had absent levator function and severe ptosis; additionally, there were medial epicanthal bands in both of her eyelids, blocking her visual field (Figure 1).

Informed consent was signed by her family, and serial operations were planned for the reconstruction. In the first

operation, the medial epicanthal bands were released. The following operation was planned for ptosis. Under general anesthesia, the hair was separated with bands for a zigzag incision over the temporal region. Then, the tract of the superficial temporal artery was localized by using Doppler ultrasonography. After the zigzag incision was performed, another T incision was added over the temporal region. The skin flaps were elevated just below the hair follicles, and after the meticulous dissection of the superficial temporal fascia, two pieces of the superficial temporal fascia strips were elevated over the deep temporal fascia. The deep temporal fascia remained intact (Figure 2A).

The superficial temporal fascia was cut to create 4 equal fascia strips measuring 3 × 60 mm (Figure 2B). Two 2 mm long strap incisions were completed, 3 mm above the lid margin, where it crosses with the corneo-scleral limbus. These incisions were advanced to the tars. Then, four eyebrow incisions were also performed to each corresponding eyebrow margin (2 central, 1 nasal, and 1 temporal). These incisions were advanced to the periosteum. To create the new supratarsal fold, a 3 mm-wide skin strip was excised, 9 mm above the lash line (Figure 2C). The superficial temporal fascia graft was then inserted between the orbicularis oculi muscle and tarsus, at the lid margin, and pulled toward the nasal and temporal eyebrow incisions under the orbicularis oculi muscle. The margin of the upper eyelid was left over the upper limbus level to adjust the final position of the upper eyelid. Therefore, each strip was shortened according to the eyelid position during the procedure. Thus, we prevented lagophthalmos during the postoperative period (Figure 2D). The lid incisions and the elliptic incisions were closed with 6/0 absorbable sutures. Then, nonabsorbable sutures were placed at the end points of the fascia grafts. Finally, a penrose drain was placed in the donor area and a skin closure was performed. The surgery was completed without any complications, and the dressing was changed on the first post-operative day.

RESULTS

There was no hematoma or flap necrosis in the donor area, and the upper eyelid edema was resolved within 1wk. The incision scars were nearly negligible in both the donor area and the eyelids within 6mo after the operation. No significant change in the lid position, wound infection, healing problems, or alopecia in the donor area were observed during



Figure 1 Bilateral congenital blepharoptosis.

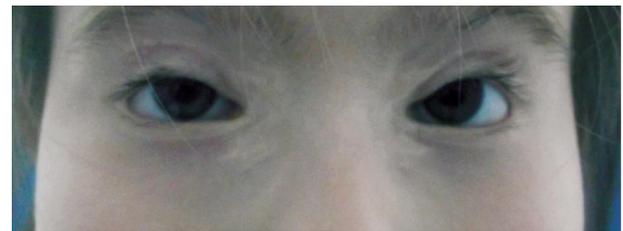


Figure 3 Postoperative 18-month photograph of the patient.

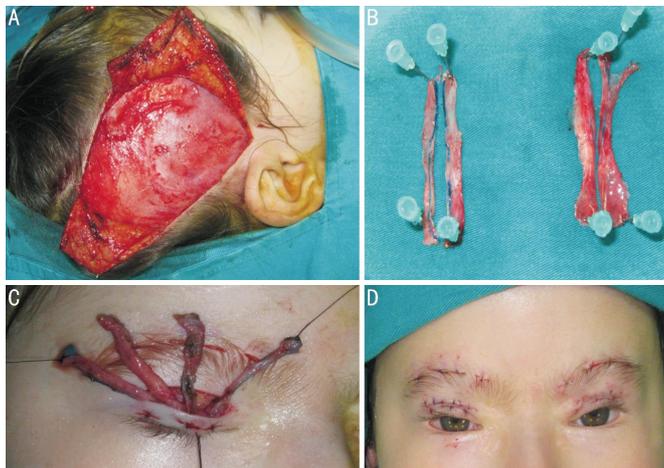


Figure 2 Intraoperative images of the technique A: Elevation of the superficial temporal fascia; B: Creation of four equal fascia strips; C: Four temporoparietal fascia strips passed through the tunnels; D: Final position of the upper eyelids.

the early and late postoperative visits (Figure 3). The postoperative long term result was good, according to the criteria of Manners *et al*^[4].

DISCUSSION

Because levator muscle dysfunction usually accompanies congenital blepharoptosis, classical levator muscle procedures could not be applied for the surgical reconstruction of this malformation. For several years, the frontalis muscle has been used in these cases. The aim of this surgery was to obtain the advantage of the frontalis muscle function, to provide for the opening of the upper eyelid. To date, many materials have been used in these surgeries, such as silicone, prolene, and supramid sutures^[2]. Even wire was used by Garcia and Blandford^[5]. However, these materials may cause foreign body reactions, exposition, granuloma formation, infection, and consequently, the recurrence of the ptosis^[2]. These complications have led plastic surgeons to explore autogenous materials that would adjust to the body more easily. The fresh autologous fascia lata graft was first used in 1908 by Payr^[6]. This autologous fascia lata graft is an effective and suitable suspension material, but it may be difficult to obtain. Furthermore, it has other disadvantages, such as a visible scar and herniation at the donor area, and the requirement of two distinct operation regions^[2].

The palmaris longus tendon has also been used as a suspension material by some authors^[7-8]. It is available at any age, and it has a smaller area when compared to the tensor

fascia lata graft. Moreover, the palmaris longus tendon may cause less donor site morbidity. However, median nerve injury has been reported during the scarification of this tendon^[9]. In addition, it causes a visible incision scar on the patient's wrist, and an operation area distant from the head is required.

The deep temporal fascia was first used by Tellioglu *et al*^[2] for a frontal sling operation. The advantages of this method are low donor site morbidity, hiding the scar beneath the scalp line, and using the same region for both the recipient and donor areas. In the present study, we aimed to develop Tellioglu's technique for the advantages listed above, by using the superficial temporal fascia. Although it is hard to dissect the temporoparietal fascia because of the tight fibrous connections between the fascia and the skin, its dissection was easily obtained in the present case. Moreover, the deep temporal fascia, which is an important anatomical structure, was also protected. Additionally, hematoma formation was prevented with the non-exposed temporal muscle. Being softer and more flexible, the superficial temporal fascia is a more manipulative material than the deep temporal fascia, so that it can pass easily through the tunnels over the eyelids. Despite its soft structure, the superficial temporal fascia is able to maintain its suspension power for a long period of time.

Before the harvesting of the superficial temporalis fascia, the anatomy of the temporal area should be reviewed in detail. The superficial temporal artery and frontal branch of the facial nerve are two important anatomical structures which have to be protected in this method^[10-11]. The superficial temporal artery has two main branches: the anterior and posterior. They lie in the superficial temporal fascia and anastomose with the anterior and posterior vascular systems of the scalp. The anatomical variations of this artery are well-documented in the literature^[10-11]; therefore, the artery should be marked at the beginning of the operation with Doppler ultrasonography. The frontal nerve crosses the zygomatic arch superficially, and lies between the lateral eyebrow and zygomatic arch, deep to the temporoparietal fascia^[12]. This nerve innervates the frontalis, orbicularis oculi, and corrugator muscles. Care should be taken during the dissection, and loupe magnification could be helpful for a safe surgery.

In conclusion, the superficial temporal fascia could be a new, convenient, autologous structure in the frontalis suspension technique in the future. However, new studies in large patient groups should be designed for a comprehensive analysis.

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