# Transconjunctival Entropion Repair

*Steven C. Dresner, MD, James W. Karesh, MD*

Involutional lower-eyelid entropion has three underlying correctable causes: eyelid laxity, overriding of the orbicularis oculi muscle, and attenuation of the lower-eyelid retractors. We describe a new technique for correcting this problem. A transconjunctival approach is used to advance or fortify the lower-eyelid retractors. The orbicularis oculi muscle can also be addressed through this approach. Combining this technique with lateral canthal resuspension anatomically corrects the entropion by addressing all three correctable causes. Transconjunctival blepharoplasty can also be performed in conjunction with this technique. Twenty-three eyelids of 18 patients successfully underwent this procedure. Six patients underwent simultaneous transconjunctival blepharoplasty. Follow-up ranged between 9 and 18 months. There were no postoperative recurrences, overcorrections, or lower-eyelid retraction. This approach yields a stable and definitive repair of involutional entropion with excellent postoperative cosmesis. *(Arch Ophthalmol. 1993;111:1144-1148)*

Many procedures have been described for correcting involutional entropion.[1-11] The development of these techniques has been based on an understanding of the various correctable pathophysiologic processes underlying this condition: (1) horizontal eyelid laxity, (2) overriding of the preseptal orbicularis oculi muscle, and (3) attenuation of the lower-eyelid retractors. Involutional enophthalmos may also play a role in the cause of involutional entropion; however, this factor cannot be safely or easily managed.[1] Definitive surgical correction of involutional entropion needs to address all three of the correctable causes. We have developed a new technique to repair this condition that corrects these anatomic abnormalities and provides increased cosmesis through a transconjunctival approach.

*From the Department of Ophthalmology, Division of Ophthalmic Plastic and Reconstructive Surgery, The Jules Stein Eye Institute, UCLA School of Medicine, Los Angeles, Calif (Dr Dresner); the Krieger Eye Institute, Sinai Hospital of Baltimore (Md) (Dr Karesh); and The Wilmer Ophthalmological Institute, The Johns Hopkins University, Baltimore (Dr Karesh).*

## SURGICAL TECHNIQUE

The lower eyelid is anesthetized through the inferior fornix with an injection of approximately 2 mL of 1% xylocaine hydrochloride with a 1:100 000 dilution of epinephrine. A 1- to 2-mL bolus of this same solution is instilled into the lateral canthus down to the periosteum. A protective eyelid plate is used over the globe during the dissection.

A lateral canthotomy is performed with a straight tenotomy scissors (**Figure 1**, top left). The inferior crus of the lateral canthal tendon is then incised (Figure 1, top right). A small retractor is placed in the lateral canthal incision. Beginning at the lateral canthus and extending just lateral to the punctum, an incision is made with a cutting unipolar cautery just below the lower tarsal border through the conjunctiva and lower-eyelid retractors (Figure 1, bottom left). Little bleeding is usually encountered in this relatively bloodless plane. The orbital septum and the orbicularis oculi muscle are not violated during the dis-

