



# Preemptive Inferior Fornixstabilizing Procedure to Reduce Chemosis During Lower Eyelid Ectropion Repair: Surgical Technique and Outcomes



Joseph D Boss<sup>1\*</sup> and Hassan AS<sup>2,3</sup>

<sup>1</sup>Department of Ophthalmology, Wayne State University, USA

<sup>2</sup>Eye Plastic & Facial Cosmetic Surgery, USA

<sup>3</sup>Department of Surgery, Spectrum Health Hospital, USA

**Submission:** April 08, 2017; **Published:** June 08, 2017

**\*Corresponding author:** Joseph Boss, Department of Ophthalmology, Kresge Eye Institute, Wayne State University School of Medicine, USA, Tel: (810)-955-3596; Email: [joe.boss@wayne.edu](mailto:joe.boss@wayne.edu)

## Abstract

**Purpose:** To describe and evaluate an experimental inferior fornix stabilization procedure in an effort to prevent or limit postoperative chemosis following ectropion repair.

**Design:** Retrospective case series

**Methods:** This was a study of 24 inferior fornix stabilization procedures done at the time of lower eyelid ectropion repair involving inferior retractor tightening surgery in a total of 19 patients. Inclusion criteria included patients with severe lower eyelid ectropion requiring inferior retractor tightening surgery that was at an increased risk of postoperative chemosis. The surgical technique for the inferior fornix stabilization involved placing two to three absorbable 6-0 chromic gut sutures passed in mattress format through the inferior fornix cul-de-sac at the time of ectropion repair. The chemosis classification system described by Weinfeld et al. was used for classifying postoperative chemosis.

**Results:** The incidence of chemosis noted postoperatively was 20.8 percent (5 of 24). All five cases of postoperative chemosis were classified as Type 1, acute mild. In all cases, chemosis ultimately resolved without any permanent sequela.

**Conclusion:** We believe this surgical technique can be used as a successful preventative measure for postoperative chemosis.

## Introduction

The mainstay treatment for ectropion is surgery. Surgical options include ectropion repair with tarsal strip or a medial conjunctival diamond-wedge resection to rotate the punctum inwards [1]. Additionally, the inferior eyelid retractors, consisting of capsulopalpebral fascia and the inferior tarsal muscle, can be adjusted via a trans conjunctival retractor repair in the most severe cases of ectropion with poor lid stability [2,3]. This trans conjunctival procedure, however, can be associated with chemosis as a result of the extensive manipulation of the conjunctiva during surgery [4-6]. Post operative chemosis may be asymptomatic or cause tearing, discomfort, foreign-body sensation, decreased vision, or possibly result in poor wound healing and a compromised ectropion repair secondary to increased stretching of the tarsal strip and forniceal ligaments

[4-7]. The cause of postoperative chemosis is likely multifactorial, probable etiologies include lymphatic disruption, venous congestion, excessive cautery, or allergic response [4,8]. These etiologies of chemosis results in increased conjunctival laxity and stretching of the forniceal ligaments that connect the inferior conjunctival cul-de-sac to the orbital floor, further worsening and progressing the cycle of conjunctival edema and possibly causing conjunctival prolapsed [5,9]. In the majority of cases, post-operative chemosis resolves spontaneously, however, various postoperative medical treatment options have been used for persistent chemosis, including aggressive lubrication, topical steroids, ocular decongestants, and pressure patching [4,8]. In cases when chemosis is resistant to medical management, various surgical procedures have been described,

such as drainage conjunctivotomy, temporary tarsorrhaphy, resection of prolapsed conjunctiva, a limbal peritomy followed by sub conjunctival and sub-Tenon's fascia dissection, as well as injection of sub conjunctival tetracycline [5,7,10].

We trialed an experimental inferior fornix stabilization procedure in an effort to prevent or limit postoperative chemosis. Absorbable 6-0 chromic gut sutures passed through the inferior fornix cul-de-sac and passed full thickness through the lower eyelid were placed at the time of ectropion repair prophylactically in patients that were at a high risk for postoperative chemosis. The majority of the literature on postoperative chemosis treatment is limited to suggestions for management based on small case series, with few reports on techniques aimed at preventing chemosis [4,5,7,8]. We describe and evaluate a preemptive inferior fornix stabilization procedure by reviewing the incidence of postoperative chemosis following ectropion repair combined with inferior fornix stabilization.

