International Journal of Medical Arts

Volume 4, Issue 8, August 2022

https://ijma.journals.ekb.eg/

Print ISSN: 2636-4174

Online ISSN: 2682-3780

Available online at Journal Website
https://ijma.journals.ekb.eg/
Main Subject [Ophthalmology]

Original Article

Lateral Tarsal Strip in Management of Involutional and Paralytic Ectropion and Entropion

Mohammed Hakeem [1]*, Younes Elsaied Abdelhafez [1], Abd-ElMongi ElSayed [2], Mohammed ElTaher Abd-ElWahab [2]

[1] Department of Opthamology, Damietta Faculty of Medicine, Al-Azhar University, Damietta, Egypt.

[2] Department of Opthamology, Faculty of Medicine, Al-Azhar University, Cairo, Egypt.

Article information

Received: 22-09-2022

Accepted: 17-10-2022

DOI: 10.21608/IJMA.2022.164730.1517

* Corresponding author

Email: mohamedhakim416@gmail.com

Citation: Hakeem M, Abdelhafez YE, ElSayed A, Abd-ElWahab ME. Lateral Tarsal Strip in Management of Involutional and Paralytic Ectropion and Entropion. IJMA 2022 August; 4 [8]: 2578-2585. doi: 10.21608/IJMA. 2022.164730.1517

ABSTRACT

Background: Normal contour and tone of the lower eyelid margin are important for preserving the corneal integrity and for the tear distribution on the cornea. Two of most common abnormalities of eyelid margin are ectropion and entropion.

The Aim of the work: This study aims to evaluate the efficacy of the lateral tarsal strip in the management of the paralytic and involutional ectropion and entropion.

Patients and Methods: We included 69 eyelids of 49 patients. Patients were divided into three groups; Group A: 20 patients with involutional ectropion [bilateral]. Group B: 17 patients with paralytic ectropion due to 7th nerve palsy [unilateral]. Group C: 12 patients with a unilateral involutional entropion.

Results: The mean age of cases was 70.2 ± 10.9 years. 59.2% of cases were male, while 40.8% were female. In group A; Before Lateral Tarsal Strip, the median and range of lid distraction test [LDT] was 0 [0- 13], while after Lateral Tarsal Strip was 0[0-9] [P=0.2]. In group B and C; the median LDT decreased significantly from 14 and 13.5 respectively before Lateral Tarsal Strip to 10 in both groups after Lateral Tarsal Strip [P = 0.001, P = 0.005 respectively].

Conclusion: Lateral tarsal strip is an effective technique for the management of the paralytic and involutional ectropion and entropion.

Keywords: Lateral tarsal strip; Ectropion; Paralytic Ectropion; Entropion.

INTRODUCTION

Normal contour and tone of the eyelid are important for preserving the corneal integrity and for the tear distribution on the cornea. The skin of the lower eyelid is considered the thinnest skin in our body so, it is more liable for skin defects than other parts. Two of most common abnormalities of eyelid margin are ectropion and entropion [1].

Ectropion is a turning of the margin of the eyelid outward. However, entropion is a turning of the margin of the eyelid inward. Ectropion usually occurs in the lower eye lid [2]. It is classified into; congenital, involutional which is caused by laxation of the canthal tendons., cicatricial which is caused by anterior and middle lamellar shortening, paralytic which may occur due to VII cranial nerve palsy, mechanical which may be due to fluid accumulation or effect of mass as tumor [3].

The most common type of ectropion is involutional that is triggered by horizontal laxity of the lower eyelid with abnormal insertion of the retractors. It has a prevalence of 2% [2]. Risk factors for ectropion includes; age, excessive rubbing or pulling of the eyelid, and using the contact lenses. The patients may present with corneal exposure symptoms, irritation, inadequate lubrication, epiphora, and corneal disease [3]. Complications of ectropion are tarsal thickening, inflammatory changes, corneal ulceration, epiphora, and cosmetic misconfiguration which will affect the patient's quality of life [4].

