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Upper eyelid reconstruction with a horizontal V–Y myotarsocutaneous advancement flap

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Summary Upper eyelid tumours, particularly basal cell carcinomas, are relatively frequent. Surgical ablation of these lesions creates defects of variable complexity. Although several options are available for lower eyelid reconstruction, fewer surgical alternatives exist for upper eyelid reconstruction. Large defects of this region are usually reconstructed with two-step procedures. In 1997, Okada et al. described a horizontal V–Y myotarsocutaneous advancement flap for reconstruction of a large upper eyelid defect in a single operative time. However, no further studies were published regarding the use of this particular flap in upper eyelid reconstruction. In addition, this flap is not described in most plastic surgery textbooks.

The authors report here their experience of 16 cases of horizontal V–Y myotarsocutaneous advancement flaps used to reconstruct full-thickness defects of the upper eyelid after tumour excision. The tumour histological types were as follows: 12 basal cell carcinomas, 2 cases of squamous cell carcinomas, 1 case of sebaceous cell carcinoma and 1 of malignant melanoma.

This technique allowed closure of defects of up to 60% of the eyelid width. None of the flaps suffered necrosis. The mean operative time was 30 min. No additional procedures were necessary as good functional and cosmetic results were achieved in all cases. No recurrences were noted.

In this series, the horizontal V–Y myotarsocutaneous advancement flap proved to be a technically simple, reliable and expeditious option for reconstruction of full-thickness upper eyelid defects (as wide as 60% of the eyelid width) in a single operative procedure. In the future this technique may become the preferential option for such defects.

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Figure 1 Case 1. Initial markings of surgical excision of a squamous cell carcinoma of the upper eyelid margin in a 60-year-old man. The V–Y myotarsocutaneous flap skin incisions are also marked, extending laterally into the crow's feet area.

By far, the most common cause of eyelid defects is excision of tumours.^{1–3} Post upper eyelid tumour ablation, direct repair is possible of defects of up to 30% of eyelid width in younger patients, and up to 40% of the eyelid width in older patients who have eyelid skin laxity.⁴ However, for larger defects, either local flaps or grafts are required. These options frequently fail to achieve an excellent cosmetic outcome as the thin and mobile skin of the upper eyelid is substantially different from that encountered in other body areas. Moreover, the relative scarcity of redundant tissue in the abutting regions of the upper eyelid can make mobilisation of significant amounts of tissue into this area a significant challenge⁵ and often demands a two-step reconstructive procedure.¹

In recent times, several authors have emphasised the use of several flaps intrinsic to the upper eyelid^{6–10} so as to circumvent these problems. In 1997, Okada et al. described a horizontal V–Y myotarsocutaneous advancement flap for upper eyelid reconstruction, purportedly with several advantages over traditional surgical options.⁷ However, in

the literature review conducted by us, we failed to encounter further reports on the use of this particular type of flap. In fact, this flap is not even mentioned either in recent textbooks on facial plastic surgery and oculoplastic surgery or in newer articles on eyelid reconstruction.^{1,11}

Patients and methods

From January 2000 through May 2009, 16 patients with locally advanced malignant tumours of the upper eyelid underwent surgical resection by the senior author. Most of these tumours (12) were basal cell carcinomas. There were also two cases of squamous cell carcinomas, one case of sebaceous cell carcinoma and one of malignant melanoma.

The resections had curative intent, resulting in upper eyelid full-thickness defects ranging from 40% to 60% of eyelid width. There were nine women and seven men. The patients ranged from 45 to 78 years, with a mean age value of 62.3. The follow-up varied from 2 months to 5 years, and was 25 months on average.

After excision, the surgical specimen was sent to the pathology laboratory and was assessed by both gross examination and microscopical observation of fresh-frozen sections. Only after the pathologist's concordance was the planned reconstruction undertaken.

The surgical defects were rectified with a horizontal V–Y myotarsocutaneous advancement flap similar to the one originally described in 1997 by Okada et al.⁷ The flap was based on the lateral cantal region, with the medial border corresponding to the height of the lateral border of the defect. The flap extended laterally into the crow's feet area where it ended in an acute angle. The superior border corresponded to the line of the superior palpebral fold. The inferior margin continued till the inferior limit of the eyelid's defect. The height-to-width ratio was approximately 1:3 to 1:4, resulting in a relatively long flap.

