

Reconstruction of the Lower Eyelid Substance Loss: About 11 Cases and Review of the Literature

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Abstract

Original Research Article

This article is a general review of the different flaps for reconstruction of lower eyelid substance loss. We study 11 cases of large basal cell carcinoma of the lower eyelid requiring palpebral reconstruction, of which 09 patients benefited from flap reconstruction. We will also make through these observations, a development of the various techniques with a review of the literature, highlight the results of the various possible skin flaps for the reconstruction of substance loss of the lower eyelid.

Keywords: Flaps, lower eyelid, reconstruction, techniques, results.

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INTRODUCTION

Reconstruction of a lower eyelid defect that extends over more than a quarter of its width cannot be achieved by direct closure and requires a more complicated reconstructive approach [1]. Often these are techniques that mobilize flaps outside the eyelid area or even flaps taken from the upper eyelid. These well-known techniques can solve the functional aspect of the reconstruction, but they are sometimes unsatisfactory from an aesthetic point of view [2, 3].

We report on 11 cases of large basal cell carcinoma of the lower eyelid requiring palpebral reconstruction, of which 09 patients benefited from flap reconstruction. Through these observations, we will also review the different techniques with a review of the literature, highlight the results of the different possible skin flaps.

MATERIAL:

This is a retrospective and analytical study over an extended period from 2016 to 2021 performed in the department of maxillofacial surgery of the Military Hospital of MARRAKECH. We included all patients hospitalized in the department for an inferior palpebral tumor who had received surgical treatment with reconstruction. There were 11 of them.

METHOD:

The collection of clinical, radiological, histological and therapeutic data is carried out for each patient from the medical records archived in the maxillofacial surgery department.

RESULTS

The 11 patients were aged between 50 and 70 years, and had the following histories: 04 of them were hypertensive under treatment, 03 were diabetic and 06 had no particular history, smoking was found in 09 patients, no patient had similar cases in the family.

Most of them presented after a delay of more than 12 months. They consulted for a tumor of the lower eyelid progressively increasing in volume.

Clinical examination showed an ulcerated tumor with telangiectasias. Visual acuity was not impaired. None of the patients had lymph node involvement. Almost all patients were pain-free, which explains the delay in diagnosis.

The surgical intervention consisted in a first step of a large exeresis of the tumor Anatomopathological examinations showed the predominance of basal cell carcinoma.

The excision margins showed incomplete excision of basal cell carcinoma in 3 cases, in the rest of the cases the excision was complete.

The technique of extemporaneous examination was not used and for this reason the reconstruction was done in a delayed way after the result of the classical histology in most of the patients.

The second stage of the operation consisted of reconstruction of the lower eyelid using different flaps depending on the location and size of the loss of substance:

- The Mustard flap was used 4 times (Figure 1 & 2).
- An orbito-naso-genic flap was used in 3 cases
- In 2 patients a Tripiier flap was used

Direct suture technique was used twice for lower eyelid loss of substance following BCC in subjects over 60 years of age.

In all patients, the results were favorable from a functional and aesthetic point of view.



Figure 1: Reconstruction of a lower eyelid SDB with a Mustard flap after removal of a lower eyelid BCC



Figure 2: Use of a Mustard flap

DISCUSSION

General Rules:

To reconstruct the eyelid, the surgeon must determine the most appropriate technique to restore the natural eyelid contour for each clinical scenario. Eyelid reconstruction requires the restoration of three layers: an outer layer of skin, an inner layer of mucosa, and a semi-rigid tarsal plate interposed between them.

With proper preoperative evaluation and surgical planning, we are already halfway through the procedure. Therefore, we need to know If the defect is full thickness with eyelid margin involvement or only an anterior lamellar defect. We need to specify:

- ✓ Size of the defect: amount of lamellar loss
- ✓ Location: medial, lateral or central
- ✓ Involvement of the medial or lateral canthus
- ✓ Involvement of the lacrimal drainage system
- ✓ Age of patient: eyelid laxity
- ✓ Opposite eyelid condition
- ✓ Assessment of contralateral eyelid

