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Reconstruction of lower eyelid and periorbital district: an orbicularis oculi myocutaneous flap

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Received 21 August 2007; accepted 9 June 2008

KEYWORDS

Reconstruction;
Lower eyelid;
Myocutaneous flap

Summary The upper eyelid has long been considered a good source of skin graft, but it is infrequently used as a unipedicled flap, based either medially or laterally, to reconstruct the skin of the lower eyelid. Here we describe a procedure in which we use the upper eyelid skin and underlying orbicularis muscle as a myocutaneous flap to reconstruct the lower eyelid and periorbital region.

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The branches of the ophthalmic artery perforate the extremities of the tarsus and create a vascular arch on the tarsus margin.¹ This vascular arch supplies the orbicularis oculi muscle. Consequently, small myocutaneous flaps that are as long as the tarsus can be raised from the arch. However, because of the short length of the pedicle, the use of these flaps is limited to the reconstruction of small areas on the lower eyelid and in the glabellar region.² The aim of this procedure is to raise longer and wider flaps based on a different vascular inflow.

Patients and methods

From January 2003 to December 2004, we treated 35 patients referred for skin lesions involving the lower eyelid or the periorbital region (zygomatic area, fronto-temporal region, naso-orbital region or nasal region). All patients

underwent tumour resection and immediate reconstruction by means of a myocutaneous flap raised from the upper eyelid. Twenty of the 35 flaps were laterally based and 15 were medially based. Sixteen were island flaps, and in ten cases the island flap was used in association with other flaps. In 7 out of 35 cases, the flap supported a random skin area of about 1 cm.

Case reports

Case 1

A 68-year-old woman was affected by an elliptical-shaped basal cell carcinoma involving the lower eyelid and medial canthus (Figure 1A). She underwent a wide excision down to the bone. Reconstruction was performed with a 7-cm long and 2-cm wide medially based myocutaneous flap. As shown

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doi:10.1016/j.bjps.2008.06.038

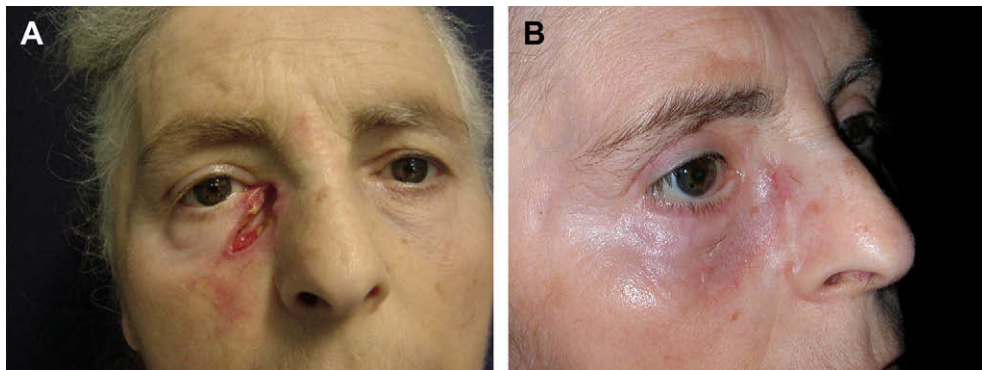


Figure 1 Case 1. (A) Deep basal cell carcinoma of the medial canthus and (B) 3 months after surgical treatment with the myocutaneous upper eyelid flap.

in Figure 1B, there was a very good aesthetic and functional outcome 3 months after surgery.

Case 2

A 62-year-old woman was affected by basal cell carcinoma of the frontotemporal region. The lesion was 4 cm long and 2.5 cm wide. It did not involve the periosteum (Figure 2A). We covered the defect with a large myocutaneous laterally based island flap raised from the upper eyelid. The de-epithelised pedicle was buried deep into the skin of the superior lateral periorbital area (Figure 2B). One month after surgery, the outcome of surgery was excellent, and scars were not conspicuous (Figure 2C).

Case 3

A 60-year-old male affected by basal cell carcinoma of the naso-orbital area. The tumour excision involved an area 2-cm diameter down to the bone (Figure 3A). We filled the defect with a medially based myocutaneous island flap positioned through a subcutaneous tunnel (Figure 3B). Two months later, slight contracture of the pedicle caused the overlapping skin to rise. Figure 3C shows the patient 3 months after surgery.

