Surgical Technique: Modified Lateral Tarsorrhaphy

Don J. de Silva, F.R.C.S., F.R.C.Ophth., Yashin D. Ramkissoon, Ph.D., M.R.C.P., F.R.C.Ophth., Andre R. Ismail, F.R.C.Ophth., and Michèle Beaconsfield, F.R.C.S., F.R.C.Ophth.

Adnexal Service, Moorfields Eye Hospital, London, United Kingdom

Purpose: The signs of thyroid eye disease include proptosis, eyelid retraction, and exposure of the ocular surface, resulting in a symptomatic and unsatisfactory aesthetic appearance. A number of surgical techniques have been proposed to treat the eyelid sequelae of thyroid eye disease, which vary in both complexity and potential complications; the authors propose a novel technique for correcting inferolateral scleral show. This technique is proposed for cases of mild inferior scleral show (2 mm or less).

Methods: This retrospective consecutive case series includes 7 eyes of 5 patients from 2003 to 2006. All patients underwent surgery by a single surgeon at Moorfields Eye Hospital, London, UK. The surgical technique is composed of 3 principal steps: 1) marking of intended lateral tarsorrhaphy, 2) gray line split and anterior lamella excision, and 3) suturing of upper and lower limbs of lateral canthal tendon/lateral ends of tarsal pates) and canthal angle reformation.

Results: Seven eyes of 5 patients underwent the procedure; all patients were women, and their mean age was 49.6 years (range 29–67). Mean inferior scleral show was reduced from 2.0 mm preoperatively (range 1.5–2.5) to 0.3 mm postoperatively (range 0.0–0.5) at 49-month follow up. There were no complications related to the surgical technique, and all patients were satisfied with the postoperative result. One patient with proptosis measuring 24 mm required 2-wall orbital decompression 20 months later.

Conclusions: Patient selection is important for the effective use of the modified tarsorrhaphy technique and should be reserved for those with 2 mm or less of inferior scleral show. Two principal factors to be considered before this eyelid surgery and the use of a box suture in reformation of the lateral canthal angle are discussed. Although a number of surgical procedures are available to manage eyelid malposition secondary to thyroid eye disease, they vary in complexity and severity of complications. The modified tarsorrhaphy technique was effective in the treatment of a specific group of patients who had undergone previous orbital and eyelid surgery for thyroid eye disease.

(*Ophthal Plast Reconstr Surg* 2011;27:216–218)

Thyroid eye disease causes mucopolysaccharide deposition and fibrosis in the eyelids and orbital connective tissue, resulting in proptosis, eyelid retraction, and exposure of the ocular surface. Surgical management includes orbital decompression and strabismus surgery, followed by eyelid surgery to treat eyelid malposition. The posterior lamella of the lower eyelid inserts in the lateral orbital rim and apposition to the globe results in the curvature of the lower eyelid.[1] Proptosis may cause a sliding effect of the lower eyelid downwards on the globe, resulting in apparent increased eyelid retraction and inferior scleral show. Canthopexy alone is rarely adequate to alleviate inferior scleral show in thyroid eye patients with proptosis, owing to the negative vector of the lower eyelid.[2]

A number of surgical procedures have been proposed to treat inferior eyelid retraction, including lower eyelid retractor recession, tarsorrhaphy, and lower eyelid spacer inserts with autologous or nonautologous grafts.[3,4] These techniques vary in both complexity and severity of complications; in this article, we describe a relatively straightforward technique for correcting mild inferolateral scleral show (Fig. 1).

METHODS

This retrospective, noncomparative consecutive case series included 7 eyes of 5 patients from 2003 to 2006. All patients underwent surgery by a single surgeon (MB) at Moorfields Eye Hospital, London, United Kingdom. The indications for surgery were symptoms of ocular discomfort and unsatisfactory aesthetic appearance secondary to mild inferior scleral show in the absence of lower eyelid laxity (Fig. 1). All patients had thyroid eye disease that had been stable for longer than 6 months, and the 2 bilateral cases received the same surgical treatment. Exclusion criteria included patients with more than 2 mm of inferior scleral show.[5] This requires lower eyelid elevation with spacer material, whether caused by lower eyelid retraction secondary to inferior rectus tethering, or with lower eyelid laxity requiring lateral canthoplasty. Patients with severe proptosis with an indication for orbital decompression were excluded. The outcome measures were inferior scleral show, palpebral apertures, photographic documentation, complications of surgery, and patient satisfaction.

