



Correction of Involutional Entropion by Excising Redundant Skin and Pretarsal Orbicularis Muscle without Vertical and Horizontal Tarsal Fixation

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Purpose: This study evaluated the effect of the excision of redundant skin and pretarsal orbicularis muscle, without vertical or horizontal tarsal fixation, on the correction of involutional entropion.

Methods: This retrospective interventional case series recruited patients with involutional entropion who underwent excision of redundant skin and pretarsal orbicularis muscle, without vertical or horizontal tarsal fixation, from May 2018 to December 2021. Preoperative clinical characteristics and surgical outcomes, including recurrence at 1, 3, and 6 months, were determined by reviewing the medical charts. Surgical treatment included the excision of redundant skin and pretarsal orbicularis muscle, without any tarsal fixation, and simple skin suture.

Results: All 52 patients (58 eyelids) attended every follow-up visit and were thus included in the analysis. Among 58 eyelids, 55 (94.8%) had satisfactory results. The recurrence rate was 3.45% (two eyelids) and the overcorrection rate was 1.7% (one eyelid).

Conclusions: Excision of only redundant skin and the pretarsal orbicularis muscle, without capsulopalpebral fascia reattachment or horizontal lid laxity correction, is a simple surgery for correcting involutional entropion.

Key Words: Aging, Entropion, Surgery, Technique

Lower eyelid entropion is characterized by inversion of the lower eyelid margin and lashes, and sometimes the external skin surface, which may lead to conjunctival injection, ocular irritation, tearing, discharge, corneal erosions,

and corneal ulcers in severe cases. Because the most appropriate surgical option may differ depending on the lid margin, it is important to differentiate true entropion from other conditions causing ciliocorneal touching, such as epiblepharon, distichiasis, or diseases that destroy the lid margin architecture. Involutional entropion generally occurs with advancing age. A relatively recent survey conducted in 24,565 elderly people reported that the prevalence of involutional entropion in the elderly was 2.1% (1.9% in men and 2.4% in women) [1]. The main factors involved in involutional entropion include horizontal and vertical lower eyelid laxity and overriding of the preseptal

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orbicularis oculi muscle (OOM) onto the pretarsal OOM [2,3].

The treatment of involutional entropion requires correcting underlying causative factors, for which many surgical procedures have been described [2,3]. Vertical lower lid laxity is treated by altering the lower eyelid retractors (capsulopalpebral fascia, CPF), for example by plication, shortening, or reinsertion (Jones procedure). Horizontal laxity is treated using lower eyelid shortening procedures, such as wedge resection of the tarsus, a lateral tarsal strip (LTS) procedure, or lateral canthopexy. Overriding of the preseptal OOM is corrected by transverse blepharotomy (Wies procedure), OOM tightening, excision, transposition, the Hotz–Celsus procedure, or nonsurgical procedures such as the injection of *Botulinum* toxin [3,4].

Historically, involutional entropion has typically been corrected with procedures that combine CPF repair with horizontal lower lid laxity correction. Although this has a high success rate, there are still several problems including complicated techniques, the possibility of bilateral asymmetry, and difficulty reoperating in case of recurrence. The modified Hotz procedure has been used to treat epiblepharon. It involves excising a strip of skin and the OOM and fixing the skin to the underlying tarsus with eversion [5]. A recent article introduced a new surgical technique combining a modified Hotz procedure with the Jones procedure and reported a decrease in the rate of involutional entropion recurrence [6].

Minimally invasive surgical techniques have shown advances. Regardless of the causative factors, quick and simple surgical procedures are preferred for treating involutional entropion. In this study, we evaluated the efficacy of

excision of redundant skin and the pretarsal OOM, without vertical or horizontal tarsal fixation, for correcting involutional entropion. A strip of skin and the OOM can be excised simply and quickly; this is similar to the modified Hotz procedure, except that the skin is not fixed to the underlying tarsus.

Materials and Methods

Ethical statements

The study was approved by the Institutional Review Board of Soonchunhyang University Bucheon Hospital (No. 2022-09-014) and performed in accordance with the principles of the Declaration of Helsinki. Written informed consent for publication of the clinical images was obtained from the patient.

Patient selection

This retrospective interventional case series retrospectively reviewed the clinical data of 52 patients (58 eyelids) with involutional lower eyelid entropion who underwent excision of redundant skin and pretarsal OOM, without vertical or horizontal tarsal fixation, performed by a single surgeon (SYJ) between May 2018 and December 2021. Patients were excluded if they had a history of previous eyelid surgery or were lost to follow-up after 1, 3, or 6 months. The preoperative clinical characteristics and surgical outcomes, including recurrence at each time point, were extracted from the medical charts. Procedural success was



Fig. 1. Photographs of an 83-year-old female patient with involutional entropion who underwent the Hotz operation. (A) Gentian violet was used to mark the incision. (B) Skin and orbicularis muscle were excised using Westcott scissors. (C) Skin sutures were applied using 6-0 black silk. Written informed consent for publication of the clinical images was obtained from the patient.

defined as a lack of recurrence or the absence of overcorrection during the follow-up period.

