

**RECONSTRUCTION OF FACIAL SKIN DEFECT BY VARIOUS FLAPS:
OUR EXPERIENCE**Atishkumar B. Gujrathi¹, Vijayalaxmi Ambulgekar²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Face represents complete personality of human being. Cosmetically it is very important part of a person especially for woman. There are many situations when due to disease or trauma, facial defect arises, which requires reconstruction by either local or distant surgical flaps. **METHODS AND MATERIALS:** In rural places, we come across many patients suffering from trauma and skin malignancy of face. These patients require reconstruction done esthetically with local flaps. Objective of this study is to share our experience of providing esthetically good results at our secondary referral care center. Hereby, we present case series of 14 patients operated at our institute. These patients were analyzed according to the age, sex, nature of injury and anatomical location of lesion on the face. All these patients were operated and reconstruction of defect was done with various local flaps best suited for respective lesion, under local anesthesia or sedation. Post-operative nature of wound was analyzed for flap viability or flap necrosis. **RESULTS:** Amongst them were 7 male and 7 female, ages ranging from 4 to 80 years. 7 out of 14 patients were of basal cell carcinoma, 4 were due to trauma, 2 were due to dog bite and 1 case of recurrent pleomorphic adenoma at root of nose. All patients had excellent flap viability at end of 6 months and flap achieving almost similar color and contour as that of surrounding skin. **CONCLUSION:** Reconstruction of facial defects by local flaps is very easy and cost effective technique. This can be done even at secondary referral care centre with minimal availability of facilities.

KEYWORDS: Facial Injuries, Surgical flaps, Skin Neoplasm, Esthetics.

INTRODUCTION: Skin is a complex organ system that is essential for all forms of mammalian life. The face is the central focus for one's identity, and any disfigurement of facial skin draws undesirable attention. The face has an extensive vascular supply arising from branches of both the internal and external carotid systems with rich collateralization and defined vascular territories¹. Knowledge of these vascular territories and the extensive collateralization of these vessels allow the successful design of a variety of local flaps.² Cutaneous flaps may be classified by the nature of their blood supply (random vs. arterial), by configuration (rhomboid, bilobed), by location (forehead, cheek, lip), and by the method of transferring the flap.³ On the basis of location, flaps are classified as local, regional and distant. A local flap is one in which tissue immediately adjacent to or near the primary defect is used to cover the defect³. Selection of flaps is determined by location and size of skin defect.

In rural places we came across quite a few patients suffering from trauma and cutaneous cancer of face and nose. These patients were operated and the defect thus arose were repaired esthetically with local flaps. Our technique is although very old but is easy and cost effective

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which can be performed even at remote places in Local anesthesia with sedation. Our hospital is of the level of secondary referral center. Hereby, we present case series of 14 patients operated at our institute. These patients were analyzed according to the age, sex, anatomical location of lesion on the face. Amongst them 7 were male and 7 were female, age ranging from 4 to 80 years. 7 out of 14 patients were of basal cell carcinoma, four were due to trauma (either accidental or assault), two were due to dog bite and one case of recurrent pleomorphic adenoma at root of nose. All these patients were operated and reconstruction was done with various local flaps with good esthetic result.

Amongst our 14 patients, seven patients were having basal cell carcinoma between the age group 50yr to 60yrs, four patients were having defects due to trauma (accidental or assault) were between the age group 20 to 40 yrs. of age group, two were children 4 to 6 yrs. of age having facial defect due to dog bite and one patient of recurrent pleomorphic adenoma at root of nose of age 80yrs.

Our aim is to describe our experience of reconstructing facial skin defects by local flaps successfully at our institute and to provide good esthetic look and better rehabilitation to patients of trauma and post cancer surgery even at remote places.

MATERIAL AND METHODS: After clearance from the local ethical committee and taking informed consent from patients, prospective analytic study was carried out among thirteen patients operated during June 2013 to August 2014.

Among fourteen patients 7 were male and 7 were female, age ranging from 4 to 80 years. 7 out of 14 patients were of basal cell carcinoma, 4 were due to trauma (Either accidental or assault), 2 were due to dog bite and 1 case of recurrent pleomorphic adenoma at root of nose. A detailed history of all patients was taken and a thorough clinical examination was performed and necessary laboratory tests were done. Detailed examination of defect was done and its measurements were noted down. Patients suffering from diabetes, hypertension or any major medical illness who failed to get medical fitness or which could affect flap viability were excluded from study.