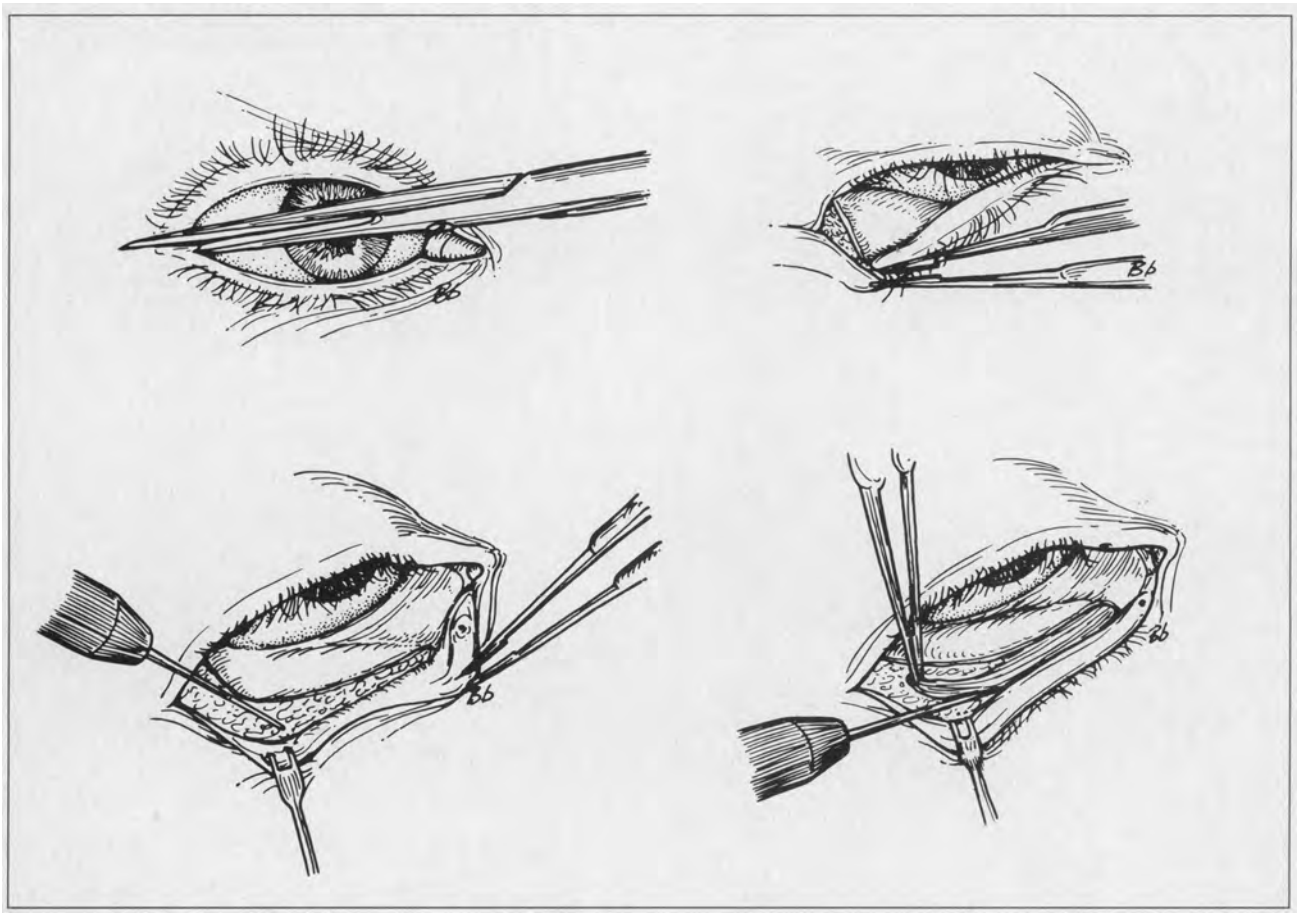

**Figure 1.** *Top left, A lateral canthotomy is performed with a straight tenotomy scissors. Top right, The inferior crus of the lateral canthal tendon is incised. Bottom left, An incision is made with a unipolar cutting cautery just below the tarsal border through the conjunctiva and lower-eyelid retractors. Bottom right, A cutting cautery is used to excise a strip of orbicularis muscle along the full length of the incision.*

section. The conjunctiva and lower-eyelid retractors are elevated and separated from the anterior eyelid lamella and orbicularis muscle. The surgical plane is carried inferiorly toward the inferior orbital rim between the lower-eyelid retractors and the fat pads. Downward traction on the lower eyelid with either a rake or a small Desmarres retractor is used for improving exposure.

Once the fat pads are identified, a transconjunctival blepharoplasty can be performed when necessary. Gentle pressure on the globe or upward traction on the lower-retractors is helpful for demonstrating the three lower-eyelid fat compartments. The fine connective tissues covering the fat pads can be incised with the cutting cautery. Each fat pad is excised with the needle tip of the cutting cautery without clamping. Small vessels in the fat are cauterized when seen. When the entropion is unilateral, a limited fat excision or none at all can be performed to ensure symmetry with the other eyelid.

The lower tarsal border is then pulled upward, everting the eyelid. Cutting cautery is used to excise a strip of orbicularis oculi muscle below the tarsus along the full length of the incision (Figure 1, bottom right). Since the orbital septum fuses with the lower-eyelid retractors approximately 5 mm below the tarsal border, excision of the orbicularis oculi in this area can be performed without violating the body of the orbital septum. The lower-eyelid retractors are firmly adherent to the conjunctiva and immediately posterior to the fat compartments. If there is any uncertainty about their location, the patient can be asked to look upward and downward to identify the edge of the retractors.

