

The Looi Suture Technique for Anchoring the Lateral Tarsal Strip to the Lateral Orbital Wall

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Abstract

Introduction: The lateral tarsal strip procedure (LTS) was first reported by Anderson and Gordy in 1979 for the management of paralytic or senile eyelid laxity. Since its description, the LTS procedure has been subject to several modifications by various authors. In this study, we described the Looi suture technique, a small modification in the technique of suturing the LTS to the lateral orbital wall periosteum. Using this technique, the surgeon achieves a larger area of contact between the anterior surface of the tarsal strip and the lateral orbital wall periosteum, promoting a stronger adhesion. With a double-armed suture, the technique also allows for adjustment of the lower lid tension to avoid over- or under-correction of horizontal lid laxity. This study aimed to evaluate the technique. **Materials and Methods:** This was a retrospective non-comparative case series of 39 eyelids of 31 patients who underwent LTS with Looi suturing technique for the correction of involutional lower lid laxity which had resulted in either entropion or ectropion. In this procedure, a novel technique utilising a double armed 5/0 Ethibond suture is used to secure the LTS to the lateral orbital rim, with the aim of increasing appositional contact between the LTS and periosteum. **Results:** In 36 eyelids with entropion, the procedure was combined with lower lid retractor repair, and in 3 eyelids with ectropion, with medial tarsoconjunctivoplasty. Surgery was successful in 37 of 39 eyelids (94.87%) after one procedure. The remaining 2 eyelids required repeat procedures to achieve anatomical success. Both cases had been performed by trainee surgeons under supervision. Postoperative follow-up period ranged from 1 day (in a visiting overseas patient) to 2 years. **Conclusion:** This study described the Looi suturing technique in performing the LTS procedure and we found it a simple and effective modification when dealing with lower lid laxity.

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Introduction

The lateral tarsal strip (LTS) procedure was first described by Anderson and Gordy in 1979 for the management of paralytic or senile eyelid laxity and lateral canthal tendon laxity. The procedure described by the authors involved lateral canthotomy and inferior cantholysis, dividing the lid into anterior and posterior lamellae, fashioning a tarsal strip from the posterior lamellae, and suturing the tarsal strip to the periosteum of the lateral orbital wall, thereby adjusting the height and tension of the lateral canthus.¹

Since its description, the tarsal strip procedure has been subject to several modifications by various authors. In 1991, Weber et al described several refinements in technique,

including electrosurgical deepithelialisation of conjunctiva and lid margin, use of a V-shaped needle, direct needle passage about the lateral orbital tubercle, and the parallel placement of a buried absorbable suture to unite the upper and lower lid margins and to maintain a long-lasting sharp canthal angle.² Baker et al performed lateral canthotomy using a CO₂ laser, and found 3 distinct advantages, namely a cleaner dissection allowing better visualisation of tissues, preservation of the lateral canthal angle, and prevention of epithelial inclusions by avoiding the violation of the conjunctival mucosa.³ Olver et al described a minimally invasive technique that performed a LTS and diagonal tightening of the orbital septum and lower lid retractors to

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the lateral orbital rim via a 1-cm lateral canthal incision.⁴ Chang et al augmented the technique to reduce the vertical palpebral aperture in the management of paralytic ectropion and lagophthalmos. This consisted of a long strip (10 mm to 15 mm) that is attached to the outer temporal orbital rim, at a point higher than a conventional LTS. It included removal of a small part of the upper eyelid anterior lamella laterally to pass the long strip up high enough.⁵ The LTS procedure has also been combined with lower lid retractor repair,⁶ Quickert sutures⁷ and orbicularis resection⁸ in the management of lower lid entropion. In medial ectropion, the LTS procedure has been used to correct horizontal lid laxity, in combination with resection of the lower lid retractors subjacent to the punctal area⁹ and transconjunctival retractor plication¹⁰ to correct punctal eversion.