After explaining possible outcome and prognosis of surgery, pre-anesthetic fitness was obtained. Although general anesthesia was required only in three patient, two were children of age group 4-6yrs. and one of recurrent pleomorphic adenoma of nose who was operated for removal of mass in same surgery, rest all eleven patients were operated under local anesthesia in the form of 2% xylocaine infiltration along with sedation either intramuscular or in intravenous infusion form depending upon patient's pain threshold.

All patients were operated under strict aseptic condition and local flaps were taken according to type of injury or skin defect and site of defect. Flaps were secured with non-absorbable sutures and aseptic dressing was given to all patients.

After surgery, all patients were assessed on post op day 1 for flap viability or rejection if any. Flap viability was assessed by looking for color, local temperature of flap, wound gapping or discharge from stitch site. All patients were re-assessed on post op day 7 for acceptance of flap and stitch removal. After suture removal, patients were asked to follow up on post op 1 month and 6 month period for final esthetic look on face.

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OBSERVATIONS:

Cause Facial defect	Males	Females	Total
Basal cell carcinoma	3	4	7
Road traffic accidents	2	1	3
Assault	-	1	1
Dog bite	1	1	2
Recurrent pleomorphic adenoma at root of nose	1	-	1
Total	7	7	14

Table 1: Showing cause of facial defects among different sex

Types of local flaps	Numbers of cases					Total
	BCC	Road Traffic accidents	Assault	Dog bite	Recurrent pleomorphic adenoma at root of nose	
Rhomboid flap	2	1	-	1	-	4
Advancement flap	3	1	-	1	1	6
Bilobed flap	2	-	-	-	-	2
Paramedian Forehead flap	-	1	1	-	-	2
Total	7	3	1	2	1	14

Table 2: Showing types of local flaps being performed

From table 1, amongst 14 patients, total male were 7 and female were 7, showing equal sex distribution.

Out of these 7 males, 3 cases were of Basal Cell Carcinoma on Face, 2 patients of Road Traffic Accidents; one case of recurrent pleomorphic adenoma at root of nose and one case were of Dog Bite. Amongst them, all cases of Basal Cell Carcinoma and recurrent pleomorphic adenoma at root of nose were seen in elderly age group, Road traffic Accident in younger age and a case of Dog Bite was seen in a child.

Out of 7 female patients, 4 were of Basal Cell Carcinoma of Skin on Face, 1 case of Road traffic accident, 1 due to Dog Bite on Face and 1 case of injury due to assault. While considering age distribution, similar trend was observed like male with all Basal Cell Carcinoma seen in Elderly patients, Road traffic accident in younger patient, dog bite in child and one case of assault was seen in young married adult female.

From table 2, four different local flap designs were used for reconstruction of facial skin defect. Flaps used were Rhomboid flap, Advancement flap using burrow's triangle technique, bilobed and forehead rotational flap. Choice of flap used was based on site and size of skin defect arose after excision of lesion. Special attention was paid to preserve good vascular supply to pedicle of flap so as to achieve flap viability.

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In our study, maximum no. of cases, totaling 6, were performed using advancement flap with burrow's triangle technique. Of these, 3 cases were of Basal Cell Carcinoma, 1 Road traffic accident, 1 dog bite and one case of defect created at root of nose by excision of recurrent pleomorphic adenoma.

Second most preferred flap design was Rhomboid flap, used in 4 patients. Of these 2 were of Basal Cell carcinoma, 1 of Road traffic accident and 1 of Dog bite. Defect arising from excision of these lesions were small enough to be reconstructed with this simple flap design very efficiently.

Two cases of Basal Cell carcinoma were on Ala of nose and defect arose after excision of lesion was circular. This necessitated use of bilobed flap for reconstruction in these cases.

Forehead rotational flap was used in 2 cases, one of Road traffic accident and one of assault. Both these cases had complete avulsion of tip and ala of nose, resulting in large defect which was deficient in cartilaginous support. This required full thickness forehead rotational flap for reconstruction of entire external nasal framework.

