

## **Optimization of diagnosis and surgical treatment of Involutional Entropion of the Lower Eyelid**

### **ABSTRACT**

**Background:** Rolling inwards of the lid margin is called entropion, and is produced by a disparity in length and tone between the anterior skin muscle, and posterior tarso-conjunctival laminae of the eyelid. . Involutional, cicatricial, spastic, or congenital are some of the classifications involutional entropion there is general instability of the lid structures with age .A weakness of the posterior retractors of the lid occurs, together with a laxity of the medial and lateral canthal ligaments, accompanied by a loss of posterior support ,as atrophy of the orbital fat leads to enophthalmos. The current treatment modalities for this condition are surgical in nature, although non-surgical temporary medical treatment are also used. It's a **commonest** types of eyelid asymmetry. Corneal and conjunctival **damage may lead to** abrasions, scarring, corneal thinning, or corneal neovascularization **due to** this misalignment. Unilateral or bilateral entropion is possible. Involutional entropion of lower eyelids are common, but cicatricial upper eyelids are common. Entropion of lower eyelid is a much more prevalent than entropion of the upper eyelid.

**Objective:** The purpose is to review the scientific literature on diagnosis and surgical management of involutional entropion of the lower eyelid.

**Methodology:** The data were collected from the various electronic data bases like google scholar, PubMed and various books.

**Conclusion:** After reviewing the articles, we come to the conclusion that the signs and symptoms of involutional entropion are easily manageable by given treatment.

**Keywords :** Entropion, enophthalmos, tarso-conjunctival laminae, involutional, cicatricial, canthal ligament.

### **INTRODUCTION**

Rolling inward of eyelid margin is called entropion . With ageing, the lid structures become more and more unstable . There is a weakening or dehiscence of the inferior retractors of the lid and laxity of the medial and lateral canthal ligaments. This is followed by a loss of self - confidence . Enophthalmos due to atrophy of the orbital fat requires posterior support. The tarsus is linked to the pretarsal orbicularis, while the pre-septal orbicularis is not, possesses shaky attachments and a proclivity to overpower the pretarsal orbicularis . As a result, the tarsal plate's bottom border is moved forward , as is the lid's margin onto the globe [1].

Collagen degradation, disordered collagen fibres, and aberrant elastogenesis are seen in the plates of the tarsus of an involutional entropion . Collagen fibres offer tensile strength to the tarsus, whereas elastic fibres provide resilience to the tarsus. The tarsus begins transition from collagenous fibres to elastic fibres as we get older. The overall number of fibres drops as well . Due to this, entropion causes eyelid laxity and tarsal atrophy .[2] Symptoms are comparable to trichiasis and are caused by cilia rubbing against the cornea and conjunctiva. Foreign body sensation, discomfort, lacrimation, and photophobia are among them

### **Symptoms:**

On closer inspection, the lid border is seen to be inverted . It can be classified into three grades depending on the degree of inversion . Mostly posterior lid border is inverted in Grade-1; Grade- II entropion inverts the lid margin; and grade III entropion inverts the entire lid margin, including the anterior border . The following etiological variables lead to its development: (i) degradation of palpebral connective tissue segregating the orbicularis muscle fibres, permitting pre-septal fibres to dominate the pretarsal fibres; (ii) capsule-palpebral fascia (lower lid retractor) weakening or dehiscence (iii) horizontal slackness of the fibres[3] The older a person becomes, the more likely he or she is to develop entropion . Bilateral disease affects three times as many people as unilateral disease . This was found more commonly in women than in men because women's tarsal plates are smaller .[4]

The type of entropion detected determines the pathophysiology .

The retractors of the inferior palpebral sulcus, orbicularis, tarsus, and canthal tendons all help to secure the lower lid . The tarsal plate and canthal tendons horizontally stabilise the lid . The inversion of the lid is possible due to the weakening of these components . The retractors on the bottom lid help to keep the lid in place vertically . The levator aponeurosis and Mueller's muscle in the upper lid also play this duty . The pre-septal orbicularis muscle may become superior and overcome the pretarsal muscle if these extensions become weak, this causes the edge of eyelid to twirl in opposition to the eye .

