

Glabellar flap technique in oculoplastic surgery

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Facial skin defect reconstruction in medial-canthal area of the lids can be a challenge even when performed by a skilled surgeon. The excision of large tumors in this area leads to significant surgical defects that cannot be repaired by merely closing the wound. The glabellar area provides a source of redundant skin with similar characteristics to that of the medial-canthal lid area. The purpose show the possibility of the glabellar flap technique surgery in patients after tumor excision in the medial canthal area with the formation of a large surgical defect and especially those with defect under the medial canthal tendon. We selected 15 well-documented retrospective cases of patients operated over 2 years and followed up for a minimum of 36 months, who underwent surgery with a glabellar flap technique. Patients were operated with V-Y glabellar rotation, advancement, or combined transposition flap techniques. According to the defect's location, we divided the patients into three groups: upper, medial, and lower surgical defects. A satisfactory functional result was obtained in all the patients. In most of them, the cosmetic results were also good. No additional surgical procedures were required in any of the patients. Our experience showed excellent results with the glabellar flap technique in all three types of lesions in the medial canthal zone—upper, medial, and especially lower which until recently was thought to be inappropriate.

Key words: Glabellar flap, nasal reconstruction, ocular tumors, oculoplastic surgery

Facial skin defect reconstruction in medial-canthal area of the lids can be a challenge even when performed by a skilled surgeon. The excision of large tumors in this area makes surgical defects impossible to repair by just closing the wound. Medial canthal area is constructed by relationship of eyelids, brow, nose, cheek and share their unique anatomy. All adjacent structures in the area have different textures, thickness, color, and anatomical features to be addressed and present difficulties in wound repair and surgical planning.^[1,2] There are several basic surgical techniques for closing a medial defect: a direct closure, suitable for defects with excessive skin available, "laissez faire" for small defects, free skin graft, and various transposition flap techniques—glabellar flap in this case.^[3] The glabellar area serves as a source of redundant skin with characteristics similar to those of the medial-canthal lid area. This technique requires significant preoperative preparation. Descriptions of the operative technique are found in manuals on oculoplastic surgery, but comparable outcome data or practical guidelines in publications are scarce. Most of the information about this surgical technique is available from publications by specialists in dermatology, ENT, and plastic surgery. Few reports by ophthalmologists have been issued during the last 10 years [Graph 1]. In ophthalmic surgery, it is crucial to avoid noncompliance with the normal physiology and function of the eyelids to prevent dramatic eye conditions.

A brief historical review shows the first description of the glabellar flap technique in "Rhinoplastik" (1818) by Carl

von Graefe, and later by Joseph (1931), Labott (1933), and Limberg (1939).^[4,5] The technique of glabellar flap was also described as the V-Y technique. There are many alternatives and modifications of the primary technique such as "banner" flap, dorsal nasal flap, bilobed flap, rhomboid flap, and even "Batman" flap, all well described by authors of different medical specialties, and less often by ophthalmologists.^[1,2,5-7]

Aim

This article aims to share our experience with the glabellar flap technique in patients after tumor excision in the medial canthal area with the formation of a significant surgical defect. Results are reported from an eye surgeon's perspective, taking into account possible complications of the eyes and adnexa, as well as esthetic and physiological outcomes.

Methods

We selected 15 well-documented retrospective cases of patients who underwent surgery with a glabellar flap technique in 2 years and followed up for a minimum of 36 months. All the cases selected were with large tumors with surgical defects, sized 15 to 35 mm. The majority (92%) had histologically proven basal cell carcinoma (BCC). The rest had other skin tumors in the medial canthal area; thus, a glabellar flap technique was chosen. Four patients had an eyelid involved, and one had a large area of nasal skin involved. All the tumors were

