



## TEMPORAL FOREHEAD FLAP FOR RECONSTRUCTION OF LARGE PARTIAL THICKNESS EYELID DEFECTS

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### ABSTRACT INTRODUCTION

Various options have been suggested for reconstruction of partial thickness eyelid defects including skin grafts and local flaps. In this study we are revisiting the temporal forehead flap for reconstruction of large anterior lamella defects of upper and lower eyelids.

#### MATERIALS AND METHODS:

Anterior lamella defects involving more than 50 % of upper or lower eyelids were reconstructed with temporal forehead flap in 10 patients between January 2016 to December 2017 and results observed.

#### RESULTS:

All flaps survived well. Two patients required secondary thinning of the flap. One patient had eyebrow elevation which settled down after six weeks with massaging. No ptosis and no ectropion were observed.

#### CONCLUSION:

The temporal forehead flap is an excellent choice for reconstruction of large anterior lamella defects of the eyelid.

**KEYWORDS :** eyelid defects, temporal forehead flap, Fricke flap.

### INTRODUCTION

Eyelids form an all-important protective mechanism for the eyeball. They also maintain the integrity of tear films and aid in lacrimal drainage. Primary function of upper eyelid is mobility and that of lower eyelid is stability.

Any defect in the eyelid warrants reconstruction for protection of the eyeball and aesthetic reasons. Reconstruction of eyelid is done in layers to simulate the natural anatomy. Eyelid is divided into anterior and posterior lamellae. Posterior lamella consists of tarsal plate and conjunctiva and thus reconstruction option should establish a firm support with lining. Anterior lamella represents skin and muscle; reconstruction requiring soft tissue. For any viable reconstructive option, one vascular layer is a must and the other can be a graft. Various options have been suggested for reconstruction of anterior lamella including skin grafts and local flaps. In this study we are revisiting one of the cornerstone options for reconstruction of large anterior lamella defects of upper and lower eyelids, the temporal forehead flap.

#### AIM:

To study the effectiveness of temporal forehead flap for reconstruction of large anterior lamella defects of upper and lower eyelids

#### MATERIALS AND METHODS

The study was conducted on 10 patients in our hospital between January 2016 to December 2017. All patients with anterior lamella defects involving more than 50 % of upper or lower eyelids, secondary to trauma or oncological resection were included in the study. We excluded full thickness eyelid defects, anterior lamella defects less than 50 % and congenital eyelid defects.

Preoperatively, Ophthalmologist opinion was obtained to document the vision. Artificial tear drops and dark goggles were prescribed. Post-traumatic cases were taken up for reconstruction 48 hours after primary wound debridement.

Procedure: Surgery was done under general anesthesia via endotracheal intubation. The defect was marked and transferred to the supraorbital region, the flap marked 1 to 2 cm above the eyebrow. Incision made after tumescent injection, incision deepened up to the galea. The lateral aspect of the flap was kept as wide as possible (at

least 1:4 for the base to length dimension of the flap). The flap was dissected along the plane between the subcutaneous tissue and the underlying muscles of the brow and lower forehead. Special attention should be paid to avoid excessive thinning of the flap. Then, it was transposed to the eyelid defect. Flap inset was given with interrupted 5/0 vicryl sutures and nylon 6/0 sutures. The donor-site wound was either closed primarily with interrupted subcutaneous 5/0 vicryl sutures and simple interrupted 6/0 nylon sutures or grafted with split thickness skin graft. [Figure 1]



**Figure 1: Temporal forehead flap for upper eyelid reconstruction**

#### RESULTS

All flaps survived well. Two patients required secondary thinning of the flap. Donor site skin graft 100% take was observed. In one patient there was a mild elevation of the eyebrow in the initial post-operative period which settled down after 6 weeks with massaging alone. The donor for the skin graft also healed without any complications. There was no difficulty in moving the reconstructed eyelid. No ptosis and no

ectropion were observed. [Figure 2]



**Figure 2: Temporal forehead flap for lower eyelid reconstruction**

### DISCUSSION

Upper and lower eyelids have certain unique anatomical features which should be kept in mind prior to choosing the best option for their reconstruction.

