Nasolabial Flap: A Valid Option for the Reconstruction of Periocular Soft Tissue Defect

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Received, 12 April, 2019
Accepted, 17 May, 2019

A soft tissue defect on the face poses more challenge for a reconstructive surgeon as compared to other areas, for being the esthetic zone, paucity of local tissue to mobilize and the close proximity of the highly sensitive organs viz. eyes, nose, mouth and ears. Periocular region is one such area which, if not reconstructed well, leads to complications such as ectropion with corneal exposure, conjunctival exposure, canthal deformity, epiphora, etc. Nasolabial flap is a versatile flap which can be raised as axial or random flap. With the availability of option to raise a superiorly based or inferiorly based flap, the versatility of a nasolabial flap cannot be over emphasized. Here we present a case series of using nasolabial flap to successfully cover defects of the periocular region to maintain function as well as esthetics.

Keywords: island flap, nasolabial flap, periocular defect, propeller flap.

Eyelid and periocular defects may result from congenital anomalies, neoplastic processes, ablative surgical procedures, or trauma. Regardless of the etiology, however, the skin, muscle, supporting structures, and conjunctiva must be assessed and, if absent or deficient, reconstructed. Evaluation of defects with respect to location and the extent to which the area is affected (partial or full thickness) may also be predictive of possible post-operative complications. Periocular region further can be divided into different zones which aids the surgeon to plan for the appropriate reconstructive procedures.[1] Lower eyelid and the surrounding area is

one of such zones with its own anatomic, functional variations and requiring esthetic considerations during reconstructions. Defects where primary closure is not possible, the local flaps are the first and ideal choice for coverage. The most frequently used flaps for this region are Mustardee cheek advancement flap, Nasolabial flap, Fricke flap, Tripier flap, etc. Here we present a series of 6 cases where Nasolabial flap was used in different fashion to successfully cover the defects with minimum visible donor site scar.

Materials and Methods:

This is a review of the patients operated for periocular defects using nasolabial flap between 2016 and 2018 under the department of Plastic, Cosmetic and Maxillofacial surgery, B and B hospital. Two patients, 3 and 5 years old, were cases of Tessier cleft No. 4, one had ectropion as a result of scar contracture from previous surgery and remaining 3 patients, 27- 40 years of age, had sustained soft tissue defect following road traffic accident **(Figure 1, 2)**. Informed consent for the procedure and clinical photographs was taken from all the patients or their guardians. In all of the patients, the soft tissue defect was covered using the nasolabial flap of different sizes. None of the cases required inner lamella or tarsus reconstruction for the lower eyelid.

Surgical Technique:

Nasolabial flap is raised from the naslolabial fold of tissue lateral to the nasolabial crease. The dissection is done above the Subcutaneous Musculoaponeurotic System (SMAS) layer to avoid damage to the nerve. The skin in this region is richly supplied by the perforating branches forming the subdermal plexus of facial artery and its terminal end angular artery. It can be based on a superior or inferior pedicle and can be transposed, interpolated or advanced or rotated as an island flap. If the island flap is rotated on an axial pedicle, it is also called a propeller flap. The size of the flap that can be harvested for primary closure of the donor site, depends on the age of the patient. An older face will have more redundant tissue than in the younger patient.[2,3]

Nasolabial flaps are more commonly used to close defect in the lip and lateral nasal region and rarely described for periocular reconstruction. But as in our case series, this flap has proven to be a viable option. Cases where tarsus of the eyelid has been affected, conchal cartilage or muco-cartilage graft from the nasal septum can be utilized and the outer lamella reconstructed with nasolabial flap. Ancillary procedure such as canthoplasty can be employed to prevent ectropion and canthal deformities as in our cases.[2,3]

S.No.	Age/Sex	Cause of defect	Location	Type of Nasolabial flap
1	3 yrs/F	Tessier Cleft No. 4	Medial region of lower eyelid	Inferiorly based island flap
2	5 yrs/F	Tessier Cleft No. 4	Medial region of lower eyelid	Inferiorly based island flap
3	27yrs/M	Operative site infection and wound contracture	Infraorbital region	Inferiorly based island flap
4	30yrs/M	Road Traffic Accident	Infraorbital region	Inferiorly based island flap
5	40 yrs/M	Road Traffic Accident	Medial region of lower eyelid	Inferiorly based island flap
6	27 yrs/M	Road Traffic Accident	Lateral aspect of eyelid to temple region	Superiorly based propeller flaps

Table 1: Summary of the patients and treatment

Results:

Inferiorly based, V-Y advancement of nasolabial island flap was used in all 5 cases except one where the defect was on the far lateral periocular region extending to the temple area **(Table 1)**. In this case, a superiorly based propeller flap was raised which was also the largest in our series with the dimension of 3.5 cm X 1.5 cm and was rotated nearly 90 degrees supero-laterally to reach the defect **(Figure 3)**. In all cases, the defects were successfully closed without any tension or ectropion. Anchorage of the dermal tail of the flap to the medial and lateral canthal tendon attachment was done to avoid ectropion and canthal deformity. None of the cases required tarsus reconstruction. The donor site scar was minimal and camouflaged within the nasolabial fold. Postoperative care included intravenous antibiotics and alternate day dressing. There was no tip or margin necrosis of the flap in any of the 6 cases. The initial swelling subsided within 2 – 3 weeks, no contracture was seen and wound healed with primary intention. Follow up period ranged from 4 weeks to 6 months. All patients were satisfied with the cosmetic results and improved function.