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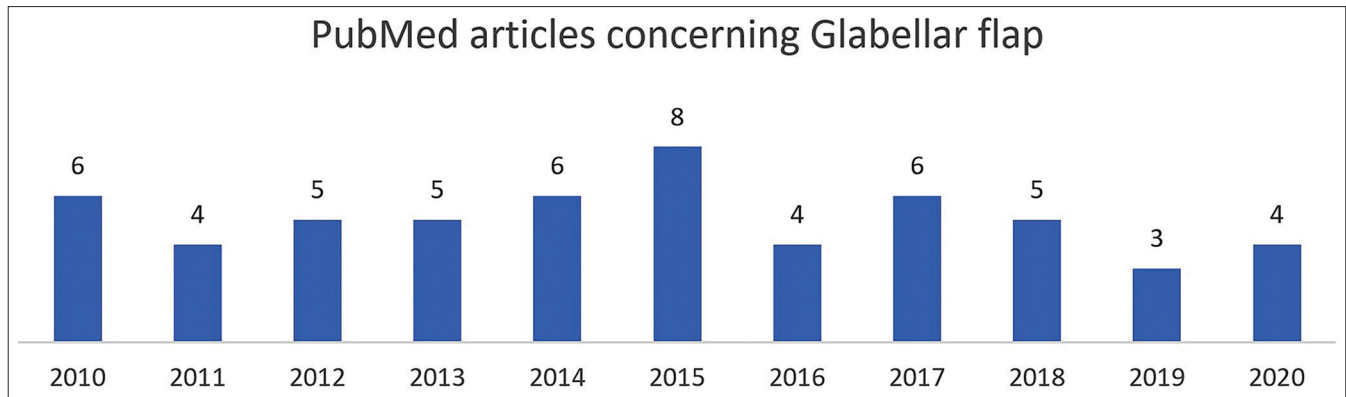
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Graph 1: Number of articles in PubMed concerning glabellar flap, with only a few in ophthalmology

excised with at least a 5 mm visible margin of healthy tissue to achieve tumor-free recipient edges. The operations were performed under local anesthesia. The main modifications of the glabellar flap were the use of a V-Y rotation transposition flap left or right. In one patient, a combined technique was used— glabellar flap plus free skin graft.

Preoperative planning

Canaliculi were probed in typical manner. The skin in glabellar area was carefully examined to determine whether it could be used as a donor, and for the presence of scars, deformities, or other skin tumors. The size, depth, and location of the surgical defect, the texture, and elasticity of the skin around the defect, are to be examined too. Expected results of the upcoming operation can prevent unexpected complications during surgery.

Surgical technique

The glabellar flap is a V-Y flap that allows the skin to be transposed from the glabellar area by advancing and rotating toward the defect. The glabellar flap technique has many varieties: depending on the flap shape, we can have V-shaped, rhomboid, round, to mention a few, and depending on the flap movement, with rotation, advancement, transposition, or combined. As far as rotation is concerned, we could have left and right rotation techniques, with or without a tunnel, uni- or bipedicle.^[5,6,8-10] In the operations reported, mainly two types of operative techniques were used that were well described in oculoplastic books.^[1,11-13]

Outlining the flap

Depending on the desired flap shape, we outlined and oriented the flap with its longer end opposite the defect. Then we marked the lines that would be incised and left unmarked the areas around those to be transposed or rotated. Outlining a graft 2-4 mm larger than necessary was a precautionary move.

Raising the flap

The flap was undermined as required, with the vasculature, if possible, and excess underlying tissue removed to obtain a thin flap and leave it attached to an unmarked pedicle where the transposing/rotating bridge would take place.

Flap insertion

The mobility of the flap was checked and aligned with the defect. The tension lines were checked. We trimmed the flap



Figure 1: (a) A right rotation flap over brow hinge, with a tumor located well below the middle line - day 0, (b) Post operation view of the same patient - day 1

to cover the defect smoothly and we also trimmed hinge zones in case of T, V, or Y-shaped flap.

Closure

The flap was sutured, and the flap source defect closed with 4/0 absorbable suture or just silk.

Pearls and pitfalls

The placement of mattress sutures in the areas of high tension or poor adhesion of the graft, together with a bolster, is directly linked to graft survival. The graft had to adhere tightly with good compression to the wound's bed, which led to improved revascularization. It was possible to operate in 2 stages with a 7-day interval, during which histology results were assessed.

Glabellar V-Y advancement rotation flap

This operation aims to move the flap in the form of a different geometric figure (V-Y in our case) to cover the surgical defect and close the newly formed excisional defect [Fig. 1]. We used this technique with a variant of the left or right rotation of the flap [Figs. 2 and 3]. We also covered both ipsilateral and contralateral surgical defects.

Combined technique: V-Y rotation flap plus free cutaneous graft

When the technique with rotation and transposition of the flap is insufficient to cover the whole defect, we could use an additional piece of graft in the form of free skin graft usually harvested in the preauricular or medial forearm areas [Fig. 4].

Immediate postoperative care

Patients wore a compression bandage with antibiotic ointment for 24–48 h, after which the dressing was removed, and the patient was instructed to keep the wound well-oiled using an antibiotic ointment. The sutures were removed about 7–8 days or a little earlier to reduce scarring.