### **Tests for detection of involutional entropion**

The snapback and distraction tests can both reveal involutional entropion . When the margin of the eyelid is withdrawn from the globe , a weak subsequent snap back to the globe's surface is done as part of this very test . It is vital that the patient does not close his or her eyes again. Moving the inferior palpebral sulcus anywhere from the bulbus oculi and measuring the **interval with how the distraction test is** done . It is regarded abnormal if the distraction is more than the given value that is 6 mm . Eyelid retractor disinsertion can also be checked using a slit lamp examination.[5] Parallel or upright slackness , or the two are existing in involutional entropion. The classic trinity related with involutional entropion includes dehiscence of the inferior eyelid retractors, parallel lid slackness, and **overriding** of the orbicularis oculi muscle .The pinch test (distraction test) is a common method for detecting horizontal laxity . It entails pinching the globe with the central eyelid . If the value of the this test is greater than 8 mm , the eyelid is called affirmatively loose . Entropion is usually diagnosed without the use of laboratory procedures . An **exophthalmometry** reading is done to determine involutional entropion .

### **Possible diagnosis**

Entropion should be differentiated from epiblepharon , trichiasis , trachoma , and distichiasis .

### **Treatment and management of involutional entropion**

The treatment of entropion should be tailored to the cause . Ocular lubrication, artificial tears , or contact lenses are frequently employed in medical treatment . This would protect the ocular area from the harm caused by eyelash irritation . In spastic entropion , easy procedures , typically break the loop . In a patient with this entropion , botulinum toxin injection are generally recommended . Lubricants and eyelid taping are both temporary solutions for involutional entropion alleviation. Injections of botulinum toxin into the overriding orbicularis muscle can also provide temporary relief . However, both entropion and ectropion require some surgery for correction , which frequently requires horizontal lid tightness . Further conventional Quickert everting sutures, regular lateral tarsal strip (LTS) operations, and union of course of action are all options for involutional entropion therapy . The pathophysiology of involutional entropion is addressed with surgery, which includes reattaching the retractors to the tarsal plate and shortening the horizontal ligament producing a cicatrix between the pretarsal and tarsal plates and the breadth of the tarsal plate . The motive of the surgery is to reinstate the vertical and horizontal tautness of the lid . In the aged, involutional entropion causes corneal epithelial issues, ocular discomfort, and blepharospasm . Entropion can lead to corneal ulceration , microbial keratitis , vision loss , and ultimately blindness unless treated rationally . Parallel lid slackness, upright lid slackness secondary to denuded, disinsertion or slackness of inferior lid retractors, and overriding of the pre-septal orbicularis onto the pretarsal orbicularis incidental to the slacking of the orbicularis and skin adhesion to the tarsal plate are all factors that put up to the inward twirl of the eyelid margin . [6]

### **Surgical techniques**

To repair the anatomical alterations, numerous surgical procedures have been documented, with varying success rates. Lid shortening operations like the or Horizontal slackness can be treated using full-thickness wedge resection .Retractor plication, contraction and reintegration and the placement of fornix sutures that pass through retractors were tried to address vertical laxity. Overriding has been prevented by transverse blepharotomy . As the sutures dissolve, they leave mark and they stick between the lesser retractors and the tarsal plate, preventing inward rotation and recurrence .

### **Retractors for the lower eyelids**

The most important aspects of involutional entropion restoration is to improve the activity of the bottom lid retractors via an incisional or non slit technique .

### **Everted sutures**

Simple everting suture of the lower lid using double-arm 5-0 Vicryl chromic catgut may be effective in involutional entropion affecting bedridden patients or those for whom surgery is a medical risk . The needle has been inserted transferred from the conjunctiva to the skin adjacent to the eye through the lid, but not touching, the conjunctiva Via, the tarsus's inferior border There is a slight downward traction. When the needle is inserted through the muscle and skin, it is applied to the skin. The second needle is 3 mm horizontally away from the first. The suture has been tied . firmly and allowed it fall out on its own after three weeks. Reaction of the tissues to the Gut suture aids in the formation of a cicatricial barrier that

keeps the eyelid in everted position. Everting sutures entail putting mattress sutures all the way through the eyelid's thickness . From the retractors to the pretarsal tissues , everting sutures form a scar tract . After suture removal or breakdown , the scar causes persistent lid eversion of varying duration . In the past, everting sutures were suggested for the short term repair of involutional entropion .This treatment is also beneficial for sufferer who cannot endure more invasive surgery, such as those who are on anticoagulant or antiplatelet drugs, as it allows them to continue taking these medications. (7)

The following are some of the most commonly utilised surgical techniques : A triangular section of tarsal plate and conjunctiva is excised from the base down, as well as the orbicularis oculi muscle being double breasted, in a modified Wheeler's procedure . Bick's technique, as modified by Reeh: It's beneficial for those who have horizontal lid laxity . The surgery of Weiss. An incision is made in the lid edge, throughout the entire area of the eyelid, involving the skin, orbicularis, and tarsal plate. Mattress sutures are then inserted into the downward end of the tarsus and arise few mm beneath the lid border of the skin. The entropion is addressed by transposing the tarsus after the sutures are tied . Tucking inferior lid retractors (operations by Jones, Reeh, and Wobig):: This surgery is done in serious cases or when relapse occurs after previous surgeries .

