INTRODUCTION

Numerous procedures have been proposed to correct involutinal entropion, but no single operative method has been established as a standard [1]. If lower lid laxity is not present, an everting suture can be placed in very elderly patients. This technique is fast, but the effect of everting sutures is temporary [2]. Other new techniques have been described, with a higher suc-
cress rate and lower recurrence rate than everting sutures [2-5]. We modified the Wies procedure to increase the success rate and to prevent scar formation in the conjunctiva. Our aim is to describe a modified technique for lower eyelid involutional entropion without horizontal eyelid or canthal tendon laxity and to present the findings of our technique, which combines modified everting sutures with reattachment of the lower eyelid retractors to the inferior tarsal plate.

METHODS

Patients
From January 2014 to March 2019, the author (EMS) performed this procedure in appropriate cases. A retrospective review was conducted of the charts of all patients who underwent involutional lower eyelid entropion repair at our oculoplastic department between January 2014 and March 2019. The study was approved by the ethical board (IRB No. E-19-2594) and carried out in accordance with the tenets of the Declaration of Helsinki. All patients provided written informed consent prior to enrollment.

The exclusion criteria for this procedure were horizontal eyelid laxity and medial and lateral tendon laxity. Twenty-five patients (37.3%) admitted for entropion surgery were eligible for this procedure. We retrospectively analyzed the medical records of these 25 patients and extracted preoperative and postoperative information on horizontal eyelid and canthal tendon laxity, lower eyelid retractor function, and orbicularis muscle overriding.

Entropion surgery was performed in 338 patients between January 2014 and March 2019. The modified entropion technique was used in 28 eyes of 25 patients who did not have horizontal eyelid and canthal tendon laxity.

Preoperative and postoperative photographs of each patient were taken and recorded in patients’ electronic records. Any recorded complaints (discomfort, itching, redness, and tearing), corneal punctate staining, and photographs of each patient were evaluated before and after surgery. The recurrence rate was also investigated.

At follow-up, patients were assessed for symptom relief and resolution of the inward rotation of the eyelid margin in the primary and downward-gazing positions. Surgical success was defined as correct anatomical position of the eyelid and symptom relief.

Steps of the surgical technique
The skin was marked parallel to the lid edge from the punctum to the lateral canthus, 4 mm below the eyelashes (from the lower
edge of the tarsus). Local anesthetic infiltration of the eyelid with lidocaine HCl with epinephrine was performed. A subtarsal skin incision was made with a scalpel (Fig. 1A). The orbicular muscle was carefully dissected with scissors until the lower edge of the tarsal plate was reached. It was dissected downward until the lower lid retractors were seen (Fig. 1B). A full-thickness incision was not made. The conjunctiva was not touched; it was fully preserved. First, a double-armed 6.0 polyglactin suture was passed through the midpoint of the lower lid retractors (Figs. 1C, 2A), and then through the inferior border of the tarsal plate in the upper wound edge (Fig. 2B), and then through the skin 2 mm inferior to the lashes (Fig. 2C). This was first everting suture. Reattachment of the lower lid retractors to the tarsus (Fig. 2B) and placement of the everting suture (Fig. 2C) were performed in the same step. The second everting suture was placed in the same way, but laterally (Fig. 1D). If prominent orbital muscle hypertrophy was observed, 1 to 2 mm of skin and the orbicular muscle was horizontally excised. The skin was closed separately with interrupted 6-0 polyglactin sutures.

Skin sutures were removed in the first week. The everting sutures were left in place for 2 weeks, as they helped to form an adhesion between the lower lid retractors and inferior tarsal plate.

This technique can be classified as a modified version of the Wies technique, based on the modification of Collin, for the following reasons: (1) No full-thickness transverse skin incision was made. The conjunctiva was not touched; it was preserved. In contrast, in the Wies procedure, a full-thickness incision is made [2,4]; (2) The lower lid retractors were reattached to the inferior tarsal plate, instead of to the anterior tarsal plate as in the Wies procedure; (3) Two everting sutures were placed, which helped to form an adhesion between the inferior retractors and the inferior tarsal plate. A third everting suture, in the medial third of the lower lid, was not placed because it may result in punctal ectropion and epiphora. In contrast, in the Wies procedure, three everting sutures are placed [2,4]; (4) In the same step, vertical retractor laxity or disinsertion, which is the primary focus of the procedure, was corrected and the everting suture was placed; or (5) If prominent orbital muscle hypertrophy was observed, 1 to 2 mm of skin and the orbicular muscle was horizontally excised.