Causes of the entropion includes; horizontal eyelid laxity, disinsertion of the retractor muscles, inflammations, overriding of the orbicularis oculi muscle, congenital origin, and involutional changes [5]. The most common type of entropion is the involutional type with a prevalence of 2.1% [6]. Entropion may result in trichiasis which may complicate corneal abrasion, ulcers, neovascularization and conjunctival damage [5].

Management of eyelid malposition may be medical or surgical. Medical treatment includes lubricants which relief the patients' symptoms. However, surgical treatment is the main line for management. There are different surgical options with acceptable outcomes for management [7].

After good evaluation of the patient preoperatively, the appropriate surgical procedure will be chosen [8]. Surgical procedures for horizontal laxity of eyelids include; lateral Bick's shortening, wedge excision, and lateral tarsal strip [LTS] [9].

The lateral tarsal strip technique aims to correct the anatomical defect, and maintaining the natural anatomy and the integrity of tear outflow and passage [10]. The lateral tarsal strip is a promising approach in correction of the lower eyelid malposition. It is not only correct the sight and the angel of the lateral canthus, but it also, avoids the palpebral aperture disfigurement and phimosis [11].

This approach is widely used and successful technique for the management of the horizontal laxity [9]. To get the best surgical result, it is agreed that the surgery should target both vertical and horizontal laxity [12].

THE AIM OF THE WORK

This study aims to evaluate the efficacy of the lateral tarsal strip in the management of the paralytic and involutional ectropion and entropion.

PATIENTS AND METHODS

Study populations

Our study is an interventional prospective study that was done between March 2019 and March 2022. Our research followed the principles of the Helsinki Declaration. An ethical approval was obtained from the Damietta Faculty of Medicine, Institutional Review Board. We included 49 patients [69 eyelids]. Patients were divided into three groups; Group A: 20 patients with bilateral involutional ectropion were corrected with a simple LTS surgical procedure. Group B: 17 patients with unilateral paralytic ectropion due to 7th nerve palsy was corrected with a simple LTS surgical procedure. Group C: 12 patients with a unilateral involutional entropion.

Inclusion Criteria

1] Patients with lower eyelid ectropion due to paralytic cause or involutional changes, 2] Willing to participate in the study. 3] patients with excessive laxity.

Exclusion criteria

1] Unwilling to participate in the study, 2] Patients with congenital, and cicatricial ectropion. 3] Patients with lack of the retractor muscle function or with grade 4 medial canthal tendon laxity. previous laser treatment, 4] Patients with excessive lower eyelid laxity 5] patients with previous eyelid surgery.

Preoperative evaluation

Complete medical history and physical examination were done to each patient during enrollment. complete ophthalmic examinations were done before surgery. The following tests were done for ectropion diagnosis and assessment; Lid Distraction Test, and Snap-Back Test. The Lid Distraction Test was measured as the following; the lower eyelid is grasped centrally and pulled away from the globe as far as possible without causing discomfort and the maximum separation of the lower lid margin from the lower limbs is measured in the primary position. Fluorescein eye stain was done to detect any corneal defect.

Operative procedure

Operative technique was performed under local anesthesia. We injected a dose of 3–4 ml of lidocaine [2 %] and epinephrine [1:100.000] into the lateral orbital rim, eyelid, and canthal angle. To control the hemostasis after minutes, lateral canthotomy was done. We removed the lateral canthal tendon from its attachment to the orbital rim at the lateral side, and we identified the orbital periosteum. To create a lateral tarsal strip, we split the lateral aspect of the anterior and posterior lamellae, and we removed the epithelial lining of the lid margin by a Wescott scissors. The epithelium of the posterior conjunctival surface was removed by a 15 Bard-Parker blade. An incision below the cilia by 2 mm was done, and we dissect around the orbicularis muscle to tarsus using the Westcott scissors. We pulled gently over the lateral canthal angle to provide an excess length, then it was excised. We sutured the tarsal strip to the periosteum by using the double-armed braided polyester sutures [4/0] on the inner side of the lateral wall of the orbit with a half-circle needle.

