

Treatment of Cicatricial Lower Eyelid Ectropion with Suture of Horner Muscle Combined with Fascia Transplantation

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Summary: This case series aimed to describe a new technique for correcting contractures and deformities that reliably addresses lacrimal punctum deviation and severe cicatricial lower eyelid ectropion. This was a technical description and a retrospective interventional case series. Eyelid ectropion and lacrimal punctum deviation were treated surgically by grafting the fascia lata and suturing the tarsus-Horner muscle. In total, three patients underwent this surgery: one for burns, one for lower eyelid tumor resection, and the other for an orbital floor fracture following a motorcycle accident, all resulting in ectropion. All patients previously had failed ectropion correction procedures, including scar revision, skin grafting, auricular cartilage grafting, and lateral tarsal strips. The mean follow-up was 15.8 (12.5–18.5) months. Furthermore, all patients showed resolution of lower eyelid ectropion and significant improvement in lower eyelid contracture, with a mean increase of 4.0 (2.5–5) mm. No severe complications were observed, and they reported a significant improvement in ocular surface symptoms. Our study shows that tacking of the tarsus and Horner muscles in combination with fascia lata grafting is effective in correcting refractory cicatricial lower eyelid ectropion with deviation of the tear punctum. (*Plast Reconstr Surg Glob Open* 2024; 12:e5675; doi: 10.1097/GOX.0000000000005675; Published online 21 March 2024.)

INTRODUCTION

Cicatricial lower eyelid ectropion occurs when scar contracture affects the eyelid.^{1,2} Techniques, including lateral tarsal strip, canthopexy, or medial spindle incision, are used for correcting lower eyelid ectropion depending on the specific causative factors, such as the eyelid mechanics, its external position, and the condition severity.^{3,4} Therefore, maintaining proper contact between the eyelid and ocular surface is crucial in preventing dryness and tear flow issues associated with eyelid laxity.⁵

A modified procedure involving suturing the tarsus medial side and Horner muscle base and horizontal tightening using a fascia lata graft was evaluated to address these challenges. The Horner muscle, which is located deep within the medial canthus tendon in the posterior

lacrimal fold, has a deep portion corresponding to the upper half of the lacrimal sac that is attached to the lacrimal sac via the posterior branch of the medial canthal tendon (MCT) and connective tissue.⁶ Functional lacrimation and lower eyelid ectropion can be improved using this muscle and medially shifting the tissue. Therefore, this approach aims to enhance the surgical reconstruction effectiveness and minimize abnormal eyelid positioning-related complications.

This retrospective case series involved three patients; therefore, it did not require an institutional review board approval. It adhered to the Declaration of Helsinki principles.

CASE PRESENTATION

Patients and Methods

Surgery using this method was performed between January and December 2021 on three patients retrospectively enrolled in the study (Table 1). The inclusion

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criteria were fascia lata grafting and Horner muscle-tarsus tacking surgery to repair refractory cicatricial lower eyelid retraction. A single plastic surgeon performed all procedures. Patients underwent a preoperative evaluation, including a complete history, examination, and photography.

Case 1 was a 73-year-old male patient with facial burns from a laboratory explosion who immediately underwent a skin grafting procedure. Subsequently, he underwent scar revision and lateral tarsal strip surgery. However, the scar recurred with lachrymation, inadequate eyelid closure, and lower eyelid ectropion (Fig. 1A).

Case 2 was a 72-year-old female patient who underwent excision of a xanthoma on the lower eyelid, reconstructed using a rotation flap. This eyelid became ectropic and did not improve despite auricular cartilage grafting, scar revision, and skin flap reconstruction. She also complained of tearing and dry eye symptoms. (See figure, Supplemental Digital Content 1, which displays case 2 presenting with left lower lid cicatricial ectropion and retraction following left lower eyelid reconstruction with multiple procedures. B, Case 2 at postoperative 1 year with improvement in left lower lid ectropion, retraction, and exposure keratopathy. <http://links.lww.com/PRSGO/D123>.)

Case 3 was a 62-year-old male patient who sustained a left orbital floor fracture in a motorcycle accident when he was 18 years old. During the fracture repair surgery, the patient underwent a left subciliary incision, resulting in postoperative lower eyelid ectropion. He complained of visual dissatisfaction and lachrymation and underwent a lateral tarsal strip procedure but showed no improvement. (See figure, Supplemental Digital Content 2, which displays case 3 presenting with left lower lid cicatricial retraction and ectropion following orbital fracture repairs and revisions and multiple unsuccessful eyelid retraction and ectropion repairs. B, Case 3 at postoperative 1 year with improvement in left lower lid ectropion, retraction. <http://links.lww.com/PRSGO/D124>.)

Surgical Procedure

An incision was made through a prominent scar related to a previous surgery. The lower eyelid mobility

Takeaways

Question: Is the combination of Horner muscle suture and fascia graft effective in reliably addressing severe cicatricial lower eyelid ectropion?

