Efficacy and Complications of the Transconjunctival Entropion Repair for Lower Eyelid Involutional Entropion

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Purpose: To evaluate the efficacy of the transconjunctival entropion repair (TCER) for lower eyelid involutional entropion.

Design: Retrospective, noncomparative, interventional case series.

Participants: One hundred fifty-one eyelids in 120 patients who underwent TCER for involutional entropion over a 12-year period from February 1991 through January 2003.

Methods: Surgical technique addressed all 3 anatomic factors underlying the entropion and was performed through a transconjunctival incision. Lateral tarsal strip procedure addressed horizontal eyelid laxity, lower eyelid retractor reinsertion addressed retractor disinsertion, and excision of a strip of the preseptal orbicularis oculi addressed preseptal orbicularis override.

Main Outcome Measures: Entropion resolution, entropion recurrence, postoperative eyelid retraction, and complication rate.

Results: Transconjunctival entropion repair resulted in resolution of entropion, with a success rate of 96.7% (146 of 151 eyelids); entropion recurrence rate was 3.3% (5 of 151 eyelids). No patient had postoperative eyelid retraction or scleral show, and there were no overcorrections or secondary ectropions in any of the 151 eyelids. Postoperative complications occurred in 6 of 151 eyelids (4.0%) of 6 of 120 patients (5.0%) and included stitch abscess (1 eyelid, 0.7%), lateral tarsal strip dehiscence (2 eyelids, 1.3%), lateral canthal dystopia (2 eyelids, 1.3%), and conjunctivochalasis (1 eyelid, 0.7%).

Conclusions: The transconjunctival lower eyelid entropion repair is effective and safe with low recurrence and complication rates. The TCER circumvents the risk of lower eyelid retraction and overcorrections that may occur with the transcutaneous approach. Ophthalmology 2006;113:2351–2356 © 2006 by the American Academy of Ophthalmology.

Involuntary entropion of the lower eyelid is a relatively common problem in the elderly population. The inward rotation of the eyelid margin may cause foreign body sensation, tearing, ocular irritation, superficial keratopathy, and corneal scarring, and requires surgical repair. Numerous procedures have been described for entropion repair; however, many older techniques have poor long-term success, owing to the failure of earlier procedures to address all of the multiple pathophysiologic components of the condition. The 3 anatomic factors that likely contribute to involutional entropion are (1) horizontal eyelid laxity, (2) lower eyelid retractor attenuation or disinsertion, and (3) preseptal orbicularis oculi override. In 1993, Dresner and Karesh1 introduced the transconjunctival entropion repair (TCER), which addressed all 3 anatomic factors of involutional entropion and decreased the complications of secondary retraction by using a transconjunctival approach instead of a transcutaneous approach. Their technique included a lateral tarsal strip procedure2 for horizontal tightening, lower eyelid retractor reinsertion for retractor disinsertion,3 and excision of a strip of the preseptal orbicularis oculi for preseptal orbicularis override. Their initial study of 23 eyelids in 18 patients reported no recurrences over a follow-up period of 9 to 18 months. The purpose of this study was to examine the efficacy and complications of the TCER by 1 of the original describing authors in a relatively large number of patients over a 12-year period.

Materials and Methods

Surgical Technique

Our surgical technique for the TCER is similar to the technique originally described in 1993 by Dresner and Karesh1 (Fig 1).
Figure 1. Transconjunctival entropion repair, intraoperative photographs. A, An incision is made with cutting monopolar cautery through the conjunctiva and lower lid retractors, just inferior to the lower tarsal border (arrow), extending from the lateral fornix to the punctum. B, The cautery tip identifies the lower eyelid retractors. Also identified: orbicularis (longer arrow) and tarsal conjunctiva at lower tarsal border (shorter arrow). C, The anterior, inferior surface of the tarsal plate is dissected from orbicularis with monopolar cautery. Also identified: retractors (horizontal arrow), orbicularis (vertical white arrow), and inferior edge of tarsus (vertical black arrow). D, Cutting monopolar cautery is used to excise a thin (1–2 mm) strip of preseptal orbicularis muscles (longer arrow) just inferior to the tarsal border (shorter arrow) along the full length of the incision. Care must be taken to avoid buttonholing the skin, which lies immediately behind the orbicularis muscle in the everted lid. The free edge of retractors is reattached to the tarsus by passing the needle through the retractors (E), then through anterior, inferior tarsus with 2 interrupted buried 6-0 polyglactin sutures (F). Also identified: anterior surface of tarsus (longer white arrow), inferior edge of tarsus (black arrow), and orbicularis (shorter white arrow).
Anesthesia is achieved with a mixture of 1% lidocaine with 1:200,000 epinephrine, 0.5% bupivacaine with 1:200,000 epinephrine, and hyaluronidase, mixed in a 5:5:1 ratio. Three milliliters of this anesthetic is injected into the inferior fornix, and 2 mL is injected subcutaneously at the lateral canthus and down to the periosteum of the lateral orbital rim. A corneal protector may be placed during the dissection, if desired.

