Scientific Research Publishing

Modern Plastic Surgery, 2025, 15(1), 21-31
https://www.scirp.org/journal/mps
ISSN Online: 2164-5280
ISSN Print: 2164-5213

Upper Eyelid Myocutaneous Flap and External Tarsorrhaphy, Two Combined Minimally Invasive Techniques in the Functional and Cosmetic Correction of Cicatricial Ectropion of the Lower Eyelid: An Experience of Two Clinical Cases Follow in Short Term

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How to cite this paper: Apouakone, J.C., Fazaa, E., El Hajj, L., Lipa, G., Cassier, S. and Dunet, E. (2025) Upper Eyelid Myocutaneous Flap and External Tarsorrhaphy, Two Combined Minimally Invasive Techniques in the Functional and Cosmetic Correction of Cicatricial Ectropion of the Lower Eyelid: An Experience of Two Clinical Cases Follow in Short Term. *Modern Plastic Surgery*, **15**, 21-31.
https://doi.org/10.4236/mps.2025.151002

Received: November 24, 2024
Accepted: January 23, 2025
Published: January 26, 2025

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Abstract

Cicatricial ectropion of the eyelid is an eversion of its edge, which has moved away from the globe. It is frequently the result of cicatricial retraction after trauma. The main risk is the occurrence of a corneal ulcer or chronic conjunctivitis. Their treatment is often difficult, especially when the ectropion is old and significant. There are several classic techniques for correcting cicatricial ectropions, but the technique of the myocutaneous flap combined with external tarsorrhaphy without damage to the canthal ligament is minimally invasive, not very widespread, yet responds very well to the rules of plastic surgery. We report two cases of post-traumatic cicatricial ectropions of the left lower eyelid, respectively in a 33-year-old and an 87-year-old, treated using this technique. The surgical procedure was performed in two stages, after evaluation of the skin of the flap to be harvested: harvesting of the flap and closure plasty including external tarsorrhaphy. Patient follow-up did not note any complications. This combined technique offers a minimally invasive alternative for the often-delicate treatment of ectropions.

Keywords

Ectropion, Scar, Flap, Eyelid, Tarsorrhaphy

1. Introduction

Cicatricial ectropion of the lower eyelid is an eversion of the eyelid edge that has moved away from the globe [1]. It is more frequently the result of retractile scars after eyelid trauma [2] [3]. Correction of cicatricial ectropion is sometimes complicated and can be achieved by several techniques, such as grafts or flaps [4] [5]. Multiple flap techniques are found in the literature, such as the nasolabial flap, the Mustardé flap, the Tenzel flap, the Fricke flap, or the upper eyelid myocutaneous flap [6] [7]. In 1885, Landolt was the first to describe the upper eyelid myocutaneous flap, later called a "blepharoplasty flap" by Siegel in 1987 [8]. This is a type of flap that, although old, remains current. It can be used in combination with a composite graft or flap or with a lateral canthopexy with tarsal ligament involvement, generally in moderate to severe ectropion [8]-[10]. This technique requires prolonged postoperative follow-up and presents the risk of increasing morbidities. The myocutaneous flap combined with tarsorrhaphy without canthal ligament involvement is a less invasive technique, less used than the classic techniques for correcting cicatricial ectropion [10] [11]. They meet the principles of eyelid reconstructive surgery, which advocates the use of similar loco-regional tissues to maximize the restoration of eyelid appearance and function. Its use also saves time in the perioperative period and provides a good postoperative result [8] [12] [13]. We describe two experiences of the use of these combined techniques: in a young subject and an elderly subject.

2. Methods

The study was descriptive in a prospective phase over a period of one year, from May 2023 to May 2024. Patients were recruited after providing informed consent from consultation to postoperative follow-up during the study period in the plastic surgery department of Longjumeau Hospital.

The patient selection criteria were based on the following elements, which concerned all patients of all ages.

- Diagnosis of scar ectropion: The patient must have a confirmed diagnosis of scar ectropion by an ophthalmologist or plastic surgeon.
- Presence of a scar: The patient must have had an eyelid or periocular scar, which is the cause of the ectropion.
- Eye symptoms: The patient was expected to have ocular symptoms such as dry eye, pain, foreign body sensation, or blurred vision, etc.
- Failure of conservative treatments: The patient must have already tried conservative treatments such as eye drops, compresses or massages without significant improvement.

