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Reconstruction of eyelid zones II and III: case series

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Abstract: The eyelids represent anatomical structures of high complexity, requiring the plastic surgeon's technical skills and experience to their reconstruction. Defects in these areas happen mainly after tumor resection, with the lower eyelids being a frequent site of lesions of this nature. The options for reconstruction vary according to some criteria, including the size of the resulting defect, location, and depth. The result of the reconstruction is mainly aimed at restoring the proper functioning of this delicate structure. Methods: This work presents a series of seven cases of patients of different complexity, attended, and treated by the Plastic Surgery Service of the Federal Hospital of Ipanema. We show the versatility of local flaps to restore the proper anatomy and function of the lower eyelid. We also try to highlight different types of tumor pathologies that occur in this region. Results: No patient evolved with ectropion or anatomical distortion, ultimately obtaining a good cosmetic and functional result. Discussion: The medial region of the eyelids represents a significant challenge for its reconstruction since, in this topography, there are delicate structures such as the lacrimal canaliculus and the medial canthal ligament. Several local flaps can be used depending on the extent and depth of the defect generated after trauma or tumor excision. Having mastery over the periorbital anatomy and surgical options is essential for successful treatment.

Key words: carcinoma; basal cell; eyelid neoplasms; surgical flaps; face; anatomy

1 Introduction

Detailed knowledge of the anatomy of the eyelids and ocular region (Figure 1) helps the surgeon select the best surgical technique to restore ocular function and improve the aesthetic result. The eyelid is divided into anterior and posterior lamella. The anterior lamella is composed of skin and orbicularis oculi muscle. The posterior lamella is composed of conjunctiva, tarsus, and eyelid retractor muscles. The orbital septum can be considered a middle lamella and is not usually reconstructed. The ocular conjunctiva on the surface of the globe is continuous with the conjunctiva that lines the inner surface of the eyelids; this relationship must be maintained or restored during reconstruction to preserve eyelid function [1][2].

The periorbital zones can be divided didactically as represented in Figure 2 and are numbered from I to V.

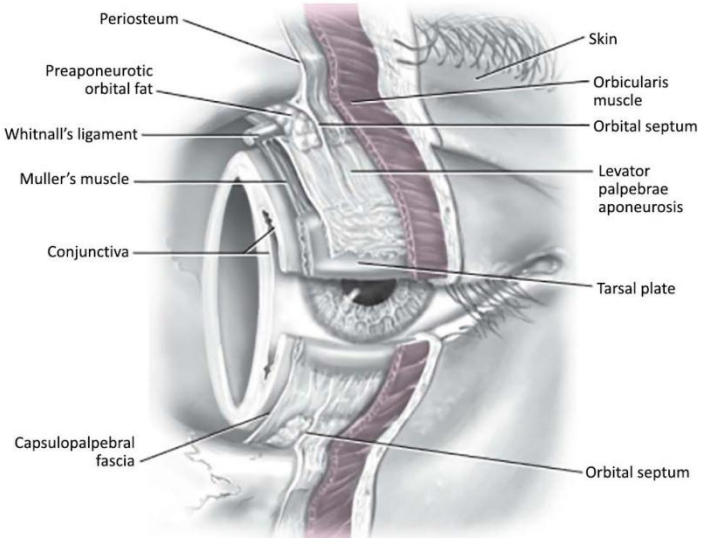

Figure 1. Eyelid anatomy. Division of eyelid structures into anterior, middle and posterior lamellae (Source: Atlas of Aesthetic Eyelid and Periocular Surgery, 2004 [3])

Surgical excision of skin tumors is one of the most common causes of eyelid defects. Basal cell carcinoma (BCC) is the most common tumor in this location, accounting for approximately 90% of cases, with a predominance of lesions in the lower eyelid [1]. Squamous cell carcinoma, sebaceous carcinoma and melanoma are less prevalent histological types [2]. Defects resulting from the excision of skin tumors of the eyelid require detailed knowledge of the anatomy of the periorbital region and the most appropriate surgical approaches for successful reconstruction.

