

# Lower eyelid entropion following transconjunctival orbital fracture repair: Case series and literature review

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Quick Response Code:

<b>Website:</b> www.saudijophthalmol.org
<b>DOI:</b> 10.4103/sjopt.sjopt_53_22

## Abstract:

Lower eyelid malpositions following transconjunctival repair of the floor and the zygomaticomaxillary complex fractures are rarely observed. The case series includes three patients (mean age, 22 years; 3 males) who developed lower eyelid entropion following orbital fracture repair (two complexes, one isolated type) using titanium mesh ( $n = 2$ ) or iliac bone grafting ( $n = 1$ ) through the transconjunctival approach. Entropion repair was attempted with scar release and Jones procedure in one, and posterior lamellar lengthening with mucous membrane graft in two patients. At a median follow-up of 25 months (range, 3–24), two patients had symptomatic relief without any lash globe touch, and one patient had persistent entropion after multiple interventions including failed mucous membrane graft ( $n = 1$ ), full-thickness blepharotomy with everting sutures ( $n = 1$ ), and scleral spacer grafting for posterior lamellar lengthening ( $n = 1$ ). The literature is inconclusive about the association between eyelid malpositioning and any specific implant material, type of fracture, or incision closure technique.

## Keywords:

Cicatricial entropion, entropion, entropion after fracture repair, orbital fracture, transconjunctival approach

## INTRODUCTION

Eye lid malpositions, either ectropion or entropion, are rarely seen complications following orbital fracture repair.<sup>[1]</sup> The type of eyelid malposition varies with the approach used for fracture repair and the transconjunctival approach is more often associated with entropion (0%–4.4%).<sup>[2–10]</sup> Other than inducing ocular symptoms of irritation and watering, it can result in vision-threatening complications.<sup>[3]</sup> Cicatricial lower eyelid entropion following orbital fracture repair can be transient, which resolves with conservative measures such as lubricants, taping, and lid massage.<sup>[4]</sup> However, 0.4%–4.4% of patients require surgical correction, and existing options include reattachment of retractors with or without placement of spacer grafts for lengthening the posterior lamella.<sup>[2]</sup> The reported literature on the outcomes of entropion postfracture repair is sparse, with most cases reports discussing merely its incidence. The current case series discusses the outcomes of

cicatricial entropion correction that developed following transconjunctival orbital fracture repair, along with a literature review.

## CASE REPORTS

The Institutional Ethics Committee approval was waived as it is a retrospective study. The study protocol adhered to the tenets of the Declaration of Helsinki. Written informed consent was taken to include patient details and photographs for publication purposes. Consecutive patients who underwent cicatricial entropion correction following fracture repair over the past 2 years were analyzed.

### Case 1

A 26-year-old male presented with the left orbital floor and zygomaticomaxillary complex (ZMC) fractures involving the inferior orbital rim, the anterior part of the orbital floor, and frontozygomatic bone [Figures 1a and b]. External examination revealed sutured skin laceration involving the temple area, 1 cm lateral to the lateral canthus. He underwent

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**How to cite this article:** Wagh RD, Naik M, Bothra N, Singh S. Lower eyelid entropion following transconjunctival orbital fracture repair: Case series and literature review. Saudi J Ophthalmol 2023;37:154-7.

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Submitted: 25-Mar-2022

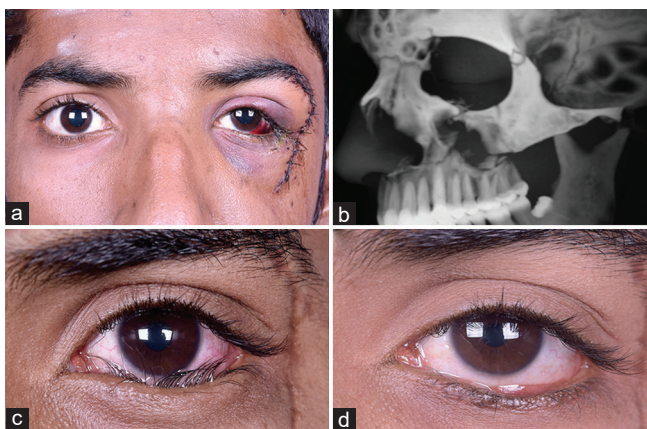
Accepted: 15-May-2022

Published: 25-Mar-2023

left floor fracture repair with titanium mesh placement through canthus-to-canthus transconjunctival incision without lateral canthotomy. The conjunctival incision was left unsutured at the end of the surgery. At the same sitting, a maxillofacial surgeon performed open reduction and internal fixation of the frontozygomatic fracture. Two weeks after fracture repair, he presented with in-turning of the lower eyelid margin with lash-globe contact causing epiphora. There was inferior forniceal shortening with symblepharon inferiorly [Figure 1c]. He underwent symblepharon release through a transconjunctival approach and Jones procedure through a subciliary incision for the entropion correction. Postoperatively, adequate eyelid eversion was achieved. Six weeks after entropion correction, the eyelid remained in everted position with no lash-globe touch [Figure 1d], and his vision had improved to 20/100, but there was persistent chemosis in the inferior bulbar conjunctiva. The chemosis reduced over the next 3 months of follow-up.