- ✓ Mobility of surrounding tissues

- ❖ The goals are to ensure:
 - ✓ Adequate closure of the eye,
 - ✓ Preservation of the tear film,
 - ✓ Maintenance of an unobstructed visual field,
 - ✓ And to recreate an aesthetically appealing eye.
- ❖ General considerations for eyelid reconstruction:
 - ✓ Both flaps must be replaced, the skin and muscle flap in front and the cartilaginous structure and smooth mucosa in back.
 - ✓ In general, one of these two flaps has to be reconstructed as a flap and the other flap can be replaced by a graft/free flap. The flap provides the vascular supply. However, there have been attempts to reconstruct the entire lower eyelid with a single thick flap.
 - ✓ The levator palpebrae superioris, orbicularis oculi and inferior retractors must be respected.

- ✓ A stable mucocutaneous eyelid margin with good apposition to the globe must be obtained.
- ✓ Special attention must be paid to the integrity of the lacrimal apparatus when the resection involves the medial canthal region.
- ✓ Scars are hidden if the incisions are made in or parallel to the skin folds (tension lines of the relaxed skin). Curved scars are less visible than straight scars.
- ✓ The goal is to achieve symmetry between the two eyes for a better aesthetic appearance.
- ✓ Avoid overlapping wound edges,
- ✓ Sutures should always be placed with the knots on the skin side, to avoid irritation of the cornea.
- ✓ Postoperative ectropion, a classic complication in lower palpebral reconstruction, should be avoided.

Principles of palpebral repair surgery:

❖ Principle of homology:

Any structure of the human body is ideally replaced by its counterpart (thus the best substitute to reconstruct an eyelid is the eyelid itself).

❖ Principle of "plane by plane" repair:

Palpebral repair involves the reconstruction of a deep mucosal plane, an intermediate tarsal plane and a superficial skin plane. The anterior lamella is composed of the skin and the orbicularis muscle; the posterior lamella is composed of the conjunctiva, the tarsus and the eyelid retractors. For full-thickness defects, both lamellae usually need to be reconstructed.

❖ Safety principle:

This refers to vascularity. If only one flap is reconstructed, a flap or graft can be used because the remaining flap is vascularized.

If the defect is transfixing, both flaps must be reconstructed; in this case, two flaps or a flap and a graft can be used but never two grafts at the same time because the absence of vascularization will lead to the failure of the repair.

Lower eyelid involvement is the most frequent but with less risk for the eye. Therefore, one should not take the risk of using the upper eyelid to reconstruct the lower eyelid unless one makes sure that the harvesting is not harmful to the upper eyelid. It should also be noted that the repair of the orbicularis muscle and the eyelashes is not necessary on the lower eyelid.

Description of techniques:

- Bi-pedicled heteropalpebral flap of the upper eyelid (Tripiet flap): (method opted for 2 patients in our study)

Allows reconstruction of the anterior flap over its entire width. It is based on the excess skin of the upper eyelid

The flap is harvested through 02 horizontal incisions, one low above the upper palpebral crease, the other high above. The pedicles are lateral and medial. It carries away the muscular and cutaneous planes [3].

- Mustarde temporo-jugal gliding flap (method chosen for 04 of our patients)

Allows reconstruction of the anterior flap along its entire length and also reconstruction of the posterior flap. The course of the flap goes up and out of the external canthus, rounds around the temporal region and goes down in front of the ear to the lobe (Figure 2). It is completely detached in the subcutaneous plane. The flap must be attached to the external orbital periosteum superiorly, to support its heavy weight and thus avoid the occurrence of an ectropion [3].

- Advancement rotation flap:

The loss of substance must not reach the free edge, with a maximum diameter equal to half the length of the palpebral slit. Two triangular flaps (cutaneous-muscular) are harvested, extending respectively the upper edge of the loss of substance along a horizontal line medially and the lower edge along a horizontal line laterally.

- Unipedicular upper heteropalpebral flap:

Uses a rotation flap taken from the upper eyelid. The line is triangular with a medial point, and includes the skin and the underlying orbicularis muscle. The detachment arrives at the tail of the eyebrow.

- Nasolabial flap with superior pedicle (the method performed for 02 patients)

A skin paddle along the nasolabial fold is traced, with a superior pedicle (located at the level of the medial canthal ligament), with a lower tip. The facial artery is the limit in depth of the dissection (it is not harvested) [5, 3].