Figure 1: 27-year-old male patient had undergone ORIF for fracture of right infra-orbital rim and floor of the orbit. 3A, B) The wound had healed with complicated scar causing ectropion of the lower eyelid. The wound was explored, implant removed and scar tissue was excised. V-Y advancement of nasolabial island flap was performed. The wound healed uneventfully with significant improvement in the ectropion (D).

Figure 2: 40-year-old man sustained a soft tissue defect on the right medial canthal region during a motorbike accident. A) The inferior punctum of nasolacrimal duct was displaced but intact. An inferiorly based nasolabial flap was raised and v-y advancement done to cover the canthal defect and the donor site defect was closed with the advancement of cheek flap (C,D). Medial canthopexy was done.

Figure 3: 27-year-old patient sustained a large soft tissue defect of about 3cm X 2cm over the left infraorbital region extending to lateral canthal and temporal region (A). A 3.5 cm X 1.5 cm nasolabial flap was raised on its superior pedicle, a branch of angular artery (B). The island flap also known as propeller flap, then was rotated around 90 degrees to reach the defect on the lateral canthal region. Donor site was closed primarily (C). 5 weeks post-operatively, would healing is good and form and function restored (D).

Discussion

Proper reconstruction of lower eyelid and surrounding periocular region is a challenging task. Defect in this region, if left to heal with secondary intention or by using inappropriate method of coverage may lead to complications such as eyelid margin contracture i.e. ectropion with exposure of the conjunctiva, sclera, medial and lateral canthal deformities, reflex epiphora, disruption of nasolacrimal drainage. This will not only create esthetic concern but pain and discomfort to the patient.[2]

The need to match the color and texture of the skin make local flaps the most ideal option for the reconstruction of this region. While Mustardee cheek advancement flap is the most commonly described one, the need for wide incision, heavy weight of the flap and scar contracture tend to cause mild ectropion of the eyelid.[4] The sideburn will pose a limitation to the extent of advancement of the Mustardee flap. Also,

for the closure of a small size defect, a significant amount of dissection and elevation of the flap is required. J. Barba-Go´mez et al. proposed a modification of Frickie's cheek flap for the periocular defect closure. However, in their series, all of the patients with regular functional results developed minimal exposure of the sclera. All of the patients developed ocular chemosis.[5]

Although nasolabial flaps are mostly recommended for the reconstruction of lip, lateral nasal defects, and intra-orally for buccal to palatal mucosa and vestibular defects, our experience with these series of patients and their satisfactory outcome allows nasolabial flap a place for the reconstruction of the periocular region. As mentioned earlier a nasolabial flap is raised either as a superiorly based or inferiorly based flap on the perforators of facial artery. Defect on the medial half of the infraorbital region can be covered with V-Y advancement of inferiorly based island flap while to reach to the lateral half, a propeller flap is raised based on its superior pedicle and rotated to reach the defect as in our last case. The arc of rotation of the superiorly based flap is extended 360 degrees even reaching to the contralateral periocular region.[6,7]

There was 100% flap survival with no tip or margin necrosis which is sometimes seen with cheek advancement flap and the donor site scar is well camouflaged within the nasolabial crease. To avoid any ectropion or canthal deformity, the dermal tail of the flap is sutured to the periosteum near the attachment of lateral or medial canthal tendon. During the follow up between 4 weeks to 6 months, no complication was observed.

Siegel was the first to describe the use of a nasolabial flap combined with a palatal mucosal graft to cover a shallow lower eyelid defect.[8] Nakajima et al introduced a subcutaneous flap pivoting the lateral canthus to reconstruct the skin of the whole eyelid as an aesthetic unit.[9] Yousefiazar et al in his series of reconstruction of medium-sized eyelid defects using modified Nasolabial flap describes the method of tunneling the dermal tail of the flap under the orbicularis oculi muscle for orbital canthus fixation.[10] Another encouraging article is by Chen et al where they have used inferiorly pedicled nasolabial flap for reconstruction of anterior maxilla defects. In this study, 5 of the 7 patients underwent radiotherapy after surgery and 1 patient had undergone ipsilateral neck dissection without any complications in survival of the flap.[11] This provides more confidence on the reliable vascular interconnection between the contralateral sides and also with other arteries such as transverse facial artery, infra-orbital artery, supra-trochlear artery in line with study by Hynes B and Boyd JB.[12]

Conclusion

Our experience with nasolabial flap for the reconstruction of lower eyelid and periocular defect has been extremely satisfying in terms of the restoration of form and function of the area with minimum of complications and donor site morbidity. Hence, nasolabial flap avails

itself as a viable option for the reconstruction of the periocular region.

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