**RESULTS**

The mean age of the patients was 71.0 ± 8.0 years (range, 56–87 years). Nine of the patients (36%) were women and 16 (64%) were men. Lower lid entropion was present in the right eye in 14 patients (56%), in the left eye in eight patients (32%), and in both eyes in three patients (12%).

All patients except one had primary involutional entropion. The one patient with a recurrent case had undergone a lateral tarsal strip (LTS) procedure 1 year ago. The mean follow-up period was 27.3 ± 12.4 months (range, 6–60 months). No intraoperative complications were observed.

Our technique was successful, with a satisfactory and comfortable eyelid position (Fig. 3). The symptoms of all patients were alleviated. One patient (3.6%) experienced recurrence after 2 years. Re-operation was recommended for this patient, but the patient did not complain of the condition and chose not to undergo repeated surgery (Fig. 4). The remaining 27 eyes had a correct anatomical position of the eyelid. At every visit, patients were asked to close their eyelids, and we checked whether entropion had occurred. Problems with scarring did not occur in

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**Fig. 2. Modified everting sutures and the retractors reattachment**

First, double-armed 6.0 polyglactin sutures were passed through the midpoint of the lower lid retractors (A), then the inferior border of tarsal plate in the upper wound edge (B), and then the skin 2 mm inferior to the lashes (C). Both reattachment of the lower lid retractors to the tarsus (B) and the everting suture (C) were performed in the same step.
any patient, and postoperative punctal eversion or overcorrection was not observed in any cases. The success rate was 96.4% after a mean follow-up of 27 months.

**DISCUSSION**

Involutional lower eyelid entropion is a frequently occurring malposition of the eyelid that may threaten the eyesight [3]. The main etiological factors are disinsertion or dehiscence of the lower eyelid retractors, vertical lid laxity secondary to dehiscence, lower eyelid laxity (either of the canthal tendons or of the eyelid itself), and overriding of the preseptal orbicularis over the pretarsal orbicularis [5-8]. An ideally effective technique would be able to correct all the causative factors, while minimizing the recurrence rate [3]. The literature contains descriptions of several techniques for correcting involutional lower eyelid entropion [1,3,9-20]. Varying success and recurrence rates have been reported to result from different modified or combined entropion surgical procedures.

Everting sutures alone are known to be a safe, fast, simple, and effective treatment for involutional entropion, but the recurrence rate was 15% at a mean follow-up of 31 months [15,16]. If there is horizontal eyelid laxity, an everting suture can be combined with LTS to increase the efficacy of the evert ing suture procedure [16-18]. The recurrence rate in procedures combining evert ing sutures with LTS was reported to be 0% and 2% by
Scheepers et al. [17], with a minimum follow-up of 18 months, and Barnes et al. [18], with a mean follow-up of 18 months, respectively. Differences in surgical technique or the patient population may contribute to variation in the recurrence rate [17]. However, regarding the surgical techniques combined with LTS, providing a cosmetically acceptable lateral canthal angle is one of the most important points to be considered. We think that our modified technique is especially advantageous because it does not cause lateral canthal angle deformation.

If horizontal eyelid laxity is present, the Wies method can be combined with LTS [13,14]. In a study by Serin et al. [13], recurrence was observed in nine of the 31 eyes (29.0%) in which the Wies procedure was performed, whereas recurrence only was found in one of the 45 eyes (2.2%) treated with a technique combining LTS, retractor tightening, and evert suture s. On average, recurrence took place 4.8 months after the procedure in the Wies group, whereas only patient with recurrence in the combined procedure group presented at 2 months postoperatively [13]. Lance and Wilkins [14] reported a recurrence rate of 11% in 66 cases treated with the Wies procedure alone, whereas no recurrences were observed in 29 cases treated with a procedure combining the Wies procedure with lateral canthal horizontal shortening [14]. In this study, recurrence was observed in only one eye (3.6%) at 24 months of follow-up. Therefore, we suggest that long-term, regular follow-up of patients is important for detecting long-term recurrence.