Follow-up

Patients were examined at one day, one week, and one month postoperative. At each follow up time the patients were asked about the recurrence of symptoms, and were examined pre and post orbicularis actions. They were also examined by slit lamp for detection of any complications.

Statistical analysis

Statistical analysis was performed with SPSS statistical software, version 25 [IBM, Chicago, Illinois, USA]. Categorical data were presented as number and percentage. Parametric data were presented as mean and standard deviation. While, non-parametric data were presented as median and range. Chi square test was used to compare categorical data. While Kruskal-Wallis test was used to compare non parametric data between the three studied groups. Mann-Whitney test was used to compare non parametric data between each 2 groups. Wilcoxon test was used to compare data before and after LTS.

RESULTS

Table [1] shows the demographic characters of studied patients in which the mean age was 70.2 ± 10.9 years. 59.2% of cases were male, while 40.8% of were female. In terms of laterality, 35% of cases were bilateral, 43% were in the right side and 22% were in the left side. The majority of cases were presented by foreign body sensation [46.9%], 34.7% were presented by tearing, and only 18.4% were presented by cosmoses.

Table [2] demonstrates the comparison of lid distraction test [LDT] among studied groups. As regards group A, the median value of LDT before LTS was 0 [0-13], As regards group B, the median value of LDT before LTS was 14[12-16], As regards group C, the median value of LDT before LTS was 13.5[12-15]. In terms of LDS, there were highly statistically significant differences among the three studied groups before LTS [P≤ 0.001]. As regards group A, the median value of LDT after LTS was 0 [0-9], As regards group B, the median value of LDT after LTS was 10[8-14], As regards group C, the median value of LDT after LTS was 10[9-13]. In terms of LDT, there were highly statistically significant differences among the three studied groups after LTS [P≤ 0.001].

Table [3] illustrates the comparison of lid distraction test before and after surgery in each group. In group A; Before Lateral Tarsal Strip,

LDT was 0 [0- 13] [median and range], while after Lateral Tarsal Strip was 0[0-9] with no statistically significant difference [P=0.2]. In group B; Before Lateral Tarsal Strip, LDT was 14[12-16], while after Lateral Tarsal Strip was 10[8-14] with highly statistically significant difference [P=0.001]. In group C; Before Lateral Tarsal Strip, LDT was 13.5 [12-15], while after Lateral Tarsal Strip was 10 [9- 13] with statistically significant difference [P=0.005].

Table [4] display the comparison of complications after LTS among studied groups. As regards group A, the majority of cases demonstrated no complications [87%] with only 6 cases [15%] were undergone recurrence. As regards group B, the majority of cases demonstrated no complications [64.7%]. There were two recorded cases underwent recurrence, two recorded cases developed granuloma, single case developed infection and single case developed dehiscence. As regards group C, the majority of cases demonstrated no complications [91.7%], while only one case [8.3%] was undergone recurrence. In addition, there were no statistically significant differences among the three studied groups in terms of post-operational complications [P=0.07].

Finally, as shown in figure 1, 2, and 3**;** Lateral tarsal strip is an effective technique for the management of the paralytic and involutional ectropion and entropion.

Table [1]: Demographic characters of studied patients

Variables [N=49 patients]		
Age [years] [Mean ± SD]		70.2 ± 10.9
Sex No. [%]	Male Female	29 [59.2%] 20 [40.8%]
Laterality N [%]	Bilateral Unilateral	20 [35%] 29 [59.1%]
Complaint / N [%]	Tearing Fb Cosmoses	39 [34.7%] 26 [46.9%] 37 [18.4%]

Table [2]: Comparison of lid distraction test among studied groups

Variable	Group A [N= 40 eye]	Group B [N= 17 eye]	Group C [N= 12 eye]	P value*
	Median [Min – Max]			
LDT before LTS [mm]	0 [0-13]	14 [12-16]	13.5 [12-15]	< 0.001
LDT after LTS [mm]	0 [0-9]	10 [8-14]	10 [9-13]	< 0.001

