Lateral Wedge Resection: A Simple Technique for Repairing Involutional Lower Eyelid Entropion

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BACKGROUND Lower lid involutional entropion is a common eyelid pathology affecting the elderly population. Most of the reported surgical techniques are mainly based on a lateral tarsal strip anchored to the orbital rim.

OBJECTIVES To report the surgical outcome using a simple single-stitch lateral wedge technique to repair involutional lower entropion.

METHODS This single-surgeon, retrospective, noncomparative cases series included all patients with involutional lower eyelid entropion who were operated on using the lateral wedge technique.

RESULTS Fifty-eight eyelids of 52 patients (46 unilateral, 6 bilateral; 27 men, 25 women; age, mean 67 ± 10; range 50–85) underwent surgical repair. Immediate resolution of entropion and associated ocular symptoms was achieved in 55 eyelids (94.9%). One case had postoperative ectropion that completely resolved spontaneously after 4 weeks, and one had wound dehiscence that healed completely without any intervention. Another patient had residual entropion that resolved after an additional surgical repair. No other cases of recurrence were noted during a mean follow-up period of 16 months (range 6–24 months).

CONCLUSION This minimally invasive single-stitch lateral wedge technique is a simple and effective procedure for repairing involutional lower eyelid entropion and is associated with low recurrence and complication rates.

Igal Leibovitch, MD, has indicated no significant interest with commercial supporters.

Entropion is an inward rotation of the eyelid margin that most commonly affects the lower eyelid. Entropion may be unilateral or bilateral and is usually classified as congenital, acute spastic (sustained orbicularis-oculi muscle contraction after ocular irritation, inflammation, or surgery), cicatrical (vertical tarsoconjunctival contracture after inflammation, infection, or surgery), or involutional. Entropion should be distinguished from trichiasis, in which the lashes are misdirected toward the globe, and from epiblepharon, in which the skin and pretarsal orbicularis muscle push the lashes toward the globe.

Lower eyelid involutional entropion is the most common form of entropion, and it mainly affects the elderly population. The possible pathophysiologic factors involved in the development of this eyelid malposition are horizontal laxity of the eyelid, attenuation or disinsertion of the eyelid retractors (capsulopalpebral fascia and inferior tarsal muscle), and overriding of the preseptal orbicularis oculi muscle. More recently, age-related orbital fat atrophy with relative enophthalmos and smaller than average tarsal plates have also been found to be possible risk factors for developing entropion.

Various techniques have been described for correcting involutional entropions. Most of these techniques are based on a canthotomy with horizontal tightening of the lower lid using a lateral tarsal strip anchored to the exposed orbital rim with several stitches.

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The purpose of this study was to present the surgical outcome with a simple single-stitch technique based on a lateral wedge at the area of the lateral canthal tendon, without a canthotomy and without the need to expose the orbital rim.

**Methods**

This was a retrospective interventional case series of all consecutive patients with lower lid entropion who were operated on between July 2006 and March 2009 by a single surgeon. This series included only patients with involutional entropion (Figure 1), with or without a spastic component, who had no previous eyelid surgery and who were followed for at least 6 months postoperatively. Patients diagnosed with a cicatricial entropion were not included.

All patients underwent a complete oculoplastic and ophthalmological examination, including assessment of horizontal laxity (using the snapback test), the degree of retractors disinsertion (inferior fornix depth, lower eyelid movement on downgaze), and the degree of superior migration of the preseptal orbicularis (as the patients squeeze their eyes closed). Patients with a symptomatic entropion (eyelid margin eversion causing ocular irritation or corneal rubbing) were referred to surgery.

