

## Original article

### Outcome of Lateral tarsal strip (LTS) procedure in the correction of eyelid malposition

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#### Abstract

To analysis the effectiveness of lateral tarsal strip for the surgical repair of the marginal malpositions of the lower eyelid. A retrospective, consecutive case series of patients who underwent lateral tarsal strip (LTS) procedure for all types of involuntional lower eyelid malposition (entropion and ectropion) and paralytic ectropion, at one tertiary eye centre of Dhaka, Bangladesh, between January 2013 and December 2017. All records were evaluated to determine the indications, management strategies, surgical outcome and postoperative complications. A total of 46 lower eyelids marginal malposition's of 41 patients were studied in this study and lateral tarsal strip (LTS) procedure was used to repair the involuntional entropion (52%), involuntional ectropion (35%), and paralytic ectropion (13%) of the lower eyelid. The male to female ratio was 2:1. The mean age was 61.34 years with 26 years to 85 years age range. The surgical correction was satisfactory in 93.5% cases. Lateral tarsal strip (LTS) procedure achieved statistically significant better anatomical and functional outcomes for the correction of all types of involuntional eyelid marginal malposition's and paralytic ectropion.

**Key words:** Lateral tarsal strip, Involuntional, paralytic, entropion, ectropion.

#### Introduction

Entropion and ectropion are common eyelid malposition. Inward rotation of the eyelid margin and outward rotation of the eyelid margin from the normal anatomical eyelid position are known as entropion and ectropion respectively. Horizontal eyelid margin laxity is an important factor that influences the eyelid stabilization and laxity found in involuntional entropion, involuntional ectropion and paralytic ectropion of the lower eyelid margin. There are many surgical procedures to address the horizontal eyelid laxity including lateral tarsal strip (LTS), wedge excision, wheeler technique, or lateral Bick's shortening<sup>1-4</sup>. Lateral tarsal strip (LTS) is a successful procedure for the management of horizontal laxity in the cases of entropion and ectropion<sup>2, 3</sup>. Horizontal eyelid laxity may be generalized or primarily affect the medial or lateral canthus. Generally, it is addressed by tightening the eyelid in its area of maximum laxity. Numerous surgical techniques have been described for correction of horizontal eyelid laxity including full thickness resection of the eyelid, lateral tarsal strip, medial, or lateral canthal tendon plication and medial canthal resection, in cases of severe medial canthal laxity<sup>1</sup>. There are significant advantages to

performing a lid shortening procedure in the lateral canthal area, rather than in more central positions of the eyelid. These include better cosmesis, maintaining normal anatomy of the lid margin, avoidance of lid notching, or the suture-related corneal irritation and faster rehabilitation. We attempt to analysis the efficacy of lateral tarsal strip (LTS) procedure for the surgical correction of the involuntional marginal malpositions paralytic ectropion of the lower eyelid.

#### Methods

**Methods:** This retrospective consecutive case series study was carried out in Bangladesh eye hospital, Dhaka, Bangladesh between January 2020 to June 2020. This study includes patients with involuntional entropion, involuntional ectropion and paralytic ectropion who had undergone lateral tarsal strip (LTS) procedure and followed up after the LTS procedure at least 1 year during the time of January 2013 to December 2017. All surgeries were done by a single surgeon. All records were evaluated to determine the indications, management strategies, surgical outcome and postoperative complications. Surgical outcome includes anatomical and functional outcomes including restoration of normal

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eyelid marginal position, and relief of symptoms. We assessed any recurrence of the marginal malposition of the eyelid during follow time. Patients were advised for follow up at 6 weeks, 3 months, 6 months, 9 months, and 12 months of eyelid surgery. Data were analyzed and all statistical steps were performed and using quick calc graph pad software for determination of mean, test of significance and p-value.

