ABSTRACT

Aim To introduce ‘kite-tail’ strips or a ‘multiple Z-plasty’ technique on an autogenous fascia lata graft without a stripper to correct severe blepharoptosis by frontalis suspension and to evaluate its effectiveness on surgical outcome.

Methods 26 eyelids of 18 patients (seven women, 11 men; 10 unilateral, eight bilateral) underwent this procedure. Only a small skin incision was made on the leg measuring 2 cm. A final of 3.5×0.6 cm or 5×1 cm fascia lata strip was obtained according to the ptosis laterality. The obtained fascia lata graft was then dissected by a described stripping technique for a final of one or two fascia lata strips approximately 12.5 cm×2 mm long. Functional and cosmetic results were evaluated and the advantages of this technique were stressed.

Results Mean age was 26.0 years (range 3–64) with a mean follow-up period of 28.8 months (range 6–52). All cases achieved good to excellent final lid positions and adequate cosmetic results with no postoperative early (haemorrhage, wound infection) or late (contour abnormality, overcorrection, muscle herniation, recurrence) complications.

Conclusions This is an easily mastered, simple, safe and efficient alternative technique that offers various benefits over conventional approaches. It avoids extended blunt dissections and has fewer postoperative leg complaints with less haemorrhage—haematoma formation or muscle prolapsus. It is useful at any age, especially in small children who already have a limited amount of delicate fascia lata and may be preferred when a fasciotome or videoendoscope is not available or fails to harvest sufficient material of fascia lata.
Figure 1  A 2-cm long skin incision (A) site is marked in the iliotibial tract by a surgical pen along the line sited between the lateral tibial condyle and the superoanterior iliac crest (adult measurements). The subcutaneous tissue and the fat are dissected to expose the underlying fascia lata fibres running parallel to the axis of the leg (B). The anterior plane of the fascia lata is further exposed by inferior (C) and superior (D) blunt dissections by the little finger of the surgeon. A short segment of fascia lata graft measuring 3.5×0.6 cm (paediatric measurements in unilateral cases) was withdrawn.
Clinical science

Surgical technique

Fascia lata harvesting

Under general anaesthesia and in a supine position, the leg was straightened with the toes turned medially. After surgical cleaning and antiseptic preparation, the thigh was draped and the skin incision site was marked between the lateral iliac crest and the top of the graft, which were then extended superiorly for 3.5 cm using a Westcott scissors. A horizontal incision connecting the two vertical incisions was performed to obtain a fascia lata strip. While an assistant retracted the incision site inferiorly, anterior and posterior vertical fascia lata cuts were made at the top of the graft. The graft was de-fat and further exposed by inferior and superior dissections by the little finger of the surgeon downwards (figure 1C) and upwards (figure 1D) for approximately 1.5 cm in either direction of the main incision borders and the graft width was defined.

Postoperatively, topical antibiotic ointment to the suture line was administered for a week. The skin sutures were removed at 10 days.

A ‘kite-tail’ fascia lata strip preparation

The harvested fascia lata graft was carefully cut into 2-mm-wide continuous strips using either a Westcott scissors or a scalpel blade for a final configuration of ‘Z’ (figure 1F). The short strips were folded on each other and sutured together at the cut ends from their continuous corners using one 6-0 Vicryl (figure 1G) to strengthen them further against traction during the suspension procedure (H). A final continuous one piece of 10 mm wide fascia lata strip (I) was obtained (figure 1H). In bilateral cases, the prepared fascia lata strip (figure 1K) was not subdivided into two pieces (figure 1L) until the completion of unilateral suspension procedure.

Frontalis suspension

The modified Fox pentagon method with five stab skin incisions was used in the usual way. In bilateral cases, the eyelid margin was adjusted to a position 1–1.5 mm below the superior limbus in each eye. In unilateral cases, symmetry was considered with the opposite eyelid margin. No special technique was used to reform the eyelid crease.