* Kruskal-Wallis test. LDT: lid distraction test. LTS: Lateral tarsal strip

Table [3]: Comparison of lid distraction test before and after surgery in 3 studied groups

Test	Group A			Group B			Group C		
	Before Lateral Tarsal Strip	After Lateral Tarsal Strip	P value	Before Lateral Tarsal Strip	After Lateral Tarsal Strip	P value	Before Lateral Tarsal Strip	After Lateral Tarsal Strip	P value**
Lid distraction test [mm] [Median [Min – Max]]	0 [0-13]	0 [0-9]	0.2	14 [12-16]	10 [8-14]	**0.001***	13.5 [12-15]	10 [9-13]	**0.005***

** Mann-Whitney test.

Table [4]: Comparison of complications after LTS among studied groups

Post operative complications	Group A N= 40 eye	Group B N= 17 eye	Group C N= 12 eye	P value
	N [%]			
No	34 [85]	11 [64.7]	11 [91.7]	**0.07***
Recurrent	6 [15]	2 [11.8]	1 [8.3]	
Granuloma	-	2 [11.8]	-	
Infection	-	2 [11.8]	-	
Dehiscence	-	1 [5.9]	-	

* Kruskal-Wallis test.

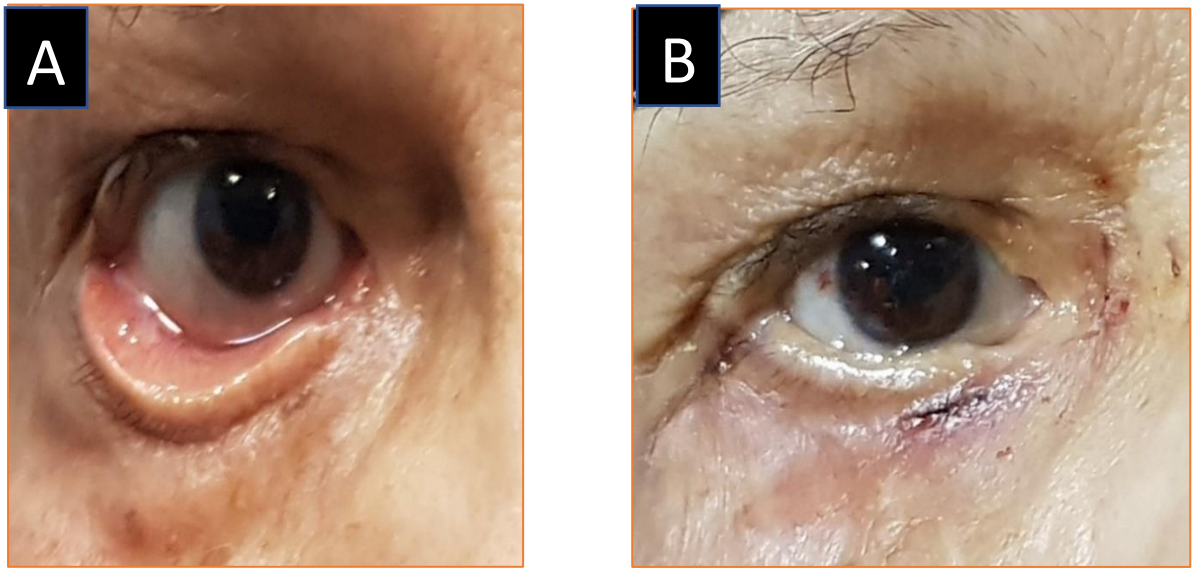

Figure [1]: A case of unilateral involutional ectropion **A.** preoperative. **B.** 2 weeks post surgical repair by a lateral tarsal strip