**Surgical technique for lateral tarsal strip**

Lateral canthotomy incision or Horizontal skin and orbicularis incision, measuring approximately 5–10 mm at the lateral canthus by Ellman radiofrequency cautery or No. 15 surgical blade, dissection for exposing the periosteum of the lateral orbital wall. An inferior cantholysis is then made with RF Cautery or scissors. The Fashioning of the tarsal strip for approximately 5-10 mm, depending the lower lid laxity, through splitting gray line with separation of the anterior and posterior lamellae of the lateral aspect of the eyelid. Excise the anterior lamella overlying the tarsal strip, and scraped of the tarsal conjunctiva with 15 no. blade behind the tarsal strip. Lateral tarsal strip is then grasped and placed into the position of lateral orbital rim to assess the appropriate amount to shorten it by Westcott scissors. The Fixating sutures is passed through the LTS and the needle then engaged the periosteum of the lateral orbital rim by 5/0 Prolene suture which is at least 2 mm superior to medial canthus. The periosteal bite is confirmed by the pulling on the sutures and second suture is placed in the same manner. The sutures are then tied, and after that the canthus is reformed by trimming the lash follicle at the level of anterior lamella of the LTS and is sutured with 6/0 vicryl buried suture into gray line. Skin and orbicularis closure with 6/0 vicryl sutures

**Results:** We studied lateral tarsal strip (LTS) procedure for 46 lower eyelids marginal malposition of 41 patients. Among them, 36 (81%) cases were unilateral and 5

(19%) cases were bilateral eyelid marginal malposition. In bilateral cases, 3 (60%) were involuntional entropion and 2 (40%) were involuntional ectropion. 24 (52.2%) lower eyelids were evaluated as involuntional entropion, 16 (35%) cases eyelids presented involuntional ectropion and 06 (13%) eyelids showed paralytic ectropion. A total of 31 (67.4%) male and 10 (32.6%) female made the study group. The mean age ± SD was 61.34± 5.74 years with theage range from minimum 26 years to maximum 85 years. Forty four (95.6%) eyelids obtained satisfactory outcome after repair of eyelid entropion and ectropion with unique lateral tarsal strip procedure within the follow-up period. Two eyelids (4.4%) showed recurrences after 6 months of the LTS procedure. Among the recurrence cases, one (4.1%) was involuntional entropion and another one (6.25%) was involuntional ectropion.



Figure 1: 1a- a 76 year old female presented Involuntional entropion in left lower eyelid with chronic dacryocystitis. 1b- 1<sup>st</sup> POD of DCR with Lateral tarsal strip procedure

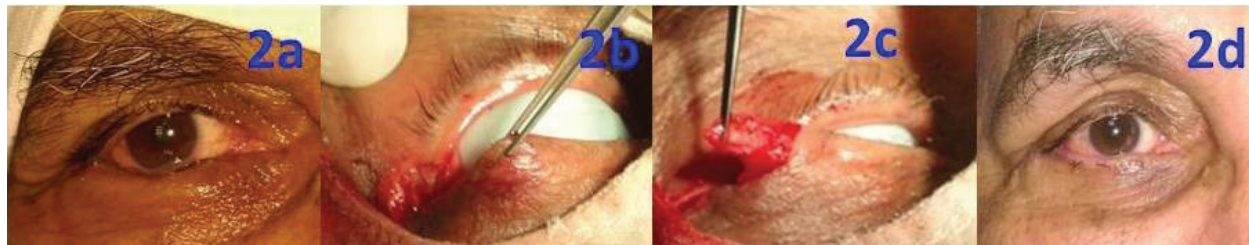
There was observed any recurrence after correction of paralytic ectropion. The success rate was 96%, 94%, and 100% In the cases of involuntional entropion, involuntional ectropion, and paralytic ectropion respectively. There was no statistically significant difference between the success and recurrence of involuntional entropion and involuntional ectropion. Chi-square test was done and The P-value was >0.05.

