

TWO-PRONGED PARAMEDIAN INTERPOLATED FOREHEAD FLAP FOR TWO-STAGE MEDIAL CANTHUS RECONSTRUCTION

Filippo Taccioli¹, Camilla Reggiani^{2,3}, Pierantonio Bellini⁴,
Cristina Magnoni²

¹ Department of Plastic, Reconstructive and Aesthetic Surgery, University Hospital of Modena, Modena, Italy; ² Regenerative and Oncological Dermatological Surgery Unit, Modena University Hospital, Modena, Italy; ³ Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy; ⁴ Unit of Dentistry and Oral-Maxillo-Facial Surgery, Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance, University of Modena and Reggio Emilia, Modena, Italy

Summary

Introduction. Medial canthus reconstruction is challenging, especially due to the required mobility of new eyelids to assure satisfactory closure of the eye rim and avoid the development of ectropion and/or lagophthalmos. Moreover, reconstruction must also assure a valid functional replacement of the medial canthal retinaculum and an aesthetically acceptable result.

Various reconstructive options have been described, including full thickness skin grafts, cartilage grafts, mucous membrane grafts, and various flaps like local rotational, glabellar, finger, myocutaneous orbicularis muscle island and forehead flaps.

We present a case of two-stage medial canthus reconstruction obtained using a paramedian, interpolated, two-pronged forehead flap.

Clinical case. An 81-year-old male was admitted to our Clinic, following a diagnosis of a second recurrence of BCC on the right medial canthus. Previous reconstructions were achieved using a local rotation flap in 2009 and a rotational glabellar flap with a full-thickness graft in 2013. However, in 2021 another local BCC recurrence was confirmed; the lesion involved both the medial canthus and eyelids. Given previous local flap interventions, surrounding tissue was expected to be poorly vascularized with a scarce mobility so our choice fell on a distal paramedian forehead flap.

During the first surgical step we prepared the flap and split its distal portion into two even extremities, which were sutured to the correspondent medial portion of the eyelids. In the second surgical step, 40 days later, the flap was autonomized. Nine months after the surgery, during the clinical examination a mild microphthalmia was reported but there was no limitation to the eye movement or eyelid closure. There were no signs of lagophthalmos, ectropion or entropion.

The patient referred a satisfying quality of life, referring only a mild epiphora and a subjective reduction of visual field during eye movement in the horizontal plane. These symptoms were not considered invalidating by him.

Conclusions. In this specific case reconstructive options were limited due to the patient's surgical history.

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Correspondence

Filippo Taccioli

Department of Plastic, Reconstructive and
Aesthetic Surgery, University Hospital of Modena,
largo del Pozzo 71, 41121 Modena, Italy
E mail: filippotac@hotmail.it

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We believe that using a two-pronged paramedian frontal flap is an elegant and valid technique for reconstruction of medial canthal defects, which if performed correctly, not only provides good eyelid functionality but is also aesthetically pleasing.

Moreover, based on our experience, the technique is safe to perform with none or minor sequelae.

Key words: basal cell carcinoma, BCC, forehead flap, medial canthus, reconstruction, two pronged

INTRODUCTION

Medial canthus reconstruction is challenging, especially due to the required mobility of new eyelids to assure satisfactory closure of the eye rim and avoid the development of ectropion and/or lagophthalmos. Moreover, reconstruction of the medial canthus must also assure a valid functional replacement of the medial canthal retinaculum¹ and an aesthetically acceptable result.

In case of an extensive loss of the tarsal plate of eyelids, not only anterior lamella (composed by skin and orbicularis muscle) but also posterior lamella (tarsus and conjunctiva) has to be reconstructed to avoid deformities and provide an adequate lubrication.

Various reconstructive options have been described for defects involving medial canthus, including full thickness skin grafts, cartilage grafts, mucous membrane grafts, and various flaps like local rotational, glabellar, finger, myocutaneous orbicularis muscle island and forehead flaps^{2,3}.

Depending on the structural and functional defect these aforementioned techniques can be used alone or combined but a strict standardization of the reconstructive plan is not possible due to differences in patients and the variable involvement of canthal and palpebral structures. We present a case of two-stage medial canthus reconstruction obtained using a paramedian, interpolated, two-pronged forehead flap.

DESCRIPTION OF CASE REPORT

An 81-year-old male was admitted to our Clinic, following a diagnosis of a second recurrence of BCC on the right medial canthus.

Previously, in 2009, a nodular superficial BCC was excised from the same site and the defect was covered using a local rotation flap. The tumor was small (0.8 cm) and did not influence the functionality of the eyelids.

In 2013, a local BCC recurrence was confirmed and



Figure 1. Recurrence of basal cell carcinoma involving the medial canthus of the right eye (arrow).

excised. Reconstruction was achieved using a rotational glabellar flap and a full-thickness graft and in 2014, the patient underwent an ectropion correctional surgery.