Surgical Technique. The principal intraoperative steps are shown in Figure 2 and were as follows.

1) The extent of the intended anterior lamellar excision was marked ~0.2 mm from the angle of the lateral canthus (Fig. 2A). In unilateral cases, the extent of tissue to be excised was evaluated by comparison with the lateral canthal contour and position of the contralateral eye. Surgery was performed under local anesthetic infiltration (bupivacaine 0.5% with adrenaline 1:100,000); some received intravenous sedation before the local anesthetic was given.

2) A gray line split was performed with a blade, and the anterior lamella, including the eyelash margin, was excised (Fig 2B). The conjunctival epithelium of the eyelid margin of the posterior lamella was then excised with a blade.

3) The lateral canthus was reformed by using a 6-0 polyglactin 910 (Vicryl) vertical mattress ("box") suture from the upper limb to the lower limb of the lateral canthal tendon (Fig. 2C). The position and height of the new lateral canthal corner were verified by comparison

Accepted for publication April 12, 2010.
Presented at Oxford Ophthalmological Congress, Oxford, U.K., July 6, 2009.
The authors declare no commercial interests or licensing agreements.
Address correspondence and reprint requests to Michèle Beaconsfield, F.R.C.S., F.R.C.Ophth., Adnexal Service, Moorfields Eye Hospital, City Road, London EC1V 2PD, UK. E-mail: mb@lidsurgery.co.uk

DOI: 10.1097/IOP.0b013e318202f577

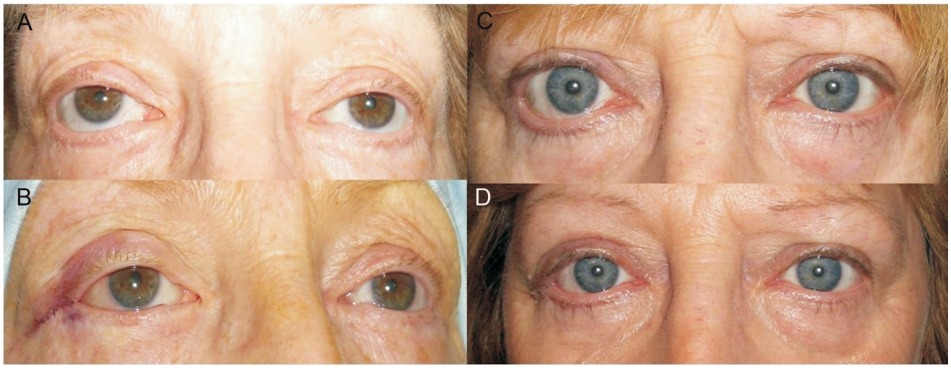

FIG. 1. Patient 1: preoperative **(A)** and immediately postoperative **(B)** photographs. **C, D,** Patient 2: preoperative **(C)** and 4-month postoperative **(D)** photographs.