**Table-1: Distribution of demographic and clinical profile**

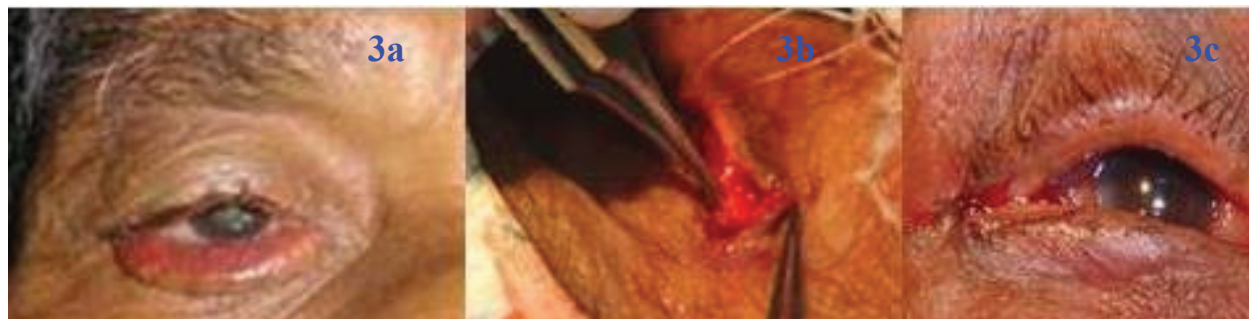
Parameters	Involuntional Entropion		Ivoluntional Ectropion		Paralytic Ectripion		Total	
	No.	%	No.	%	No.	%	No.	%
Male	15	71.4	11	78.5	05	83.3	31	75.6
Female	06	18.6	03	21.5	01	16.7	10	24.4
Total Eyelids	24	52.0	16	35.0	06	13.0	46	100
Unilateral	18	75.0	12	75.0	06	100	36	78.2
Recurrences	01	04.2	01	06.2	00	0.0	02	04.4
Success	23	95.8	15	93.8	06	100	44	95.6
Overreaction	01	04.2	00	0.0	00	0.0	01	2.2
Mild Echymosis	21	87.5	13	81.2	04	66.7	38	82.6
Pain lasting for 5-7 days	11	45.8	08	50.0	03	50.0	22	47.8
Pain lasting for 8-10 days	02	08.3	01	06.2	00	0.0	03	06.5

The success rate was highly satisfactory in the cases of paralytic ectropion, sign test was analyzed and the one tail P-value was  $<0.05$  that was statistically significant. Postoperative complications were included overcorrection (2.17%) after correction of entropion, mild ecchymosis (82.6%), and mild to moderate pain (100%) up to 4 days, tightening of lower eyelid (67.4%),

and feeling of tightness at lateral canthus (93.5%). Overcorrection were managed by conservatively, ecchymosis were resolved within 2 weeks of surgery, pain were persist up to 5 to 7 days of surgery, tightening of lower eyelid and tightness of lateral canthus were stabilized after 1 to 2 weeks of LTS procedure.



**Figure 2 (a-d): Involuntional Entropion of right lower eyelid, Lateral canthotomy incision with Inferior cantholysis, Lateral tarsal strip (LTS), restoration of lower eyelid margin after LTS procedure**



**Figure 3 (a-c): Involuntional Ectropion of right lower eyelid, Lateral tarsal strip (LTS), restoration of lower eyelid margin after LTS procedure**

## Discussion

Senile involuntional eyelid malposition like entropion and ectropion causes an imbalance between the usual forces acting on the lower eyelid<sup>5-7</sup>. Due to the exact nature and complex anatomy of the eyelid, surgical correction of eyelid malposition requires a comprehensive understanding of the anatomy as well as comprehensive preoperative planning and surgical enforcement. Both entropion and ectropion are of different clinical entities but can present similar pathogenesis (mainly worsening of horizontal and vertical lid laxity). Lateral tarsal strip (LTS) technique is a simple and unique procedure to correct both ectropion and entropion of different types of etiology<sup>8-9</sup>. The tarsal strip procedure ensures a normal horizontal length stabilization of the lower eyelid and also corrects the attenuated lateral canthal tendon. Lateral plication sutures; also unite the temporal lower lid orbicularis muscle to periosteum of the lateral orbital rim, which is helping to suspend lower eyelid skin<sup>10</sup>. Paralytic ectropion due to facial nerve palsy often requires surgical intervention for cornea protection<sup>11</sup>.

We studied 24 (52%) cases of involuntional entropion, 16 (35%) cases of involuntional ectropion and 6 (13%) cases of paralytic ectropion due to long standing facial nerve palsy among 41 patients. A study from Egypt evaluated 27 eyelids of 27 patients with lower eyelid malposition in the form of entropion and ectropion as a sequence of facial palsy, involuntional changes, spastic entropion and lid laxity. Out of them, 62.9%, 29.6%, and 7.4% were suffered from ectropion, entropion, and lower eyelid laxity, respectively. The satisfactory outcome was in the 44 (95.6%) cases of our study. The functional and aesthetic outcomes in 90.9% of patients with lower eyelid malposition, as a resultant effect of facial nerve palsy, 66.6% of involuntional ectropion patients showed improvement of the tearing eye. Eventually, 22.2% patients developed postoperative complications<sup>9</sup>. A combined procedure of Lateral tarsal strip with infraciliary rotation sutures is a successful technique with no recurrences in the correction of 44 involuntional entropion of 36 patients<sup>12</sup>. Lateral tarsal strip with infraciliary rotation appears to be a safe and effective technique to repair involuntional eyelid entropion