First, the superficial incisions were made till the level of the orbicular muscle in the upper eyelid and the subcutaneous tissue at the lateral cantal region. After upper eyelid eversion with a Desmarres retractor, an incision through the eyelid conjunctiva and tarsal plate was made at the level of the superior palpebral fold. At this stage, a V-shaped

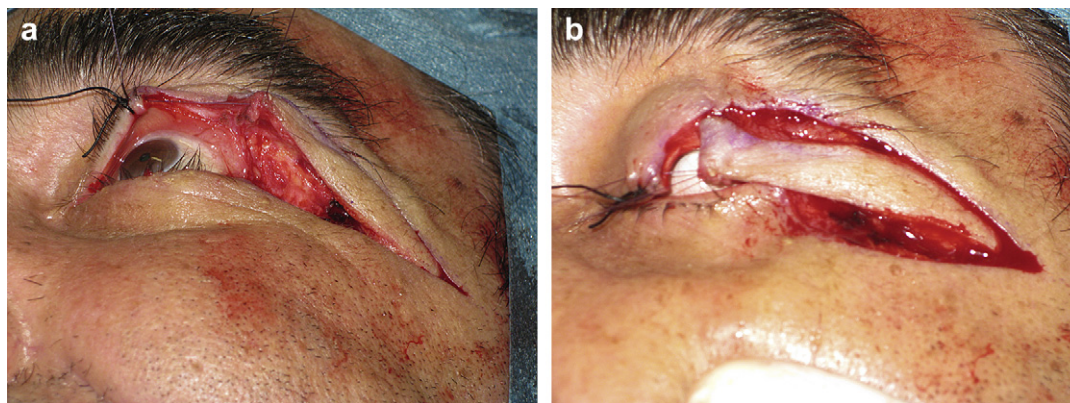


Figure 2 Case 1. (Left [Figure 2a]) The resulting defect represents approximately 40% of the original width of the eyelid. A horizontal V to Y myotarsocutaneous flap is raised based on the upper orbicular muscle and lateral orbital subcutaneous tissue. (Right [Figure 2b]) The flap is mobilised into the defect, allowing for closure.

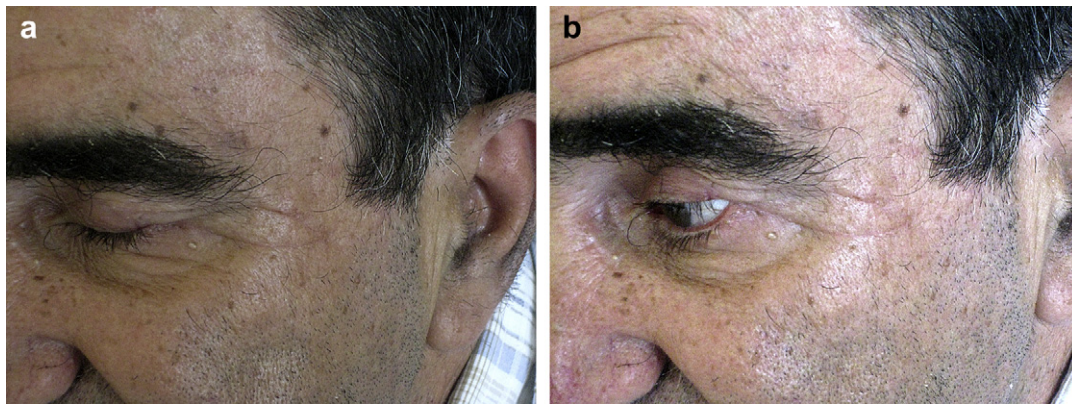


Figure 3 Case 1. One year after surgery, no recurrence is observed. Eyelid function is normal. Scars are inconspicuous and easily confused with the lateral cantal wrinkles.

myotarsocutaneous flap pedicled at the superior orbicular muscle was created. It is worth mentioning that the trickiest part in elevating the flap was achieving the right depth of dissection, as very superficial incisions would compromise the flap's excursion, whereas incisions through the muscle might jeopardise the flap's viability. The flap was then mobilised horizontally with the help of a gentle pull pressure exerted through a skin hook placed on its medial border. To increase the excursion, a gentle blunt dissection was performed at the lateral aspect of the flap incisions. At times it was necessary to divide some fibrous connections in that region. To promote horizontal sliding of tissues and closing of the defect without tension, a lateral cantotomy was performed when necessary.

The flap was sutured in two layers after alignment with the eyelid-free margin. The tarsus and conjunctiva were sutured with a simple running suture with a 6/0 resorbable Monosyn®. On the skin, either interrupted stitches or a simple running suture with a 6/0 nylon were used. The cutaneous stitches were removed between 5 to 7 days post-operatively.