The hospitalised patients were discharged on the next day. Oral antibiotics plus analgesic anti-inflammatory drugs were prescribed for a week along with topical antibiotics and lubricating eye drops for 2 weeks. The patients were seen at the seventh day, and then every 3 months.

Postoperatively, donor site morbidity was evaluated and any objective or subjective complication was noted, if present. The final eyelid position (functional success), contour and symmetry (cosmetic success) were evaluated by photographic review and were classified as excellent, good or poor.

RESULTS

Twenty-six eyelids (10 unilateral, eight bilateral) of 18 patients (seven women, 11 men) were included. There were six children (seven eyelids) and 12 adults (19 eyelids). The mean age of patients was 26.0 years (range 3–64 years) with the mean of 28.8 months follow-up time (range 6–52 months).

Twenty-two cases underwent this operation as a primary procedure, whereas four cases for a recurrence. Sixteen eyelids had severe ptosis with absent levator functions (0–2 mm) and 10 had moderate ptosis with poor levator functions (3–4 mm). The diagnosis was isolated congenital blepharoptosis in 14 cases (53.8%), blepharophimosis syndrome in four (15.3%), third nerve palsy in three (11.5%), myopatic ptosis in two (7.6%), chronic progressive external ophthalmoplegia in two (7.6%) and traumatic ptosis in one (3.8%). Two children with blepharophimosis did not accept any further surgery for their epicanthic folds and telecanthus.

The average improvement in palpebral aperture was 3.4 mm. All eyelid positions were maintained within 1 mm of the targeted level in the primary position of gaze. The functional success rate was 100% at the first month after the surgery and 96% at the last follow-up. Only one patient with bilateral severe ptosis had an intentional moderate final result as he had negative Bell’s phenomenon. However, the visual axis still remained clear in the primary gaze position (figure 2A,B).

At first visit, 92% and 86% of patients demonstrated cosmetic success rates regarding lid contour and symmetry, respectively, in both adult (figure 2) and paediatric (figure 3) cases, with no postoperative early (wound infection, exposure) or late (eyelid contour abnormality, overcorrection) complications.

Regarding donor site morbidity, only one leg was used in all cases and there was no postoperative wound infection, discharge, haematoma, granuloma formation or hypertrophied skin scar formation, and no patients demonstrated visible or palpable muscle prolapsus. Many patients complained of leg pain or discomfort along the site of the leg incision at rest for up to 2 days or on walking for up to 7 days, which disappeared after a week.

The parsed fascia lata strip was strong enough and palpebral apertures remained stable. There was only one case of long-term undercorrection. Temporary corneal epithelial defects from lagophthalmos were seen in eight eyes, which was well tolerated with tear drops or ointments. Dermatochalasis was seen in six eyelids and no cases demonstrated fascia lata extrusion or needed revision surgery for recurrence.

DISCUSSION

Various synthetic or non-autogenous banked materials are generally not preferred as they have a high incidence of...
recurrences and complications such as local infections and granuloma formation as well as late extrusion or absorption. Therefore, fresh AFL is the most reliable and the least reactive homologous tissue at present, with a high success rate.

In the classic approaches, the wound size is either the same length as the graft (12–15 cm) or the surgeon needs a blunt dissection with some unwanted damage to the surrounding tissues by fascia lata stripper used for the upper knee or higher level approaches. This may sometimes result in haemorrhage and muscle herniation with long-lasting pain on walking or limping.

The aforementioned problems and complication rates might be avoided if a simple and minimally invasive approach could be achieved. This paper modified both harvesting and stripping techniques and did not find any serious short or long-term complications. Minimal pain on walking, if present, only lasted for a few days and only one patient had occasional discomfort during exercise, with no cases of muscle bulging on the leg.

Figure 2 Two adult patients with bilateral severe blepharoptosis (A and C) and their postoperative appearances at 2 (B) and 8 weeks (D), respectively. Two teenager patients with unilateral blepharoptosis (E and G) and their postoperative fascial status at 3 (F) and 2 weeks (H), respectively.
Although there were no cases of eyelid retraction in our cases, this may still be encountered as a possible late complication of AFL. The first results of this technique are encouraging. The 3–5 cm length of fascia lata graft was shorter than all previous approaches. The strip was strong enough for both paediatric and adult eyelids. In other words, the parsing of the fascia lata did not result in weak points where suspension might fail. Indeed, there were no recurrences at the last visit. A recent paper has reported a functional success rate of 100% at the first month and 94% at the last visit. Our results are similar to that study.