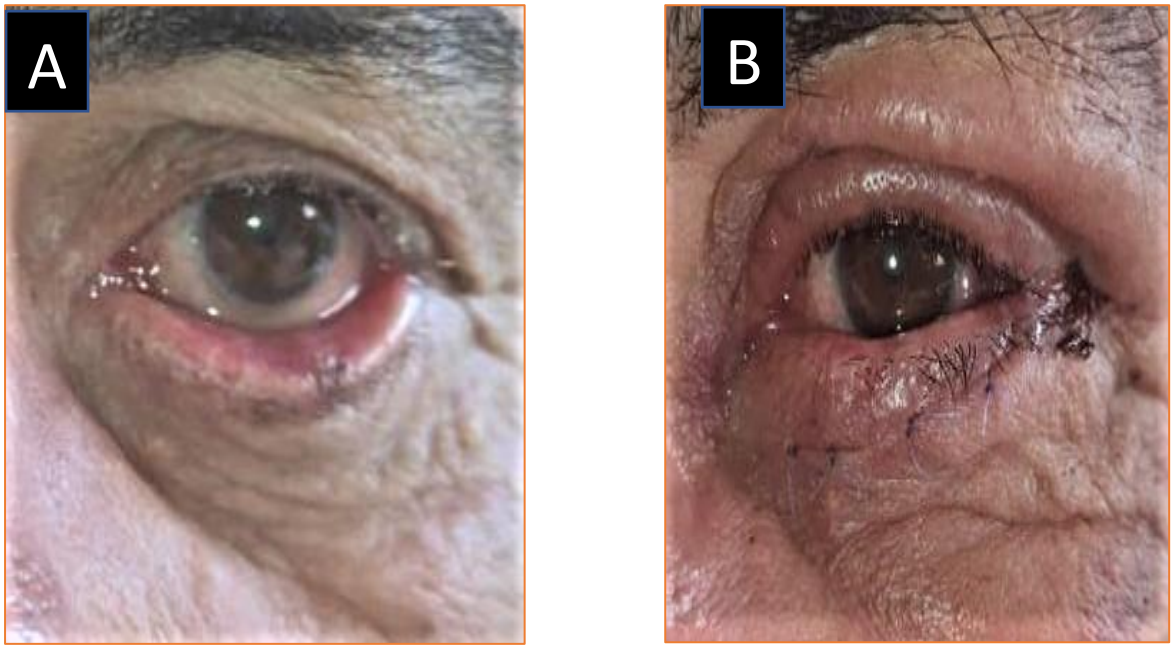

Figure [2]: shows A case of unilateral involutional ectropion **A.** preoperative. **B**. 2 weeks post surgical repair by a lateral tarsal strip

