

RECONSTRUCTIVE SURGERY OF THE EXTERNAL NOSE

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SUMMARY

This is a retrospective study of reconstructive procedures used in 30 patients, who presented with various defects of nose following trauma or underwent ablative nasal surgery. They were treated between September, 1985 to September 1997. There were 16 male and 24 female, within the range of 15 to 65 years (average age 35 years). This study outlines an approach that aims to restore the nose to a normal appearance. The reconstruction was carried out with skin grafts in 8 patients, composite graft from auricle in 13 patients. The later group comprised of median forehead flap in 3 patients nasolabial flap in 5 patients. Converse scalping flap in 2 patients and combination of seagull forehead and local flaps, as described by Millard, in 3 patients. As a final step in total nasal reconstruction, costal cartilage grafts were added to lift and narrow the dorsum to make the nasal tip more pointing. After a follow up of 6-18 months, over all results of repair have been satisfactory, though in few cases infection and rejection of the graft and flaps posed a few problems.

INTRODUCTION

The nose is the most prominent part in the face most liable to injury. While it is primarily an organ of respiration, its aesthetic function is not less important. Deliberate amputation of the nose has been common practice in NWFP for centuries. Enemies chopped off the nose of their foes, dacoits cut off the noses of their victims and husband rendered the same punishment to their erring spouses. Even today deliberate amputation of the nose is fairly common and provides ample opportunity for nasal reconstruction. Traumatic full thickness loss of the nose can also occur due to animal and human bites. In these bite injuries the loss can vary from only a portion of the alae to whole pyramid.¹ In slicing injuries due to sharp instruments the loss can vary from only that of the tip to the whole pyramid. The patient may present himself immedi-

ately after the injury with or without the amputated part, or a few days later with an infected wound.²

Carcinoma of the nose constitutes 26 percent of all skin carcinoma. Approximately 90 percent of nasal neoplasm are basal cell carcinomas, 9 percent squamous cell carcinomas and the remaining one percent are rare tumours like melanoma.^{3,4} Lesions involving nasal vestibules and septum are rare, the majority being squamous cell carcinomas, with a few melanomas.⁵ Various defects of the nose occur after tumour resection which needs different types of reconstructive procedures.

An open wound of the nose is most easily closed by excising exposed bone and cartilage and covering the defect with a skin graft. However, certain patients wish not only to have the defect closed but also want to 'look normal'. Certain principles are

unique to aesthetic reconstruction of the face, that is, reconstruction where the aim is to recreate the missing part in its original shape, colour and texture.

MATERIAL AND METHODS

Thirty patients were operated from September 1985 to September 1997 at the department of ENT, Head and Neck Surgery of Hayat Shaheed Teaching Hospital attached to Khyber Medical College, Peshawar. Sixteen were male and fourteen were female, Eighteen patients had post traumatic loss while 12 had loss following tumour resection. The age ranged from 15-65 years (average age 35 years). The depth and location of the defect determined which materials and techniques had to be used for reconstruction of the external nose. Defects that involved only skin and superficial fat were repaired with a skin graft, where as a flap was required when the bone or cartilage was exposed. If a defect extended through cartilage or bone to mucosa, then a cartilage graft was used to achieve normal contour and prevent contracture. Full thickness defects of the nostril margin demanded a thin composite graft of skin and cartilage

identical to the normal nasal lining. When a nasal defect was too large to be repaired with free composite grafts or local flaps a regional flap was used. The nasolabial flaps were used for small unilateral or bilateral defects. The median forehead flap was used for large unilateral defect. To reconstruct large bilateral defects, when both sides of the nose were missing and only a part of the nasal bones remained, either a converse scalping flap with skeletal support and lining were used in stages or the Millard technique was adopted where we used a L-shaped septal stout, from the remaining septal cartilage, as a central support, adjacent nasal bones skin and bilateral nasolabial flaps as lining for the vestibules, a seagull shaped midline forehead flap to cover the dorsum. This required three surgical stages plus several additional operations to shape the alae and side walls and then the nostril margins. Among the free grafts used which received their blood supply from the recipient site, were: split thickness grafts; full thickness grafts of both skin and mucous membrane; composite grafts, from the ear with skin on one or both surfaces of the cartilages; costal cartilage grafts, obtained from the seventh or eighth costal cartilage.

TABLE - I

TYPES OF GRAFTS AND FLAPS USED IN RECONSTRUCTION OF NOSE

Type of graft and flaps	No. of patients	%
Split thickness skin graft.	3	10
Full thickness skin graft.	5	17
Composite graft from the ear.	3	10
Local flaps.	6	20
Median forehead flap.	3	10
Nasolabial flap.	5	16
Converse 'scalping flap'.	2	7
Millard Combine 'seagull flap' and local flap.	3	10

Flaps with blood supply, used in the area of the nose, were: local flaps, i.e. rotation, transposition and advancement flaps; regional flaps, i.e. median forehead and nasolabial flaps, converse scalping flap, Millard combine seagull flap and local flap.