The retractors are separated from the conjunctiva with the cutting cautery to create a free edge (**Figure 2**, top left). This free edge is then reinserted into the inferior and anterior tarsal border with two buried 5-0 polygalactin sutures (Figure 2, top right). Reattaching the retractors to the anterior surface of the tarsus appreciably everts the eyelid margin. No closure of the conjunctiva is necessary since the conjunctiva readily reattaches to the inferior tarsal border.

The eyelid is then horizontally shortened to correct all eyelid laxity and a tarsal strip is formed as a substitute lateral canthal tendon. The needle tip of the electrocautery unit is used to create this strip by dissecting the tarsus of the lateral eyelid from the anterior eyelid lamella and removing the eyelid margin and epithelium from it. Shortening of the strip before its reattachment to the lateral orbital rim periosteum prevents the formation of

a lateral subcutaneous lump after closure of the skin (Figure 2, bottom left). The tarsal strip is reinserted into the lateral orbital rim with two 4-0 polygalactin sutures. The canthotomy incision can then be closed in standard fashion (Figure 2, bottom right).

## RESULTS

Transconjunctival entropion repair was performed successfully on 23 eyelids of 18 patients with involutional entropion (**Figure 3**). There were six men (33%) and 12 women (67%) ranging in age from 63 to 94 years. The mean age was 78 years. Five patients (28%) had bilateral entropion repair and 13 (72%) had unilateral repair. Of the 13 unilateral repairs, nine (69%) involved the right eyelid and four (31%) the left. Transconjunctival blepharoplasties were performed concomitantly in five patients with bilateral entropion (**Figure 4**) and in one patient with unilateral entropion. Patients with cicatricial entropion were excluded from this study.

All patients underwent horizontal eyelid shortening and lateral canthal resuspension as well as reinsertion of the lower-eyelid retractors. Postoperative follow-up ranged from 9 to 18 months. During this period there were no entropion recurrences. No patient had postoperative eyelid retraction or scleral show, and there were no overcorrections. One patient had a postoperative stitch abscess, which resolved with antibiotic treatment and removal of the suture. Postoperative ecchymosis was minimal and generally resolved in 2 weeks. The conjunctival incisions were all fused in the first week after surgery, and persistent conjunctival edema was not a problem. No patients had postoperative corneal stippling or epithelial defects.

## COMMENT

Most authors agree that there are three elements responsible for involutional entropion: lower-eyelid laxity, attenuation of the lower-eyelid retractors, and overriding of the orbicularis oculi muscle.[12-15] Therefore, a definitive procedure should address all three of these elements. The eyelids should be shortened horizontally; the lower-eyelid retractors should be fortified or reinserted; and the orbicularis oculi muscle should be attended to, either weakening it or creating a scar barrier under the tarsus to prevent overriding of the preseptal portion.

In the evolution of entropion repair, many techniques have been described. In general, some failed to address any of the causative factors underlying involutional entropion. Most, however, corrected only one