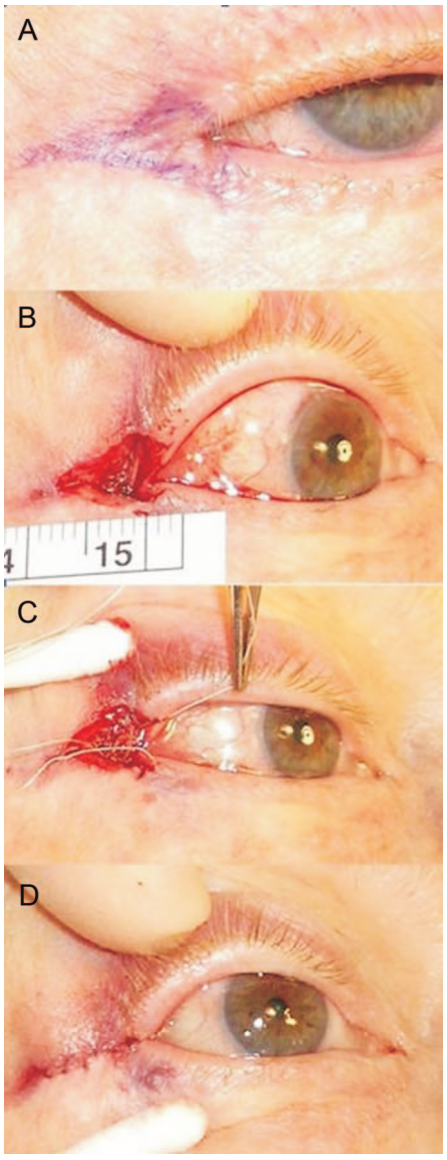

FIG. 2. Intraoperative photographs showing the 3 steps of the modified tarsorrhaphy technique. **A,** Marking 2 mm from angle of lateral canthus. **B,** Gray line split and excision of anterior lamella. **C,** Lateral canthus reformation with vertical mattress suture from upper to lower limb of lateral canthal tendon. **D,** After skin closure.

with the contralateral side in unilateral cases, and in bilateral cases, symmetry was achieved by choosing a level at the horizontal midpupillary line in primary gaze. The lateral canthal angle was then reformed using a 7-0 polyglactin 910 (Vicryl) suture through the gray line of the upper and lower lids, and the anterior lamellar defect was closed by opposing the skin edges with interrupted 7-0 polyglactin 910 (Vicryl) sutures.

RESULTS

The characteristics of the patients and eyelid measurements are summarized in Tables 1 and 2. Seven eyes of 5 patients underwent the procedure; all were women, and their mean age was 49.6 years (range 29–67). Mean inferior scleral show was reduced from 2.0 mm preoperatively (range 1.5–2.5) to 0.3 mm postoperatively (range 0.0–0.5), and follow-up time was on average 49 months (range 16–71). There were no complications related to the surgical technique, and all patients declared themselves satisfied with the postoperative result. One patient with proptosis measuring 24 mm underwent required 2-wall orbital decompression 20 months after eyelid surgery.

DISCUSSION

Thyroid eye disease is an aesthetically and psychologically debilitating condition, and we describe a relatively straightforward surgical technique to manage symptomatic mild inferolateral scleral show. The technique was effective in the treatment of patients who had undergone previous orbital and eyelid surgery for thyroid eye disease. This resulted in no specific postoperative complications. Patient selection is important for the effective use of the modified tarsorrhaphy

TABLE 1. Characteristics of patients undergoing modified lateral tarsorrhaphy

Patient no.	Age	Sex	Eyelid	Etiology	Previous ocular surgery
1	32	F	Bilateral	TED	Orbital decompression, blepharoplasty
2	53	F	Right	TED	Radiotherapy, tarsorrhaphy, lower lid alloderm grafts, LUL lateral lowering
3	67	F	Right	TED	None
4	29	F	Bilateral	TED	Orbital decompression
5	67	F	Right	TED	None

LUL, left upper eyelid; TED, thyroid eye disease.

TABLE 2. Pre- and postoperative eyelid measurements

Parameter	Measurement or result	
	Preoperative	Postoperative
Eyelid measurement (mm [range])		
Hertel exophthalmometry (mm)	20.3 ± 3.2 (18.0–24.0)	—
Levator function (mm)	15.3 ± 0.6 (15–16)	—
Palpebral aperture (mm)	9.5 ± 2.2 (8–11)	9.0 ± 2.0 (7–10)
Scleral show (mm)	2.0 ± 0.5 (1.5–2.5)	0.3 ± 0.4 (0.0–0.5)
Patient satisfaction	—	4 of 5 patients happy with results
Complications	—	1 patient went on to require 2-wall decompression

