



Original Article

Total and Near Total Composite Lower Eyelid Defect Reconstruction with Glabella Flap: An Excellent Option with Limited Donor Site Availability

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ABSTRACT

Background/Objective: Traumatic loss of the lower eye lid is usually combined with the paucity of adjacent flaps to reconstruct composite defects. We describe the use of Glabellar flaps with composite or cartilage graft to reconstruct total or near total composite lower eyelid defects and its outcome.

Material and Methods: This case series was done from January 2017 to December 2019. Patients of either gender, with unilateral post traumatic partial or full thickness lower eyelid defect of 75% eyelid loss or more and Glabellar flap as only remaining option to reconstruct the anterior lamella were included. Patients with medial, lateral canthi, upper eyelid and injuries to orbital contents were excluded. The outcome was assessed on follow-up by the presence of epiphora, ectropion, lagophthalmos, obstruction of vision, graft infection/extrusion, lower lid retraction, donor site scarring and the need for flap debulking.

Results: 12 patients were operated for lower eyelid defects. 2 (16.7%) patients had total loss of eyelid, while 10 (83.3%) had near total loss, 7 (58.3%) patients presented with partial thickness loss of the eyelid, while rest presented with full thickness loss. 1 patient (8.3%) presented with epiphora, similarly 1 (8.3%) had obstruction of vision in down gaze and 1 (8.3%) had conjunctivitis. None had any other complaint.

Conclusion: Glabellar flap together with composite or cartilage graft is an excellent option to reconstruct total or near total composite lower eyelid defects.

Keywords: Eyelid Reconstruction, Glabellar Flap.

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INTRODUCTION

Lower eyelid reconstruction is a fairly common problem for a plastic surgeon. Partial or total loss can result after trauma, cancer ablation or congenitally. Lower eyelid reconstruction presents a unique challenge, combining the need for knowledge of anatomy, function and aesthetics.^{1,2} But, if executed precisely, the results are extremely rewarding. A variety of options exist for

lower eyelid defects with full or partial thickness loss, involving 75% or more of the eyelid.³ Lower eyelid defects created after cancer ablation result in full thickness defects, but the regional tissues are in abundance and thus a reconstructive surgeon has a variety of options to choose from, following the dictum of replacing like with like. But the defects resulting from trauma, offer a different problem as compared to those after cancer ablation. Not only the defect may be of partial thickness, but the wound edges are ragged and frequently there are injuries to the adjacent facial areas, severely limiting the options to reconstruct the defect.^{4,5} Although many options are described to reconstruct partial or full thickness, total or near total eyelid defects, but forehead, especially Glabellar flap is seldom described.^{6,7,8} We presented a case series utilizing Glabellar flap for reconstruction of partial and full thickness defects of the lower eyelid, with total or near total eyelid loss, and present its outcome.

MATERIAL AND METHODS

Study Design & Setting

This descriptive case series was done at Jinnah burn and reconstructive surgery center Lahore, from January 2017 to December 2019 with an approval from the ethical committee.

Inclusion Criteria

We included patients of either gender, who presented with unilateral post traumatic partial or full thickness lower eyelid defect of 75% eyelid or more and injuries to adjacent facial subunits such that Glabellar flap was only remaining option to reconstruct the anterior lamella.

Exclusion Criteria

We excluded patients who had injuries of the medial, lateral canthi and upper eyelid requiring reconstruction and those with injuries to orbital contents.

Data Collection

Patients were enrolled for the surgery after informed consent and surgeries were performed. Patients were then followed on outdoor bases. The outcome was assessed on the bases of the presence of epiphora, ectropion, lagophthalmos, an obstruction of vision, graft infection/extrusion, lower lid retraction, donor site scarring and the need for flap debulking.

Operative Technique

All procedures were done with general anesthesia. After thorough wound debridement, an assessment was done regarding the defect dimension and loss of the components. Considering the opposite uninvolved lower eyelid and the defect itself as a template, Glabellar flap was marked as a transposition flap with 10 – 20% larger dimensions, and planning was done in reverse for infallible reconstruction. For full thickness defects, template was used to mark and harvest nasochondromucosal (NSCM) graft, with extra mucosa for easy stitching and overlapping over the flap. For defects limited to the anterior and middle lamella, conchal cartilage graft was taken to reconstruct the tarsal plate. Glabellar flap was then raised, with distal 1/3rd consisting of skin and subcutaneous tissue, middle 1/3rd with frontal muscle and the proximal part with pericranium. Structures were then reconstructed with deeper layers first. If NSCM graft was used, the mucosal side was kept towards the conjunctive and affixed. Then Glabellar flap was stitched over it. If conjunctiva was intact, then conchal cartilage graft was stitched with the remnants of the plate or medial and lateral canthi tendons. Flap was then stitched over, with attention paid to stitch it firmly with the lateral canthus. After 3 weeks, the division of the flap was done, with care to align eyebrow hairs at the donor site. Special attention was paid to stitch the lateral end to the lateral canthus and lower punctum is not nipped in the stitch. Patients were then assessed in the outdoor



Figure 1A-F: A year's old male presented with near total loss the right lower eyelid lid. There were deep abrasions over the upper eyelid, cheek and forehead over the eyebrow. After thorough debridement, middle lamella was reconstructed with a contralateral conchal cartilage graft. Glabellar flap was used to surface the defect. Division and in setting were done after 3 weeks. (Informed consent from the patient was obtained before using pictures).

clinic, and the above mentioned variables were assessed by requesting patients to answer a questionnaire. Figure 1 shows a patient who presented with right lower eyelid near total defect, involving middle and anterior lamella. Reconstruction was done with conchal cartilage graft and Glabellar flap in two stages. No further debulking was done.

