

Treatment of Trichiasis by Releasing Follicle Roots of Eyelashes: A New Technique

Sacit Karademir, MD
Galip Agaoglu, MD

Summary: Trichiasis is an acquired condition in which eyelashes are misdirected toward the ocular surface, resulting in eye irritation and ocular morbidities. Different treatment modalities have been described, including surgical and non-surgical methods. The goal of this article is to present a novel technique for treatment of trichiasis, with a brief review of treatment options. Through a supratarsal incision, each misdirected eyelash follicle root was reached and freed from surrounding tissues by meticulous dissection. Then, hair shafts on the lid margin were redirected upward and glued to 2 bars extending horizontally across the upper eyelid. Two years after operation, the corrected eyelashes maintained their normal upward direction. To the best of our knowledge, this is the first reported case of chronic trichiasis treated by this technique. The main advantage of the technique, unlike most of the other treatment methods, is that follicles of the affected eyelashes are not removed or destroyed, which is appreciated from the aesthetic point of view, especially in female patients. We believe that any plastic surgeon with basic knowledge of blepharoplasty and hair transplantation can perform this technique without much difficulty. So far, there is no recurrence; however, long-term follow-up with a large series of patients is required for drawing better conclusions. (*Plast Reconstr Surg Glob Open* 2021;9:e3480; doi: [10.1097/GOX.0000000000003480](https://doi.org/10.1097/GOX.0000000000003480); Published online 22 March 2021.)

INTRODUCTION

Trichiasis is a lid margin disorder in which eyelashes are directed inward toward the eyeball, causing eye irritation. It is an acquired condition. It might be confused with distichiasis, which is congenital and is characterized by an excess row of eyelashes emerging posteriorly to the orifices of the meibomian glands.¹ Trichiasis can occur in all ages; however, it is commonly seen in adults. Patients usually present with pain, foreign body sensation, redness, and tearing in the affected eye. If untreated, it may cause ocular morbidities, including corneal abrasion, scarring, and keratitis, threatening patients' vision.^{2,3} The main causes of trichiasis are chronic inflammation of the eyelid margin, skin and conjunctival diseases, and eyelid margin scars related to surgery or trauma.⁴

Trichiasis can be classified according to the number of misdirected eyelashes: major trichiasis affects 5 or more

cilia and minor trichiasis affects <5 cilia. The severity of the disease can also be assessed by identifying the extension of eyelid involvement.^{4,5}

This article aims to introduce a new method for correction of trichiasis, with a brief review of treatment modalities. We present a case of unilateral trichiasis involving the upper eyelid in a young patient who was treated by correcting the direction of eyelashes after full release of each follicle root.

CASE REPORT

A 42-year-old female patient presented with a history of having something in her right eye, redness, and tearing for more than 20 years. She has been plucking her eyelashes since her eye symptoms started. She underwent frontalis sling surgery twice in another center, by using tensor fasciae latae graft, for her congenital ptosis of the right eye. She had no history of trauma or any other eye surgery apart from frontalis sling. On examination, right eyelashes in the central portion of upper eyelid were directed inward, touching cornea and conjunctiva. Eyelid margin was in normal position with no inward inversion, which excluded cicatricial entropion. There were no corneal

From Department of Plastic Reconstructive and Aesthetic Surgery, Koç University, Istanbul, Turkey.

Received for publication December 15, 2020; accepted January 21, 2021.

Copyright © 2021 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \(CCBY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: [10.1097/GOX.0000000000003480](https://doi.org/10.1097/GOX.0000000000003480)

Disclosure: The authors have no financial interest to declare in relation to the content of this article.

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.



Fig. 1. Preoperative anterior close-up view of the patient showing trichiasis involving the central portion of the right upper eyelid. She also had inferior displacement of the same eyelid due to laxity of previously performed frontalis sling for congenital ptosis.

abrasions or opacities. Visual acuity was normal. There was inferior displacement of upper eyelid due to laxity of her previous frontalis sling for congenital ptosis (Fig. 1). The patient received non-steroidal anti-inflammatory medication for the redness and edema in the eyelid (probably from her previous surgery) and conjunctiva (due to irritation of the inverted eyelashes) for 1 week before surgery and was continued for another week after surgery.