Case 4

A 56-year-old woman was affected by Merkel tumour involving the lower eyelid and the zygomatic area down



Figure 2 Case 2. (A) Frontotemporal region basal cell carcinoma, (B) 7 days after surgical treatment with a laterally based myocutaneous upper eyelid flap and (C) 1 month after surgery.

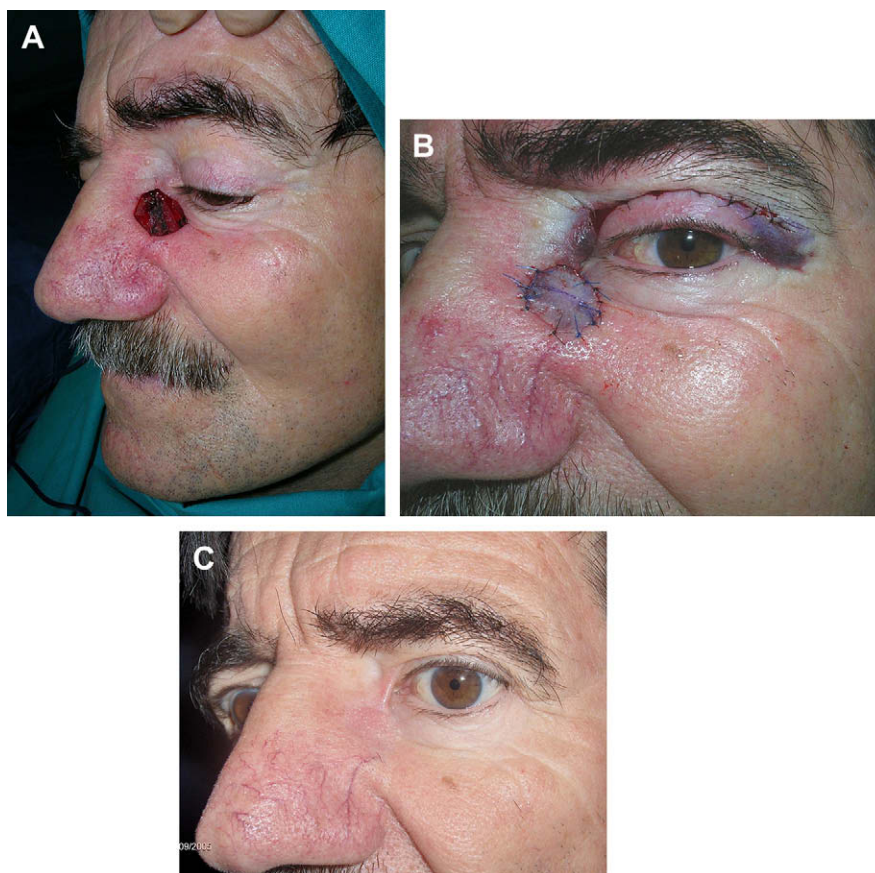


Figure 3 Case 3. (A) Skin defect after excision of basal cell carcinoma of the naso-orbital area, (B) Immediate postoperative view. The raw area has been covered with a medially based myocutaneous island flap from the upper eyelid and (C) 3 months after surgery.

to the bone (Figure 4A). The excision extended to just beyond midway of the lower eyelid and to the inter-orbitozygomatic area. Reconstruction was performed with a myocutaneous laterally based flap from the upper eyelid associated with an island flap from the nasolabial fold. Figure 4B shows the area 6 months after surgery.

Case 5

A 74-year-old woman was affected by basal cell carcinoma of the lower eyelid involving the eyelid margin (Figure 5A). In this case, it was necessary to remove almost the entire lower eyelid. Reconstruction was performed with a tarso-conjunctival flap (the Landolt–Hughes technique) raised