RESULTS

12 patients were operated for lower eyelid defects.

Gender Distribution

8 (66.7%) patients were male, while 4 (33.3%) were female.

Age Incidence

Mean age was 43 ± 10.9 years.

Clinical Presentation

2 (16.7%) patients had total loss of eyelid, while 10 (83.3%) had near total loss. 7 (58.3%) patients presented with partial thickness loss of the eyelid, while rest presented with full thickness loss. Post operatively, only 1 patient (8.3%) presented with epiphora who was referred to ophthalmology department for probing of punctum. 1 (8.3%) had obstruction of vision in down gaze requiring debulking and 1 (8.3%) developed conjunctivitis. None of the patients developed gravitational or cicatricial ectropion, lagophthalmos, lower lid retraction, graft extrusion/infection and excessive scarring over the forehead.

DISCUSSION

Eyelid reconstruction has evolved as the field of plastic surgery has expanded and more anatomical knowledge has been gained over the decades. The eyelid is a very complex structure,

comprising of anterior, middle and posterior lamella. Although some describe it as a bilayer structure, but most often the tarsal plate is included as a middle distinct layer. For partial thickness defect, where anterior lamella is lost and the defect is not amenable to closure with a flap, full thickness skin graft can cover the defect, but if a tarsal plate is also lost, supportive structure to reconstruct the tarsal plate is needed otherwise ectropion may result.⁹ A cartilage graft and coverage with a flap is an optimum technique and results in a best outcome.¹⁰ If all three layers are lost, then a composite graft of cartilage and mucosa and a flap is needed to integrate the composite graft.^{9,10}

Many options exist to reconstruct the defect in case of total or near total lower eyelid loss. But as the soft tissue here has more laxity as compared to other facial units, a careful examination is warranted to ascertain the percentage of the eyelid lost, as mostly the loss is very less as compared to what is apparently perceived. A loss of more than 75% of the lower eyelid is usually perceived as total or near total loss and reconstruction is done based on the number of layers and the amount of tissue lost. Many flaps are available to reconstruct the anterior lamella, which borrow tissue from adjacent areas, e.g. upper eyelid, cheek and forehead.¹¹ Defects limited to the lower eyelid and created after cancer ablation, spare adjacent structures and flaps can be taken from them for reconstruction.¹² But in cases of post traumatic defects, the adjacent tissues are frequently involved, thus the options are limited. Glabellar area is seldom discussed in the literature for the reconstruction of the lower eyelid. It is supplied by dorsal nasal branches of angular artery, and axial pattern flaps are frequently harvested for nasal reconstruction.¹³ We have used this area to develop long axial pattern flaps to reconstruct the lower eyelid, and in none of the cases flap necrosis occurred. The forehead tissue can be taken as a full thickness flap, incorporating skin,

subcutaneous tissue, frontalis muscle and pericranium or thin flaps based on skin and subcutaneous tissue distally with the inclusion of frontalis in second third and pericranium in the proximal third of the flap.¹³ We used the second technique to keep the portion of the flap used for the eyelid as thin as possible. Although as in the case of nasal reconstruction, an intermediate stage can be utilized to debulk the flap in the second stage, we did not employ it in our case series and found good results with none of the patients complaining of gravitational ectropion due to bulky flap and obstruction of vision in straight gaze. We also anchored the flap as well as the cartilage with remnants of medial and lateral canthi or the tarsal plate with fine non absorbable sutures to support the repair. Only one patient developed obstruction of vision in down gaze. Our results differ from other studies, where higher incidence of lagophthalmos, lower lid retraction and exposure is noted.^{14,15} This may be due to secondary grafting for the tarsal plate and involvement of lacrimal apparatus in defects approaching medial canthus. Another problem was ectropion and exposure keratitis, which is reported higher in literature than we observed in our cases. These complications were prevented by designing 10 – 20% larger flap as compared to the template taken from the contralateral lower eyelid, which allowed for easy suturing and prevented ectropion due to soft tissue contraction after healing. One patient developed conjunctivitis in our series due to protrusion of permanent suture used to affix the cartilage graft. It was subsequently removed, which resulted in the resolution of the patient's complaint in a few weeks.

The Glabellar flap is an axial pattern, robust flap which can be raised as a thin flap distally to reconstruct the lower eyelid defect. Flaps from other areas, e.g. upper eyelid are thinner as compared this flap. As the healing in forehead region is very good, minimal and acceptable scarring is observed when it is used. Although we

have used it for lower eyelid reconstruction, it can also be used for upper eyelid, but the mechanics related to upper eyelid come into play when a flap is used to reconstruct the upper eyelid. Thus, further research is needed to compare the results of this flap with other loco-regional options, as the eyelid tissue requires thinner flaps for reconstruction, but have other associated problems.

CONCLUSION

Utilization of Glabellar flaps together with composite or cartilage graft to reconstruct lower eyelid defects is a safe procedure with good and predictable results.

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Additional Information

Disclosures: Authors report no conflict of interest.

Ethical Review Board Approval: The study was conformed to the ethical review board requirements.

Human Subjects: Consent was obtained by all patients/participants in this study.

Conflicts of Interest:

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Muhammad Omar Afzal	Study design and methodology.
2.	Yawar Sajjad	Paper writing, referencing, data calculations and literature review
3.	Kamran Khalid	Data collection and calculations
4.	Moazzam Nazeer Tarar	Analysis of data and interpretation of results etc.