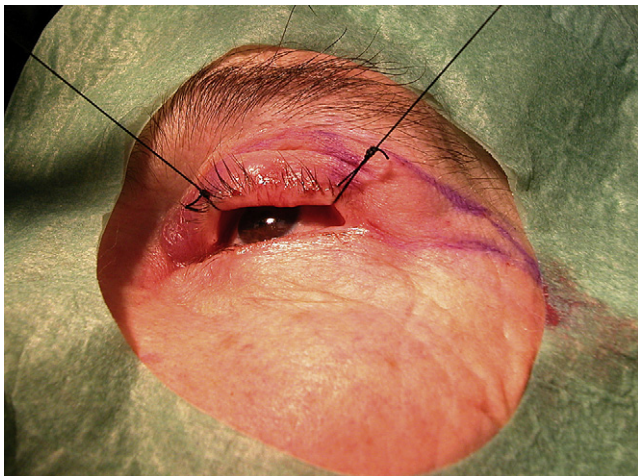


Figure 4 Case 2. A 72-year-old woman with a sebaceous cell carcinoma of the upper eyelid is prepared for wide surgical excision of the lesion. The skin incisions for a long and wide horizontal V to Y myotarsocutaneous flap are drawn.

For each patient, the authors evaluated the following criteria: demographic features, duration of the reconstructive procedure, surgical complications, tumour recurrence and the functional and aesthetical results obtained. Patient satisfaction with the procedure was also recorded.

Results

In all patients in whom the horizontal V–Y myotarsocutaneous flap was used, the closure of the defect was achieved in an expeditious manner and in a single surgery. None of the flaps showed any signs of necrosis. Most patients had transient periorbital oedema and bruising in the first few days after surgery but these subsided rapidly.

The reconstructive procedure took an average operating time of 30 min (ranging from 20 to 45 min).

No revision surgeries were deemed necessary as all patients showed a stable upper eyelid with acceptable motility and adequate corneal protection, including the blink reflex.

No recurrences were observed.

From a cosmetic point of view, results ranged from satisfactory to excellent in all patients. The incisions used became unremarkable and easily merged with natural wrinkles and folds at a rapid pace.

All patients were pleased with the functional and cosmetic results.

Clinical cases

Case 1

A 60-year-old man presented with a squamous cell carcinoma of the lateral half of the upper eyelid (Figure 1). The tumour was resected with a 5 mm margin. The resulting defect was repaired by means of a horizontal V–Y myotarsocutaneous flap (Figure 2). One year after surgery, no recurrence was observed and the patient showed a good functional and aesthetic result (Figure 3). In fact, even though the surgical scars were somewhat visible, they were mistaken for the natural wrinkles in the crow's feet area.

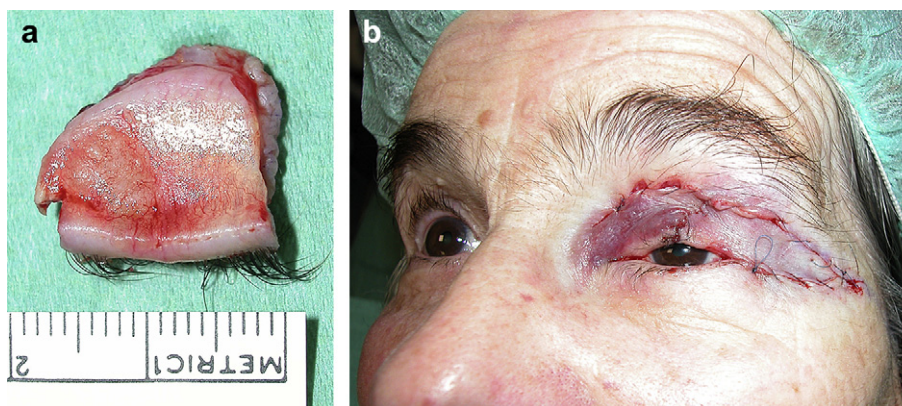


Figure 5 Case 2. (Left [Figure 5a]) The surgical specimen is approximately 2cm wide, representing around 60% of the upper eyelid width. (Right [Figure 5b]) Photograph taken at the end of the reconstructive procedure. The V to Y flap was mobilised into the defect. A medial advancement flap was created to facilitate closure without tension or distortion of upper eyelid morphology.

Case 2

A 72-year-old woman presented with a sebaceous cell carcinoma of the middle portion of the upper eyelid (Figure 4). The tumour was resected with a 5 mm margin, resulting in the excision of a 2 cm-wide surgical specimen (Figure 5) and a defect of approximately 60% of the original eyelid width. The defect was closed with a long horizontal V–Y myotarsocutaneous flap (Figure 5). To facilitate closure and prevent eyelid deformation, a medial advancement flap was also performed. One year after surgery, no recurrence of disease was observed. Moreover, an excellent functional and aesthetic result was obtained, with the surgical scars being close to invisible (Figure 6).