- Tenzel flap:

The modified Tenzel flap begins with a semicircle at the level of the lateral canthal area as with the classic Tenzel flap. A semicircle is made below the Pitanguy line. The lateral end of the line is extended to the level of the tragus. The dissection is extended to the submuscular plane on the upper cheek area. It is important to fix the flap to the periosteum of the orbital rim to prevent inferior descent of the flap with a late ectropion [4].

Results of the different flaps :

- The V-Y advancement flap:

The V-Y advancement flap requires less dissection and less operative time. However, the V-Y advancement flap results in a vertical scar on the relaxed skin tension line (poor aesthetic result) [6, 7].

- **Mustard flap:**

This flap is advantageous because it has a good color match, is well vascularized, and contains an abundance of tissue. This flap can cover large defects of the lower eyelid. However, its direction of rotation increases the rate of complications such as ectropion and epiphora, and it also leaves a scar at the cheek eminence. Unfortunately sometimes, the thick, fatty cheek skin that remains after the cheek flap procedure leaves the patient with an unsightly, plump eyelid that contrasts sharply with the very thin, distinct skin of the opposite eyelid [8, 9].

Among its advantages [10]:

Filling of various sizes of loss of substance in the lower eyelid, without using the upper eyelid.

Allows the replacement of the entire anterior lamella and part of the cheek, in association with other techniques (tarsconjunctival or auricular cartilage grafts) and thus the recreation of both palpebral lamellae.

The zygomatic skin has a thinness, a texture and a color quite similar to the palpebral skin

The location of the scars in the natural folds (nasolabial fold, crow's feet and preauricular region).

Disadvantages :

Difficulty of its realization.

It requires a precise dissection in order not to damage the facial nerve and the parotid.

The importance of fixing the flap in the external angle to the orbital periosteum to avoid the risk of palpebral ptosis (high risk).

- **Pedicled Tripiier flap:**

The aesthetic result, despite the presence of scars in the cheek, is often very acceptable; indeed, the scars have a horizontal arrangement. It allows to fill in deficits extended to the corners. The most frequent complication is early edema and lasts almost 3 weeks [11, 12].

In one study, this flap gave very good functional and aesthetic results in 173 patients with various palpebral pathologies: congenital malformations, facial paralysis, anophthalmos, burns, tumors, post-traumatic sequelae, involuntal ectropion, and post-aesthetic blepharoplasty complications [16].

The heteropalpebral flap provides identical tissues, dynamic support, supports the eyeball, and allows for associated procedures.

- **The Tenzel flap [13, 14]:**

Despite its advantages, the classic Tenzel procedure is not free of scarring ectropion.

The modified Tenzel flap had several advantages: relatively invisible scars, minimal complications such as ectropion, and versatile

applicability in periorbital reconstruction procedures, simplicity of the procedure, utilizes thin ideally colored and textured skin, and effective prevention of complications such as distal flap necrosis.

- **Single-pedicled upper palpebral skin flap:**

It is less reliable than the tripiier flap, indeed the tip of the flap suffers in the first postoperative days. It has several advantages: simple procedure with low risk of necrosis, often good aesthetic result. Allows to avoid ectropion. It should be noted that a difficulty of superior palpebral closure internally may arise in case of narrow harvesting at this level [15].

- **Naso genicular flap:**

It has good aesthetic and functional results, especially without scar ectropion. Indeed, the aesthetic results are as follows: few retouching operations are necessary, symmetrical results [16]. Functionally: it ensures a preserved palpebral function, no ectropion, little morbidity at the donor site [16].

CONCLUSION

Eyelid reconstruction is one of the most challenging areas of reconstructive surgery, as the eyelid presents a delicate interplay between anatomy, function, and aesthetics. There are a variety of flaps available for periocular reconstruction, so it is imperative to be familiar with the complex anatomy of the lower eyelid and to be familiar with the many reconstructive techniques [17].

It is therefore up to each surgeon, depending on his or her experience and the advantages and disadvantages of each technique, to make the optimal choice.