### **Bick's procedure modified by Reeh**

An inverted houseshaped lid shortening is achieved using the Bick process, as modified by Reeh . The Bick technique, as modified by Reeh, is used to create an inverted house shaped lid shortening .One 40 silk suture is threaded through the skin of the medial edge few mm from the injury border. Without passing through the conjunctiva, the suture passes through two-thirds of the thickness of the tarsus. After that, a needle is inserted into analogous tissue on the lateral margin before piercing the lateral canthal tendon. A comparable size silk suture is carried past by the epidermis and lower tarsus on the wound's medial boundary, then through the orbicularis laterally before being secured to the periosteum of the lateral orbital rim. The sutures are left in situ, and the tarsus is reconstructed. With 6-0 chromic catgut sutures, the tarsus and related tissue are closed laterally. A 60 silk suture is run over the grey line of the two wound borders, knotted, and left long for later fixation to the forehead, where it will stay for two or three days. The epidermis edge is sealed with interrupted size silk sutures .within two 4-0 silk sutures are knotted securely at the end of the process to secure the tarsal edge to the lateral canthal tissue . In few days, the suturing are removed, and the 40 silk fixation sutures are left in place for 10–12 days .

### **Tucking of inferior lid retractors**

Tucking inferior lid retractors (operations by Jones, Reeh, and Wobig): Tucking of the inferior lid retractors is recommended in cases with severe entropion . From the lateral canthus to the intersection of the inner and middle thirds , a 5 mm incision is made beneath the lid margin . The pretarsal and preseptal parts of the orbicularis are separated, and the bottom end of tarsus is visible . To open the preaponeurotic space, the orbital septum is detached from the tarsus at its point of attachment to the lower border . Excess preseptal skin and orbicularis muscle can be removed when there is attachment of the preseptal muscle to the fascia is loosened by blunt dissection over an area of about 10 mm .At the level of the

middle and lateral point of the lower lid, a particular size silk suture is then introduced through the preseptal skin . With a little bite, the suture is passed through the inferior lid retractors or aponeurosis around few mm beneath lesser tarsus . Before entering the tarsal edge, the needle is passed via the retractors at lower border of the tarsus . The needle is threaded into the upper skin and knotted in a slip knot . When the patient looks down, the lower lid should ideally move down 3 mm. This necessitates changing the position of the lower bite through the aponeurosis. Three or four identical sutures are put after the central stitch is satisfactory . For 6 to 10 days, the sutures are left in place .[7]

### **Combined surgical techniques**

Multiple surgical procedures are used in combined surgical treatments to treat the three components of involutional entropion. Jones emphasized on the advancement of the lower lid retractors to correct the vertical lid malposition . LTS is the removal of a section of the lateral eyelid , may be required to address horizontal slackness . A 1 cm long incision in the skin was created ,from canthus to the 1 rim for the combination surgery . A lateral canthotomy and cantholysis were done on the lateral canthal tendon's lower limb . The lateral orbital rim was detected and orbicularis fibres present on the lateral orbital rim were anatomize .

To create a periosteal flap, The periosteum was vertically incised and divided medially in the periosteal flap .The layer of the conjunctiva was removed obliquely employing unsharpened-pointed scissors distributed anterior to the retractor layer from the lateral canthal area to the lower punctum, at the level of the inferior boundary of the tarsal plate .To construct a tarsal strip, the antecedent lamella and superior mucocutaneous junctional tissue were removed, and the conjunctival epithelium was debrided. To give a little tighter inferior lid, the strip was contracted. The retractor layer of the conjunctiva was anatomized caudally and then constricted .Lower wound: Preseptal orbicularis, retractor layer, and conjunctiva were all sutured with some polyglactin sutures . [8] The suturing were knotted to give the lid a modest ectropion . The lower lid undergoes some morphological changes as a result of ageing . Horizontal slackness, vertical slackness , and countermanding of the preseptal orbicularis muscle onto the pretarsal orbicularis muscle are all familiar to have a part in the origin and development of involutional entropion . [9] The plate of tarsal and canthal tendon are both lax, resulting in horizontal laxity . Depletion , denuded, or d of retractors cause vertical laxity . Orbicularis malfunction and a lack of proximity of the orbicularis to the epidermis and tarsal plate encourage countermanding of the preseptal orbicularis onto the pretarsal orbicularis.[10-16]