Under local anesthesia with sedation, a supratarsal incision was made 8 mm above and parallel to the lid margin in the central part of upper eyelid where the trichiasis was located. Through supratarsal incision, first skin and orbicularis oculi muscle were incised, and dissection was continued in the sub-muscular plane, inferiorly elevating pretarsal portion of orbicularis oculi muscle from anterior surface of tarsal plate until follicle roots of eyelashes were seen (Fig. 2). Then under loupe magnification, each inwardly turned hair follicle root was freed from surrounding tissues by meticulous dissection. Finally, hair shafts on

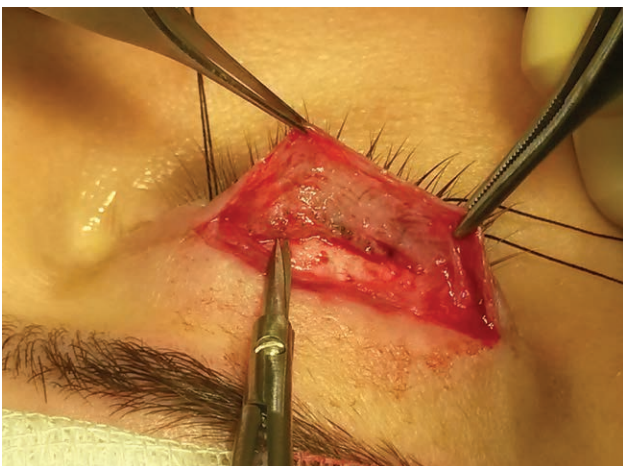


Fig. 2. Intraoperative view showing dissection of eyelashes' follicle roots.



Fig. 3. Immediate postoperative view. After closure of supratarsal incision, each freed hair shaft on the lid margin was redirected upward and glued to 2 bars extending horizontally across the upper eyelid.

the lid margin were redirected upward, and cyanoacrylate adhesive was used to glue the corrected eyelashes to 2 bars formed by 2-0 nylon suture material extending horizontally across the upper eyelid 5 mm above the lid margin (Fig. 3). Supratarsal incision was closed by subcuticular running suture using 6-0 Prolene. The operation time was 2 hours. Postoperative period was uneventful, and the dressing and nylon bars were removed at postoperative day 7 (Fig. 4). (See Video 1 [online], which displays the brief animation of the procedure.) Meanwhile the ptosis of the patient was revised by re-tightening previously used fasciae latae. Two years after operation, there was no inward growth of eyelashes, and the corrected lashes maintained their normal upward direction (Fig. 5).

DISCUSSION

Trichiasis is a common abnormality of the eyelashes affecting mainly the central portion of the lower eyelid. However, trachoma associated trichiasis is more common in the upper eyelid.⁴⁻⁶ Our case was unilateral, involving the central portion of the upper eyelid.

Diagnosis of trichiasis is straightforward, but it is important to find out the accompanying conditions and to assess the extent of eyelid involvement, as they are the 2 most



Fig. 4. Postoperative temporal view 7 days after surgery showing upward direction of eyelashes.



Fig. 5. Postoperative (A) lateral and (B) from-above views (with the eye closed) 2 years after operation, showing no recurrence. The corrected lashes maintained their normal upward direction.

important factors in determining the treatment method to be used. In our case, the cause was most probably due to surgical intervention, which was done twice in our patient for correction of her congenital ptosis.

There are several methods for the treatment of trichiasis, including surgical and non-surgical methods. The principle of all these methods is to remove or correct the route of misdirected cilia to eliminate symptoms of patients. Temporary measures (including lubricants, contact lenses, and simple epilation) can alleviate the symptoms of the patients for short term.^{4,6,7} However, epilation leads to the problem of regrowing eyelashes within 4–6 weeks, and epilated lashes are often broken off during removal, resulting in sharp eyelash stubs, which may continue to cause damage to the cornea.^{6–8} Our patient has been practicing mechanical epilation of her eyelashes for years since her symptoms started after her first ptosis correction surgery. Fortunately, she had no corneal abrasions or opacities. Although surgical treatments of trichiasis are initially successful, long-term results are associated with high recurrent rates.⁴ Electrocautery is a common treatment method for trichiasis, especially for minor cases; however, it is associated with high recurrence rates and may result in scarring, leading to secondary eyelid deformities.^{8–12}

Laser ablation has the advantages of less inflammation and fewer complications. It is used to treat minor trichiasis and in patients with ocular pemphigoid, in which the stimulation of inflammation is undesirable.¹³ Argon laser was first used in 1979 for the treatment of trichiasis,¹⁴ and since then, different success and complication rates have been presented.^{15–17} Different types of lasers have been used for the treatment of trichiasis.^{4,18–20}