All patients were followed up on post op day 1, 7, 1 month and 6 month as per protocol set. All patients showed excellent flap viability on day 1 and 7. None of the patients had signs of flap rejection or necrosis in the form of skin discoloration or change in local temperature. At time of stitch removal, none of the cases had wound gapping or discharge. Flap was very well accepted and healed. At time of 1 month follow-up, flap achieve similar color and contour as that of surrounding skin, which suggested good flap acceptance. At time of 6 month follow-up, scar mark almost faded with suture line visible only on close inspection. And thus, all patients had very good cosmetic result.

Figure 1: Showing traumatic facial defect reconstruction with rhomboid flap.

Fig. 1a: Traumatic defect over left cheek, **1b:** Intraoperative photograph showing closer with rhomboid flap, **1c:** 2 weeks after surgery.



Figure 1a, 1b & 1c

Figure 2: Showing basal cell carcinoma at all of nose and reconstruction done with bilobed flap. (2a. showing lesion of basal cell carcinoma over right ala of nose, 2b. intraoperative photograph showing defect after removal of lesion, 2c. showing Bilobed flap 2d. 1 weeks after post op.)

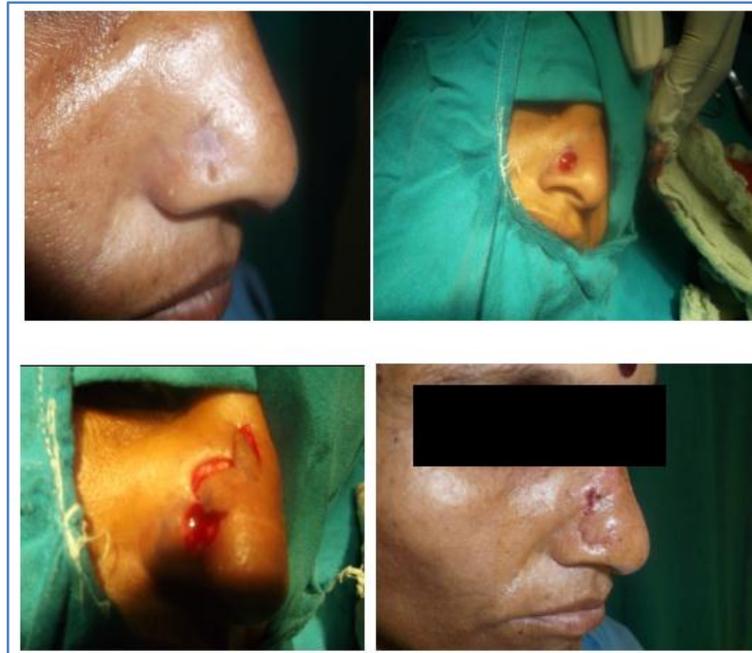


Figure 2a, 2b, 2c & 2d

Figure 3: Showing avulsion injury to tip of nose and reconstruction done with forehead flap. (3a. showing traumatic avulsion of tip of nose, 2b. showing reconstruction done with paramedian forehead flap, 3c. showing flap after 3 weeks post op.)



Figure 3a, 3b & 3c

Figure 4: Showing pleomorphic adenoma at root of nose involving skin and removed along with skin, defect reconstructed with advancement flap by burrow's triangle. (4a. showing pleomorphic adenoma at root of nose involving overlying skin, 4b. intra operative photograph showing defect after removal of tumor with skin, 4c. showing advancement flap by burrow's triangle, 4d. 2 weeks after post operative.)



Figure 4a, 4b, 4c & 4d

DISCUSSION: Face represents complete personality of human being. Therefore, adequate cosmetic correction of facial defects arising due to various injuries and lesions is very important. Well established "Reconstruction ladder" exists in current surgical practice for management of such defects on face with healing by secondary intention and granulation formation at one end of spectrum and reconstruction by micro-vascular surgery at other extreme. Reconstruction of defect by local flaps falls in-between this spectrum with intention of achieving best cosmetic results comparable to micro-vascular surgery and also feasibility of the technique at secondary referral Centre where many a times expertise for micro-vascular surgery is not available.