RÉFÉRENCE

1. Lo Torto, F., Losco, L., Bernardini, N., Greco, M., Scuderi, G., & Ribuffo, D. (2017). Surgical treatment with locoregional flaps for the eyelid: a review. *BioMed Research International*, 2017, 6742537. <https://doi.org/10.1155/2017/6742537>.
2. Eyelid Reconstruction - EyeWiki n.d. https://eyewiki.aao.org/Eyelid_Reconstruction (accessed February 13, 2022).
3. Bruneau, S., Arnaud, D., Rousseau, P., Belmahi, A., Duron, J. B., Gary-Bobo, A., ... & Bardot, J. (2013, October). Aspects esthétiques de la reconstruction des paupières. In *Annales de Chirurgie Plastique Esthétique* (Vol. 58, No. 5, pp. 437-456). Elsevier Masson. <https://doi.org/10.1016/j.anplas.2013.06.010>.
4. Guyot, L., Seguin, P., & Benateau, H. (2010). *Techniques en chirurgie maxillo-faciale et plastique de la face*. Paris: Springer Paris. <https://doi.org/10.1007/978-2-8178-0073-8>.
5. Sugg, K. B., Cederna, P. S., & Brown, D. L. (2013). The VY advancement flap is equivalent to

- the Mustardé flap for ectropion prevention in the reconstruction of moderate-size lid-cheek junction defects. *Plastic and reconstructive surgery*, 131(1), 28e-36e.
<https://doi.org/10.1097/PRS.0b013e3182729e22>.
6. Mustardé, J. C. (1983). Reconstruction of Eyelids. *Annals of Plastic Surgery*, 11, 149–69.
 7. Kroll, S. S., Reece, G. P., Robb, G., & Black, J. (1994). Deep-plane cervicofacial rotation-advancement flap for reconstruction of large cheek defects. *Plastic and reconstructive surgery*, 94(1), 88-93.
<https://doi.org/10.1097/00006534-199407000-00008>.
 8. MPileP: Marieme EL HASSNAOUI. Les carcinomes évolués des paupières: profil épidémiologique et prise en charge chirurgicale. n.d.
 9. Cha, J. A., & Lee, K. A. (2020). Reconstruction of periorbital defects using a modified Tenzel flap. *Archives of Craniofacial Surgery*, 21(1), 35-40. <https://doi.org/10.7181/acfs.2019.00577>.
 10. Santos, G., & Goulão, J. (2014). One-stage reconstruction of full-thickness lower eyelid using a Tripier flap lining by a septal mucochondral graft. *Journal of dermatological treatment*, 25(5), 446-447.
<https://doi.org/10.3109/09546634.2013.768329>.
 11. Echchaoui, A., Benyachou, M., Houssa, A., Kajout, M., Oufkir, A. A., Hajji, C., ... & Abbassi, A. (2016). Prise en charge des carcinomes des paupières: étude bicentrique rétrospective sur 64 cas avec revue de littérature. *Journal Français d'Ophthalmologie*, 39(2), 187-194.
<https://doi.org/10.1016/j.jfo.2015.05.011>.
 12. Amine, M. H. M. (2013). Les Carcinomes Des Paupieres et Reconstruction.
 13. Alghoul, M., Pacella, S. J., McClellan, W. T., & Codner, M. A. (2013). Eyelid reconstruction. *Plastic and reconstructive surgery*, 132(2), 288e-302e.
<https://doi.org/10.1097/PRS.0b013e3182958e6b>.
 14. Elliot, D., & Britto, J. A. (2004). Tripier's innervated myocutaneous flap 1889. *British journal of plastic surgery*, 57(6), 543-549.
<https://doi.org/10.1016/j.bjps.2004.02.021>.
 15. Karim, A., Schapiro, D., & Morax, S. (2005). Reconstruction de la paupière inférieure de pleine épaisseur: À propos de 3 cas et revue de la littérature. *Journal français d'ophtalmologie*, 28(6), 675-680.
 16. Bompoy, L. (2019). These: Versatilite Du Lambeau Naso-Genien 2019.
 17. Bardot, J., Casanova, D., & Malet, T. (2004). Chirurgie reconstructrice des paupières. *EMC-Chirurgie*, 1(4), 365-390.
<https://doi.org/10.1016/j.emcchi.2004.04.001>.