### Case 2

A 31-year-old male presented 1 month after injury to the left eye with a heavy bolt at his workplace. His clinical examination revealed 5 mm of enophthalmos and hypoglobus in the left eye and healed facial scars [Figure 2a]. He had no light perception in the left eye secondary to indirect traumatic optic neuropathy. Orbital imaging revealed large isolated floor and medial wall fractures [Figure 2b]. He underwent fracture repair with iliac bone grafting through canthus-to-canthus transconjunctival incision without lateral canthotomy and primary conjunctival closure. At 6-week follow-up visits, he presented with left lower eyelid entropion and was managed conservatively [Figure 2c]. Six months following surgery, lower eyelid entropion persisted, and he started developing pannus involving the inferior cornea in the left eye. Entropion was managed with posterior lamellar lengthening using mucous membrane graft and scar tissue release, but entropion persisted at 1-month follow-up [Figure 2d and e]. He subsequently



**Figure 1:** (a) Standard clinical photograph of case 1 at presentation with the left lower eyelid ecchymosis, sutured laceration, and zygomaticomaxillary fracture involving the inferior orbital rim and floor (b). (c) Six weeks after orbital fracture repair, the left lower eyelid developed entropion, which corrected well following symblepharon release and Jones procedure (d)

underwent full-thickness blepharotomy with lash-everting sutures [ $n = 1$ ; Figures 2f and g], which was unsuccessful, followed by lower eyelid retractor release with scleral spacer graft [ $n = 1$ ; Figure 2h]. One month postoperatively, the entropion was well corrected, but at 2 months, he presented with extrusion of the graft during routine activity, with recurrence of entropion. He was subsequently managed with electroepilation of the offending lashes [Figure 2i].

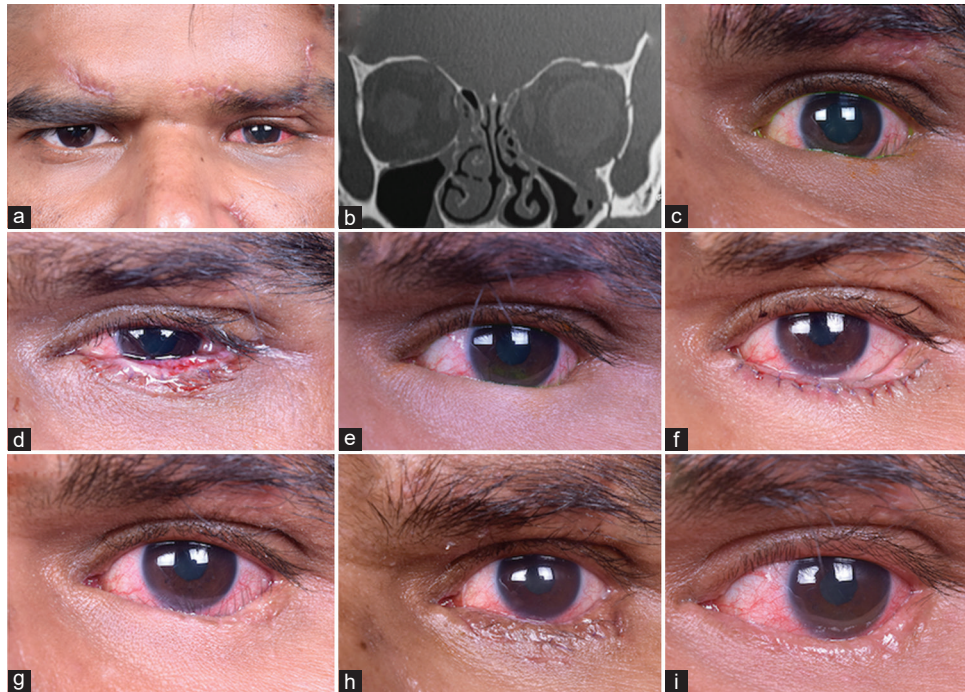
### Case 3

A 9-year-old child was brought to the clinic for inturned left lower eyelid for 1 year [Figure 3a]. One year ago, he underwent an orbital floor fracture repair elsewhere through a transconjunctival approach using a titanium sheet. Lower eyelid entropion was managed with retractor release and placement of a free tarsal graft harvested from the upper eyelid for lengthening the posterior lamella. At the last follow-up of 2 years, the patient was asymptomatic and had minimal residual medial entropion without any lash-globe contact [Figure 3b].