3. Medical Observation

3.1. Case 1

A 33-year-old patient presented to our department with a secondary cicatricial ectropion of the left lower eyelid. The patient was treated for multiple facial inju-

ries following a road accident 4 months before the consultation. On examination, he had scars on the left lower eyelid, the left internal brow ridge, and the left frontotemporal region. The scar on the left lower eyelid was hypertrophic and retractile, with an ectropion of the left lateral lower eyelid (Figure 1). A slight scleral exposure, without epiphora, or signs of chemosis or keratoconjunctivitis, was found on clinical examination. The left upper eyelid was healthy. Initially, he was prescribed massages of the eyelid scar twice a day for three to five minutes, rifamycin ophthalmic for 10 days, and nocturnal occlusion of the left eye to prevent the occurrence of a corneal ulcer. The respective controls at one month and two months showed efficacy with regression of the scar hypertrophy, but persistence of the ectropion of the left lower eyelid. The indication for a scar revision and correction of the ectropion of the lower eyelid by a myocutaneous flap of the upper eyelid and tarsorrhaphy was posed.

Figure 1. Preoperative photograph of the patient who has had an ectropion.

Surgical Technique

The procedure was performed in the operating room, under local anesthesia and neurolept-analgesia. Before the procedure, an assessment of the skin of the flap to be harvested was performed. The skin of the upper eyelid was pinched at the skin fold to determine the extent of the myocutaneous tissue that could be removed as a flap while preserving the function of the upper eyelid. The upper eyelid was put under tension, allowing the loss of substance to be filled to be clearly visible and facilitating the positioning of the flap.

The flap was harvested by excision of the pre-measured area of the left upper eyelid, corresponding to the defect of the left lower eyelid. A lateral detachment was performed to free the flap and facilitate its mobilization. It was then dissected deep into the skin, removing part of the orbicularis muscle (Figure 2). The flap was then mobilized by rotation vertically and then horizontally on the defect of the lower eyelid under a skin tunnel created at the external canthus (Figure 2). A tension-free suture of the edges of the flap was performed with interrupted cutaneous stitches using Prolene 6.0. The donor site was also closed using Prolene 6/0.

Subsequently, after reviving the ciliary edges, an external tarsorrhaphy was performed with two interrupted stitches using Vicryl 6.0. An occlusive dressing and eye protection with a shell were applied postoperatively. The patient was put on paracetamol. The immediate postoperative course was simple. On postoperative day 2, the patient presented with slight eyelid edema, without reported pain. The flap was well colored; no signs of infection or tissue necrosis were found. The sutures were well in place. A prescription for vitamin A eye ointment at a rate of one application morning and evening, regular washing with dacryoserum was given to the patient, and then a new follow-up appointment was given for postoperative day 6.

Figure 2. Unipedicled myocutaneous flap of the patient's left upper eyelid. Rotated lower eyelid scar to fill eyelid defect.

At the postoperative day 6 follow-up, the correction of the lower eyelid ectropion was effective and the tarsorrhaphy was in place. There were no complications. Partial removal of the sutures was performed.

The patient was also reviewed on postoperative day 9; he had no complaints, and no signs of flap suffering were found. The remaining sutures were removed. New follow-up appointments were carried out at one month and three months post-operatively, which revealed functional improvement (**Figure 3**).

Figure 3. Photograph seen at 03 months post-operative.

3.2. Case 2

This was an 87-year-old female patient with a medical history of high blood pressure and idiopathic thrombocytopenia who came to consult for the progressive onset of discomfort in the left eye, which had become permanent. The clinical examination revealed a scar on the left lower eyelid following the suture of a wound in the emergency room approximately 2 months before the consultation. Eversion of the free edge of the lower eyelid was also observed, resulting in a significant ectropion (**Figure 4**).

Figure 4. Appearance of the ectropion scar of the lower eyelid upper eyelid left preoperative view.

We indicated scar revision and correction of ectropion of the left lower eyelid using a myocutaneous flap taken from the left upper eyelid.

Surgical Technique

The same technique as that performed in the first patient was used. A 2 × 0.5 cm upper eyelid myocutaneous flap was mobilized to fill the defect on the left lower eyelid (**Figure 5**).

Figure 5. Pedicled single flap of folded down for filling the lower defect.

The follow-up was simple, with no complications noted on postoperative day 2. The sutures were removed on postoperative day 6. One month postoperatively,

there was a good improvement in the ectropion with its complete disappearance (**Figure 6**).

Figure 6. Photo of the patient 01 month postoperatively with correction of the ectropion.