In this study, we describe a small modification in the technique of suturing the LTS to the periosteum of the lateral orbital wall. Using this technique, the surgeon achieves a larger area of contact between the anterior surface of the tarsal strip and the lateral orbital wall periosteum, promoting more stable adhesion and improving apposition between the lower lid and the globe. The technique also allows for adjustment of the lower lid tension to avoid over- or under-correction of horizontal lid laxity. We call this the Looi suture technique.

Materials and Methods

This was a retrospective noncomparative case series of 39 eyelids of 31 patients who underwent the Looi suture technique either by a single subspecialty-trained oculoplastic surgeon (AL), or by ophthalmology residents operating under direct supervision, from 1 January 2007 to 30 April 2009.

Using the Looi suture technique, the LTS is prepared as previously described. This involves lateral canthotomy and inferior cantholysis, followed by excision of the anterior lamella at the lateral end of the tarsal plate. The extent of excision is determined by the degree of horizontal lid laxity, and the distance between the lateral end of the lower lid and the lateral orbital wall periosteum. This is aided intraoperatively by stretching the lateral end of the lid to the intended suture-anchoring site on the lateral orbital wall. Deepithelialisation of the conjunctiva is performed using diathermy and scraping of the diathermised area with a 15-G blade.

Following this, the lateral orbital rim periosteum is exposed with the aid of curved Westcott scissors. The blades of the scissors are stretched apart to allow visualisation of the periosteum between the blades. A cotton tip applicator is used to push the orbital contents away to aid visualisation. A double-armed 5/0 Ethibond suture with a half-circle reverse

cutting needle (Ethicon, Inc) is then passed through the orbital wall periosteum posterior to the orbital rim and at a height that allows good cosmetic apposition of the lower lid against the globe (Figs. 1 and 2).

The 2 ends of the suture are then passed through the LTS in a parallel fashion from the anterior surface to the posterior surface, then back to the anterior surface, going from a lateral-to-medial direction (Fig. 3). The strip is then glided along the length of the Ethibond suture towards the lateral orbital rim, and the 2 ends of the suture are firmly tied to secure the lid position. Postoperatively, all patients were given a regime of topical antibiotic cream to the skin wound, and topical antibiotic/steroid eyedrops. No systemic antibiotics were given.

In our series, this modified technique of LTS procedure was either performed in conjunction with lower lid retractor repair in cases of entropion, or with medial conjunctivoplasty in cases of ectropion. Success was defined as good postoperative lid-globe apposition, with no inturning of the lash margin in cases of entropion, and no punctal eversion in cases of ectropion.



Fig. 1. The Looi suture technique. The 5/0 Ethibond suture has been secured to the lateral orbital wall periosteum, and the two arms of the suture have been passed through the LTS from the anterior surface to the posterior surface, then back to the anterior surface again.



Fig. 2. The end result is a correction of lower lid laxity with stable lid-globe apposition. The two ends of the 5/0 Ethibond suture have been tied.

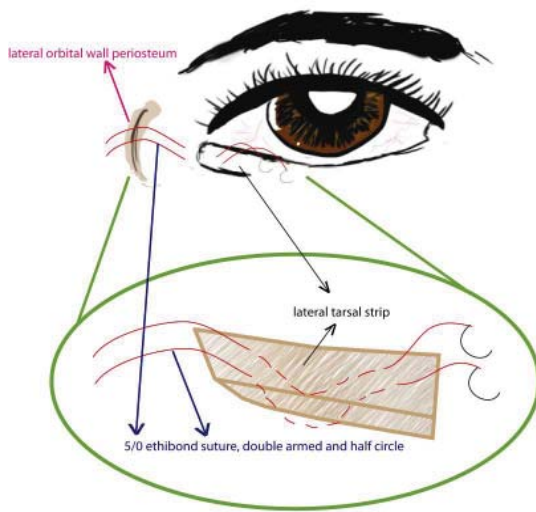


Fig. 3. Diagrammatic representation of the surgical technique.