Radiofrequency ablation is simple, inexpensive, effective, and free of complications. Its success rate was reported to be 60%–67% in a single session of radiofrequency ablation.^{10,21} Application of 0.02% mitomycin C, in conjunction with radiofrequency ablation, may help improve the success rate of radiofrequency ablation.²²

Cryotherapy is an effective treatment for trichiasis, involving both small and large segments of the eyelid margin. It is based on the principle that the hair follicles are more sensitive to the destructive effects of freezing than the skin and conjunctiva. The success rates are 34%–56% after 1 application and 70%–90% after 2 sessions.⁴ However, it is associated with significant risk of

complications, including lid depigmentation, lid notching, and xerosis.²³ Selective cryotherapy to the anterior lid lamella after lid margin split may avoid eyelid pigmentary changes.^{4,24} Trephination alone or in combination with electrocautery, to increase the success rate, has been used for trichiasis treatment, with a low recurrence rate and a few complications.^{15,25–27}

Surgical procedures are considered in relapsing cases, in patients with scarring diseases, and even in mild cases where other treatment modalities are not available (2, 4, 10, and 28). Intermarginal split lamella with graft is the most commonly used procedure for treatment of major trichiasis, which involves splitting the lid margin into anterior and posterior lamella and inserting a graft in between. The aim here is to displace malpositioned eyelashes away from the globe.² The lid lamella resection technique includes resection of anterior lamella containing the misdirected lashes and closure of the defect by a skin advancement flap.^{2,28} When the trichiasis is segmental, involving less than one-third of the eyelid, a full-thickness block resection of the eyelid will efficiently eliminate the anomalous eyelashes, with an excellent aesthetic result.⁴

In the presented technique, a question can be raised if the repair of the previously placed sling was responsible for the good result. The patient had frontalis sling surgery twice in another center but her eye symptoms did not disappear even after her first frontalis sling. Without a doubt, re-tightening of previously placed frontalis sling has lifted and improved her eyelid appearance but cannot change the direction of the inverted eyelashes. To the best of our knowledge, this is the first reported case of chronic trichiasis involving the upper eyelid treated by this technique. However, we believe that the technique can also be applied to the lower lid by following the same principles. The advantages of the technique are as follows:

1. Unlike most of the other treatment methods where eyelash follicles are either removed or destroyed, in this technique, follicles remain intact and their direction alone is corrected.
2. The incision is placed in supratarsal crease as in the upper blepharoplasty procedure, making the scar invisible when the eye is open, and slightly visible when the eye is closed.
3. Keeping eyelashes intact can be appreciated from an aesthetic point of view, especially in female patients.

The main drawback of the procedure is that it requires a patient surgeon to dissect each follicle root separately. So far, 2 years after surgery, there was no recurrence and no tarsal deformity was encountered. However, long-term follow-up with a large series of patients is required. We believe that any plastic surgeon who has basic knowledge of blepharoplasty and hair transplantation can perform this technique without much difficulty.

CONCLUSIONS

Trichiasis is an acquired condition in which eyelashes are misdirected toward the ocular surface, resulting in eye irritation and ocular morbidities. Different treatment modalities have been described, including surgical and non-surgical methods. The goal of this article is to present a novel technique for treatment of trichiasis with a brief review of treatment options. Through a supratarsal incision, each follicle root of the misdirected eyelashes was reached and freed from surrounding tissues by meticulous dissection. Then hair shafts on the lid margin were redirected upward and glued to 2 bars extending horizontally across the upper eyelid. Two years after operation, the corrected eyelashes maintained their normal upward direction. To the best of our knowledge, this is the first reported case of chronic trichiasis treated by this technique. The main advantage of the technique, unlike most of other treatment methods, is that affected eyelash follicles are not removed or destroyed, which is appreciated from an aesthetic point of view, especially in female patients. We believe that any plastic surgeon with basic knowledge of blepharoplasty and hair transplantation can perform this technique without great difficulty. So far, there is no recurrence; however, long-term follow-up with a large series of patients is required for drawing better conclusions.

Galip Agaoglu, MD

Koç University Hospital
Plastic Reconstructive and Aesthetic Surgery Department
Davutpaşa Caddesi
No:4 34010 Topkapı
Istanbul, Turkey
E-mail: agaoglug@gmail.com

PATIENT CONSENT

The patient provided written consent for the use of her image.