technique, and 2 principal factors should be considered when managing the lower eyelid retraction: severity of proptosis and the position of the lateral canthal angle. Patients with marked proptosis or inferior rectus tethering should be treated with orbital decompression or inferior rectus recession, respectively, before considering eyelid surgery.[3] An unsatisfactory aesthetic result was found in the one patient in our series who had significant proptosis preoperatively but had declined orbital surgery. Not all patients are willing to undergo orbital decompression owing to potential morbidity and complications; however, this patient subsequently elected to undergo 2-wall orbital decompression surgery.[6 7] Eyes with greater than 2 mm of inferior scleral show and with eyelid laxity are not suitable for this modified tarsorrhaphy technique. Marked inferior scleral show (>2 mm) is an indication for elevation of the eyelid using a spacer with autologous or nonautologous material,[5] as a large classic tarsorrhaphy results in a marked reduction in horizontal palpebral aperture and an apparent reduction in eye size.[3] However, spacers are associated with complications, including shrinkage and unpredictability, recurrence (3%–13%), and bulky appearance.[4] This modified tarsorrhaphy technique also has an effect on reducing the size of the lateral scleral triangle; furthermore, this technique avoids the unsatisfactory postoperative appearance of an inferiorly placed lash line at the lateral canthus, which is often lower than the lash line of the lower eyelid, as can be seen in classic lateral tarsorrhaphy. Lateral canthal slings are not indicated in the absence of lateral canthal laxity.

The use of a box suture to approximate the superior and inferior limbs of the lateral canthal tendon, which are attached to the inner aspect of the lateral orbital rim on Whitnall's tubercle, is sufficient to re-form and support the new lateral canthal angle, resulting in a mild elevation of the lower eyelid. Lateral canthopexy is a useful surgical technique in shortening the distance from the lateral canthus to the lateral orbital rim. However, in the presence of proptosis too high a canthal placement can result in the lower eyelid sliding downwards on eyelid closure ("like a trouser belt under a beer belly"), and superior canthal placement can mechanically impair eyelid closure.[8] Patients with significant proptosis would benefit from decompression surgery first, as eyelid surgery alone is unlikely to result in an optimal outcome.

Modified lateral tarsorrhaphy is a straightforward and effective technique for the management of patients with mild inferolateral scleral show secondary to thyroid eye disease. The technique is a useful addition to the oculoplastic surgeon's armamentarium in the cosmetic rehabilitation of thyroid eye disease.

REFERENCES

1. Knize DM. The superficial lateral canthal tendon: anatomic study and clinical application to lateral canthopexy. *Plast Reconstr Surg* 2002;109:1149–57, discussion 58–63.
2. McCord CD, Boswell CB, Hester TR. Lateral canthal anchoring. *Plast Reconstr Surg* 2003;112:222–37, discussion 38–9.
3. Thaller VT, Kaden K, Lane CM, Collin JR. Thyroid lid surgery. *Eye* 1987;1:609–14.
4. Olver JM, Rose GE, Khaw PT, Collin JR. Correction of lower eyelid retraction in thyroid eye disease: a randomised controlled trial of retractor tenotomy with adjuvant antimetabolite versus scleral graft. *Br J Ophthalmol* 1998;82:174–80.
5. Collin JR. *Manual of Systematic Eyelid Surgery.* 2nd ed. Edinburgh, UK: W.B. Saunders Company, 1989.
6. Garrity JA, Fatourechi V, Bergstralh EJ, et al. Results of transantral orbital decompression in 428 patients with severe Graves' ophthalmopathy. *Am J Ophthalmol* 1993;116:533–47.
7. Goldberg RA, Shorr N, Cohen MS. The medical orbital strut in the prevention of postdecompression dystopia in dysthyroid ophthalmopathy. *Ophthal Plast Reconstr Surg* 1992;8:32–4.
8. McCord CD, Ford DT, Hanna K, et al. Lateral canthal anchoring: special situations. *Plast Reconstr Surg* 2005;116:1149–57.