Results

In total, 39 procedures using this technique were performed on 31 patients during the period of review. Twelve patients were male and the remaining 19 were female. The ethnicity of patients were as follows: 29 Chinese, 1 Malay and 1 Indian. The average age was 75.5 years (range, 54 to 92 years). Nine patients underwent bilateral procedures, while the remaining 21 patients underwent unilateral procedures. The indications for surgery included involutional entropion (28 patients) and involutional ectropion (3 patients). Postoperative follow-up duration ranged from 1 day in a foreign patient from Indonesia to 2 years. Mean follow-up duration was 7.25 months. All cases were either performed by the senior author (17 cases), or by residents under her supervision (22 cases). No cases were performed by residents without supervision.

Patients were reviewed on the first postoperative day, then again within the first postoperative week. At the second visit, the skin sutures were removed. Patients were then reviewed again at the first postoperative month.

At each review, subjective symptoms of each patient were recorded. Patients were examined for lid position, eyelash margin position, punctal position and lid-globe apposition.

Thirty-seven out of 39 procedures were successful (94.87%). In these 37 cases, good postoperative lid-globe apposition was achieved, with no inturning of the lash margin in cases of entropion, and no punctal eversion in cases of ectropion.

In the early postoperative period, mild lower lid bruising

was reported in all patients but no complications such as lymphedema, conjunctival chemosis or suture granuloma were seen.

In our series, 2 cases were unsuccessful after the first procedure. In the first case of unilateral involutional entropion in a 74-year-old female, surgery was uncomplicated, and recurrence of lower eyelid laxity occurred only 4 months later. During the second surgery, the LTS was noted to be attached to the lateral orbital wall periosteum. It was felt that there was undercorrection of the horizontal lid laxity in the first operation. The lower eyelid position remained stable on follow-up over the following 18 months, with no recurrence of entropion.

The second case was a case of bilateral involutional entropion in an 84-year-old female, for which bilateral surgery was done. The patient was well with bilateral good lid-globe apposition at the first 2 postoperative visits, at days 1 and 5. On the 15th postoperative day, the entropion was noted to have recurred, and a repeat LTS procedure was performed the same day. Intraoperatively, a large hematoma was noted in the lateral canthus wound, and the Ethibond suture had completely cheesewired off the lateral orbital wall periosteum, leaving the LTS completely detached. The LTS was re-attached during this procedure. Unfortunately, on review 5 days later, the wound was noted to be gaping, and entropion had recurred for a second time, necessitating a third procedure the following day. Intraoperatively, the LTS was found to be again detached from the lateral orbital wall, and by this time the lateral orbital wall periosteum was frayed from repeated attempts at reattachment. A decision was made to reattach the LTS to the superior limb of the lateral canthal ligament instead. This proved successful, and lid-globe apposition and stability has been maintained in the 1-year postoperative period to date.

Discussion

The Looi suture technique is a small modification in the technique of suturing the LTS to the periosteum of the lateral orbital wall in the management of involutional lower eyelid laxity. This study has demonstrated its high degree of efficacy (94.87%) after a single procedure.

This technique is also relatively simple to perform. In our series, 22 out of 39 (56.41%) of procedures were performed by ophthalmology residents undergoing training, under the direct supervision of a subspecialty-trained oculoplastic surgeon (AL). These residents were all in their 4th to 6th years of ophthalmic training, and had 6 months or less experience in oculoplastic surgery. Despite their relative inexperience, the residents achieved a success rate of 90.09%.

The surgical success rates can be improved by paying

particular attention to the degree of horizontal tightening required for the horizontal lid laxity. Ideally, the result should be a lid that is well apposed to the globe without excess tension on the canthal tendons and without any sclera show. In the 2 cases that required repeat surgery, one was likely due to undercorrection. The other was possibly caused by some eye rubbing that led to wound dehiscence and haemorrhage. In this second case, it has to be emphasised that the passage of the needle through the periosteum can be traumatic to the periosteum if one does not take care to follow the curve of the needle. Using a 1/2 circle needle helps with atraumatic placement of the suture through the lateral orbital wall periosteum.

Conclusion

In summary, this study described the Looi suture technique, a modification in the technique of anchoring the LTS to the periosteum of the lateral orbital wall. This technique is easy to perform and has a high success rate, making it an ideal suturing technique when performing the LTS procedure.

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