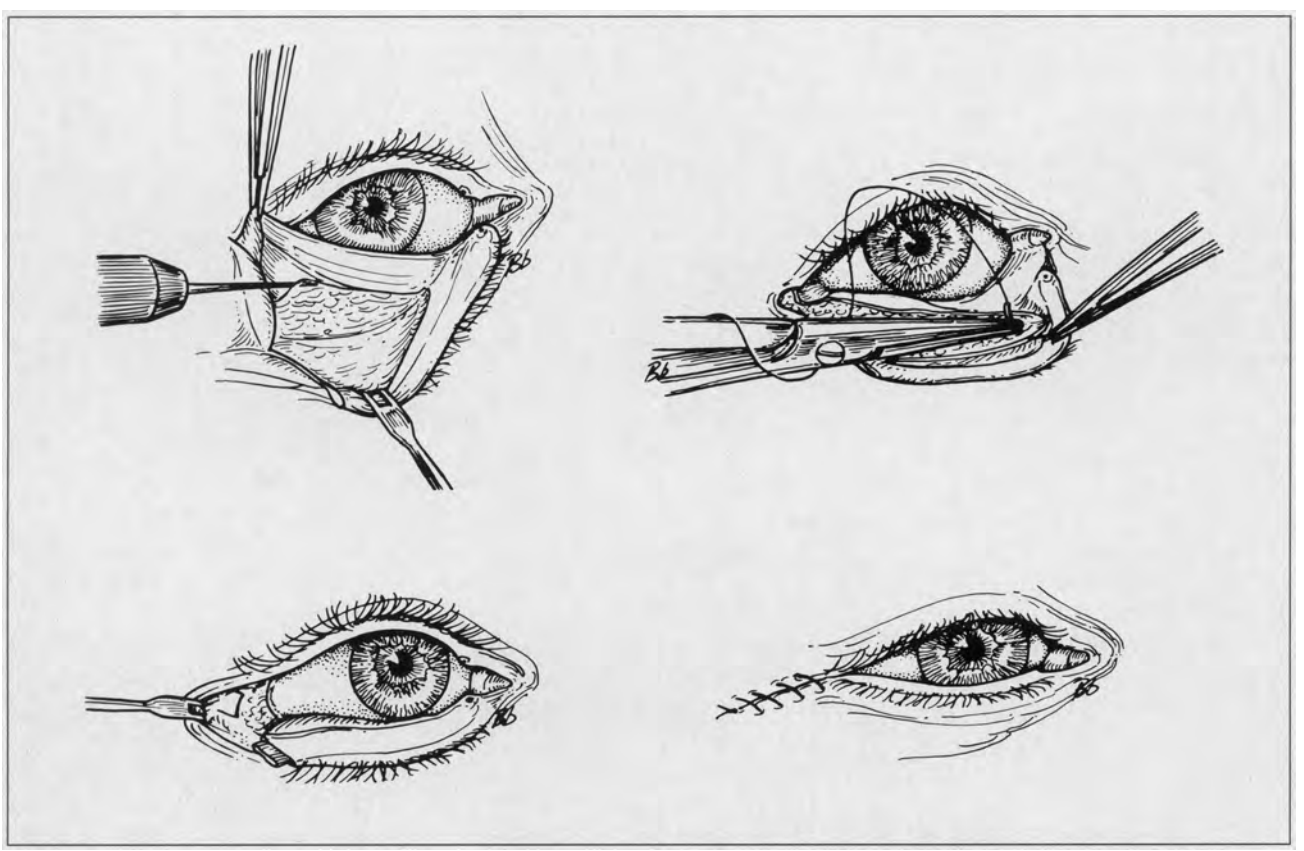

**Figure 2.** *Top left, The retractors are separated from the conjunctiva with the cutting cautery to create a free edge. The tip of the cautery points to the lower-eyelid retractors. Top right, The lower-eyelid retractors are reinserted to the inferior anterior tarsal surface with two buried 5-0 polygalactin sutures. Bottom left, A horizontal eyelid shortening and eyelid resuspension through tarsal strip formation is then performed to tighten the eyelids. A small portion of tarsus extends from the horizontally shortened eyelid before its reattachment to periosteum of the inner aspect of the lateral orbital rim. Bottom right, The skin incision is then closed in standard fashion.*