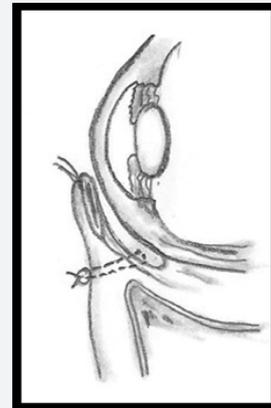
**Methods**

This was a retrospective case series study of 24 inferior fornix stabilization procedures done at the time of ectropion repair involving inferior retractor tightening surgery in a total of 19 patients by a single surgeon (A.S.H.) in a clinical practice. This study met IRB criteria for exemption by the Spectrum Health Human Research Protection Program and was in accordance to HIPAA regulations and adhered to the Declaration of Helsinki and all federal or state laws. The surgical technique for the ectropion repair combined with the inferior fornix stabilization procedure is described below. Additionally, four of the ectropion repairs required full-thickness skin grafting. Inclusion criteria included patients with severe lower eyelid ectropion requiring inferior retractor tightening surgery that were at an increased risk of postoperative chemosis based on preoperative physical exam findings of conjunctival prolapse, inflammation, and severe lid instability with recession of the inferior retractors, or a history of previous postoperative, chronic chemosis. Exclusion criteria included patients under the age of 18 years old, inferior fornix stabilization done at a date other than when ectropion repair was performed, and inferior fornix stabilization done in combination with any surgery other than lower eyelid ectropion repair by tightening inferior retractors.

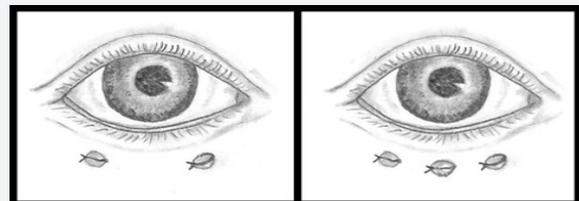
**Surgical Technique**

Attention was given to the lower lid of interest where local anesthetic was injected sub conjunctivally as well as transcutaneously and in the lateral portions of the upper and lower lid, and down to the lateral orbital rim periosteum. Attention was then turned to the inferior fornix of the lower lid of interest, where a Colorado tip Bovie needle was used to make an incision along the inferior border of the tarsal plate. The dissection was carried infero-posteriorly until the inferior retractors were identified. The inferior retractors were cleared from the overlying fat and advanced to the cut end of the conjunctiva and to the inferior border of the tarsal plate,

along its entire length with buried 6-0 vicryl suture. An inferior fornix stabilization procedure was then performed with two to three, double-armed 6-0 chromic gut suture. In advancing the inferior fornix, a redundant dead space of conjunctiva was also advanced. The double armed 6-0 chromic sutures positioned in mattress format were then advanced through this dead space of conjunctiva 5mm posterior to the inferior border of the tarsal plate in the depth of the inferior cul-de-sac, securing them to the inferior retractors in their new position (Figure 1). The two arms of the mattress suture were placed 3mm apart. The double-armed 6-0 sutures were passed through the inferior retractors prior to exiting full-thickness through the lower eyelid and tied over a foam bolster, stabilizing the inferior fornix. When two mattresses were used, they were positioned at the junction of the inner and middle lid margin and at the junction of the middle and outer lid margin. When three mattresses were used, the additional suture was positioned midline. (Figure 2) Lastly, a tarsal strip procedure was performed.



**Figure 1:** Sagittal view of Inferior fornix conjunctiva stabilization. The sutures are placed through the conjunctiva at the depth of the inferior fornix cul-de-sac, 5 mm posterior to the tarsal plate, stabilizing the inferior fornix conjunctiva. The suture is then passed full-thickness through the lower eyelid and tied around a bolster.