If there is no horizontal eyelid laxity, as in our patients, the Wies and Jones procedures can be considered as alternative options. The Jones technique may be used as a primary procedure, but it is mostly used for recurrent involutional entropion [2]. Athavale and O’Donnell [9] reported that LTS combined with a modified version of the Jones technique (lower eyelid retractor reattachment onto the anterior surface of the tarsal plate) was an effective surgical technique based on the results of 24 months of follow-up. Because horizontal eyelid laxity might have been present, all patients underwent lateral canthoplasty and LTS as part of the procedure. Athavale and O’Donnell [9] did not place evert suture s. In their technique, the sutures were passed through the inferior skin border, then through retractor s and anterior surface of tarsal plate, and then through the upper edge of the skin border. Our procedure involved modified evert suture s combined with direct reattachment to the inferior tarsal plate of the lower eyelid retractors. In our procedure, the sutures were passed first through the lower lid retractors, and then the inferior border of the tarsal plate, and then through skin 2 mm inferior to the lashes (the first evert suture). The skin was closed separately with interrupted 6-0 polyg lactin sutures.

The Wies procedure mainly corrects vertical laxity and orbicularis dysfunction [2,4,13]. It is a combination of transverse full-thickness blepharotomy and evert suture s [2,4,13]. In our technique, a full-thickness incision is not done. Therefore, the conjunctiva is preserved. This point is very important, particularly in patients with ocular cicatricial pemphigoid (OCP). Although the etiology is not involitional, entropion is a common finding in OCP patients. This technique may also be useful in patients with OCP.

If horizontal eyelid laxity is not present, we suggest that the Wies procedure can be modified to increase the success rate. In this way, it may be more effective than the standard Wies procedure. The recurrence rates after the Wies procedure have been reported to be 11%–29% [13,14,18,19]. In our modified Wies technique, the rate of recurrence was 3.6% and the time to recurrence was 2 years in the sole patient who experienced recurrence. Another advantage of this method may be that recurrence occurs later than in other methods reported in the literature [1-24]. The cause of late recurrence may be fibrosis between the tarsus and retractors. This fibrosis may also prevent overriding and relapse in the late period. Furthermore, both strengthening the retractors of the lower eyelid and making the evert suture s in the same step shortened the surgery time. Moreover, the conjunctiva and fornix were preserved, the effectiveness of the Wies procedure was increased, and the rate of complication was dramatically reduced with this method. Another advantage is that the lateral canthal angle did not deteriorate. As we know, the cosmetic results of a surgical technique should be taken into consideration when selecting the most appropriate procedure, and cosmetic results may be as important as surgical outcomes in oculoplastic surgery. No patients had problems with scarring or the lateral canthal angle in our study. However, our study lacks a comparison with standard evert suture s, the Wies procedure, or the Jones procedure. The retrospective nature of our study and limited number of patients are other limitations of our research. Although many studies investigating surgical repair techniques for involitional entropion have compared combined or modified techniques with more traditional ones [1-24], to our best knowledge, this particular modification has not been described in the literature.

A recently published review analyzed studies examining various causative factors and treatment procedures to clarify and correct involitional lower eyelid entropion [20]. Using a combination of these treatment procedures to correct multiple etiological factors further decreases the recurrence rate, as in our modified technique [20]. In our study, a patient with recurrent entropion after LTS was successfully treated with this method. Additionally, the recurrence rate in our study (3.6%) was low.

We propose that this modified Wies technique (transverse
semi-thickness blepharotomy and modified everting sutures combined with reattachment of the lower eyelid retractors to the inferior tarsal plate) is an effective surgical procedure that may be preferred for the primary treatment of involutional lower entropion. The advantages of this procedure include the lack of a conjunctival scar, punctal eversion, and lateral canthal angle deformation. Additionally, a low recurrence rate and a long interval until recurrence were observed. We believe that our technique might be very useful in appropriate cases.

NOTES

Conflict of interest
No potential conflict of interest relevant to this article was reported.

Ethical approval
The study was approved by the Institutional Review Board of University of Health Sciences, Numune Education and Research Hospital (IRB No. E-19-2594) and performed in accordance with the principles of the Declaration of Helsinki. Written informed consents were obtained.

Patient consent
The patients provided written informed consent for the publication and the use of their images.

Author contribution
Data curation: KO Yalcinsoy. Formal analysis: EM Sen. Methodology: EM Sen. Writing - original draft: EM Sen. Writing - review & editing: EM Sen, KO Yalcinsoy.

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