REFERENCES

1. Wolfley D. Excision of individual follicles for the management of congenital distichiasis and localized trichiasis. *J Pediatr Ophthalmol Strabismus*. 1987;24:22–26.
2. Ferraz LC, Meneghim RL, Galindo-Ferreiro A, et al. Outcomes of two surgical techniques for major trichiasis treatment. *Orbit*. 2018;37:36–40.
3. Scheie HG, Albert DM. Distichiasis and trichiasis: origin and management. *Am J Ophthalmol*. 1966;61:718–720.
4. Ferreira IS, Bernardes TF, Bonfioli AA. Trichiasis. *Semin Ophthalmol*. 2010;25:66–71.
5. Araújo FAM, Cruz AAV. Eyelash abnormalities at the Hospital of the School of Medicine of Ribeirão Preto. *Arq Bras Ophthalmol*. 2002;65:343–349.
6. Gower EW. Trichiasis: making progress toward elimination. *Int Ophthalmol Clin*. 2007;47:77–86.
7. Chiou AG, Florakis GJ, Kazim M. Management of conjunctival cicatrizing diseases and severe ocular surface dysfunction. *Surv Ophthalmol*. 1998;43:19–46.
8. McCracken MS, Kikkawa DO, Vasani SN. Treatment of trichiasis and distichiasis by eyelash trephination. *Ophthalmic Plast Reconstr Surg*. 2006;22:349–351.
9. Fonseca Junior N, Lucci L, Paulino L, Rehder R. O uso do laser de argônio no tratamento da triquiase. *Arq Bras Ophthalmol*. 2004;67:277–281.
10. Kormann R, Moreira H. Eletrólise com radiofrequência no tratamento da triquiase. *Arq Bras Ophthalmol*. 2007;70:276–280.
11. Mona K, Sarju D, Muddassar H, Carole AJ. Time-consuming eyelashes: an audit of trichiasis management. *Clinical Audit*. 2010;2:83–87.
12. Campbell DC. Thermoablation treatment for trichiasis using the argon laser. *Aust N Z J Ophthalmol*. 1990;18:427–430.
13. Bartley GB, Lowry JC. Argon laser treatment of trichiasis. *Am J Ophthalmol*. 1992;113:71–74.
14. Berry J. Recurrent trichiasis: treatment with laser photocoagulation. *Ophthalmic Surg*. 1979;10:36–38.
15. Michael SM, Don OK, Sunil NV. Treatment of trichiasis and distichiasis by eyelash trephination. *Ophthalmic Plast Reconstr Surg*. 2006;22:349–351.
16. Gossman MD, Yung R, Berlin AJ, et al. Prospective evaluation of the argon laser in the treatment of trichiasis. *Ophthalmic Surg*. 1992;23:183–187.
17. Al-Bdour MD, Al-Till MI. Argon laser: a modality of treatment for trichiasis. *Int J Biomed Sci*. 2007;3:56–59.
18. Hata M, Monteiro E, Schellini S, Aragon F, Padovani C. Laser de argônio no tratamento da triquiase e da distiquiase. *Arq Bras Ophthalmol*. 1999;62:285–295.
19. Pham RT, Biesman BS, Silkiss RZ. Treatment of trichiasis using an 810-nm diode laser: an efficacy study. *Ophthalmic Plast Reconstr Surg*. 2006;22:445–447.
20. Moore J, De Silva SR, O'Hare K, et al. Ruby laser for the treatment of trichiasis. *Lasers Med Sci*. 2009;24:137–139.
21. Kezirian GM. Treatment of localized trichiasis with radiosurgery. *Ophthalmic Plast Reconstr Surg*. 1993;9:260–266.
22. Kim GN, Yoo WS, Kim SJ, et al. The effect of 0.02% mitomycin C injection into the hair follicle with radiofrequency ablation in trichiasis patients. *Korean J Ophthalmol*. 2014;28:12–18.
23. Johnson RL, Collin JR. Treatment of trichiasis with a lid cryoprobe. *Br J Ophthalmol*. 1985;69:267–270.
24. Khafagy A, Mostafa MM, Fooshan F. Management of trichiasis with lid margin split and cryotherapy. *Clin Ophthalmol*. 2012;6:1815–1817.
25. Han JH, Doh SH. Treatment for trichiasis through a combination of eyelash trephination and electrocautery. *Acta Ophthalmol*. 2012;90:e211–e213.
26. Keller HH. Surgery of the eyelid edge: references for general practice. *Klin Monatsbl Augenheilkd* 1990;196:417–418.
27. Burton M, Solomon A. What's new in trichiasis surgery? *Community Eye Health*. 2004;17:52–53.
28. Steinkogler FJ. Treatment of upper eyelid entropion. Lid split surgery and fibrin sealing of free skin transplants. *Ophthalmic Plast Reconstr Surg*. 1986;2:183–187.