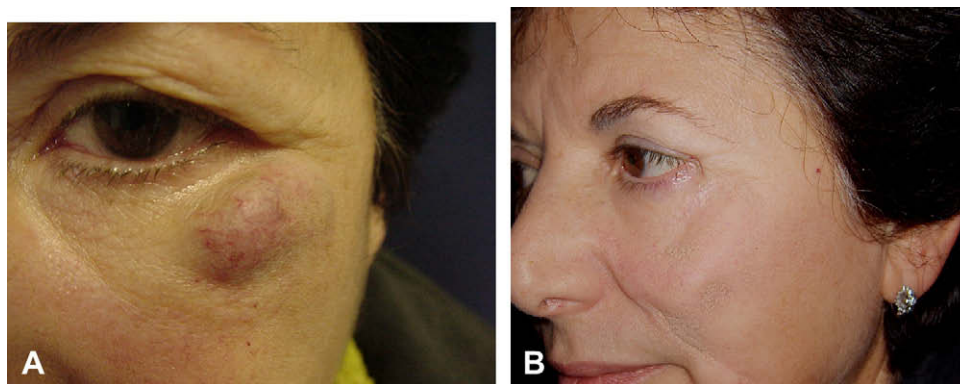


Figure 4 Case 4. (A) Merkel tumour located in the zygomatic area and (B) 6 months after surgical treatment with an upper eyelid myocutaneous flap associated with an island flap from the nasolabial fold.

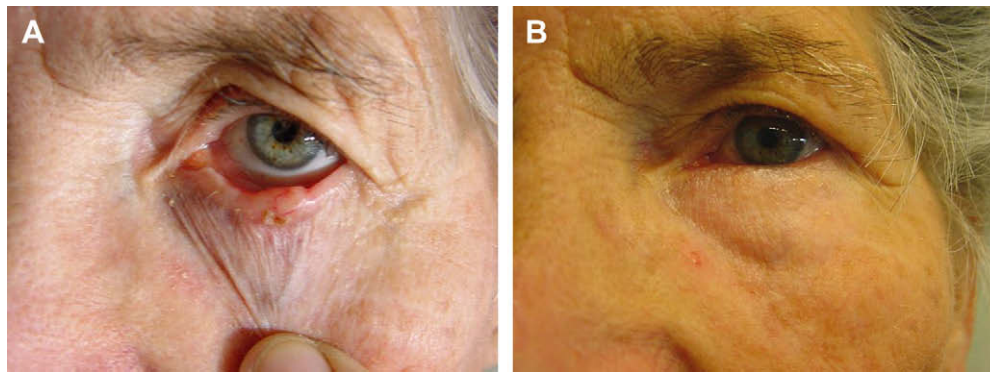


Figure 5 Case 5. (A) Lower eyelid basal cell carcinoma. (B) Reconstruction with a tarsconjunctival flap with the Landolt–Hughes technique and a laterally based myocutaneous orbicularis oculi flap.

from the upper eyelid, and the exposed surface of the flap was covered with a laterally based myocutaneous flap raised from the upper eyelid. **Figure 5B** shows the patient 3 months after surgery.

Results

The reconstructions were uneventful in all 35 cases. The flaps were highly viable. In fact, there were no signs of arterial impairment in any case. All flaps were dark in colour during the first 3 days after surgery, probably due to initial poor venous drainage. **Figure 6** shows a typical instance immediately after surgery. Oedema generally disappeared completely within 15 days post operation. The two cases of lower eyelid retraction with reduced lid–brow distances (**Figures 1B** and **3B**) settled very well. No patient suffered from epiphora.

No damage was detected at the donor site. Notwithstanding the large amount of tissue used, the eyelids closed perfectly even in the youngest patient (36 years). The reconstruction was very satisfactory for texture and colour match, and scars were unobvious.



Figure 6 Immediate postoperative image showing initial poor venous drainage.

Discussion

Reconstruction of the eyelid and periorbital area is difficult because of the quality of the tissues in this area, which are thin, very elastic and mobile, whereas the tissues of areas closer to the orbita, which are generally used for reconstruction, are thick and stiff.^{3–7}

The myocutaneous upper eyelid flap is a wide flap with a pedicle that allows coverage of areas up to a distance of 8 cm. The skin of the upper eyelid can survive with the arterial supply from the underlying orbicularis muscle. As shown in **Figure 7**, the vascular supply of the orbicularis oculi muscle comes from three main sources: (1) the branches of the superficial temporal artery (the orbitozygomatic branch that enters the muscle about 2 cm on the lateral side); (2) the branches of the angular artery that enter the muscle about 1 cm on the medial side⁸ and (3) the branches of the ophthalmic artery. All these branches also supply the skin around the orbicularis muscle. The vascular supply of the orbicularis follows the direction of the fibres.