Findings: Three patients were observed retrospectively, and all showed improvement in lower eyelid ectropion and contraction.

Meaning: Tacking of the tarsus and Horner muscles in combination with fascia lata grafting is effective in correcting refractory cicatricial lower eyelid ectropion with deviation of the tear punctum.

was secured through debridement while removing the scar and the previously grafted tissue. A bougie was placed over the upper and lower lacrimal dots to identify the Horner muscle, and a bow-shaped incision was made over the caruncula lacrimalis (Fig. 2A).

The Horner muscle was identified from the tarsus to the medial orbital wall (Fig. 2B), and the muscle bony attachment was sutured to the lower eyelid tarsus using a 5-0 nylon. The medial lower eyelid was medially retracted posteriorly, repositioning the lower lacrimal duct, which caused the eyelid to turn inward, making the lacus lacrimalis come in contact with the conjunctiva (Fig. 2C).

Fascia was removed from the vastus lateralis muscle. To collect the fascia lata, two horizontal incisions of approximately 1.5 cm were made along a straight line connecting the anterior superior iliac crest and the lateral condyle of the tibia; the fascia between them was collected. The subcutaneous fat was separated, and the vastus lateralis fascia located directly below it was harvested by dissecting the anterior and posterior surfaces longitudinally. The distance between the inner and outer canthi with an additional 1-cm margin to wrap around the MCT (approximately 5–6 cm) was considered the required length of the fascia. The recommended width of the fascia was approximately 5 mm on each side to enable it to sufficiently cover the lower eyelid tarsal plate and be sewn onto the lower eyelid retractor. The length was adjusted to make the tension sufficient to correct

Table 1. Case Progress and Improvement

	Case 1	Case 2	Case 3
Preoperative history	73-year-old man with facial explosive burn	72-year-old woman with xanthoma of bilateral lower eyelid	62-year-old man with left orbito-facial fractures due to motor vehicle accident
Prior surgery	Full-thickness skin graft, scar revision, lateral tarsal strip	>10 prior operations including dermis fat grafts, skin graft, rotation flap, scar revision	Lateral tarsal strip, scar revision
Preoperative ectropion	+	+	+
Snap back test	Grade IV	Grade IV	Grade IV
Postoperative ectropion	Resolved	Resolved	Resolved
Preoperative retraction (MRD2)	8 mm	10 mm	10.5 mm
Postoperative retraction (MRD2)	5.5 mm	5 mm	5.5 mm
Preoperative lagophthalmos	0.5 mm	1.5 mm	2 mm
Postoperative lagophthalmos	0 mm	0 mm	0 mm

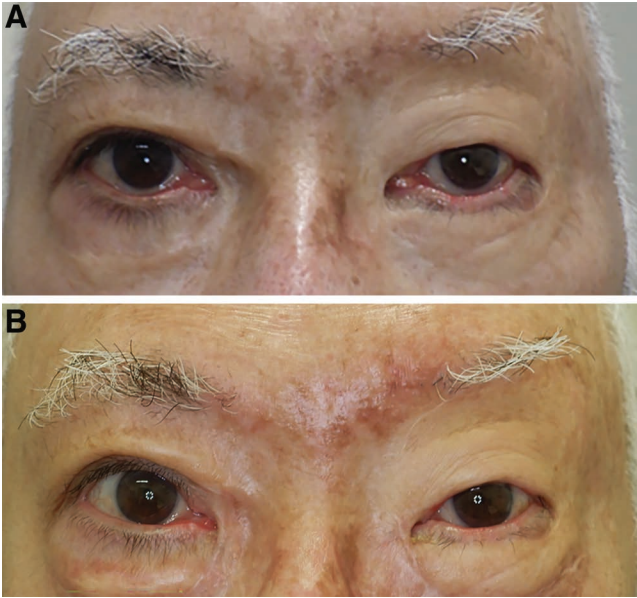


Fig. 1. Case 1. A, patient presenting with cicatricial left lower lid retraction and ectropion following eyelid reconstruction via full-thickness skin grafts. Examination revealed bilateral lower eyelid scar retraction, ectropion, and external deviation of the lower lacrimal punctum. B, One year postoperative, showing improvement in left lower lid retraction and ectropion.

the lower eyelid ectropion when sewn to the orbit's outer surface.

A V-shaped incision was made at the internal angle of the eye to identify the MCT. The fascia tip was sutured to the MCT using a 5-0 nylon, while the other end was fixed to the orbit's outer periosteum. In the lower eyelid, the fascia was fixed to the tarsus and the lower eyelid retractor using a 5-0 polydioxanone monofilament. The skin was closed with a 7-0 nylon. Ointment treatment was applied on the day of surgery, and the stitches were removed 1 week postoperatively.