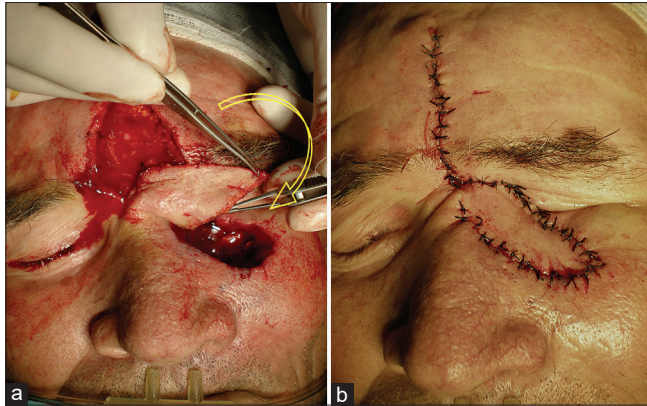


Figure 2: (a) A right rotation flap over the nasal hinge, with a tumor located lower than medial canthal line, (b) postoperative view of the same patient

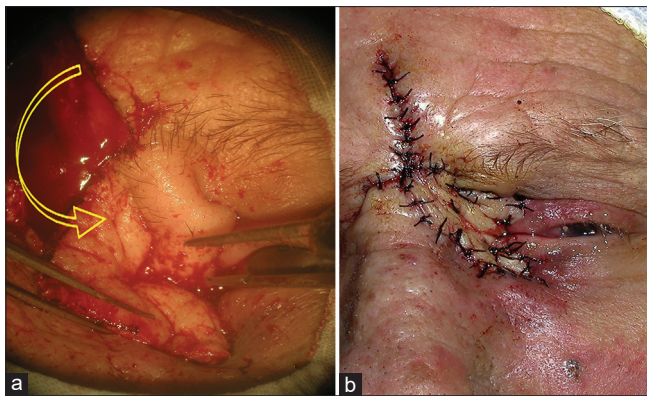


Figure 3: (a) A patient with left rotation flap, (b) the same patient after the operation - bi-horned graft attachment, a tumor located in medial canthal area

Results

The selected 15 retrospective patients (11 men and 4 women) were operated on for 2 years and followed for 3 years. The age range was 49 to 72 years (median 67.22 years).

According to the location of the defect, we divided patients into three groups: Upper - a defect located above and on the canthal line, Medial - a defect covering the canthal line and relatively equal sections of the lower and upper eyelids, and Lower - a defect below and on the canthal line. Patient distribution in these three groups was as follows: upper - 2, medial - 7, and lower group - 6 patients [Table 1]. Mean defect size for selected patients is 2.7 cm × 5.1 cm.

We operated on seven patients with lower canthal defects, which, according to some authors, would be eligible for another surgical technique [Fig. 5].

A satisfactory functional result was obtained in all patients, and in most of them a good cosmetic one as well. No additional surgical procedures were required in any of the cases. It takes a long time to achieve this result. The graft heals quickly, but the texture takes a long time—an average of 8 months. Of all 15 patients, especially those with BCC, one had recurrences after 2 years. None of the patients received radiotherapy or chemotherapy but were monitored every

Table 1: Division of the medial canthal defect into subgroups: upper, medial and lower