Video-endoscopic-assisted fascia lata harvesting techniques have been described. However, these methods still need a longer tissue dissection to harvest a final 12–15 cm long fascia lata strip, which is still not short enough, especially in children. Although a small-incision fascia lata harvesting technique has recently been described, it needs a second skin incision approximately 8 cm superior to the first one and harvests a longer fascia lata than ours. Harvesting the poorly developed delicate tissue is another important concern in small children under 3 years of age as they have short leg size. However, ptosis

**Figure 3** A 6-year-old boy with bilateral severe blepharoptosis (A) and the early postoperative result at 1 month (B). A 7-year-old girl with right moderate blepharoptosis (C) and the early postoperative eyelid status at 1 week (D). A 6-year-old boy with unilateral severe blepharoptosis (E) and the early postoperative appearance at 1 week (F). A 7-year-old boy with unilateral severe blepharoptosis (G) and the late postoperative appearance at 5 years (H).
surgery with AFL may still be needed in such cases with visual axis obscurations. Leibovitch et al. performed a 6–8-cm vertical skin incision to obtain a 7–9-cm long and 10–15-mm wide fascia lata strip, whereas paediatric fascia lata harvesting by a Crawford stripper resulted in visible muscle bulging at the donor site in approximately a quarter of cases. The present technique, however, seems to be less invasive as it needs only, for instance, a 5×1 cm long fascia lata graft for unilateral cases. Moreover, if the monotriangular method is to be preferred, it is again very important in small children.

The presented ‘kite-tail’ fascia lata strip technique offers the following advantages over previous approaches: (1) It simplifies the harvesting process as it is completely performed under direct and complete visualisation of the fascia lata graft to be excised along its both superficial and undersurface that does not allow any blunt dissection, resulting in a lower possibility of trauma to the surrounding tissues. (2) The surgeon can, therefore, easily control peroperative haemorrhages, if present, with no need to apply postoperative compression on the operation site, which markedly reduces the incidence of peroperative or early postoperative unexpected haematoma formation. (3) It reveals a smaller graft removal with broader areas of remaining fascia lata support for the underlying musculature, which clearly decreases the incidence of postoperative muscle prolapsus. (4) The leg incision site is short and single, which reduces the amount and number of scar formation, if any, whereas the tensile strength of the strip is adequate for the suspension. (5) An excellent minimally invasive procedure can be performed for children, preserving poorly developed tissues. (6) It may also be used in recurrent cases that have previously undergone AFL surgery. (7) It is comfortable, safe and easily mastered, even for beginners, who do not need any experience or excessive education. Finally, (8) it only needs conventional and simple instruments (scalpel blade, Westcott scissors), neither requires a fascia lata stripper nor expensive and sophisticated instruments, although it takes a little more time during parsing and strip suturation procedures.

In conclusion, the introduced ‘upper knee’ (low incision) approach on a short fascia lata graft appears to be a feasible method for frontalis suspension, especially in young children. It is easy to use for ophthalmologists or oculoplastic surgeons and can effectively and safely be harvested with only a short training period and learning curve. The technique has a lower morbidity and high success rate in both the short and long term. It provides predictable and satisfactory outcomes and may also be tried in an ‘upper thigh’ approach. A randomised, controlled investigation with a longer follow-up is warranted as new failures may be recognised over the years.

Competing interests None.

Patient consent Obtained.

Ethics approval Neither ethics committee nor institutional review board approval was required for this study, as this is a modified and minimally invasive version of a previous technique.

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REFERENCES

'Kite-tail' fascia lata strips technique: frontalis suspension using a non-endoscopic minimally invasive single-thigh incision approach

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