with a very high success rate (97.5%) and minimal recurrence rate (2.5%) in 39 eyelids. ocular irritation and discomfort were relieved in 97.7% cases and Careful examination is required to establish the cause of entropion prior to initiating surgical intervention<sup>13</sup>. The authors performed a retrospective study of 22 eyes of 22 patients who underwent paralytic entropion correction by a combined lateral tarsal strip and minimal temporal permanent tarsorrhaphy (5 mm) with at least 1 year of follow-up. The Lagophthalmos, grade of superficial punctate keratopathy (SPK), and tear break-up time were evaluated preoperatively and all parameters were significantly improved postoperatively (all  $P < 0.01$ ). They concluded that combined lateral tarsal strip with minimal temporal permanent tarsorrhaphy is a quick, safe, and effective surgical methods for the treatment of lower eyelid paralytic ectropion. It produces minimal cosmetic disfigurement and low morbidity during long-term follow up<sup>11</sup>. The overall recurrence was observed in two cases (4.4%) in our study. The recurrences were 4%, 6%, and 0% in the cases of involuntional entropion, involuntional ectropion and paralytic ectropion. Recurrence was in 8 entropion eyelids (17.4%) and one ectropion eyelid (2.3%) of in the 90 eyelids malposition which was corrected by the conventional lateral tarsal strip procedure in one group. The Recurrence was found in only 2 entropion eyelids (4%) in 94 eyelids malposition and repaired by a modified tarsal strip technique. The horizontal laxity was improved in both groups after surgery. There was significant differences in the patients treated with the modified technique ( $P=0.04$ ). The modified suture placement of the tarsal strip improved the lower eyelid stability and prevented recurrences after surgery. The modified LTS technique is helpful for the management of patients with entropion and ectropion<sup>14</sup>. Patients treated with double sutures and conjunctival cuts in the LTS showed lower horizontal laxity ( $3.5 \pm 0.2$ ) than patients treated with Conventional LTS ( $5.7 \pm 0.2$ ). The statistical difference was found with  $P$  value  $< 0.05$  in 2 groups of 18 months follow-up times. The use of a double suture and conjunctival cuts in the lateral tarsal strip proposed by Meduri showed a reduction of postsurgical ectropion's grade and postsurgical recurrences<sup>15</sup>. The differences in the surgical outcome of the repair of involuntional entropion by Jones retractor plication (JRP) alone in 61 patients and compared with Jones retractor plication with a lateral tarsal strip (JRP + LTS) in 57 patients for the treatment of involuntional entropion was evaluated in a study. They reported that 10 patients (16.5%) in the JRP group and 2 patients (3.5%) in the JRP + LTS group had a recurrence of the entropion at or before their 24-month follow-up visit ( $p = 0.03$ ). JRP + LTS procedure is higher success rate compared with JRP alone<sup>16</sup>. We did LTS with DCR in a case of involuntional entropion with chronic dacryocystitis at same sitting. Patient was satisfied with the relief of epiphora from her left eye and also restoration of normal eyelid position. A study reported that concurrently

performed DCR with LTS in a total of 29 eyes in 17 patients with lid laxity and epiphora. The combined surgeries were effected techniques for the treatment of nasolacrimal duct obstruction and lower lid laxity. Among the 29 eyes, the primary anatomical success rate was 89.5% and the functional success rate was 86.2%<sup>17</sup>. LTS is helping to restore the normal lid function and gives a rapid rehabilitation with few complications and excellent cosmetic outcome<sup>18-19</sup>. Everting sutures are often performed in combination with LTS for better correction of the inward rotation of eyelid margin<sup>18,20</sup>.

## Conclusion

Lateral tarsal strip (LTS) procedure is easy, simple, and unique technique to correct the all entities of lower eyelid malposition and it can be done with an additional technique to get the best anatomical and functional outcome.

## Conflict of Interest

The authors declare no potential conflicts of interest.

Author Contributions: SMK- designed the Study, procured the samples and performed the experiments, interpreted the results, SMK, FK, AKA -designed and performed the statistical analyses; IH, NCB, NP- provided critical input; FK, IH -wrote the first draft of the manuscript with inputs from all co-authors; SMK, NCB, GH- critical appraisal of the manuscript; All authors reviewed and approved the final version of the manuscript prior to submission.