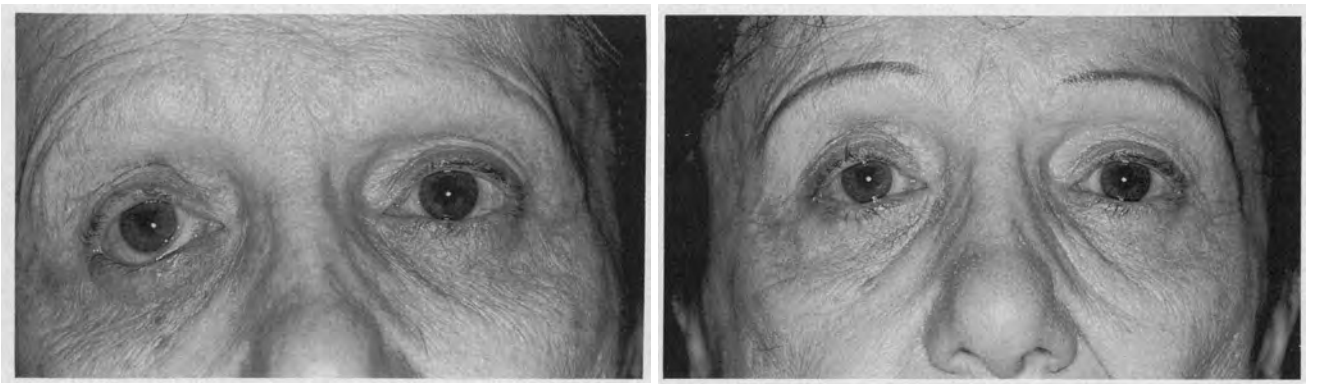

**Figure 3.** *Left, Preoperative appearance of a patient with entropion of the right lower eyelid. Right, Postoperative appearance 6 weeks after transconjunctival entropion repair.*

or two of these factors. Ziegler[2] described a technique using cautery to create a scar between the anterior and posterior lamellae of the eyelid to repair entropion. Since this technique does not address any of the causative factors, it has a high failure rate.[16]

Wies[6] attempted to create a more permanent scar between the anterior and posterior lamellae of the eyelid with a full-thickness blepharotomy combined with rotation sutures. This technique prevented overriding of the preseptal orbicularis oculi muscle but did not address eyelid laxity or the lower-eyelid retractors. However, it is helpful in certain cases of cicatricial entropion. Frequent overcorrections and poor cosmesis limit its usefulness today. To prevent overriding of the preseptal orbicularis oculi muscle, Wheeler[3] transposed a strap of this muscle from the infratarsal area to the orbital rim. While this corrected the problem with the orbicularis oculi muscle, it did not address horizontal eyelid laxity or abnormalities of the lower-eyelid retractors.

Quickert and Rathbun[7] described a suture technique to create scarring similar to that created by the Wies procedure. This was modified by Rainin[17] to include deeper cul-de-sac sutures to imbricate the lower-eyelid retractors. Both of these techniques can be helpful to temporize before a definitive procedure can be performed. Neither achieves a high degree of permanent correction since horizontal eyelid laxity is not addressed. To overcome this problem, Bick[18] described a technique of full-thickness eyelid shortening. While this corrected one underlying cause of entropion, it left abnormalities of the orbicularis oculi muscle and eyelid retractors untouched.

Leone[19] described a technique of transconjunctival tarsectomy and orbiculectomy to correct entropion. This technique excised central tarsus instead of correcting the eyelid laxity at the lateral canthus, where it is most effectively and permanently performed. In addition, it did not correct attenuation of the lower-eyelid retractors. Jones et al[8] described dysfunction of the lower-eyelid retractors in involutional entropion and advocated tucking or resecting the abnormal retractors. Dryden et al[10] described reattaching the retractors directly to the inferior tarsus in a similar fashion.

Carroll and Allen[1] have described a combined technique of retractor reinsertion and eyelid shortening that requires a full-thickness blepharotomy. Wesley and Collins[20] have also presented a combined technique of lower-eyelid retractor repair with horizontal eyelid shortening. A modification of this technique has also been described by Nowinski.[21] All these techniques provide long-term success and address the three important elements causing entropion: lower-eyelid laxity, retractor attenuation, and overriding orbicularis oculi muscle. However, these techniques require a subciliary inci-