Defect	Patients
	UPPER - 2 patients
	MEDIAL - 7 patients
	LOWER - 6 patients

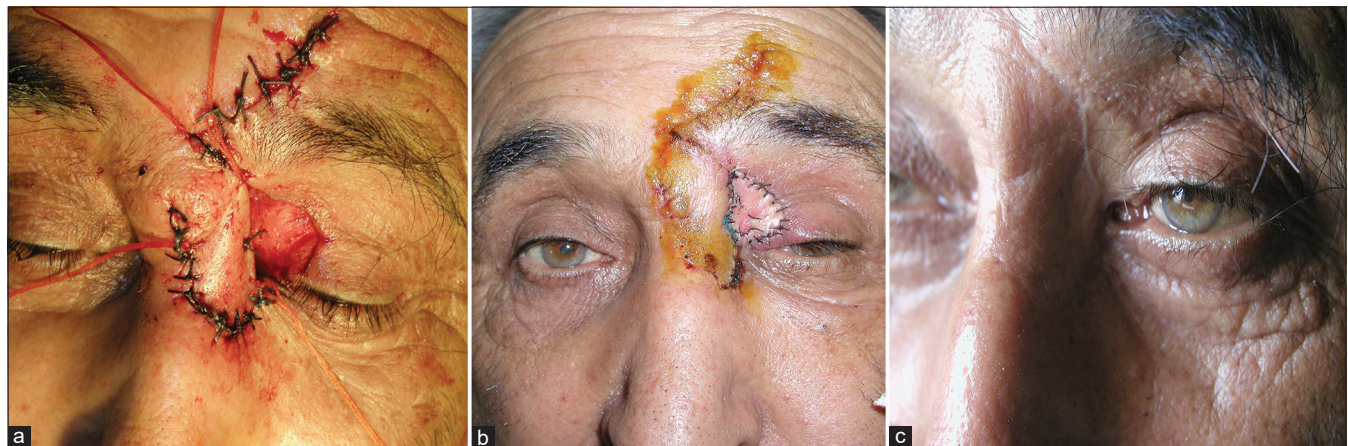


Figure 4: Combined technique: glabellar rotation flap plus free skin graft. (a) Flap did not cover the whole defect. (b) Ten days post free skin graft added to glabellar flap. (c) Good functional and cosmetic result at the sixth month

month. Slight deformation of the inner eyelid angle and mild ectropion was observed in two patients with lower eyelid margin engagement.

Discussion

The glabellar flap technique is considered the most suitable for the correction of significant defects covering the medial canthal area after tumor excision. Some authors believe that defects located below the medial canthus are not suitable for the glabellar flap technique.^[1,11] We do believe that glabellar flap technique is not the first choice for defects below medial canthal tendon as well. However, our experience showed that

proper surgical assessment could lead to good results even in that location. All our patients benefited from the glabellar flap technique, including the six ones with a lower surgical defect [Fig. 6].

Other authors use the tunnel technique when the wound starts from medial canthus, such as described by Bertelmann *et al.*,^[3,14] but we do not have much experience to make a comparison. The glabellar flap technique could be used alone or in combination with other oculoplastic techniques and procedures. We have achieved good results combining a glabellar flap and a free skin graft, as described above. A key point in some variants of glabellar flap technique is that the tissue is transported with its vasculature, which contributes to graft survival on the one side, and mattress sutures with a bolster on another [Fig. 7].

Various authors have offered variants of V-Y flaps over the years, such as an advancement flap, rotating flap, transposition flap, and combinations of them.^[2-4] The size and shape depend on the surgical defect, in which case the graft is V-shaped, rhomboid, bilobed, to mention a few. Even a large flap can survive well with a good result. A very extended V flap can be seen with a good final result [Fig. 8].

The other key point is the possibility to perform the glabellar plastic surgery in two stages. The first stage is the tumor excision. The material is sent for histopathological evaluation of the tumor. The purpose is not only to obtain histopathological results, but also to establish whether the edges of the wound are tumor-free. Having this information (usually after 7 days), the surgeon can decide to operate into a tumor-free recipient or expand the excision. We have excellent results and low recurrence rates with this two-step methodology.

Another extremely important step is to place one or more mattress sutures in the middle of the transposed flap supported by bolster or a small cotton pad. It is essential to press in the bed of excision defect; if not, a connective tissue would form underneath. Unlike other in oculoplastic surgery, we did not follow the line of relaxed tension, when the graft is often left in a poorly adapted position. Mattress sutures are directly related to graft survival as they attach it to the available vasculature. Preferably, part of the transposed graft should lie close to the arteries present in the recipient area.^[10]

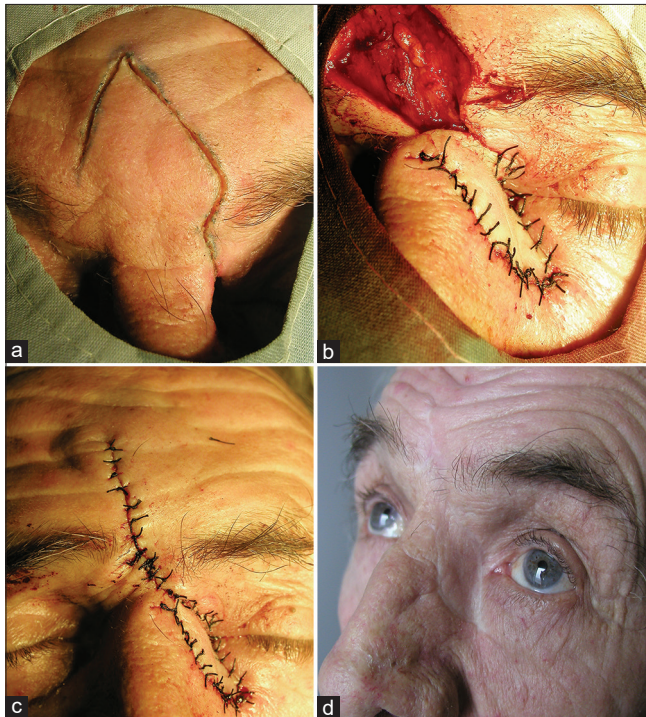


Figure 5: Lower canthal defect covered with the glabellar flap only: (a) with large glabellar flap - day 1, (b) Glabellar flap only, (c) the various curves in the nasal area are tightly covered with the graft, flap hinge trimmed - day 1, (d) Good cosmetic and functional result at 2nd year