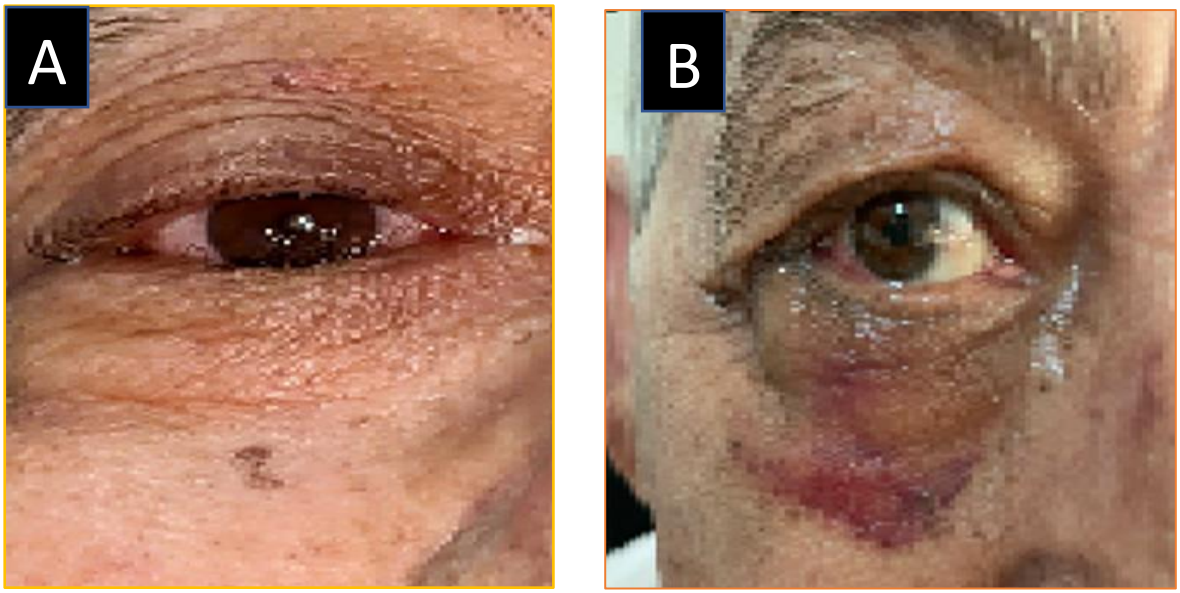

Figure [3]: A case of unilateral entropion **A.** preoperative. **B**. 2 weeks post surgical repair by a lateral tarsal strip

DISCUSSION

Entropion is a condition in which the lash line or the edge of the eyelid makes touch with the ocular surface and bends inward against the globe [13].

The most frequent types of eyelid malposition seen in ophthalmology practices are involutional entropion and ectropion. Aging-related involutional alterations to the elastic and fibrous eyelid tissues, particularly the lateral and medial canthal tendon, are the root cause of both eyelid diseases. Understanding the patho-physiology of ectropion is necessary for the surgical repair [14, 15].

The lateral tarsal strip, a well-known surgical operation, and is an effective oculoplastic method for treating horizontal eyelid laxity. Although several technical adjustments have been published to streamline the process, lower the recurrence rate, and decrease postoperative complications, lateral tarsal strip remains one of the most effective lower eyelid surgical treatments at the moment [16].

The current study included 49 patients with lower eyelid ectropion and entropion cases who underwent lateral tarsal strip procedure.

The current study evaluated the demographic characters of studied patients in which the mean age was 70.2 ± 10.9 years. 59.2% of cases were males, while 40.8% of which were females. In terms of laterality, 35% of cases were bilateral, 43% on the right side. and 22% on the left side. The majority of cases were complaining of foreign body sensation [46.9%], 34.7% of which were complaining of tearing and only 18.4% were compiling of cosmoses.

On the other hand, **Al-Taher and Awadeen** [16] evaluated 27 participants [27 eyelids] with lower eyelid malposition to evaluate the functional and cosmetic sequels of the lateral tarsal strip [LTS] in the correction of lower eyelid malposition. There were 12 males and 15 females with a mean age of 59.37±10.27 years. Out of them, 17 [62.9%], 8 [29.6%], and 2 [7.4%] patients were suffered from ectropion, entropion, and lower eyelid laxity, respectively. Furthermore, lower lid malposition was a sequel of facial nerve palsy in 11 [40.7%] participants, whilst involutional changes contributed to 12 [44.4%].

Lid Distraction Test [also known as pinch test] is a test in which the lower eyelid is gripped in the middle and pulled as far away from the globe as it can without hurting, and the distance between the lower limbus and the lower lid margin is measured in the initial position [17].

The present study compared the lid distraction test [LDT] among studied groups. As regards group A, the median value of LDS before LTS was 0 [0-13], As regards group B,

the median value of LDS before LTS was 14 [12-16], As regards group C, the median value of LDS before LTS was 13.5 [12-15]. In terms of LDS, there were highly statistically significant differences among the three studied groups before LTS [P≤ 0.001].

While, as regards after the lateral tarsal strip technique, in group A, the median value of LDS after LTS was 0 [0-9], in group B, the median value of LDS after LTS was 10[8-14], in group C, the median value of LDS after LTS was 10[9-13]. In terms of LDS, there were highly statistically significant differences among the three studied groups after LTS [P≤ 0.001].

Interestingly, the current study compared the lid distraction test before and after surgery in each studied group. As regard group A [bilateral involutional ectropion], LDT before Lateral Tarsal Strip was 0 [0-13], while after Lateral Tarsal Strip was 0[0-9] with no statistically significant difference [P=0.2]. Denoting that, LTS technique in involutional ectropion might not significantly improved lid distraction test.

