



ORIGINAL ARTICLE

Reconstruction of medium and large nasal defects.

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ABSTRACT... Objective: To share our experience with nasal reconstruction and to give a standardized algorithm for nasal reconstruction. **Study Design:** Descriptive cross sectional. **Setting:** Burns and Plastic Surgery Center, Peshawar. **Period:** January 2019 to December 2022. **Material & Methods:** Data was obtained from patient records after approval from IREB. Patients with multiple co-morbidities and small defects (<1.5cm) were excluded from this study. Defects were classified based on anatomic areas of radix, dorsum, sidewall, alar and lower third nasal defects. Cases were cross tabulated regarding site for the reconstructive options to generate the treatment algorithm. **Results:** A total of 51 cases were included in the study including 30 (58.8%) male patients. Mean age of patients was 48.12+21.89SD. Skin malignancies were the most common (n=35, 68.6%). Nasal ala was the most common site reconstructed in our study (25.5%) followed by nasal dorsum and sidewalls. Medium size (41.2%) was the most common. In 64.8% (n=33) cases, forehead based flaps were used to reconstruct the nasal defects (Table-I). In 5.9% cases we observed flap congestion. In 19 (37.25%) cases, patients presented with additional soft tissue defects which needed reconstruction (Table-II). Reconstructive options are presented as an algorithm based on the defect site (Figure-1). **Conclusion:** In this study we shared our experience with the readers regarding reconstruction of the nasal defects. We have formulated an algorithm for reconstruction of these defects that will simplify reconstruction in such cases.

Key words: Acquired Nasal Deformities, Forehead Flap, Nasal Reconstruction, Nose Neoplasms, Nasolabial Flap, Trauma.

INTRODUCTION

Face of a person is integral part of identity of any individual. Eyes always fixate on the central face and even a slight distortion in this area is easily picked up by the gazing eye. Human brain also perceives the face as part of their identity.¹ If there is any deformity of the face, this can have profound psychological complications for the patient. This can severely hinder both physical and mental recovery of the patient.

Procedures for nasal reconstruction can be found in ancient Indian texts where nasal reconstruction was attempted using a forehead flap.² This was discovered by British surgeons in India in eighteenth century. It was first published in the Madras Gazette followed by publication in the Gentlemen's Magazine in London.²

Italians also significantly contributed to the art of nasal reconstruction by using cheek tissue for reconstruction and later on used tissue from the inner arm to avoid distortion of the face.³

Due to the prominence of the central face area, there is little room for error in reconstruction of the nose. Menick et al.⁴ have done considerable work in perfecting nasal reconstruction using the forehead flap. Outcomes of nasal reconstruction can be optimized by clearly defining different reconstruction options in nasal reconstruction.⁵ This will make the decision making easy for the surgeon and will standardize the nasal reconstruction. The aim of this study is to share our experience with nasal reconstruction and to give a standardized algorithm for nasal reconstruction.

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MATERIAL & METHODS

Study Design

Descriptive cross sectional

Study Setting

Burns and Plastic Surgery Center, Peshawar.

Study Duration

January 2019 to December 2022

Sampling Technique

Convenience non-probability sampling

Data Collection

Institutional review and ethics board approval was obtained before initiating the study. Patients presented to emergency department and outpatient department were included in this study. Patient with multiple co-morbidities and small defects (<1.5cm) were excluded from this study. Data was obtained from hospital records. Defects were classified based on anatomic areas of radix, dorsum, sidewall, alar and lower third nasal defects (columella, sill floor and /or lip and complex defects). Cases were cross tabulated regarding site and size against the reconstructive options used to generate the treatment algorithm for nasal defects (Figure-1). Means and standard deviation was calculated for age and percentages calculated for the type of flap used in reconstruction.

RESULTS

A total of 51 cases were included in the study including 30 (58.8%) male and 21 (41.2%) female patients. The age of the patients ranged from 3 years to 90 years with a mean age of 48.12+21.89SD. Skin malignancies were the most common cause of nasal wounds presented for reconstruction (n=35, 68.6%), followed human bites, accounting for 9.8% (n=5) cases. Nasal ala was the most common site reconstructed in our study (25.5%) followed by nasal dorsum and sidewalls, each accounting for (17.6%). In 64.8% (n=33) cases, forehead based flaps (glabellar, median and standard) were used to reconstruct the nasal defects (Table-I, Figure-2 and 3). In 66.7% (n=34) patients, the reconstruction was single stage. In 5.9% cases we observed flap

congestion including one (2%) of insignificant partial flap necrosis. In 19 (37.25%) cases, patients presented with additional soft tissue defects which needed reconstruction (Table-II). Reconstructive options are presented as an algorithm based on the defect site (Figure-1).

Figure 1: Algorithm for reconstruction of nasal defects

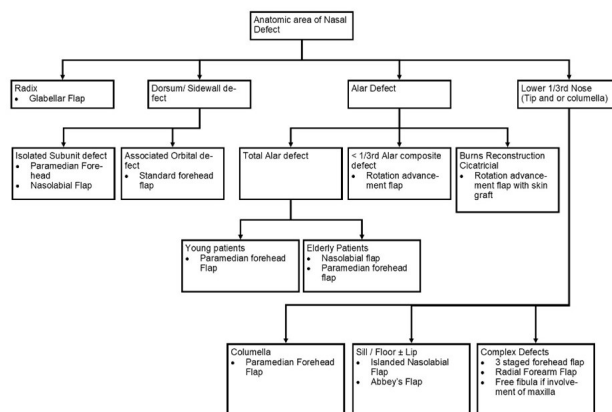


Figure-1. Algorithm for reconstruction of nasal defects

Flaps	Flap			Total
	Pedicled	Islanded	Free	
Standard Forehead	3	0	0	3
Free Osteomyocutaneous Fibula	0	0	1	1
Advancement Flap	3	0	0	3
TPF Fasciocutaneous	1	0	0	1
Glabellar Flap	6	0	0	6
Rotation Flap	2	0	0	2
TPF	1	0	0	1
Abbey's Flap	2	0	0	2
Forehead Flap	14	10	0	24
Nasolabial	8	0	0	8
Total	40	10	1	51