Lateral canthotomy is started with a #15 Bard Parker blade (BD Medical, Franklin Lakes, NJ) and completed with Stevens scissors. Inferior cantholysis is performed with monopolar cautery with a Colorado tip. The lateral inferior lid is grasped with forceps and pulled superiorly to confirm complete interruption of all attachments. A skin hook or small rake everts and retracts the lower eyelid. An incision is made with cutting monopolar cautery through the conjunctiva and lower lid retractors, just inferior to the lower tarsal border, extending from the lateral fornix to the punctum (Fig 1A). The conjunctiva and lower lid retractors are grasped, elevated, and bluntly dissected from the orbicularis muscle, which lies in the deep aspect of the surgical field (Fig 1B). Dissection is continued with monopolar cautery to expose the anterior, inferior surface of the tarsal plate (Fig 1C). Cutting monopolar cautery is used to excise a thin (1–2 mm) strip of preseptal orbicularis muscles just inferior to the tarsal border along the full length of the incision (Fig 1D). Care must be taken to avoid buttonholing the skin, which lies immediately behind the orbicularis muscle in the everted lid.

The lower lid retractors are firmly adherent to the conjunctiva. The superior aspect of the retractors is separated from the conjunctiva with the cutting cautery to create a free edge. This free edge of retractors is reattached to the tarsus by passing the needle through the retractors and then through anterior, inferior tarsus with 2 interrupted buried 6-0 polyglactin sutures (Fig 1E, F). Reattaching the retractors to the anterior surface of the tarsus everts the eyelid margin. The conjunctival edges remain in close apposition and no closure of the conjunctiva is necessary.

Attention is then turned toward the lateral tarsal strip to address horizontal laxity. The lower lid is pulled laterally, and the proper length of the lower lid is marked. The tarsal strip is created using sharp dissection along the gray line to separate the anterior lamella from the tarsus; then the eyelid margin is excised, the conjunctival epithelium is scraped with a scalpel blade, and the excess length of the tarsal strip is trimmed. The tarsal strip is attached to the periosteum just inside the lateral orbital rim using 5-0 polyglactin suture on a P-2 needle, and the suture is temporarily tied. The patient is assessed in primary gaze to assess the proper height of the lateral canthus, and the proper lower eyelid tone and contour. Once satisfactory lateral canthus placement and lower eyelid contour are achieved, a second 5-0 suture is placed through the tarsal strip and periosteum, and the sutures are tied and cut.

The remnant lateral ellia are trimmed. The lateral canthal angle is reformed with a buried 5-0 fast-absorbing gut suture, passing through the gray line of the upper and lower lids with the knot buried in the wound. The canthotomy incision is closed with interrupted 5-0 fast-absorbing gut suture.

**Methods**

This study consists of a retrospective, noncomparative, interventional case series of 151 eyelids in 120 patients who underwent TCER over a 12-year period from February 1991 through January 2003. Surgery was performed by the same surgeon (SCD) using the TCER technique described. Patients with cicatricial entropion and congenital entropion were excluded. Patients with postoperative follow-up of <20 days were excluded.

**Results**

Transconjunctival entropion repair was performed on 151 eyelids in 120 patients with involutional entropion. Of the 120 patients, 56 were men (46.7%) and 64 were women (53.3%), with a mean age of 78 years (range, 57–94), confirming that this is typically a disease of the elderly. One hundred thirty-nine eyelids (92.0%) in 109 patients underwent primary repair, and 12 eyelids (8.0%) in 11 patients underwent secondary repair. The secondary repairs were for recurrence after ≥1 entropion repair operations performed at other institutions. Of the 151 eyelids, surgery was performed on 87 right eyelids, 64 left eyelids, and 31 bilateral eyelids. Five patients (4.2%) underwent concurrent transconjunctival lower lid blepharoplasty. Fifteen upper eyelids (9.9%) in 11 patients underwent concurrent aponeurotic blepharoptosis repair. Mean postoperative follow-up was 4 months (range, 1–35 months).

Transconjunctival entropion repair resulted in resolution of entropion, with a success rate of 96.7% (146 of 151 eyelids); the entropion recurrence rate was 3.3% (5 of 151 eyelids). No patient had postoperative eyelid retraction or scleral show, and there were no overcorrections or secondary entropies in any of the 151 eyelids (Figs 2, 3). Recurrent entropion occurred in 5 eyelids of 5 patients, each of whom had undergone unilateral primary TCER. Of these 5 patients with recurrence, 2 patients underwent repeat TCER. 1 patient underwent a transcuniculate entropion repair, and 2 patients were lost to follow-up. Of the 3 patients who underwent repeat entropion repair, there was resolution of entropion.