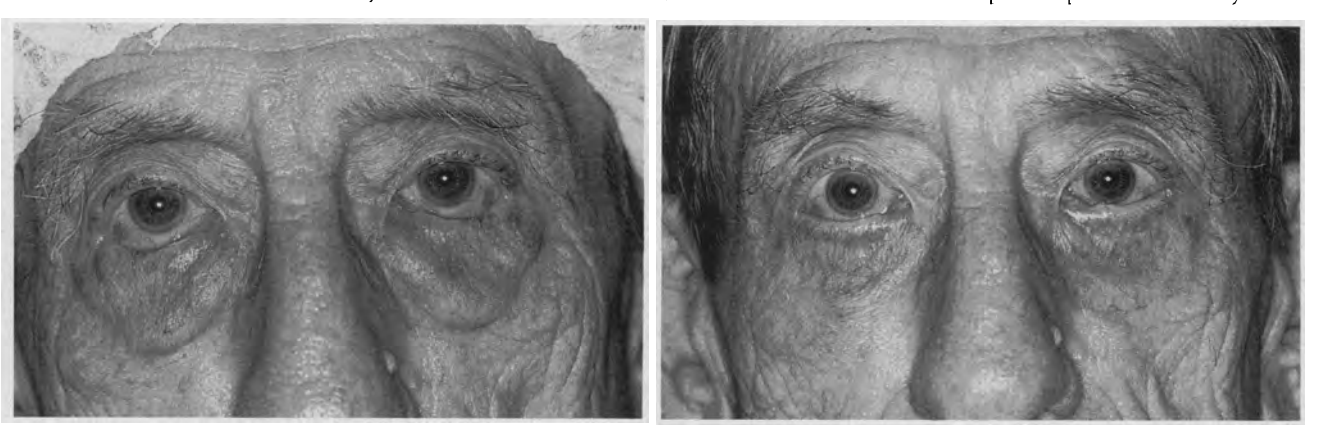

**Figure 4.** *Left, Preoperative appearance of a patient with bilateral lower-eyelid entropion. Right, Postoperative appearance 6 weeks after bilateral transconjunctival entropion repair and bilateral transconjunctival blepharoplasty.*

sion. In our experience, overcorrection and postoperative eyelid retraction with the anterior subciliary approach can be problematic and yield less than satisfactory cosmetic results.

It is interesting to note that in all the patients described by Wesley and Collins,[20] the capsulopalpebral fascia was noted to be disinserted on surgical exploration. This anatomic defect was not corroborated in our study and has not been confirmed in pathologic evaluation of other patients with entropion.[22] Indeed, in none of the patients operated on in our study were the lower-eyelid retractors noted to be completely disinserted at the time of surgery.

Hawes and Dortzbach[22] speculated that when the septum is incised from a cutaneous approach, the capsulopalpebral fascia may be disinserted inadvertently since this fascia and the orbital septum fuse into a single layer, approximately 5 mm below the tarsal border. Since their patients showed no definitive fascial disinsertion, they speculated that its occurrence may be iatrogenic. Although the exact role of the lower-eyelid retractors in the pathogenesis of entropion is still not well defined, Hawes and Dortzbach[22] did agree that laxity or attenuation of the lower retractors is partially responsible for the development of entropion. This fascial layer inserts on both the posterior and anterior tarsal surfaces and the base of the tarsus. The posterior tarsal insertion is particularly firm and extends one third of the distance up the tarsus.[22] Therefore, attenuation of the anterior portion of this insertion with retention of the posterior portion theoretically may be a contributory factor in the development of entropion. Future anatomic studies may further elucidate this.

Transconjunctival surgery has been used successfully for orbital surgery, blowout fracture repair, and lower blepharoplasty. This approach has been shown to avoid postoperative scleral show and lower-eyelid retraction.[23-25] The transconjunctival approach to entropion obviates the need for a traditional subciliary incision and scar, averts iatrogenic retractor disinsertion, and is superior cosmetically to the skin approach.

Nonetheless, it must be pointed out that there is some advantage to the cutaneous approach for entropion repair. It may be possible to create a more significant anterior lamellar scar with a skin incision and skin-muscle flap, an important aspect of successful entropion surgery. However, this must be weighed against the significant problems of eyelid retraction and a cutaneous scar associated with this approach. In addition, based on the successful and stable results achieved using a transconjunctival approach, it must be presumed that the scar created by this method is just as adherent as that produced by an anterior approach. A second concern regarding the transconjunctival approach for entropion correction is related to the possibility of conjunctival scar formation resulting in a cicatricial entropion. However, this did not occur in any of our patients and has not been shown to occur in other reports of transconjunctival surgery.[23-25]

Our procedure addresses all the correctable factors of entropion for a definitive and lasting repair. The retractors can be strengthened or directly reattached to the inferior anterior tarsus via a near-bloodless field. The anatomy of the lower eyelid leaves an approximate 5-mm area below the tarsus where the orbicularis oculi muscle can be excised without violating the body of the orbital septum. This excision creates the scar barrier to prevent overriding of the orbicularis oculi muscle. Eyelid laxity is then repaired anatomically at the lateral canthus, a modification of the procedure described by Anderson and Gordy.[26]

The transconjunctival entropion repair is also useful in bilateral cases when blepharoplasty is desired. It provides excellent cosmesis without a subciliary incision and removes the "bags" without subsequent scleral show and eyelid retraction.