Table-I. Flaps used in the study population

DISCUSSION

Nasal reconstruction has the power to give back identity to the patient. We did a total of 51 cases of nasal reconstruction. Our mean age was about 48 years but it was mostly a bimodal distribution. With younger population presenting mostly with traumatic lesions while the older population presented with cutaneous tumors mostly Basal cell carcinoma and squamous cell carcinoma. Similar age cohorts are seen in literature.⁶⁻⁸



Figure-2. Islanded Forehead flap for defect over the dorsum of nose. The defect was secondary to tumor excision.

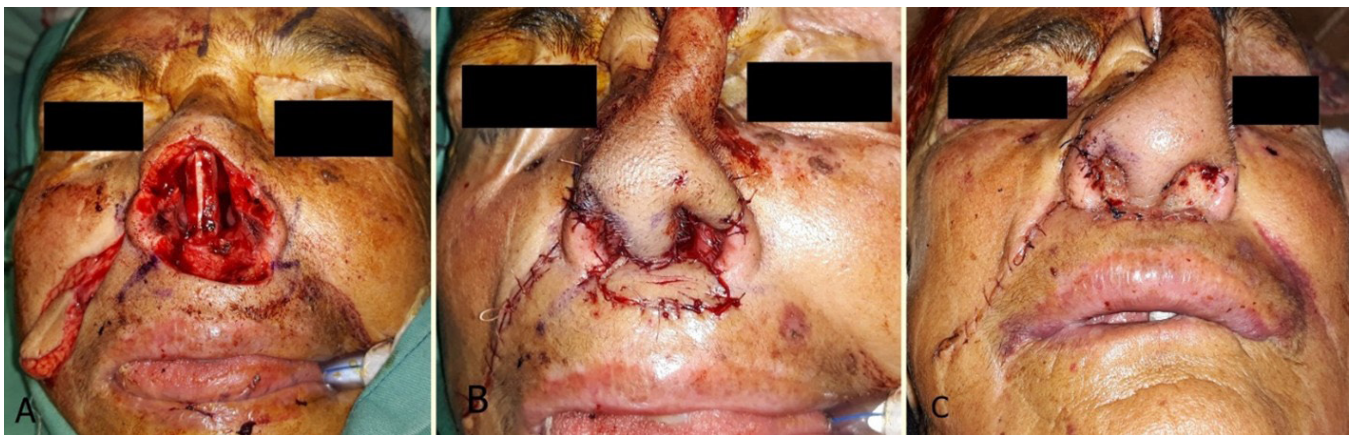


Figure-3. Composite nasal defect. Folded forehead flap was done to cover the defect. Forehead flap was folded in order to provide the inner lining. Three staged forehead flap done.



Figure-4. Nasolabial flap done for alar defect.

Additional Defect	Additional Flap							Total
	Nil	Cheek Advancement	Temporalis Muscle Flap	Transposition Flap	Islanded Nasolabial	Pedicled Nasolabial	Estlander Flap	
Nil	31	0	0	0	0	1	0	32
Cheek	2	3	0	1	0	0	0	6
Upper Lip	2	0	0	0	2	0	1	5
Lid	3	0	0	0	0	0	0	3
Orbital	3	0	1	0	0	0	0	4
Palate/Alveolus/Oral Mucosa	1	0	0	0	0	0	0	1
Total	42	3	1	1	2	1	1	51

Table-II. Additional defects and its reconstruction

Forehead flap is very well described in the literature for nasal reconstruction. Menick et al. have significant contributions in this regard.^{5,9,10} Nose is divided into different subunits including the dorsum, side walls, alae, tip and columella. Menick argued that superior results can be obtained by reconstruction of the whole subunit instead of the partial subunit.¹¹ Reconstruction using the subunit principle hides the scars in the natural creases and can give a more natural appearance.^{4,12} We have the same experience with subunit reconstruction if the nose (Figure-2 and 3). Violating the subunit principle gives rise to prominent scars which are easily visible to the observer. Although staged forehead flap is the norm, we have also done several cases of single staged islanded forehead flap. Park et al. also described a single stage repair.¹³ The advantage of islanding the flap (Figure-2) is that it is a single stage procedure as no flap division is required. This is usually preferred in elderly patients and with patients who come from far flung areas and cannot return for secondary procedures.

We have used nasolabial flaps for alar defects (Figure-4). For skin defect we use nasolabial flap to give skin cover. For full thickness defects, nasolabial flaps can be used to give inner lining to the ala along with forehead flap for outer skin coverage.^{14,15} Adequate dissection must be done if the surgeon is raising a nasolabial flap for alar reconstruction. Inadequate dissection will lead to pull on the nose and there would be secondary tip deviation to the side that is reconstructed. The pulse at the base and lateral side of the ala can later on be removed during the revision surgery.

The drawbacks in this study is that data is taken from patient records. As several variables were not present in the patient records, authors were not able to include those in the study. Further work needs to be done on this algorithm in order to refine it.

CONCLUSION



In this study we shared our experience with the readers regarding reconstruction of the nasal defects. We have formulated an algorithm for reconstruction of these defects that will simplify reconstruction in such cases. The surgeons will be able to focus on the appropriate technique for the given defect using this algorithm. Further work needs to be done in order to refine this algorithm.
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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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2	Waqas Hayat	Conception, design, writing, analysis, responsibility for content of this article.	
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