Regarding the comparison of lid distraction test before and after surgery in group B [unilateral acquired 7th nerve palsy], the present study found that LDT was 14 [12-16] before Lateral Tarsal Strip, while after Lateral Tarsal Strip was 10[8-14] with highly statistically significant difference [P=0.001]. Denoting that, LTS technique in paralytic ectropion might significantly improve lid distraction test.

Marzouk *et al.* [12] evaluated LDT before and after lateral tarsal strip technique for ectropion. It was found that it was extremely noteworthy that the Lid Distraction Test changed from 12- 14 mm before LTS to 9-10 mm after LTS.

As regard the comparison of lid distraction test before and after surgery in group C [involutional entropion], Before Lateral Tarsal Strip, LDT was 13.5 [12-15], while after Lateral Tarsal Strip was 10 [9-13] with statistically significant difference [P=0.005].

López-García *et al.* [14] measured the LDT's horizontal eye laxity in mm prior to surgery [LTS]. Several grades of lid laxity were distinguished among cases with entropion: slight [7–10 mm] was in18 cases, moderate [11–14 mm] was in 20 cases and severe laxity [≥15 mm] was in 8 cases. While after the surgery, LDT [mean ± DS] was [1.2±0.3mm] one month after surgery.

The current study displayed the comparison of complications after LTS among studied groups. As regards group A, the majority of cases demonstrated no complications [87%] with only 6 cases [15%] were undergone recurrence. As regards group B, the majority of cases demonstrated no complications [64.7%]. There were two recorded cases were undergone recurrence, two recorded cases developed granuloma, single case developed infection and single case developed dehiscence.

As regards group C, the majority of cases demonstrated no complications [91.7%], while only one case [8.3%] was undergone recurrence. In addition, there were no statistically significant differences among the three studied groups in terms of post-operational complications [P=0.07]. On the other hand, **López-García *et al*.** [14] performed a study to evaluate the results of tarsal strip method surgery for involutional lower eyelid ectropion and entropion.

It was found that eight eyelids [17.4%] treated with a traditional tarsal strip experienced recurring entropion, while Recurrence ectropion was only found in one eyelid [2.3 %] Moreover, **López-García *et al*.** [14] found that although there were frequent minor hematomas and soreness around the rim and conjunctiva right after surgery, there were no major postoperative consequences. There were no differences between the two groups' postoperative complications. Eight eyelids had entropion overcorrections, nine eyelids had ectropion, and ten eyelids had moderate to severe lower lid hematomas that healed after two weeks without further treatment. There were no suture granulomas, cysts, abscesses, or lateral canthal dehiscence discovered.

Regarding post-operative complications, **Al-Taher and Awadeen** [16] revealed that a small number of patients had experienced postoperative adverse events.

Furthermore, **Della Rocca** [18] notified that inadequate positioning of the strip leads to a gap between the upper and lower eyelids which lead to ocular exposure. After all, the relatively small sample size, the lack of randomization, obscurity of comparison group, and the substantial heterogeneity between the included

participants regarding the underlying patho-etiologies and types of lower eyelid malposition may cause these discrepancies among the studies.

In conclusion, Lateral tarsal strip is an effective technique for the management of the paralytic and involutional ectropion and entropion.

Conflict of interests: None.