However, in 2021 another local BCC recurrence was confirmed as a pinkish, hard lump (Fig. 1). The lesion involved both the medial canthus and eyelids, causing patient discomfort due to itching and epiphora.

We expected a full thickness defect of the eyelids and a complete functional loss from damage to the medial canthal retinaculum following tumor resection. Moreover, given previous local flap interventions, surrounding tissue was expected to be poorly vascularized with a scarce mobility. Therefore, due to the patient's past surgical history, we chose a distal paramedian forehead flap approach, frequently employed in our clinic⁴.

Day 0

The patient under general anesthesia underwent tumor excision for histological examination.

Pre-operative marking for the flap was drawn onto the patient prior to reconstructive stage (Fig. 2A). A paramedian left forehead flap was carefully elevated maintaining the left supratrochlear and collateral arteries; the periosteum was left in place, elevating the overlying tissue (Fig. 2B). The distal portion of the flap was de-fatted and thinned, and the full thickness was split into two even extremities, which were sutured to the correspondent medial portion of the eyelids.

A Penrose drain was placed between the two extremities to prevent fusion of the medial part of the new eyelids and avoid underlying fluid collection (Fig. 2C).

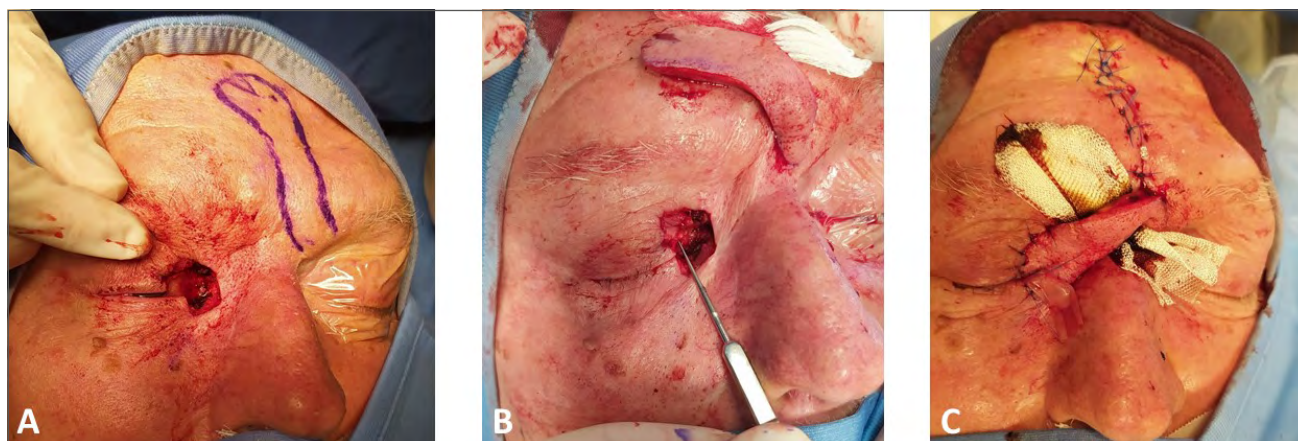


Figure 2. A) surgical wound after tumor resection and marking of the flap on the forehead prior the incision; B) flap elevation from the forehead; C) flap is splitted and positioned to reconstruct the medial canthus, a Penrose drain is placed and donor site is closed.

Histologic examination of the specimen showed tumoral infiltration in the inferior-medial margin (corresponding to medial canthus) and therefore, radicalization was planned for the second surgical stage, including flap autonomization, repositioning and remodeling.

DAY 42

The second surgical step consisted in pedicle takedown under local anesthesia, as the distal portion of the flap was well integrated with the surrounding tissues and effectively replaced the medial canthal structures (Fig. 3). The pedicle was cut and the proximal stump was divided in half and opened “book-like”. Some fat tissue was removed to match the thickness of the forehead

skin and an inverted V incision was made to receive the proximal part of the flap back in place.

A deep radicalization of the tissue underneath the distal portion of the flap was performed, before its defatting and thinning. An analogue technique was then used for the proximal portion.

Histological examination of the second surgical specimen confirmed entire tumor excision with no persistence of malignancy.

No post-operative surgical complications were observed. The patient was prescribed consultancy visits with medication twice a week for a month.

DAY 310

Upon mid-term physical examination 9 months following the second surgical step, no major patient sequelae were observed. A mild microphthalmia was reported but there was no limitation to the eye movement or eyelid closure. There were no signs of lagophthalmos, ectropion or entropion. The scars had healed well, without adhesions and the flap thinned out without need for reintervention. Inter-brow space, one of the secondary goals of reconstruction using the paramedian forehead flap⁵ was preserved, thus granting an acceptable aesthetic result (Figs. 4A-B).