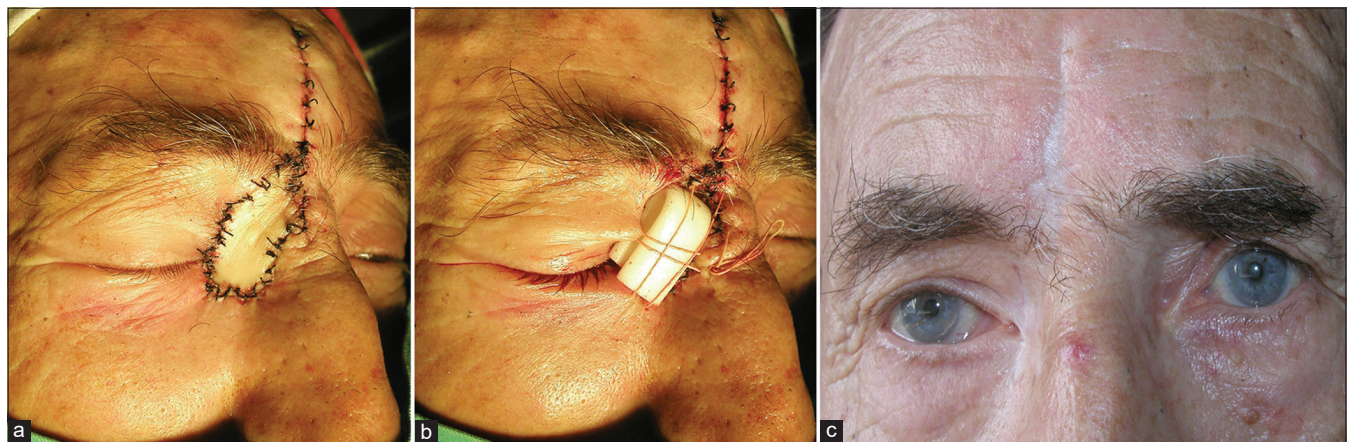


Figure 6: (a) Glabellar flap over postoperative medial canthal defect. (b) A bolster is a key for the good cosmetic outcome - day 1, (c) At 2nd year - a good cosmetic and functional outcome



Figure 7: Large defect closed with glabellar flap only: (a) significant defect of the upper eyelid - day 1. (b) A slight defect after 1st year without functional importance, left uncorrected - 1st year. (c) Lack of limitation of left eyelid closure or lagophthalmos



Figure 8: (a) Original lesion. (b) Large defect after lesion has been excised, (c) Final post-op appearance well covered by a sizeable glabellar flap. (d) Patients over 40 years of age accepted the shortening of the distance between the eyebrows pretty well. Inter brow space result at 2nd year

Possible complications include necrosis of the flap, excessive scarring, thickening of the graft, and tension due to lids' contraction, which changes their function, and lymphoedema of the flap.

The advantages of this technique are that it is the most applicable technique for medial canthal area, flap has near similar skin texture, and the operation can be performed under both general and local anesthesia.

The disadvantages are that the a flap has different skin thicknesses and elasticity, some scar and deformities can occur, and narrowing of inter-brow distance.

Conclusion

Surgical treatment of tumors in the medial canthal area is a challenge for an ophthalmic surgeon. In the early postoperative period, the healing wounds disturb both patients and inexperienced surgeons. Besides, observing our patients we noticed that cosmetic appearance becomes acceptable after about 1 month. Full recovery usually happens after approximately 6 months. Our experience showed excellent results by employing the glabellar flap technique in all three types of lesions in the medial canthal zone—upper, medial, and lower.

Statement of ethics

The study was conducted in accordance with principles for human experimentation as defined in the Declaration of Helsinki, local Good Clinical Practice guidelines. The study is retrospective and according to quoted relevant institutional review boards, approval is not required in case of properly collected and officially approved informed consent forms, which we have collected.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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