### DISCUSSION

Surgical correction of entropion following transconjunctival fracture repair can have variable outcomes, with symptomatic relief noted in 66% (2/3) of cases. All three patients had different modes and severity of the initial trauma and different extent of bony involvement (combined fracture = 2, isolated floor fracture = 1). In all cases, entropion occurred within 1 month of the orbital fracture repair. Posterior lamellar lengthening was attempted in all three patients, of which one case had persistent entropion despite multiple interventions.

Postoperative complications following the transconjunctival orbital floor fracture repair approach are chemosis, trichiasis, and eyelid retraction, which are usually transient and can be managed conservatively.<sup>[5,9]</sup> Late complications include entropion, ectropion, and eyelid retraction that usually require surgical management.<sup>[9]</sup> Entropion after orbital fracture repair surgery results from shortening the posterior lamella, which pulls the eyelid margin inward.<sup>[7]</sup> The risk factors for entropion occurrence following fracture repair can be related to surgical approach (transconjunctival vs. subciliary), the extent of fracture (isolated vs. complex), location of the transconjunctival incision (subtarsal, forniceal, or midpoint), the incision modality (cautery or knife), dissection plane (preseptal or retroseptal), and the material used for fracture repair, whether associated with lateral canthotomy and the technique of incision closure.<sup>[4,6,7]</sup> The risk analysis of lower eyelid malpositions following the transconjunctival versus subciliary approach revealed a greater incidence (4.7%) in the transconjunctival group than in the subciliary group (0%).<sup>[6]</sup> Kesselring *et al.* reported no lower eyelid malposition with a transconjunctival approach out of 198 orbital fractures repaired using different incisions.<sup>[5]</sup> Only one patient developed entropion following transconjunctival with a lateral canthotomy approach. Ridgway *et al.* reported two entropion cases after using transconjunctival incision for



**Figure 2:** (a) Standard clinical photograph of case 2 at presentation (a), with facial scars, conjunctival congestion, and left enophthalmos. (b) CT, coronal bone window scan shows left orbital floor and medial wall fracture. (c) High magnification photograph of the left eye shows lower eyelid entropion and inverted lashes touching the globe. (d and e) Postoperative photograph after surgical correction with mucous membrane graft shows good eyelid eversion that was maintained for 2 weeks, till it recurred again (e). (f) One week postoperative photograph after lower eyelid full-thickness blepharotomy, scar release, and everting sutures achieved good short-term results (g). (h) Subsequently, the posterior lamella was lengthened with a scleral spacer graft in the left eye but required electroepilation for managing persistent trichiasis (i)



**Figure 3:** (a) High magnification photograph of the left eye at presentation showing lower eyelid entropion that recovered after lengthening the posterior lamella using free tarsal (b)

orbitozygomatic fracture repair (one complex ZMC + floor using titanium mesh and one isolated ZMC).<sup>[4]</sup> Both cases were initially managed with lid massage and lubricants but ultimately required scar release and Quickert sutures for correcting the entropion. Entropion recurred in both cases, and electroepilation was advised for symptomatic relief. They suggested that the transconjunctival technique must be combined with a lateral canthotomy and tarsorrhaphy for addressing complex fractures. However, they had used titanium mesh in one of the cases, and we have used bone graft and titanium mesh in one and two cases, respectively.

There have been no reports associating any specific implant material with eyelid malpositioning following fracture repair. The comparison between the repair of isolated versus complex orbitofacial fractures revealed an increased incidence of eyelid malpositions in the complex fracture group.<sup>[7]</sup> Four

patients in their cohort developed entropion, out of which only one patient underwent entropion correction using lateral tarsal strip and infraciliary rotation. They did not find any significant difference in the outcomes related to the closure technique, rim screws, or implant material. Yamashita *et al.* studied whether the incidence of eyelid malposition differs with the number of interventions (repeated transconjunctival incisions vs. single-time intervention).<sup>[8]</sup> The incidence of transient entropion in the single incision was 1.4%, whereas persistent entropion in single and repeated incisions was 1.4 and 14.3%, respectively. They treated all eyelid malpositions conservatively with lubricants, eyelid taping, and steroid injections for up to 6 months, and entropion resolved in half of the cases. Entropion repair was done in four cases using a mucous membrane graft for lengthening posterior lamella with a satisfactory outcome.

Although the transconjunctival approach is said to have the most negligible incidence of lower eyelid malpositions, entropion can still occur. Entropion correction is required when it persists beyond 6 weeks after fracture repair, and posterior lamellar lengthening is preferred.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names

and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Financial support and sponsorship

This study was financially supported by the Hyderabad Eye Research Foundation; Grant no.: Not applicable.

### Conflicts of interest

There are no conflicts of interest.

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