Discussion

As far as we could determine, the first description of V–Y flaps in facial reconstruction dates back to 1965.¹² The first example of this kind of flap being used in eyelid reconstruction was published by Zook et al. in 1980.¹³ In this article the authors reported the use of a V–Y vertical cutaneous flap in a patient for lower eyelid reconstruction.

In 1989, Doermann et al. presented a series of 22 patients in whom reconstruction of lower eyelid defects after tumour ablation was achieved with V–Y vertical myocutaneous flaps.¹⁴

In 1988, lower eyelid reconstruction with a horizontal V–Y myocutaneous flap was described in the book *Surgery of Basal Cell Carcinoma of the Face*, based on the experience of the authors with this technique in the preceding years.¹⁵ More reports of horizontal V–Y flap for lower eyelid reconstruction were later published in 1996 by Kalus and Zamora,¹⁶ and more recently by Marchac et al.¹⁰

Literature on the use of V–Y flaps in upper eyelid reconstruction is, however, much scarcer, which is undoubtedly related to the fact that eyelid tumours are much more frequent in the lower eyelid.^{1–3} In fact, it was not until 1997 that Okada et al. described for the first time a V–Y horizontal myotarsocutaneous flap for reconstruction of the upper eyelid in a patient with an eyelid tumour. Subsequently, other authors have described the use of vertical V–Y myocutaneous flaps for upper eyelid reconstruction after oncological surgery^{5,17} and reported a good functional and aesthetic outcome in all patients.

Our data strongly support the view that the horizontal V–Y myotarsocutaneous flap presents several significant

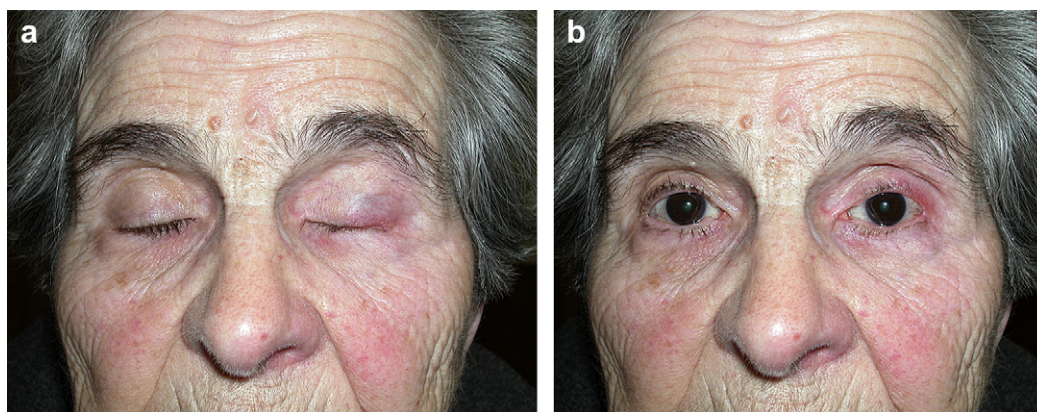


Figure 6 Case 2. One year after surgery, no recurrence or impairment of eyelid function are observed. Surgical scars are easily confused with age-related wrinkles. A good aesthetic result was achieved.

advantages, relatively, over other methods of reconstruction of the upper eyelid. To start with, it allows reconstruction of significant defects in a single surgical procedure, avoiding the morbidity, inconvenience and cost of multiple surgical procedures. Also, being relatively easy to perform, it demands a short operating time. In addition, it does not require surgical intervention on the contralateral eyelids or the lid margin of the ipsilateral lower lid, leaving these areas untouched so that they can be used for future reconstructive procedures if the tumour recurs.

The functional result is optimised by the fact that the levator muscle remains attached to the reconstructed upper eyelid, thus not compromising eyelid opening. In addition, as the orbicular muscle is not sectioned, eyelid closure and the blink reflex are also preserved.

From an aesthetic point of view, the horizontal V–Y myotarsocutaneous flap also achieves good results as it uses ideally coloured and textured thin skin for reconstruction. Moreover, the associated surgical scars become relatively inconspicuous because they are placed in natural wrinkles and folds, and because the areas involved in the reconstruction heal well in most circumstances.

Consequently, the horizontal V–Y myotarsocutaneous flap, regardless of whether it is associated to lateral canthotomy or not, seems suitable for the expeditious repair of full-thickness upper eyelid defects involving 25–60% of the upper eyelid. It is our strong belief that, in the future, this technique may well become the preferential reconstructive option in this context.

Conflict of interest statement

None of the authors has any conflicts of interest or funding to disclose.

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