A local flap consists of a tongue like protrusion of tissue which is made up of skin and a variable amount of the underlying subcutaneous tissue. It remains attached at one or more points by its pedicle, which provides an arterial blood supply with venous and lymphatic drainage. This is then moved with its blood supply in order to reconstruct the primary defect and this procedure will leave a secondary defect which may be closed by either split skin graft or direct closer⁴. The goals of facial reconstruction center on closing defects in an inconspicuous manner. Flaps are classically categorized based on their vascular supply, composition, method of transfer, and design⁵. Amongst various technique for reconstruction of facial defects described in literature, Rectangular advancement flap by Burrow's triangle, Bilobed flap, Rhomboid flap and Forehead Rotation flap are some of the most commonly used flaps in current practice.

Rectangular advancement flap, the most simple in design, is one in which the flap is moved directly along a linear axis to its recipient site.⁶ They are useful to cover medium-sized defects of nasal root and bridge. For more distal lesions there is an increasing risk of flap

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necrosis. It is recommended to limit the length of the flap to maximum four times its width. In our study, we excised two Burrow's triangle at base of flap just above eyebrow on both sides to prevent standing cone formation. This type of flap is also known as ventail flap since it resembles a helmet.⁷

The bilobed flap is a double transposition flap, first described by Esser (1918) for nasal reconstruction.⁶ It is commonly used at the nasal sidewalls and nose tip. The primary lobe is created in the same size of the primary defect or up to 20% smaller in case of enough skin laxity. The second lobe is designed at a 90° angle to the pivot point of the flap.⁸

The rhomboid flap is a complex transposition flap with a strict geometrical design introduced by Limberg in 1946.⁶ The lesion is excised as a rhomboid with internal angles of 60° and 120°. For each rhomboid defect, four possible rhomboid flaps can be designed. Selection of the most appropriate one depends on location of the defect, the skin thickness of the donor site, and the orientation of the relaxed skin tension lines. In our study, we used this Rhomboid flap on cheek where creases are not prominent, skin is thinner and resulting scar tends to blend better with adjacent skin.

The paramedian forehead flap is archetype of interpolated flap where flap is transferred by pivotal movement and has a linear configuration but its base is not contiguous with the defect. The pedicle must cross over or under the intervening tissue. This is a two stage surgical procedure where in second stage, in setting of flap is done.³ The flap design needs a sufficient height of the forehead to create a flap long enough to cover the nasal defect. The arterial supply is derived from the supratrochlear artery. The flap consists of skin musculature and vasculature. The base of the pedicle should be 1 to 1.5 cm. Subperiosteal release of the flap increases mobility. Before suturing the thickness of the flap needs to be adapted to the surgical defect. Donor site closure is performed with minimal tension. Residual defects can heal by second intention or a W-plasty is performed⁹. It is used to repair mediolateral nasal defects to reconstruct entire external nasal framework even when there is lost cartilage support.

In our study, we selected patients from all age group, presenting with various defects on facial region, arising out of various pathology. We used different flap designs for reconstruction of these defects depending on dimensions and site of lesions. Flaps used in our study were Rhomboid flap, Rectangular Advancement flap using Burrow's triangle, bilobed flap and Paramedian forehead rotational flap. While selecting these flap designs, we adhered to guidelines given in accepted literature.

Most of these cases were done under local anesthesia and at secondary referral centre without availability of micro-vascular surgery. None of these cases had any complications like wound gapping, stitch abscess, discharge from local site and flap necrosis. All cases had very good flap acceptance with suture line barely visible at 6 months follow-up visit and it achieving same contour and textures as that of surrounding skin. Specifically in our two cases of avulsion injury of nasal tip and ala, external nasal framework reconstructed by paramedian forehead flap gave good cosmetic as well as functional result.

CONCLUSION: Finally we conclude that reconstruction of facial defects by local flaps is very easy and cost effective technique. This can be done even at secondary referral care Centre with

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minimal availability of facilities. By doing this, we can prevent unnecessary burden on super-specialty health care centers and also expenditure and time of patients.

Hence the message is that reconstruction of defects by local flaps is effective not only in head and neck region but at any other body part, which can be done at any setup having basic health care facility.

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