4. Discussion

Eyelid eversion is favored by underlying horizontal and vertical tissue laxity [8] [9] [12]. Among the causes of ectropion, we find skin allergies or eczema, eyelid trauma, burns, and eyelid surgeries with excessive skin excision [2] [3]. The two patients in our study had in common ectropion caused by a post-traumatic retractile scar of the lower eyelid (**Figure 1**, **Figure 4**).

There are different options for the management of cicatricial ectropion [4] [5] [8] [9]. The option with the least morbidity and an optimal functional and aesthetic outcome should be selected [8] [9] [12]. Cicatricial ectropion is a complication that requires appropriate and personalized surgical treatment [1] [4].

The upper eyelid musculocutaneous flap is a very reliable flap on the vascular level [14]. It has multiple advantages and is a wide flap with a pedicle that allows to cover the entire extent of the lower eyelid [15]. The skin of the upper eyelid is very well vascularized thanks to the arterial supply of the underlying orbicularis muscle consisting of branches of the superficial temporal artery, and the angular and ophthalmic arteries [16]. The vascular supply of the orbicularis follows the direction of the fibers of the recipient part of the eyelid and maintains an adequate blood supply, thus reducing the risk of flap necrosis [3]-[5] [13]. In addition, the flap allows reconstruction with eyelid tissue similar to the recipient site, which optimizes the good cosmetic and functional results [1] [4] [14].

The skin of the lower eyelids requires a rich blood supply and has a potentially higher rate of necrosis and infection if blood drainage is not adequate [17]. A myocutaneous flap provides a blood bed to the lower eyelid, which may be useful in patients with previous lower eyelid trauma [4] [5] [9]. However, this is not the case with skin grafts, which are also reduced to a single skin layer, reducing the potential for function at the recipient site [4] [9] [18]. Unlike the musculocutaneous flap, the skin graft does not allow the reconstruction of the anterior lamella (palpebral skin and orbicularis muscle) and exposes more to certain complications

at the level of the graft itself (risk of necrosis, retraction, heterochromia), as well as to the morbidity caused by the harvesting site (scars, discomfort, postoperative care) [19]. The base of the flap is located at the point where the arteries enter the muscle (up to 2 cm lateral to the external canthus and 1 cm medially to the internal canthus) [18]. Thus, the entire skin of the upper eyelid can be moved on a very narrow pedicle thanks to a pivot point located outside the eyelid [3] [6]. This flap can be mobilized 360 degrees and can cover localized defects throughout the periorbital area in addition to lower eyelid defects [20]. In addition, the vascular supply can nourish a "random" area that exceeds the muscle surface by about 1 cm [14].

The myocutaneous flap is recommended in the correction of the defect caused by the retractile scar of the lower eyelid, especially in elderly patients, and is the standard reconstruction method in these cases of cicatricial ectropion [9] [16] [17]. Surgical management of cicatricial ectropion depends on the situation after release of cicatricial traction at the lower eyelid [16]. The defects result from the release of ectropion that includes the skin and orbicularis oculi, which constitute the anterior lamella of the eyelid [1]. In the procedure described by Barin and Cinal, a musculocutaneous flap was designed to repair the lower eyelid defects [21]. The application requires that the upper eyelid skin laxity be examined and sufficiently relaxed to check the availability of the skin island of the flap [4]. This is actually the first operative step that we performed in our study (**Figure 2**, **Figure 5**). The applicability of this method may be advantageous because of the excess eyelid skin available, so be sure to exploit as much of it as possible by covering the lower eyelid defect [16]. The method is beneficial for older patients due to more advanced skin laxity, but may not be suitable for younger patients who have much more toned skin [15] [16] [21]. Tarsorrhaphy is often mentioned in cosmetic surgery as stabilization for blepharoplasty of the lower eyelids [15]. We used it to strengthen the myocutaneous flap, especially in the second patient who had an effect of gravity on the ectropion, through the head regularly lowered [21].

After flap incision, dissection must be meticulous with adequate gestures to reserve the very precious pedicle of the flap [6] [9]. A pedicled flap can be harvested from the upper eyelid and transposed to the lower eyelid as an unipedicle or bipedicle flap [22] [23]. In our case, the flap was unipedicular. The combination of the myocutaneous flap technique with external tarsorrhaphy to treat cicatricial ectropion is an effective alternative surgical technique [8] [9] [12] [15] [24]. Generally, tarsorrhaphy is underused as a prophylaxis and treatment option for recalcitrant surface healing problems [3] [6]. The tarsorrhaphy procedure differs from the canthopexy technique as described by the authors, in that it does not require sacrifice of lower eyelid tissue or lateral displacement of eyelid structures to correct horizontal laxity [6] [8]. Unlike the myocutaneous flap combined with tarsorrhaphy, canthopexy is a common technique for cases of severe ectropion and is combined with lower eyelid skin grafts [3]. Also called the lateral tarsal strip surgical technique described by Anderson in 1979 [23]. It is the most commonly

practiced but is sometimes associated with a composite flap, which can increase the morbidity of the surgical procedure, unlike our combined technique [8] [12].