**Figure 2:** Frontal view of location of inferior fornix sutures and bolsters. When two mattresses are used, they are positioned at the junction of the inner and middle lid as well as at the outer and middle lid junction. When three fornix sutures are used, the additional mattress is placed midline.

**Results**

A total of 19 patients underwent the inferior fornix suture stabilization procedure at the time of ectropion repair surgery. The average age was 82.5 years old (Range: 63-95), 13 were male

(68.4%) and 6 were female (31.6%). Of the 19 patients included in the study, a total of 24 eyes underwent the inferior fornix stabilization procedure (5 OD, 9 OS, 5OU). The average number of postoperative follow-up visits was 2.2 (Range: 1-4), and the average total follow-up length was 8.5 weeks (Range: 1-16). In 79.2 percent (19 of 24) of the cases, no postoperative chemosis was noted following the ectropion repair in combination with the inferior fornix stabilization procedure described above. The incidence of chemosis noted postoperatively was 20.8 percent (5 of 24). The following chemosis classification system described by Weinfeld et al. [4] was used for classifying postoperative chemosis:

1. Type 1 (acute mild) involves mild edema and inflammation, yellow and/or pink conjunctiva color, absent lagophthalmos, and less than three weeks duration.
2. Type 2 (acute severe) involves severe edema and inflammation, yellow and/or pink conjunctiva color, lagophthalmos present laterally, and less than three weeks duration.
3. Type 3 (subchronic) involves mild to severe edema, chronic inflammation, pink color, absent lagophthalmos, and duration of chemosis between three weeks and six months.
4. Type 4 (subchronic because of lower lid malposition) involves severe edema, moderate to severe inflammation, pink color, lower lid malposition and/or ectropion, and duration lasting until lid malposition is corrected [4].

All five cases of postoperative chemosis were classified as Type 1, acute mild. In all cases, chemosis ultimately resolved without any permanent sequela. No secondary entropion was observed in any case. All patients maintained good function, motility, and cosmesis of lower eyelids, and physician and patient satisfaction was achieved in all cases.

### Discussion

This surgical technique may be used for preventing postoperative chemosis, thus limiting the deleterious effects that conjunctival edema may have on wound healing. Indications for this chemosis limiting procedure may be for severe ectropion repair, patients with high likelihood of ectropion repair failure, or those at high risk for postoperative chemosis. Chemosis or severe lid instability on preoperative physical exam, as well as a history of previous chronic chemosis following ocular surgery may provide indication for inferior fornix stabilization at the time of the initial surgery. Additionally, this chemosis limiting procedure may be used for postoperative patients who have chronic chemosis resistant to medical management requiring a return to the operating room for surgical treatment of the conjunctival edema.

Sutures have been used for correcting eyelid malrotation for centuries [11]. Snellen described the Snellen Suture

Technique in 1869 for correcting ectropion by passing a suture through the conjunctiva in the inferior fornix and out the skin inferiorly, therefore rotating the eyelid margin. Snellen used two horizontal mattress sutures about 3 mm apart just inferior to the tarsus, nearest the margin of the eyelid. The first was placed at the junction of the outer and middle third of the conjunctiva, and the second at the junction of the inner and middle third [1,12]. A modified Snellen suture technique was described by Laval and Schneider and later by Barrett aimed at correcting inferior prolapsed conjunctiva, differing from Snellen by incorporating the arcus marginalis and inferior orbital rim [13,14]. This incorporation, however, resulted in an increased risk of secondary entropion [10,13]. Malone and Tse described a inferior fornix suture technique for treating postoperative prolapsed conjunctiva using three double-armed 4-0 chromic gut sutures inserted in a horizontal mattress fashion to invaginate prolapsed inferior forniceal conjunctiva. The suture needle was passed through the dome of the prolapsed conjunctiva, into the inferior cul-de-sac, and brought out through the skin 8-9mm below the lash margin, and tied without a bolster. By not incorporating the arcus marginalis and inferior orbital rim, and by passing the suture full thickness through the eyelid, the likelihood of causing eyelid malrotation was likely reduced [10]. Unlike the technique described by Malone and Tse, the inferior fornix suture technique in this study was done at the time of the primary surgery in a preemptive effort aimed at prevention of postoperative chemosis and inferior fornix conjunctival prolapse in high risk patients. Additionally, foam bolsters were used when tying the sutures and the procedure did not include a temporary tarsorrhaphy.