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## Ethical Clearance

The study received ethical clearance from the Bangladesh eye hospital and Institute, Dhaka, Bangladesh

## References

1. Collin JRO. A manual of systematic eyelid surgery. 3rd ed. New York: Churchill Livingstone; 2006. p. 59–60.
2. Anderson RL, Gordy DD. The tarsal strip procedure. Arch Ophthalmol. 1979;97:2192–6.
3. Lateral tarsal strip versus Bick's procedure... 1121
4. Jordan DR, Anderson RL. The lateral tarsal strip revisited. The enhanced tarsal strip. Arch Ophthalmol. 1989;107:604–6.

5. Olver JM, Barnes JA. Effective small-incision surgery for involutional lower eyelid entropion. *Ophthalmology* 2000; 107: 1982-8.
6. Wright M, Bell D, Scott C, Leatherbarrow B. Everting sutures correction of lower lid involutional entropion. *Br J Ophthalmol* 1999; 83: 1060-3.
7. Van den Bosch WA, Leenders I, Mulder P. Topographic anatomy of the eyelids and the effects of sex and age. *Br J Ophthalmol* 1999; 83: 347-52.
8. Fradinho N, Pereira A, Rasteiro D, Martins J, Ferreira J, Almeida M.A. Lateral tarsal strip technique for lower lid ectropion and entropion. *IJOM*. 2013; 42 (10): 1322+
9. Al-Taher A.A. M. Awadeen A.E.R. Lateral Tarsal Strip, Can It Be One Solution for All Types of Lower Eyelid Malposition? *The Egyptian Journal of Hospital Medicine*. 2019; 75 (5): 2745+
10. Putterman A. M. Woolford T.J. Tarsal strip procedure and plication sutures combined with lower blepharoplasty. *Operative Techniques in Otolaryngology-Head and Neck Surgery*.1995; 6(4): 253-56
11. Kwon K.Y. Jang A.Y. Yoon J.S. Long-term outcome of combined lateral tarsal strip with temporal permanent tarsorrhaphy for correction of paralytic ectropion caused by facial nerve palsy. *Journal of Craniofacial Surgery*. 2015; 26 (5): e409-e412
12. Rabinovich A, Allard F.D. Freitag S.K. Lower Eyelid Involutional Entropion Repair with Lateral Tarsal Strip and Infraciliary Rotation Sutures: Surgical Technique and Outcomes. *Orbit*. 2014; 33 (3): 184-188.
13. Rabinovich A. Freitag S.K. Involutional Entropion Repair With Lateral Tarsal Strip and Infraciliary Rotation: Surgical Technique and Outcomes. *Investigative Ophthalmology & Visual Science*. 2009; 50 (13): 5051
14. López-García J.S. García-Lozano I. Giménez-Vallejo C. Jiménez B. Sánchez A. Elosua de-Juan I. Modified lateral tarsal strip for involutional entropion and ectropion surgery. *Graefe's Archive for Clinical and Experimental Ophthalmology*. 2017; 255: 619–625.
15. Meduri A. Inferrera L. Oliverio G.W et al. The Use of a Double Suture and Conjunctival Cuts in the Lateral Tarsal Strip: A New Approach to Involutional Ectropion. *J Craniofac Surg*. 2018; 29(8): 2312-2315
16. Ranno S.D, Sacchi M. Gilardi D, Lembo A, Nucci P. Retractor Plication versus Retractor Plication and Lateral Tarsal Strip for Eyelid Entropion Correction. *European Journal of Ophthalmology*. 2013; 141-146
17. Hwa L. Jin-young H. Jung Wan K. Minsoo P. Sehyun B. The Effectiveness of Simultaneous Lateral Tarsal Strip with Endonasal Dacryocystorhinostomy for the Treatment of Nasolacrimal Duct Obstruction and Lower Lid Laxity. *Journal of Craniofacial Surgery*. 2013; 24 (3): 980-83.
18. Olver JM. Surgical tips on the lateral tarsal strip. *Eye* 1998; 12: 1007-12.
19. Danks JJ, Rose GE. Involutional lower lid entropion. To shorten or not to shorten? *Ophthalmology* 1998; 105: 2065-7.
20. Barnes JA, Bunce C, Olver J. Simple effective surgery for involutional entropion suitable for the general ophthalmologist. *Ophthalmology* 2006; 113: 92-6.