Surgical technique

To excise the redundant skin and pretarsal OOM, 2% lidocaine solution with 1:100,000 epinephrine was administered into the lower eyelid. Gentian violet was used to mark the location of the crescent-shaped incision. The skin was incised using a no. 15 blade. The skin and OOM were excised using Westcott scissors. The vertical excision was ≤ 5 -mm long in all subjects. Interrupted 6-0 black silk skin sutures were applied (Fig. 1). The tarsus, CPF, and LTS were not manipulated during the operation.

Results

The mean age of the 52 study participants (24 female and 28 male patients) was 75.7 ± 9.2 years. The mean follow-up duration was 18.2 ± 6.5 months (Table 1). Successful outcomes were observed in 55 of 58 eyelids (94.8%). Recurrence and overcorrection occurred in two (3.45%) and one eyelid (1.7%), respectively.

The two recurrences were identified 3 and 6 months after surgery, and second operations were performed 1 month later. Reoperation was performed with the same technique as in the first operation, i.e., further excision of redundant skin and pretarsal OOM without vertical or horizontal tarsal fixation. No recurrence was seen. Overcorrection was observed in an 84-year-old male patient and

LTS was performed to correct it. No patients experienced severe complications, such as ecchymosis, hematoma, or eyelid or orbital infection.

Discussion

In this study, the excision of only redundant skin and pretarsal OOM, without vertical or horizontal tarsal fixation, was effective for treating involutional entropion, with recurrences seen in only 2 of 58 eyelids (3.4%), and overcorrection in 1 of 58 eyelids (1.7%). In these cases, although CPF repair and LTS were not performed, satisfactory surgical outcomes were achieved. Based on our experience, we believe that it is crucial to ensure a vertical excision length of ≤ 5 mm to prevent overcorrection, regardless of horizontal lid laxity. It is also important to not make an anchoring suture in the CPF when deciding not to perform the LTS procedure. When performing traditional CPF repair, overcorrection (ectropion) is induced by horizontal laxity in many cases, so a horizontal shortening procedure is often required at the same time as CPF repair. Excision of redundant skin and the pretarsal OOM is a very simple and quick procedure with results comparable to other surgical approaches.

The reported recurrence rates after entropion repair varied with the follow-up duration and surgical technique [3]. The Q-suture is a simple and effective procedure for involutional entropion repair, but has a high recurrence rate (21.6%), particularly at 6 months [7]; in this study recurrence at 2 years was seen in nearly 50% of the subjects. The preferential use of Q-sutures for involutional entropion could be considered controversial due to the high recurrence rate. Nevertheless, the authors emphasized the merits of their fast, simple, low-cost surgical technique, with patient satisfaction achieved regarding the degree of discomfort during the surgery [7]. In the present study, the redundant skin and pretarsal OOM were excised using a simple procedure that does not require the correction of vertical or horizontal laxity, which reduces the operating time. This procedure requires a mean of 7.5 minutes to complete. In comparison, a study introducing a modified Hotz procedure combined with the Jones procedure reported that a mean of 33.4 minutes was needed [6].

The main pathomechanism of involutional entropion is lower eyelid retractor disinsertion resulting from aging-re-

Table 1. Clinical characteristics of the patients (n = 52)

Characteristic	Value
Age (yr)	75.7 ± 9.2
Follow-up duration (mon)	18.2 ± 6.5
Sex (no. of patients)	
Female	24
Male	28
Laterality (no. of eyelids) (n = 58)	
Right	22
Left	36

Values are presented as mean \pm standard deviation unless otherwise indicated. A total of 58 eyelids from 52 patients are included.

lated changes, rather than an overriding OOM. The procedure applied herein involves excising a strip of skin and the pretarsal OOM. We believe that the CPF shortening induced by anterior lamellar contracture (cicatricial alteration) secondary to skin-muscle excision underlies the outstanding therapeutic effect of this procedure on involutional entropion. The overriding OOM has a role in the development of involutional entropion and is frequent in involutional entropion [8]. A previous study showed that tightening of the overriding OOM without correcting the lateral canthal tendon laxity was effective for treating involutional lower eyelid entropion [9]. The removal of skin and OOM corrects the overriding of OOM, presumably by decreasing the degree of potential elevation of the lower eyelid and improving the vertical eyelid laxity. The use of coagulation to control bleeding creates a scar on the skin and OOM, which promotes eyelid eversion [10]. When performing the procedure described here, care should be taken to prevent excessive excision of skin and muscle, which can lead to ectropion. We did not excise more than 5 mm of skin; therefore, only one patient had postoperative overcorrection.

Irrespective of the surgical technique, for long-term success entropion treatment might require the correction of all underlying pathophysiological mechanisms [11]. In this study, however, although CPF repair and LTS were not performed, satisfactory surgical outcomes were achieved, with short operating times and better symmetry using relatively simple procedures. The main limitation of our study was the small sample size and relatively short-term postoperative follow-up. Future studies are needed to enhance this surgical technique usefulness.

In conclusion, excision of redundant skin and pretarsal orbicularis muscle, without CPF reattachment or horizontal lid laxity correction, could serve as a simple and easy surgery for correcting involutional entropion.

Conflicts of Interest: None.

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