The upper eyelid is more curved due to the shape of the tarsus and adaptation of the lid to the curvature of the globe. The highest point of the curve is just medial to the pupil in primary gaze. The upper lid margin rests 1–1.5 mm below the limbus in adults [1]. The upper eyelid is a complex structure which has various functions including palpebral closure, spreading of the tear film, blinking. To facilitate these movements, reconstruction option should be comparable to the weight of normal eyelid and not bulky or heavy.

The lower lid has a gentle S-shaped curvature with the lowest point being just lateral to the pupil. The lower eyelid margin rests at the level of the limbus inferiorly. The lower lid is shorter, less mobile, contributing minimally for palpebral closure [1]. Ectropion and contracture should be avoided to preserve these functions.

Eye lids have the thinnest skin in the body, which becomes thicker as it approaches the eyebrow and cheek. It is firmly adherent over the pretarsal area and over the canthal regions due to absence of subcutaneous tissue [1]. Our aim in reconstruction should encompass form, function and aesthetic appearance.

As written by Mustarde, “When the eye is still present, reconstruction of an eyelid or even a part of it requires a minimum of three elements: an outer layer of skin, an inner layer of mucosa and a semi-rigid skeleton interposed between them.” [2] Similar tissue should be preferred for reconstruction when available. Flap options for upper eyelid anterior lamella defects involving more than 50% are Mustarde's lid switch flap [2], Cutler Beard bridge flap [3], temporal forehead flap (Fricke flap) [4] and modified Tessier flap [5]. Flaps available for reconstruction of the lower eyelid anterior lamella defects of more than 50 % include Mustarde cheek rotation flap [6], the Tripiet flap [7], nasolabial flap [8], paramedian forehead flap [9], temporal forehead Fricke flap [4] and Tessier flap [10]. Most of these procedures are complicated, time consuming and often multistaged.

The temporal forehead flap, also known as Fricke flap was first described by Jochim Fricke in 1829. It is a temporally based monopod flap transposition flap from the forehead. It was used in wide variety of conditions such as the reconstruction of large lower lid, upper lid, and lateral canthal defects or to bring vascularized tissue to anterior orbital defects. The donor area can be closed primarily when there is lax forehead skin or skin graft is applied. The revisions to the flap can be done after 2-week time [4]. This is a simple flap which can be done rapidly and without any major complications. It can be used to cover extensive upper and lower eyelid defects without extensive dissection. The Fricke flap is elevated in the easily identified plane between the subcutaneous tissue and the frontalis muscle/galea avoiding damage to the frontal branch and the zygomatic branches of

the facial nerve that innervate the orbicularis from its deep surface [11,12].

Disadvantages with the use of the temporal forehead flap include raised eyebrow and scarring in the forehead region as the donor site is closed by primary suturing or by split skin graft. Asymmetric brow height due to raised eyebrow can be reduced to some extent by a rigorous postoperative downward massage of the eyebrow [4]. If the flap is bulky, it can cause mechanical ptosis of the reconstructed upper eyelid and ectropion of the reconstructed lower eyelid. Hence, thinning of bulky flap is required to prevent the aforementioned complications.

### CONCLUSION

The method of eyelid reconstruction should be chosen based on the suitability of the procedure to the defect and the skill of the operating surgeon. In eyelid reconstruction, consideration has to be given to the area of involvement, degree and thickness of tissue loss. The main function of the upper eyelid is mobility and that of lower eyelid is stability, so any reconstructive procedure must be done with the ideal of producing a thin stable functional eyelid which is also cosmetically acceptable. The temporal forehead flap is easy to harvest, providing thin stable well-vascularised tissue with good pliability and mobility, with good colour and near normal texture match, donor site complications being minimal, is an excellent choice for reconstruction of large anterior lamella defects of both upper and lower eyelid.

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