### **Conclusion**

A new relationship could be formed by a shorter axial length. Both non-incisional and incisional methods to the retractors are still used for entropion . At two years, non-incisional everting sutures may be able to maintain a permanent repair . In the absence of horizontal slackness ,incisional methods that focus on advancing the falling of retractors may prove adequate successful repair. Repairing horizontal laxity, on the other hand, lowers the recurrence rate in the context of a positive pinch test . In the treatment of involutional entropion, the combination procedure appears , effective than the Wies procedure . Combination treatment tackles the three major causes of involutional entropion while allowing the surgery to be performed through a tiny incision. Vertical slackness and Dysfunction of the orbicularis are the two primary diseases that the Wies treatment corrects . The technique of Weis combines a complete transverse thickness blepharotomy with an ES treatment .

## **References:**

1. Sihota R, Tandon R. Parsons' diseases of the eye. Elsevier India; 2011.
2. Bashour M, Harvey J. Causes of involutional ectropion and entropion--age-related tarsal changes are the key. *Ophthalmic Plast Reconstr Surg*. 2000 Mar;16(2):131-41.
3. Khurana AK. Comprehensive ophthalmology. Jaypee Brothers Medical Publishers; 2019 Jun 30.
4. Michels KS, Czyz CN, Cahill KV, Foster JA, Burns JA, Everman KR. Age-matched, case-controlled comparison of clinical indicators for development of entropion and ectropion. *J Ophthalmol*. 2014;2014:231487.
5. Cillino S, Raimondi G, Guépratte N, Damiani S, Cillino M, Di Pace F, Casuccio A. Long-term efficacy of botulinum toxin A for treatment of blepharospasm, hemifacial spasm, and spastic entropion: a multicentre study using two drug-dose escalation indexes. *Eye (Lond)*. 2010 Apr;24(4):600-7. [PubMed]
6. <https://www.opthalmology.hku.hk/>
7. <https://www.opth.wisc.edu/>
8. Correspondence to Marcus M. Marcet, MD, FACS, Department of Ophthalmology, University of Hong Kong, Room 301, Block B, 100 Cyberport Road, Cyberport 4, Hong Kong.
9. Serin D, Buttanri IB, Karlioglu S, Sevim MS, Buttanri B, Akbaba M. The efficacy of the combined procedure in involutional entropion surgery: a comparative study. *Korean Journal of Ophthalmology*. 2013 Dec 1;27(6):405-8.
10. Jones LT. The anatomy of the lower eyelid and its relation to the cause and cure of entropion. *Am J Ophthalmol*. 1960;49:29-36.
11. Collin JR, Rathbun JE. Involutional entropion: a review with evaluation of a procedure. *Arch Ophthalmol*. 1978;96:1058-1064.
12. Gajbhiye, Varsha, and Yeshwant Lamture. "Minoxidil a Youth Elixir for Eyebrow Hypotrichosis." *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH* 14, no. 2 (February 2020). <https://doi.org/10.7860/JCDR/2020/42801.13474>.
13. Kedia, Palak, and Bhushan Madke. "Unilateral Molluscum Contagiosum Following Eyebrow Grooming." *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH* 13, no. 11 (November 2019): WD01-2. <https://doi.org/10.7860/JCDR/2019/42600.13283>.
14. Khasbage, Suwarna Dangore, and Arvind S. Bhake. "Cervical Lymphadenopathy in a Dental Patient: An Eye Opener Case Report." *SPECIAL CARE IN DENTISTRY* 39, no. 1 (February 2019): 59-64. <https://doi.org/10.1111/scd.12336>.
15. Laad, Gaurish, Bhushan Madke, and Balkrishna Nikam. "Cirroid Aneurysm of Upper Eyelid." *JOURNAL OF DERMATOLOGY DERMATOLOGIC SURGERY-JDDS* 23, no. 2 (December 2019): 109-10. [https://doi.org/10.4103/jdds.jdds\\_30\\_19](https://doi.org/10.4103/jdds.jdds_30_19).
16. Mahatme KG, Deshmukh P, Sable P, Chakole V. Ultrasonography: The Third Eye of Anaesthesiologist. *JOURNAL OF PHARMACEUTICAL RESEARCH INTERNATIONAL*. 2021;33(37A):235-8.