This simple surgical procedure offers several advantages over medical management alone. It can be used as a corrective treatment for persistent chemosis, and also as a preventative measure for those with a high likelihood of postoperative chemosis. Also, preventing the inferior fornix conjunctiva from prolapsing or repositioning intra operative prolapsed conjunctiva will minimize exposure, inflammation, and epidermalization of the conjunctiva [10].

This study, however, has some limitations. The lack of control arm comparing chemosis incidence following severe ectropion repair without the proposed inferior fornix stabilization procedure restricts us from comparing the natural history of chemosis independent of the inferior fornix stabilization. Future studies of this technique could be performed prospectively. We do, however, feel that this technique significantly reduced the likelihood of postoperative chemosis given that only 20.8 percent of severe ectropion repairs in patients who were at high risk of postoperative chemosis actually manifested chemosis, all of which were characterized as Type 1, acute mild. Additionally, all cases of chemosis ultimately resolved without any permanent sequela. We believe this surgical technique can be used as a successful preventative measure for postoperative chemosis as

well as for a surgical treatment option of postoperative chemosis resistant to conservative management.

## Acknowledgment/Disclosure

The authors have no proprietary or commercial interest in any materials discussed in this article.

## References

1. Eliasoph I (2005) Current Techniques of Entropion and Ectropion Correction. *Otolaryngol Clin North Am* 38(5): 903-919.
2. O'Donnell BA (2000) Eyelid retractor surgery as an adjunct to cicatricial ectropion repair. *Clinical & Experimental Ophthalmology* 28(4): 293-297.
3. Tse DT, Kronish JW, Brus D (1991) Surgical correction by reinsertion of the retractors. *Arch Ophthalmol* 109(3): 427-431.
4. Weinfled A, Burke R, Codner MA (2008) The Comprehensive Management of Chemosis following Cosmetic Lower Blepharoplasty. *Plastic & Reconstructive Surgery* 122(2): 579-586.
5. Enzer YR, Shorr N (1994) Medical and Surgical Management of Chemosis After Blepharoplasty. *Ophthal Plast Reconstr Surg* 10(1): 57-63.
6. Westfall CT, Shore JW, Nunery WR, Hawes MJ, Yaremchuk MJ (1991) Operative complications of the transconjunctival inferior fornix approach. *Ophthalmology* 98(10): 1525-1528.
7. Thakker MM, Tarbet KJ, Sires BS (2005) Postoperative chemosis after cosmetic eyelid surgery: surgical management with conjunctivoplasty. *Arch Facial Plast Surg* 7(3): 185-188.
8. Levine MR, Davies R, Ross J (1994) Chemosis following blepharoplasty: an unusual complication. *Ophthalmic Surgery* 25(9): 593-596.
9. Hawes MJ, Dortzbach RK (1982) The microscopic anatomy of the lower eyelid retractors. *Arch Ophthalmol* 100(8): 1313-1318.
10. Malone TJ, Tse DT (1990) Surgical treatment of chemotic conjunctival prolapsed following vitreoretinal surgery. *Arch Ophthalmol* 108(6): 890-891.
11. Quickert MH, Rathbun E (1971) Suture repair of entropion. *Arch Ophthalmol* 85(3): 304-305.
12. Snellen H, Cong (1869) *Internat. D'opht, Paris, France.*
13. Laval J, Schneider J (1947) Modified Snellen suture for prolapsed chemosed conjunctiva. *Arch Ophthalmol* 38(3): 375-377.
14. Barrett CV (1956) Modified Snellen suture for persistent prolapsed chemosed conjunctiva: a case report. *Am J Ophthalmol* 42: 774-776.



This work is licensed under Creative Commons Attribution 4.0 License  
DOI:10.19080/JOJO.2017.03.555614

### Your next submission with Juniper Publishers will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats  
( Pdf, E-pub, Full Text, Audio )
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>