In 8 patients skin grafts were used. In 3 patients composite graft were used, in 6 patients local flaps were used and in 13 patients regional flaps were used (Table-I).

RESULTS

No significant problem was encountered in local flaps, except one old case of delayed healing due to infection. Like wise the forehead flaps gave satisfactory results,

TABLE-II
COMPLICATIONS OF
RECONSTRUCTIVE SURGERY ON
NOSE

Complication	No. of patients	%
Delayed healing due to infection.	1	3
Partial tip necrosis due to infection	1	3
Marginal necrosis of flap	1	3
Detachment of flap	1	3
Total rejection of graft	4	13
Total	8	27

barring ofcourse minimal scarring over the forehead. In the current series, it was satisfactorily used, providing adequate relief from gross nasal deformities. However, secondary infection causing partial tip necrosis was seen in one patient, but little more than simple dressing and antimicrobial therapy was required to overcome this problem. Two of the nasolabial flaps caused some difficulty. Detachment of the flap occurred in one patient, in whom revised operation had to be done. In the second patient marginal necrosis of the flap occurred which needed resuturing for complete take up. The composite graft from the ear did not give satisfactory results in two cases, both the patient had total rejection of the graft, which had to be removed. In those cases secondary repair had to be done. The patients undergoing repair with the partial or full thickness skin grafts did extremely well except two patients who had rejection of the graft. In these cases revised operation had to be done. The complication of the above given reconstructive procedures are summarized in Table-II. After a follow up of 6-18 months, over all results of repair have been satisfactory. Unfortunately recurrent malignant disease continue to spoil the results in the long term.

DISCUSSION

The indications for reconstructive surgery of the external nose are defects due to trauma or excisional surgery. The type of reconstruction used depends on the nature of the particular defect, the condition of the recipient site, whether or not there is a through and through defect involving all tissue layers and whether the cartilage or bony frame work is deficient.⁶

In cancer surgery, it is especially important that the surgeon be familiar with all of the reconstructive techniques available.⁷ He is thus able to make a more radical excision rather than a limited excision because he knows that both function and appearance can be salvaged. The timid excision is more often carried out by the surgeon with limited knowledge of primary reconstruction.

If possible, the nasal defects should be repaired with an adjacent matching skin from local flaps.⁸ For the nose a better colour match and better healing are obtained when the immediate adjacent skin is used. In particular situations, no matter how exact the pre-planning has been, the defect at surgery often require improvisations. The surgeon must have sufficient experience to be able to improvise during the course of surgery. A primary defect should be made smaller by primary closure and the use of adjacent tissue before elaborate flaps are fashioned. The use of a traumatic surgical technique, especially in the handling of skin flaps carrying their own blood supply, is mandatory.⁹ A split thickness skin graft is usually only used for covering the entire nose with external skin loss or in a emergency situation. Split thickness grafts as a means of providing covering for the nasal dorsum are generally unsatisfactory in colour and texture. They are also not resistant to trauma, temperature and exposure to the sun.¹⁰ They may be used fairly satisfactorily in the superior one-third of the

nose, but there are better methods for repairing small defects here. The split graft is used primarily for total resurfacing of the nose where there is no exposed bone and cartilage. It should then be as thick as possible. When the location of the defect permits or if the defect is located on the tip of the nose, the use of a post auricular full thickness graft is simple and practical. There are increased advantages of the full thickness graft over the split graft.¹¹ For the thin skinned person, a full thickness graft is often satisfactory even in the lower third of the nose. A form of free graft, the composite graft contains skin, subcutaneous tissue and cartilage. The blood supply must come from the margins by revascularization from the recipient site. Defects requiring skin on two surfaces as well as supporting cartilage are ideal for composite grafts, as long as the defect is not too large.¹² This type of graft is particularly useful in the area of nasal alae.¹³ The superior third of the rim of the helix is an ideal donor site.¹⁴ For small defects there are multiple variations of local flaps utilizing the nasolabial fold area, the loose skin of the superior nose, nasion and glabella.¹⁵ This provides the most satisfactory coverage although some times considerable manipulation of the skin is necessary, including secondary rotation flaps (bilobed flaps) to close the donor area. These maneuvers are worth while to produce the desired covering.