**Surgical Technique**

All operations were performed under local anesthesia. Lidocaine 2% or bupivacaine hydrochloride 0.5% (with epinephrine 1:100,000) was injected into the lateral canthal and lower eyelid area through a transconjunctival lower fornix approach. Stevens scissors were used to perform a cantholysis of the lower limb of the lateral canthal tendon, completely releasing the lower lid from its attachment to the lateral canthal tendon (Figure 2A). The lower lid was then shortened laterally by removing a full-thickness wedge (Figure 2B). The amount removed was judged based on the degree of tightening needed by approximating the cut edge of the lower lid to the lateral canthus. In all cases, a lower-lid subciliary incision was performed using a number 15 Bard-Parker blade or an electric microdissection needle, followed by removal of a thin strip of skin and preseptal orbicularis muscle with scissors (Figure 2C and D).\(^{17}\) A 5-0 absorbable suture with a precision point reverse cutting P1 needle (coated Vicryl Rapide, polyglactin 910, Ethicon Inc., Somerville, NJ) was then passed in the area of the cantholysis starting from the inferior part of the canthus, through the lower limb of the canthal tendon, and exiting just at the junction of the cantholysis with the lateral edge of the superior eyelid margin. (While passing through the lower limb of the canthal tendon, this suture can also anchor the lateral orbital rim periosteum in cases of lateral canthal involutional disinsertion, to stabilize the lateral tendon (Figure 2E).) This same needle is then passed vertically through the lateral aspect of the superior cut edge of the eyelid margin, into the tarsal plate and exiting at the lower order of the plate (Figure 2F). Tying this single suture brings the lower lid edge back to the lateral canthal area (Figure 2G). The subciliary skin defect in this area is closed with a continuous absorbable or nonabsorbable 6-0 suture passed from the inferior edge of the skin wound through the anterior aspect of the superior part of the canthus.

![Figure 1. The left lower eyelid of a 69-year-old woman with an involutional entropion causing ocular irritation.](image-url)
Figure 2. The surgical steps in repairing a left lower lid involutional entropion in a 70-year-old woman. (A) Stevens scissors are used to perform a cantholysis of the lower limb of the lateral canthal tendon, completely releasing the lower lid from its attachment to the lateral canthal tendon. (B) The lower lid is then shortened laterally by removing a full-thickness eyelid wedge. (C) A lower lid subciliary incision is performed using a number 15 Bard-Parker blade, (D) followed by removal of a thin strip of skin and preseptal orbicularis muscle with scissors. (E) A 5-0 absorbable suture is then passed in the area of the cantholysis starting from the inferior part of the canthus, through the lower limb of the canthal tendon, and exiting just at the junction of the cantholysis with the lateral edge of the superior eyelid margin. (F) This same needle is then passed vertically through the lateral aspect of the superior cut edge of the eyelid margin into the tarsal plate and exiting at the lower order of the plate. (G) Tying this single suture brings the lower lid edge back to the lateral canthal area. (H) The skin defect is then closed with a continuous absorbable polyglactin 6-0 suture passed from the inferior edge of the skin wound through the anterior aspect of the superior part of the tarsal plate and then through the superior subciliary edge of the skin wound.
the tarsal plate and then through the superior subciliary edge of the skin wound (Figure 2H). An antibiotic eye ointment was applied to the surgical area at the end of the operation.

**Results**

Fifty-eight eyelids of 52 patients with lower lid involutional entropion (46 unilateral, 6 bilateral) underwent surgical repair using the lateral wedge resection technique. There were 27 men and 25 women, with a mean age of 67 ± 10 (range 50–85) (Table 1).

Immediate resolution of entropion and associated ocular symptoms was achieved in 55 eyelids (94.9%) (Figure 3). One case had postoperative ectropion that completely resolved spontaneously after 4 weeks (Figure 4), and one had wound dehiscence that healed completely without any intervention. Another case had residual entropion that resolved after an additional surgical repair. The reoperation rate in this series was 1.7% (1/58). No other cases of recurrence were noted during a mean follow-up period of 16 months (range 6–24 months).

**Discussion**

This manuscript presents a series of patients with involutional entropion successfully treated using a simple surgical technique. Of the 58 eyelids operated on, only one required reoperation for residual entropion. This high success rate is comparable with other previously published series.14,16

The wedge technique presented in this manuscript is a modification of other techniques published more than 25 years ago. Rainin described a procedure based on horizontal shortening of the lower eyelid by excising a pentagonal wedge located 5 to 7 mm medial to the lateral canthus, combined with everting sutures.8 Jackson described a lateral wedge technique based on incising the attachment of the

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<td>Patient characteristics</td>
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<td>Age, mean ± standard deviation (range)</td>
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<td>Follow-up duration, months, mean (range)</td>
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Figure 3. Preoperative (top) and 3-week postoperative picture (bottom) of a 75-year-old man with a right lower lid entropion. The resolving subciliary incision can be seen.
lower eyelid to the orbital rim and wedge excision of excess eyelid tissue laterally, but he then used two double-armed nonabsorbable mattress sutures to secure the lid to the lateral orbital rim, as well as several barrier sutures that were passed from the fornix to the skin.9

In all patients in this series, a subciliary incision was also made, and then a thin strip of skin and pretarsal orbicularis-oculi muscle were removed. This procedure is usually sufficient, and there is no need to reinsert the lower eyelid retractors to the tarsal plate. It is the author’s belief that wound closure with skin–tarsus–skin sutures creates scar tissue that prevents inward eyelid margin turning, avoiding reinsertion of the retractors. Shortening the anterior lamella, by removing a small strip of skin, also produced a vertical vector that prevents in-turning of the eyelid. Although the transconjunctival approach has also shown a high success rate in entropion repair,1,11,16 it could not be implemented in our cases if skin removal was also required, but it can be combined with orbicularis excision and reinsertion of the retractors.