Thus, comorbidities related to surgical procedures (such as laxity of the lateral canthal ligament, recurrent ectropion, sequelae of tension of the external canthus) [9] [20] [25].

This surgical combination of correction is of interest in the correction of the anterior lamella deficit as well as the re-tensioning of the tarsoligamentous strap [26]. Tarsorrhaphy combined with the upper eyelid by cutaneous flap is also an alternative to spare the external canthal ligament, which is often in a state of laxity in elderly patients [3] [20] [24].

In our cases, we opted for a lateral tarsoplasty, distinguishing it from lateral canthoplasty by avoiding the lateral canthal ligament [8]. The canthopexy approach to the canthal ligament often causes displacement of the anchor points of the canthal tendon, leading to involuntary movement of the eyelid, which could lead to malposition or new lateral ectropion of the lower eyelid [9] [10]. We used lateral tarsorrhaphy without damage to the canthal ligament to strengthen the myocutaneous flap and counteract the effect of the patient's head posture, which could cause gravity on the surgical scar, because she usually walked with her head bent [3] [8] [12]. Remember that the main causes of laxity of the lateral canthal ligament are senile/paralytic, congenital, traumatic, and/or medical and aesthetic causes [15] [19].

All this explains another reason to spare the canthal ligament in our two trauma cases and the senility in the elderly patient. The combination of the lateral tarsorrhaphy technique with the upper eyelid myocutaneous flap had the effect of preventing subsequent scar ectropion and providing substantial structural support, resulting in no recurrence of ectropion and acceptable results during the surgical follow-up period of our cases [3] [6] [8] [12] [15].

This combined technique has a limit in situations where there is little skin in the donor site (upper eyelid) for adequate eyelid closure [3] [26] [27].

To solve these problems, the vertical-to-horizontal local rotation technique myocutaneous flap (V to H) is used instead of the conventional wedge procedure in the lower eyelid to repair scar ectropion of the lower eyelid [3]. Some complicated cases in this V to H technique of both cicatricial and paralytic ectropion with lagophthalmos can be challenging for plastic surgeons [28].

Thus, in addition to the lateral tarsorrhaphy for these complicated cases, good functional and cosmetic results are obtained. Other limitations that make the myocutaneous flap ineffective, combined with tarsorrhaphy, are a severe defect of the lower eyelid [29]. In this case, the canthopexy technique associated with the composite graft is used, to the detriment of high risks of morbidity [3]. Also, V-Z flap techniques combined with musculocutaneous flaps can be used to cover not only lower lids, but total and subtotal defects of the eyelid, and they do not need skin grafts [14]. Complications after this combined technique can include trichiasis, adhesion between upper and lower lids after tarsorrhaphy removal, premature

opening of the tarsorrhaphy, pyogenic granuloma of the eyelid, and keloid formation [24]. As the limit of this study, we were not able to recruit enough patients to do a more comparative study. We were not able to do long-term follow-up over at least one year, which would have allowed us to have a more reasoned discussion on long-term follow-up. However, its short-term follow-up seems to quickly show a low incidence of early recurrence, as in our two cases [8] [26]. Also, the minimum duration of evaluation of the correction of ectropion can be 2 to 3 months postoperative, as we did in our two cases [30]. Although the average duration of follow-up is approximately 14 months, depending on the reason, neither recurrence of ectropion, nor abnormal position of the eyelids and donor site morbidity were observed during the follow-up of our patients [9].

5. Conclusion

Like some classical techniques for correcting cicatricial ectropion of the lower eyelid, the myocutaneous flap of the upper eyelid has multiple advantages. Its combination with tarsorrhaphy without including the external canthal tendon is non-invasive in practice by promoting a functional and aesthetic correction, but also preventive of the ectropion of the lower eyelid. We suggest the valorization of this combined technique, which gives acceptable results in a short time and offers surgeons a minimally invasive alternative to the techniques already available.

Confirm

The authors confirm that the informed consent of the patient and her parents has been obtained for the production of this publication.

Limitation

Small sample size that needs to be increased in future studies.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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