Conventionally, cutaneous flaps from the nasolabial area, based superiorly or inferiorly have been used for local defects.¹⁶ Inferiorly based rotation and transposition flaps from the nasolabial area are often used in order to cover the floor of the nose or to displace the alar attachment laterally. Superiorly based nasolabial flaps have many advantages. Particularly for reconstruction of the alae. Width of the flap depends upon laxity of skin and therefore in older age group as wide as 3 to 4 cm of width of this flap could be made available. A flap defect with a proportion of 5:1 will survive without

trouble. A large of the nose involving alae, floor of nostril and septa could be reconstructed with the use of this flap. Midline forehead flap is a vertically placed flap in the midline of the forehead, based on one of the two supratrochlear vessels.¹⁷ The maximum width that could be easily harvested to close the donor area directly, is 3 cm. In selected cases with lax skin it may be up to 4 or even 5 cm. A wide forehead is ideal, for such flaps, since a long flap could be raised. The tip of the flap is at the anterior hair line. When the hair line is receding, at the sides of the forehead, the length of the flap could be extended, from midline to the sides, over this bald area of the forehead with an angle of roughly 45 degree. In such a situation, additionally, if a high forehead is available, the tip of the flap can reach up to base of the columella. The scar then lies in the midline and some of the receding anterior hair line. The midline forehead flap must always be lined using grafts of split thickness skin, full thickness skin or mucous membrane.¹⁸ This flap has been consistently used, for nasal reconstruction, in all races, all over the world, including orientals, since it leaves a very insignificant sear. The forehead flap, as used to provide skin cover in the reconstruction of the whole nose, can take two basic forms, the 'scalping flap' and the 'seagull flap'.

The broad base and abundant blood supply of the scalping flap described by converse make it one of the most reliable and useful flaps for total nasal reconstruction. Its blood supply comes from the superficial temporal, supra orbital and supra-trochlear vessels. The area of the forehead which is used to provide the nasal cover is placed immediately above the eyebrow on one side of the midline, and the flap is continued upwards into the hair bearing scalp, curving round to have its base above the eyebrow area on the other side of the forehead, though with the incisions remaining inside the hair line. The lower border

of the flap is shaped so that it can be folded on itself to provide both the columella and the alae. If complete nasal lining is not provided during reconstruction, the raw areas will contract, leading to gross distortion of the skin covering. The end of the forehead flap can be turned in to line the lower third of the nose, but the upper defect require local flaps. A skin graft may be employed for lining but has a marked tendency to contract. The scalping flap has the advantage in that it can be brought to the nose in a single stage. The final forehead defect is minimal and placed far lateral where it is less conspicuous and can easily be hidden by hair styling. In the 'seagull flap' reconstruction described by Millard, lining is provided by intumed local flaps and skin cover by the forehead flap. The lower half of the defect is lined by bilateral intumed naso labial flaps, the upper half by turning down the nasal skin above the defect and, since their survival is critical, a preliminary delay is standard. The 'seagull flap' providing the skin cover is designed entirely on the forehead. The 'wings' of the seagull are designed to form the alae, the 'head' the columella, and the 'body' the remainder of the nasal skin. The 'body' approximately 3 cm broad, extends upwards across the forehead from the medial end of one eyebrow, incorporating the supraorbital, supra trochlear vessels. With the narrowness of the flap and the 'wings on each side, a preliminary delay is advisable if the transfer is to be achieved safely.

The differences in the design of the two flaps affects the management of the secondary defect created by the transfer. In the case of the 'scalping flap' it is usual to graft the defect of the forehead immediately; the scalp defect may either be grafted or left to granulate over the 3 week period, pending division of the flap pedicle and return of the pedicle to the scalp. The comparative narrowness of the 'seagull flap' leaves a defect which can usually be closed directly, although a small central area may have to

be left to heal spontaneously. With both flaps it is safe to carry out division 3 weeks after the initial transfer. With either design it is seldom possible to achieve a totally acceptable result primarily. Thinning and contouring are often required and usually have to be carried out in stages.

As final step in nasal reconstruction, costal cartilage grafts may be added to lift and narrow the dorsum and give more point to the nasal tip. These grafts do not support the nose, but rather add a sculptured volume which changes the surface contour.

CONCLUSION

From this study it is concluded that median forehead flaps are best for large unilateral defects of the nose, while 'scalping' and 'seagull' flaps for large bilateral defects. Nasolabial flaps are ideal for smaller unilateral on bilateral defects of alae or columella. Local flaps are most suitable for smaller defects on lateral side of nose. Skin grafts are good for the defects of skin over the dorsum or tip of the nose.

So despite the extensive damage caused by malignancy or trauma, reconstructive procedures, such as those included in this study, offer a respite from ugly defects.

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