Postoperative complications occurred in 6 of 151 eyelids (4.0%) of 6 of 120 patients (5.0%) and included stitch abscess (1 eyelid, 0.7%), lateral tarsal strip dehiscence (2 eyelids, 1.3%), lateral canthal dystopia (2 eyelids, 1.3%; Fig 4), and conjunctivochalasis (1 eyelid, 0.7%; Fig 5). One patient had a stitch abscess that resolved with antibiotics and removal of the suture. Two patients had a lateral tarsal strip dehiscence and both were allowed to heal by secondary intention; 1 patient healed satisfactorily and 1 patient developed secondary entropion and canthal dystopia. One patient had postoperative conjunctivochalasis persisting 3 months after entropion repair, which was repaired with conjunctivoplasty. Two patients had a lateral canthal dystopia and both underwent canthoplasty revision, with good results.

**Discussion**

The 3 anatomic factors that contribute to involutional entropion are (1) horizontal eyelid laxity, (2) lower eyelid retractor attenuation or disinsertion, and (3) overriding of the preseptal orbicularis oculi muscle. For many years, a fourth factor, involutional enophthalmos, was considered to be an etiologic factor in involutional entropion. Recently, this has been disproved by Kersten et al. A definitive surgical repair for involutional entropion should address all 3 anatomic components. The eyelids should be shortened horizontally, the lower eyelid retractors should be reinserted, and the orbicularis oculi muscle should be attended to, by either debulking it or creating a scar barrier to prevent preseptal override.

Numerous surgical techniques have been described for the repair of involutional entropion. These techniques have been reviewed elsewhere. However, many older techniques have poor long-term success owing to the failure of earlier procedures to address all of the multiple pathophysiologic components of the condition. Some techniques failed to address any of the causative factors. Other tech-
techniques corrected only 1 of these factors. More recently, procedures addressing all 3 causative factors of involutional entropion have been described. In 1983, Wesley and Collins introduced a technique that included retractor reinsertion, lateral tarsal strip procedure, and infraciliary skin excision. In 1991, Carroll and Allen described a technique that included retractor reinsertion, horizontal eyelid tightening procedure performed at the lateral canthus, and preseptal orbicularis oculi and skin excision. In 1991, Nowinski reported his technique of retractor reinsertion, lateral tarsal strip procedure, and excision of preseptal orbicularis oculi muscle through an infraciliary skin incision. In addition, Nowinski demonstrated that removal of the preseptal orbicularis muscle had no clinical effect on lacrimal pump function.

In 1993, Dresner and Karesh introduced the TCER, which addressed all 3 anatomic factors of involutional entropion and decreased the complications of secondary retraction by using a transconjunctival approach instead of a transcutaneous approach. Their technique included a lateral tarsal strip procedure for horizontal tightening, lower eyelid retractor reinsertion for retractor disinsertion, and excision of a strip of the preseptal orbicularis oculi for preseptal orbicularis override. Their initial study of 23 eyelids in 18 patients reported no recurrences over a follow-up period of 9 to 18 months.

Our current series evaluates 151 eyelids of 120 patients over a 12-year period, performed by 1 surgeon, who is 1 of the original describing authors (SCD). Our series is, to our knowledge, the largest published series of outcomes from TCER. The TCER resulted in resolution of entropion, with a success rate of 96.7% (146 of 151 eyelids); the entropion recurrence rate was 3.3% (5 of 151 eyelids). No patient had postoperative eyelid retraction or scleral show, and there were no overcorrections or secondary ectropion in any of the 151 eyelids. Recurrent entropion possibly occurs if there is a small component of cicatricial entropion preoperatively. In our practice, we utilize the transcutaneous approach to entropion repair in cases with involutional entropion with minimal horizontal laxity. Postoperative complications occurred in 6 of 151 eyelids (4.0%) of 6 of 120 patients (5.0%) and included stitch abscess (1 eyelid, 0.7%), lateral tarsal...
strip dehiscence (2 eyelids, 1.3%), lateral canthal dystopia (2 eyelids, 1.3%), and conjunctivochalasis (1 eyelid, 0.7%). These complications may be treated with suture removal and antibiotics, canthoplasty revision, or conjunctivoplasty. Lateral lower eyelid inflammation was noted on 1 eyelid, which resolved in 4 weeks without treatment. This inflammation may be caused by temporary disruption of lower lid blood supply. The tarsal strip interrupts the lateral blood supply to the eyelid and the myectomy may further compromise blood supply. Thus, we recommend a very small myectomy consisting of 1 to 2 mm of orbicularis excision.