*Accepted for publication March 10, 1993.*

*Reprint requests to 2222 Santa Monica Blvd, Suite 101, Santa Monica, CA 90404 (Dr Dresner).*

## REFERENCES


1. Carroll RP, Allen SE. Combined procedure for repair of involutional entropion. *Ophthal Plast Reconstr Surg.* 1991;7:123-127.
2. Ziegler SL. Galvanocautery puncture in ectropion and entropion. *JAMA.* 1909;53:183-186.
3. Wheeler JM. Spastic entropion corrected by orbicularis transplantation. *Trans Am Ophthalmol Soc.* 1938;36:157-162.
4. Sisler HA. A biomechanical and physical approach to corrective surgery for senile entropion. *Ann Ophthalmol.* 1973;5:483-484.
5. Fox SA. Relief of senile entropion. *Arch Ophthalmol.* 1951;46:424-431.
6. Wies FA. Spastic entropion. *Trans Am Acad Ophthalmol Otolaryngol.* 1955;59:503-506.
7. Quickert MH, Rathbun E. Suture repair of entropion. *Arch Ophthalmol.* 1971;85:304-305.
8. Jones LT, Reeh MJ, Wobig JL. Senile entropion: a new concept for correction. *Am J Ophthalmol.* 1972;74:327-329.
9. Iliff NT. An easy approach to entropion surgery. *Ann Ophthalmol.* 1976;8:1343-1346.
10. Dryden RM, Leibsohn J, Wobig JL. Senile entropion: pathogenesis and treatment. *Arch Ophthalmol.* 1978;96:1883-1885.
11. Schaefer AJ. Lateral canthal tendon tuck. *Ophthalmology.* 1979;86:1879-1882.
12. Hsu WM, Liu D. A new approach to the correction of involutional entropion by pretarsal orbicularis oculi muscle fixation. *Am J Ophthalmol.* 1985;100:802-805.
13. Siegel RJ. Involutional entropion: a simple and stable repair. *Plast Reconstr Surg.* 1988;82:42-47.
14. Schaefer AJ. Variation in the pathophysiology of involutional entropion and its treatment. *Ophthalmic Surg.* 1983;14:653-655.
15. Collin JRO, Rathbun JE. Involutional entropion: a review with evaluation of a procedure. *Arch Ophthalmol.* 1978;96:1058-1064.
16. Hornblass A, Bercovici E, Smith B. Senile entropion. *Ophthalmic Surg.* 1977;8:47-57.
17. Rainin EA. Senile entropion. *Arch Ophthalmol.* 1979;97:928-930.
18. Bick MW. Surgical management of orbital tarsal disparity. *Arch Ophthalmol.* 1966;75:386-389.
19. Leone CR. Internal tarsus-orbicularis resection for senile spastic entropion. *Ann Ophthalmol.* 1975;7:1004-1006.
20. Wesley RE, Collins JW. Combined procedure for senile entropion. *Ophthalmic Surg.* 1983;14:401-405.
21. Nowinski TS. Orbicularis oculi muscle extirpation in a combined procedure for involutional entropion. *Ophthalmology.* 1991;98:1250-1256.
22. Hawes MJ, Dortzbach RK. The microscopic anatomy of the lower eyelid retractors. *Arch Ophthalmol.* 1982;100:1313-1318.
23. McCord CD Jr, Moses JL. Exposure of the inferior orbit with fornix incision and lateral canthotomy. *Ophthalmic Surg.* 1979;10:53-63.
24. Tenzel RR, Miller GR. Orbital blow-out fracture repair, conjunctival approach. *Am J Ophthalmol.* 1971;71:1141-1142.
25. Baylis HI, Long JA, Groth MJ. Transconjunctival lower eyelid blepharoplasty: technique and complications. *Ophthalmology.* 1989;96:1027-1032.
26. Anderson RL, Gordy DD. The tarsal strip procedure. *Arch Ophthalmol.* 1979;97:2192-2196.