Results

Patients were monitored for 12.5–18.5 months postoperatively and examined for improvement in lower eyelid

retraction, lagophthalmos, scarring ectropion, cosmetic complications, and dry eye symptoms. All patients showed resolution of lower eyelid ectropion and significant improvement in eyelid contractures, with a mean increase of 2.8 mm (Fig. 1; Table 1).

DISCUSSION

Cicatricial lower eyelid ectropion can be difficult to treat. Surgical interventions for lower eyelid ectropion depend on the specific causative factors, the eyelid mechanics (horizontal or vertical laxity), its external position (medial, lateral, or total), and the condition severity. Techniques, including lateral tarsal strip, canthopexy, or medial spindle incision, are used based on the eyelid's location and laxity.⁷ Particularly, when intractable laxity with supportive tissue loss occurs, extensive surgical procedures, including transplantation of auricular cartilage and fascia lata, are necessary; in intractable cases, temporalis parietalis fascia, temporalis muscle, and other myocutaneous flaps are necessary.⁷ However, postoperative complications, including tenting, cosmetic dissatisfaction, and medial inferior ectropion, may arise. The most common issue with intractable lower eyelid ectropion is lagophthalmos due to impaired tear conduction caused by separating the lower lacrimal punctum from the lacrimal lake.^{8,9} This is because other reconstructive procedures only reconstruct traction horizontally, and the eyelid tissue is not tractioned along the direction of the eye's spherical structure.

The greatest advantage of Horner muscle tacking is that reconstruction along the eye's spherical morphology can correct the abnormal lacrimal point position while simultaneously minimizing the impact on the upper eyelid and implanted fascia. The MCT, an important source of fixation, bifurcates vertically outside the lacrimal sac and attaches to the tarsus. Therefore, even if the MCT is fixed to the medial orbital wall periosteum to the extent of being dissected at the inner eye angle, it will only move horizontally, and the upper eyelid will also be pulled in. Because the grafted fascia is fixed to the MCT during this maneuver, it may get pulled with it, causing the tear duct to be pushed out further.

The Horner muscle, approached through the lacrimal duct, is unrelated to the MCT, which is situated

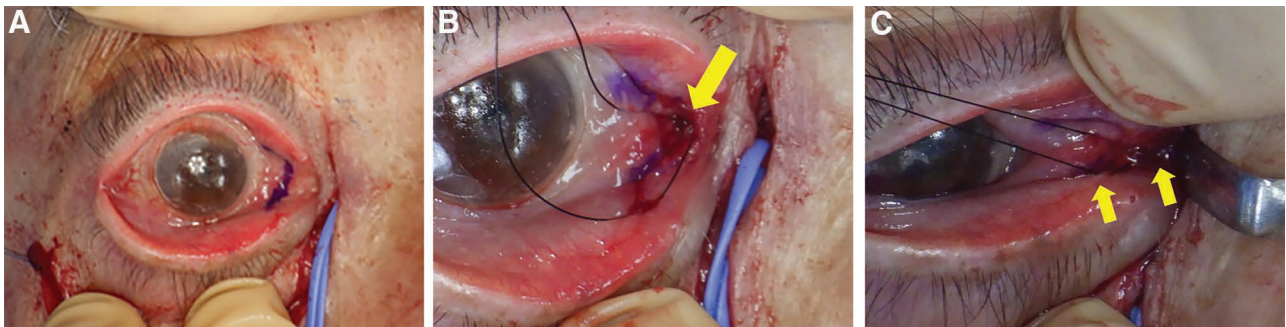


Fig. 2. Surgical techniques. A, Bow-shaped incision into the lacrimal duct to identify the Horner muscle. B, Horner muscle identification (yellow arrow). C, Tacking the Horner muscle and tarsus. By suturing the two together with nylon thread, the lower tear duct is pulled medially and posteriorly.

anatomically deep and independent of the upper and lower limbs, therefore reducing these problems. However, because the Horner muscle is involved in the tear-pumping mechanism,¹⁰ passing the nylon thread through the muscle while avoiding damage to the tear duct is important.

This study indicates that threading the tarsus and medial orbital wall periosteum and the origin of the Horner muscle and transplanting the fascia lata may be a reconstructive option for treating difficult cicatricial lower eyelid retraction with ectropion cases. Previous studies have combined fascial grafting with other methods to treat lower eyelid ectropion, including a combination of large advancement flaps and lateral burr holes.^{11,12} However, this method, focused on Horner muscle and involving medial-posterior traction in combination with fascial grafting, is a new treatment option for severe eyelid ectropion.

This study's limitations include its retrospective nature, small sample size, and lack of a control group. Furthermore, this method's drawbacks include the risks of infection due to the use of nylon threads and damage to the lacrimal duct, which is dependent on the surgeon's skill. Therefore, this method is recommended as the best option for intractable lower eyelid ectropion, which is difficult to improve using conventional techniques.

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DISCLOSURES

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