It is important that all patients with symptomatic entropion undergo a complete oculoplastic evaluation to assess the degree of horizontal laxity, retractor disinsertion, superior migration of the preseptal orbicularis, and degree of lower eyelid skin excess. In each patient, the lateral wedge technique should be tailored according to the different degrees of these parameters, and it is not designed for cases with a cicatricial component. Patients with mild involutional entropions (occasional entropion appearing during eyelid squeezing) and a mild degree of lower lid laxity, retractor disinsertion, orbicularis migration, and skin excess will require only minimal horizontal eyelid shortening and no subciliary incision. On the other hand, patients with severe entropion and significant horizontal eyelid laxity, retractor disinsertion, orbicularis migration, and skin excess will require more significant lower eyelid shortening with additional excess skin and pretarsal orbicularis excision. It is important to make an

Figure 4. Left lower eyelid entropion in a 72-year-old woman. (A) Preoperative view. (B) Ten days postoperatively, ectropion of the lower lid margin is noted. (C) Several months later, there is complete resolution of the ectropion and excellent position of the lower eyelid.
accurate intraoperative judgment and not to remove too much of these tissues to avoid complications such as lateral wound dehiscence (due to tension) and lower lid ectropion (due to excessive lower eyelid skin excision).

Complications associated with entropion surgery that is based on a lateral tarsal strip include rim tenderness, granuloma formation, and wound infection at the lateral canthus.\textsuperscript{18–20} Hsuan and Selva\textsuperscript{20} evaluated the rate of recurrence of horizontal laxity and lid malposition and suture-related complications associated with the use of an absorbable polyglactin (instead of an unabsorbable) suture in the lateral tarsal strip procedure. They found that, although the polyglactin suture does not lead to a higher recurrence rate, it does not appear to reduce the rate of wound infection associated with this procedure. The authors state that according to their experience, as well as that of other surgeons, the lateral tarsal strip procedure appears to be associated with a high rate of suture abscess and granuloma formation. They speculate that this could be related to the fact that the tarsal strip itself contains meibomian glands and is lined internally by conjunctiva. Although the conjunctiva is carefully ablated, it is not possible to remove the meibomian glands within the strip, and therefore sebaceous secretions will continue to be produced within the deep tissues and induce inflammation (similar to a chalazion or a ruptured dermoid cyst) and increase the risk of secondary infection from the skin and conjunctival wounds. The technique presented in the current study may avoid these complications, because it does not require a tarsal sling procedure.

Some of the other techniques used to repair lower-lid entropion are more invasive and prolonged; they require a canthotomy as well as a cantholysis and exposure of the orbital rim, are based on sculpting of the lateral tarsal area and design of a tarsal strip, and usually require a combination of several deep sutures. The technique presented in this manuscript is less invasive and quick; it does not require a canthotomy and exposure of the orbital rim or designing a tarsal strip and is based on a single stitch.

One common criticism of the lateral tarsal strip procedure is that failure to reattach the eyelid laterally to the inside of the orbital rim and to an area that is at a similar vertical level as the opposite side can lead to an unnatural slant to the horizontal fissure.\textsuperscript{21} The fact that the lateral wedge technique avoids a canthotomy with exposure of the orbital rim and distortion of the canthal anatomy while preserving part of the attachment of the lateral canthus to the rim and allowing exact reattachment of the lower lid to the original vertical level where the cantholysis was performed reduces the risk of this unnatural slanting-eyelid appearance.

Limitations of this study stem from its retrospective design and the lack of a control group for comparison, but this series, which is based on the experience of a single surgeon and with a relatively long postoperative follow-up period, may be an important contribution to the arsenal of surgical techniques for repairing lower-lid entropion.

In conclusion, the single-stitch minimally invasive lateral wedge technique is a simple, effective technique for repairing involutional lower eyelid entropion. It addresses horizontal lid laxity and prevents preseptal orbicularis override. This technique results in significant functional and cosmetic improvement and is associated with low recurrence and complications rates.

References


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