Previously described flaps were based on the ophthalmic artery branches supplying the orbicularis oculi muscle. Flaps based on the tarsal vascular arch have very short pedicles that limit their use. Flaps based on the orbitozygomatic artery laterally or on the branches of the angular artery medially have a longer pedicle outside the orbit, are more reliable and have a very wide arch of rotation.

We found that skin strips or skin islands in the upper eyelid are perfectly nourished by the underlying muscle that can be raised as medially or laterally based flaps. The base of the flap can be located where the arteries enter the muscle (up to 2 cm lateral to the external canthus and 1 cm medial to the internal canthus).⁸ Thus, the entire upper eyelid skin can be moved on a very narrow pedicle with the pivot point outside the eyelid. These flaps can be rotated 360° and can cover defects located throughout the periorbital area as well as defects of the lower eyelid (**Figure 8A**).^{3–5,9} Moreover, the vascular supply can nourish a random area that exceeds the muscle surface area by about 1 cm (**Figure 8B**).

The tissue of the myocutaneous flap raised from the upper eyelid is very similar in texture, colour and physical properties to the tissue to be reconstructed. Therefore, this procedure is suitable for reconstructions of many of the

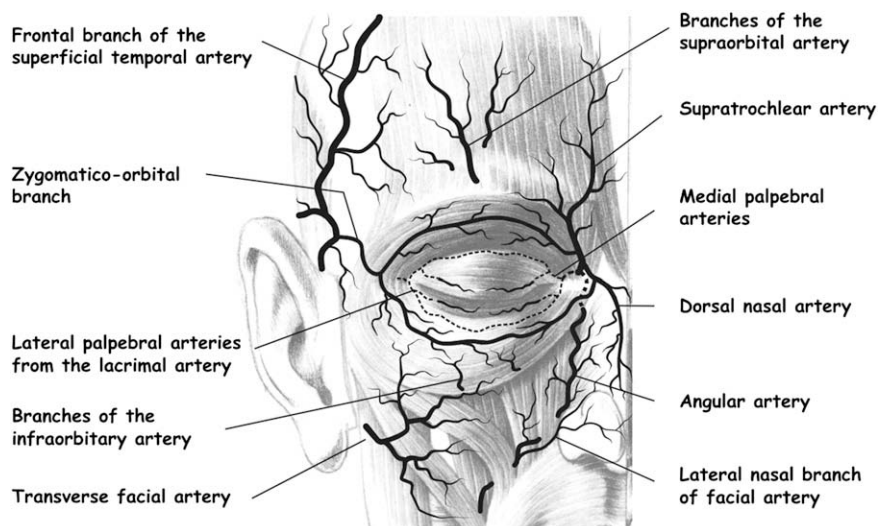


Figure 7 Scheme of vascular supply of the orbicularis oculi muscle and periorbital area.

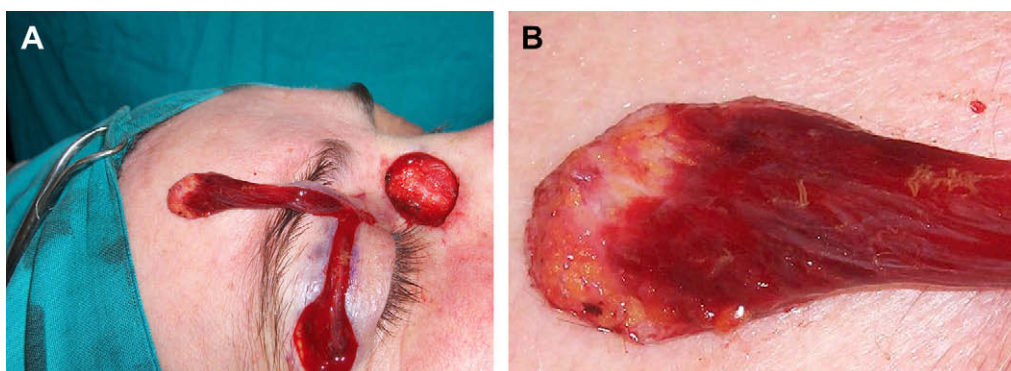


Figure 8 (A) Orbicularis oculi myocutaneous flap raised with a medial pedicle and (B) skin random area exceeding about 1 cm of the muscle surface (extended myocutaneous flap).

defects of the lower eyelid and periorbital area. Wide, thin and soft flaps with long pedicles result in optimal, functional and aesthetic results.

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