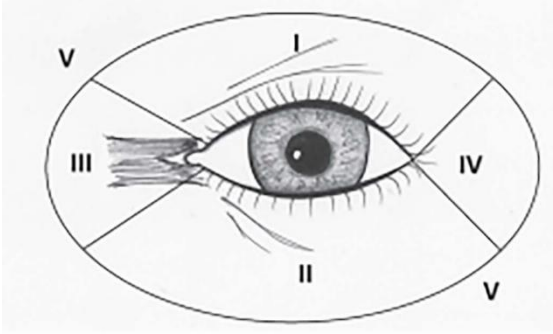

Figure 2. Eyelid zones. Representative illustration of the division of the periorbital region into zones numbered from I to V

2 Objective

The objective of this study is to apply different methods of reconstructing eyelid defects located specifically in zones II and III, or the area corresponding to the lower eyelid and medial corner, respectively.

3 Methods

Series of 7 patients aged between 69 and 90 years with surgical wounds in the lower eyelid after removal of malignant tumors, with defects ranging from approximately 30% to 80% of horizontal extension (Table 1). The patients underwent local anesthesia with or without sedation or general anesthesia. After complete excision of the tumor located in the lower eyelid, surgical reconstruction was performed, according to the extent and depth, using neighboring flaps or skin grafts. In none of the cases was reconstruction of the tarsus performed with cartilage grafts, which is common in lower eyelid surgeries with extensive involvement of this anatomical structure (Figure 2).

Table 1. Materials and methods

Patient	Sex	Age	Tumor	Location	Surgical technique
Patient 1	M	90	Sebaceous carcinoma	Zone III	Imre flap
Patient 2	F	69	Basal cell carcinoma	Zone III	Paramedian frontal flap
Patient 3	F	76	Basal cell carcinoma	Zone III	Glabellar flap
Patient 4	F	73	Basal cell carcinoma	Zone III	Esser flap
Patient 5	M	81	Basal cell carcinoma	Zones II and III	Esser flap
Patient 6	M	76	Basal cell carcinoma	Zone III	Imre flap
Patient 7	F	86	Basal cell carcinoma	Zones II and III	Skin graft

Different flaps were designed and made and a more superficial defect was repaired with a skin graft from the pre-auricular area.

3.1 Case 1

Skin graft: an 86-year-old patient whose lesion affected the skin, reaching zone III, was resected with preservation of the structures of the middle and posterior lamella. Skin grafting was performed, obtaining ipsilateral anterior preauricular skin and repairing the defect (Figure 3).

Figure 3. Patient undergoing full-thickness preauricular skin grafting after BCC excision in zone II

More superficial effects can be repaired with skin grafts, donor areas are: retroauricular, preauricular skin and in some cases the upper eyelid, as these are areas that have similarities with the eyelid skin [1][4].

3.2 Case 2

Paramedian frontal flap: the patient presented with a recurrent lesion in the medial canthus of the right eye (RE), with 10 months of evolution. Resection and intraoperative freezing were performed. The defect generated was deep to the periosteal region of the orbit. The patient had several scar areas in the nasal dorsum and glabellar region; the paramedian and contralateral frontal flap was selected for reconstruction (Figure 4).

Figure 4. Paramedian frontal flap: patient presented with a recurrent lesion in the medial corner of the RE, with 10 months of evolution

3.3 Case 3 and 4

Imre flap: two male patients were selected, the first of whom had a large lesion with partial blockage of the visual axis and underwent resection with intraoperative freezing. The pathology revealed that it was sebaceous carcinoma. The second case was a 76-year-old male with a histopathological diagnosis of BCC (Figures 5 and 6).

Figure 5. Imre flap, reconstruction of a large defect in the left medial canthus, with excellent functional and cosmetic results

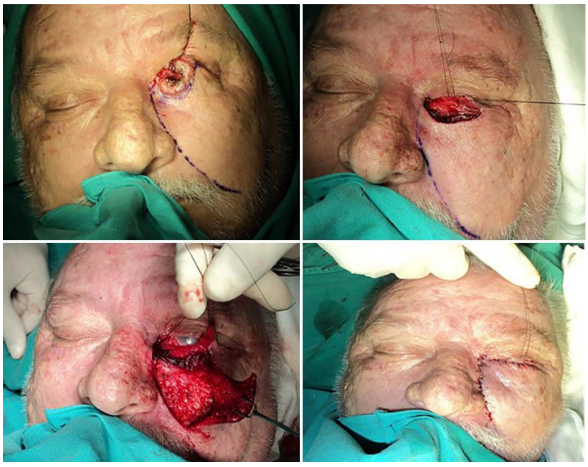

Figure 6. Imre flap: surgical sequence

3.4 Case 5

Glabellar flap: 76-year-old patient with ulcerated lesion in the transition region from the medial canthus of the eyelid to the nasal dorsum, glabellar flap performed (Figure 7).