Other reports of the results from the TCER have been recently published. When the TCER is performed as originally described with a preseptal orbicularis myectomy, retractor reinsertion, and lateral tarsal strip procedure, the recurrence rate is low. Khan and Meyer7 reported results on a slightly modified TCER that included preseptal orbicularis myectomy, retractor plication with 2 Quickeart sutures, and lateral tarsal strip. Their modification to the TCER was lower lid retractor plication with interrupted horizontal mattress sutures, which were then passed through the lid to the skin and tied on the skin surface, similar to a Quickeart suture. They reported a recurrence rate of 1.8% on 114 lower eyelids with no postoperative eyelid retraction or overcorrection, as performed by 1 surgeon over a 7-year period. These excellent results in both our series and Khan and Meyer's series are in contrast with a report by Cook et al.5 Cook et al reported results on a significantly modified TCER on 36 eyelids over a 6-year period performed by 3 different surgeons using heterogeneous techniques. In particular, the surgical technique on 14 of 36 eyelids included preseptal orbicularis myectomy, retractor reinsertion, and a periosteal flap developed at the lateral orbital wall for lateral canthal fixation. With a periosteal flap as a significant modification to the TCER, Cook et al reported a poorer recurrence rate of 8.3% on 36 eyelids. However, it must be noted that 2 of the 3 entropion recurrences occurred with attachment of the lateral tarsal strip to a periosteal flap, which may not have provided adequate horizontal tightening. Recently, Ben Simon et al10 reported on the results of a TCER; however, their technique involved retractor reinsertion primarily, either with or without a lateral tarsal strip, but no orbicularis myectomy was performed, which was a significant modification to the original TCER. Both the lateral tarsal strip and the preseptal orbicularis myectomy are integral to the success of the TCER and may explain their recurrence rate of 15% on 20 lower eyelids over a 4-year period.

The success rate of the TCER is comparable to the success rate of a transcutaneous, infraciliary approach to entropion repair. Our 3.3% entropion recurrence rate is similar to the 0% to 4% recurrence rate for the transcutaneous approach.6-8,11-13

Our secondary, consecutive entropion rate of 0% compares favorably to the 0% to 10% secondary entropion rate for the transcutaneous approach.6-8,10-13

The TCER has certain advantages when compared to the transcutaneous approach to entropion repair. It involves less extensive dissection. Less bleeding is encountered with dissection through conjunctiva and lower lid retractors compared with dissection through skin and orbicularis, hence less cautery is needed with decreased vascular sacrifice. The incision is hidden. A transconjunctival lower eyelid blepharoplasty can be performed in conjunction with the TCER. The TCER circumvents scleral show, eyelid retraction, and secondary entropion. There is less asymmetry in lower eyelid position and lower eyelash projection in patients undergoing unilateral TCER. The main advantages of TCER are its ease and speed of execution with avoidance of retraction and excellent cosmesis, especially in attaining bilateral symmetry in unilateral cases.

Nonetheless, it must be pointed out that there may be occasional advantages to the transcutaneous approach for entropion repair. It likely creates a more significant anterior lamellar scar with a skin–muscle flap, which may result in a slightly lower rate of entropion recurrence. However, this must be weighed against the higher incidence of secondary eyelid retraction or secondary entropion with a cutaneous approach. It is important to note that the main complication from internal repair, namely recurrent entropion, is relatively easy to correct with a repeat entropion repair. The main complication from external repair, namely lower eyelid retraction and/or cicatricial entropion, may be more difficult to correct and may require canthoplasty, full-thickness skin graft, hard palate or other posterior spacer graft, and/or midface lift for correction.

Transconjunctival entropion repair should be used for involutional entropion and should not be used in other types of entropion, such as cicatricial entropion or congenital entropion. Transconjunctival entropion repair is not advised in patients with marked lower eyelid dermatomalization, because a transcutaneous approach allows for concomitant lower eyelid skin or skin–muscle excision. It should also be noted that in our practice, we do utilize the transcutaneous approach to entropion repair in cases with involutional entropion with minimal horizontal laxity.

Limitations of this study arise from its retrospective, noncomparative design. Additionally, although the mean follow-up is 4 months, the relatively short-term follow-up based on the referral pattern of the authors' practice is a further limitation. Although virtually all of our patients have regular office examinations by their referring ophthalmologist, provocative testing for recurrent, latent entropion may not have been performed unless the patient complained of symptoms. Thus, recurrent entropion may be underreported.11

The transconjunctival approach addresses all major anatomic factors related to involutional entropion. It is effective and safe with a low rate of recurrence and a low complication rate. The reasons to perform the TCER are similar to the reasons to perform a transconjunctival lower eyelid blepharoplasty over a transcutaneous blepharoplasty. The complications are rare and easier to repair, it circumvents the risk of lower eyelid retraction, and the cosmesis is superior. Ideally, a prospective, randomized, longitudinal study would be desirable to compare the outcomes of the transcutaneous and transconjunctival approaches of entropion repair.
References