The patient referred a satisfying quality of life, referring only a mild epiphora, due to lacrimal apparatus resection and a subjective reduction of visual field during eye movement in the horizontal plane. These symptoms were not considered invalidating by the patient.

DISCUSSION

This case report highlights the feasibility of a modified paramedian forehead flap in medial canthus reconstruction after demolitive surgery.



Figure 3. 1-month follow-up.

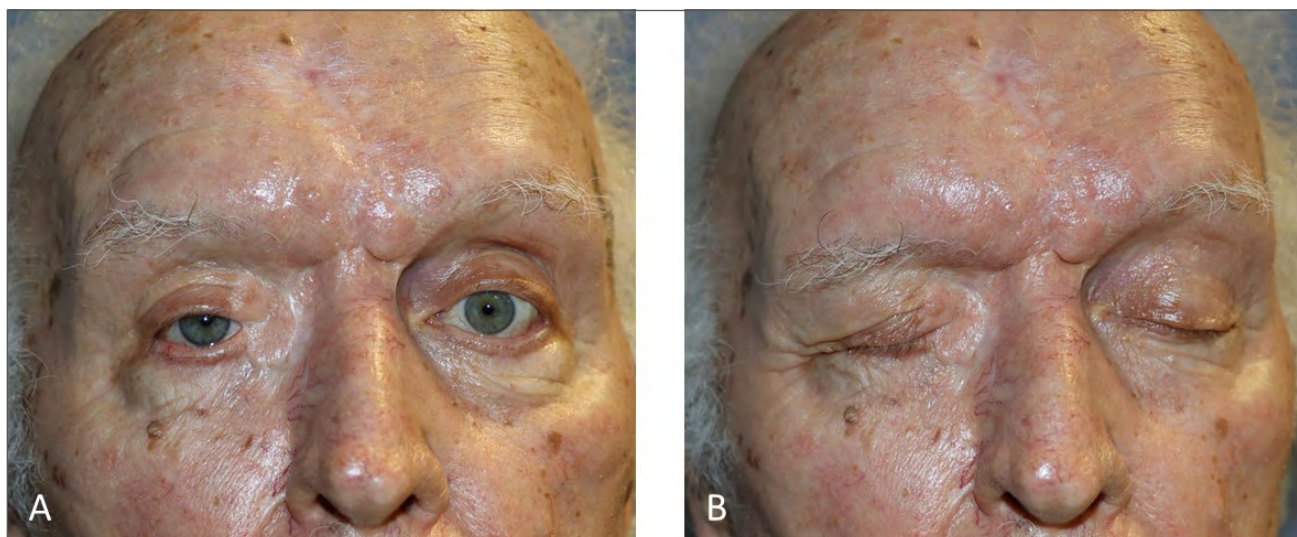


Figure 4. 9-months follow up. **A)** mild microphthalmia; **B)** satisfactory closure of the eyelid rim.

We decided to perform the first surgical step under general anesthesia since we expected a wide and deep demolition of the delicate structures belonging to the medial canthus, and this could have compromised patient's compliance.

In this specific case reconstructive options were limited due to the patient's surgical history: local flaps were already used and a full-thickness skin graft may have not adhered because of the depth of the surgical defect, nor granted the functionality of the anatomical unit.

There was not a strict necessity to reconstruct both anterior and posterior lamellae separately since the tarsal plates were subjected to minor resection so no cartilage grafts were used.

This modified forehead flap has a reliable and a somewhat constant vascularization based on the supratrochlear artery which grants flap survival and an adequate thickness suitable for covering a deep surgical defect, which can be eventually trimmed in the II stage of the surgery or afterwards.

In our opinion, however, the strongest advantage of this reconstructive option lies in a dynamic as well as static restoration of eyelids functionality.

We can't deny that an excellent patient's compliance is requested in order to achieve a reconstruction using this flap since it has to remain "bridged" for around three weeks and the patient must attend periodical medications; lastly, at least two surgical stages are required.

We believe that using a two-pronged paramedian frontal flap is an elegant and valid technique for reconstruction of medial canthal defects, which if performed correctly, not only provides good eyelid functionality but is also aesthetically pleasing.

Moreover, based on our experience, the technique is safe to perform with none or minor sequelae.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

FT: O (surgery), W, D

CR: W, O (surgery)

PB: O (surgery)

CM: A, W, O (surgery)

Abbreviations

A: conceived and designed the analysis

D: collected the data

DT: contributed data or analysis tool

S: performed the analysis

W: wrote the paper

O: other contribution (specify contribution in more detail)

ETHICAL CONSIDERATION

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Written informed consent was obtained from the patient for the publication of this report and any accompanying images.

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