REFERENCES

1. Niamtu J. Cosmetic Facial Surgery-E-Book. Elsevier Health Sciences; 2016 Dec 1. https://www.elsevier.com/ books/cosmetic-facial-surgery/niamtu/978-0-323- 07400-1
2. Ozgur O, Kaufman EJ. Ectropion. [Updated 2022 May 1]. In: StatPearls [Internet]. Treasure Island [FL]: StatPearls Publishing; 2022 Jan-.
3. Bergstrom R, Czyz CN. Ectropion Lower Eyelid Reconstruction. [Updated 2022 Jul 5]. In: StatPearls [Internet]. Treasure Island [FL]: StatPearls Publishing; 2022 Jan-.
4. López-García JS, García-Lozano I, Giménez-Vallejo C, Jiménez B, Sánchez Á, de Juan IE. Modified lateral tarsal strip for involutional entropion and ectropion surgery. Graefes Arch Clin Exp Ophthalmol. 2017 Mar;255[3]:619-625. doi: 10.1007/s00417-016-3536-2.
5. Bergstrom R, Czyz CN. Entropion. [Updated 2022 Jul 5]. In: StatPearls [Internet]. Treasure Island [FL]: StatPearls Publishing; 2022 Jan-.
6. Lin P, Kitaguchi Y, Mupas-Uy J, Sabundayo MS, Takahashi Y, Kakizaki H. Involutional lower eyelid entropion: causative factors and therapeutic management. Int Ophthalmol. 2019 Aug;39[8]:1895-1907. doi: 10.1007/s10792-018-1004-1.
7. Salgarelli AC, Bellini P, Multinu A, Landini B, Consolo U. Tarsal strip technique for correction of malposition of the lower eyelid after treatment of orbital trauma. Br J Oral Maxillofac Surg. 2009 Jun;47[4]:298-301. doi: 10.1016/j.bjoms. 2009.01.019.
8. Baek S, Chung JH, Yoon ES, Lee BI, Park SH. Algorithm for the management of ectropion through medial and lateral canthopexy. Arch Plast Surg. 2018 Nov;45[6]:525-533. doi: 10.5999/aps.2018.00836.
9. Vahdani K, Ford R, Garrott H, Thaller VT. Lateral tarsal strip versus Bick's procedure in correction of eyelid malposition. Eye [Lond]. 2018 Jun;32[6]:1117-1122. doi: 10.1038/s41433-018-0048-9.
10. Rabinovich A, Allard FD, Freitag SK. Lower eyelid involutional entropion repair with lateral tarsal strip and infraciliary rotation sutures: surgical technique and outcomes. Orbit. 2014 Jun;33[3]:184-8. doi: 10.3109/01676830.2014. 894540.
11. Dulz S, Green S, Mehlan J, Schüttauf F, Keserü M. A comparison of the lateral tarsal strip with everting sutures and the Quickert procedure for involutional entropion. Acta Ophthalmol. 2019 Sep;97[6]:e933-e936. doi: 10.1111/aos.14093.
12. Marzouk MA, Shouman AA, Elzakzouk ES, Elnaggar MT. Lateral Tarsal strip technique for correction of lower eyelid Ectropion. J of Am Sci. 2011;7[5]:394-405.
13. Pauly M, Maya TJ. Eyelid malpositions: an overview. Kerala Journal of Ophthalmology. 2017 Sep 1;29[3]:160.
14. López-García JS, García-Lozano I, Giménez-Vallejo C, Jiménez B, Sánchez Á, de Juan IE. Modified lateral tarsal strip for involutional entropion and ectropion surgery. Graefes Arch Clin Exp Ophthalmol. 2017 Mar;255[3]:619-625. doi: 10.1007/s00417-016-3536-2.
15. Lee H, Park M, Chang M, Kang DW, Lee JS, Baek S. Clinical Characteristics and Effectiveness of the Lateral Tarsal Strip and Medial Spindle Procedure. Ann Plast Surg. 2015 Oct;75[4]:365-9. doi: 10.1097/SAP.0000000000-000145.
16. Al-Taher M, Awadeen A. Lateral Tarsal Strip, Can It Be One Solution for All Types of Lower Eyelid Malposition? Egy J Hosp Med. 2019 Apr 1;75[5]:2745-52 doi: 10.21608/ejhm.2019.32066
17. Mommaerts MY, De Riu G. Prevention of lid retraction after lower lid blepharoplasties: an overview. J Craniomaxillofac Surg. 2000 Aug; 28[4]:189-200. doi: 10.1054/jcms.2000.0143.
18. Della Rocca DA. The lateral tarsal strip: illustrated pearls. Facial Plast Surg. 2007 Aug;23[3]:200-2. doi: 10.1055/s-2007-984560.

International Journal of Medical Arts

https://ijma.journals.ekb.eg/
Print ISSN: 2636-4174
Online ISSN: 2682-3780