Figure 7. Transposed glabellar flap to restore left medial canthus anatomy

3.5 Cases 6 and 7

Esser flap: a 73-year-old female patient and an 81-year-old male patient were operated on, both diagnosed with BCC (Figures 8 and 9).

Figure 8. Esser flap after extensive displacement is rotated to correct defect in zones II and III

Figure 9. Case 7. Esser flap with good final scar positioning

4 Results

Seven patients aged between 69 and 90 years underwent surgery, four females and three males, six of whom had a diagnosis of BCC and one of sebaceous tumor. All operated cases were located in periorbital zones II and/or III, in the medial corner of the unilateral lower eyelid. All evolved with good function, without retractions or distortion of the anatomy and preservation of the drainage of the lacrimal ducts.

5 Discussion

For superficial lesions, a free skin graft is used, preferably obtained from the retroauricular region. After cleaning the subcutaneous tissue, the skin to be grafted is sutured to the recipient bed and a Brow dressing is made. Five days later, the dressing is applied and the tie-over is removed [4]. In deep lesions, where the bone is exposed after resection, the VY glabella flap is used, which is simple and practical. Two incisions forming an inverted V are made in the glabella region, then the flap is detached and slid to the site where the lesion was resected and sutured [1][5].

In cases where the extremities of the eyelids are included in the resection, the frontomedial flap is used. In these cases, the surgery is performed in two stages - initially, the frontomedial flap is transposed; after 3 to 4 weeks, the second stage is performed: the pedicle is resected, and the remainder is taken to its original bed. The area is then degreased and the extremities of the eyelids are remade [5][6].

The forehead flap is safe, with little morbidity in the donor area, and is an important option for eyelid reconstruction. The need for a subsequent surgical procedure to resect the pedicle and excess adipose tissue volume in the flap is one of the main disadvantages of this procedure. The patient had an adequate postoperative evolution without complications [7][8].

When the defect is greater than 50% of the lower eyelid and this defect has a circular shape, the Imre sliding flap should be considered. The incision is parallel to the lower eyelid margin, extending to the inner corner and down to the nasolabial fold. This flap should be well detached throughout the genial region to avoid ectropion [9].

The use of the Imre flap provided good aesthetic and functional results, similar to other flaps commonly used for reconstructions of this type, such as the Mustardé, Esser and the glabellar flap for the medial canthus. As an advantage, we believe that this method ensures better positioning of the final scar in the natural grooves of the face [9].

The simple or bilobed glabellar flap is characterized by its transposition of skin from the glabellar region to the medial corner of the eye. It is important to incorporate the supratrochlear artery into the vascular pedicle of this flap. The result

may not reproduce the typical concavity of the medial corner of the eye. It is important to highlight that the presence of hair in the glabellar region represents a disadvantage in the use of this flap, since it can cause hair growth in an area of glabrous skin, such as the inner corner of the eye [1][6].

The Esser flap is used to repair large defects in the lower eyelid. The incision begins at the lateral canthus, continues upwards and descends into the preauricular region (Figures 8 and 9). The entire flap is dissected in the genial and preauricular region, through a plane immediately above the musculoaponeurotic system and, finally, it is rotated and advanced to cover the defect [1][5][7].

6 Conclusion

Eyelid reconstruction requires not only precise anatomical knowledge, but also the most varied surgical techniques, to obtain a functionally and aesthetically satisfactory result and, thus, minimize postoperative complications.

7 Collaborations

DAD	Data analysis and/or interpretation, Statistical analysis, Data collection, Conceptualization, Study conception and design, Project management, Methodology, Writing-original draft preparation, Writing-review & editing, Visualization
SDB	Project Management, Validation

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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