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Case Report

Use of Forehead and Nasolabial Flaps for Nasal Reconstruction: A Case Series

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Abstract

Background: *Nasal reconstruction requires restoration of both form and function while respecting aesthetic subunits. Forehead and nasolabial flaps are among the most reliable regional flaps for complex nasal defects.*

Methods: *This retrospective case series includes 15 patients who underwent nasal reconstruction using forehead and nasolabial flaps following trauma or oncologic excision. Outcomes assessed included flap survival, complications, aesthetic integration, and airway function.*

Results: *All flaps survived completely. Minor complications occurred in a limited number of cases and were managed conservatively. Overall aesthetic and functional outcomes were satisfactory.*

Conclusion: *Forehead and nasolabial flaps remain dependable options for nasal reconstruction, particularly for alar, tip, and multi-subunit defects.*

Introduction

Nasal reconstruction remains one of the most demanding challenges in facial plastic and reconstructive surgery due to the nose's central position, complex three-dimensional anatomy, and dual aesthetic and functional roles. Even small defects can significantly affect facial harmony, airway patency, and patient quality of life. Successful reconstruction requires restoration of nasal contour, preservation of aesthetic subunits, maintenance of structural support, and assurance of adequate nasal airflow.

Defects of the nose most commonly arise following oncologic excision of non-melanoma skin cancers, traumatic injuries, infections, or animal bites. The reconstructive ladder, while useful, is often insufficient for nasal defects because primary closure or skin grafting may lead to contour depression, alar distortion, color mismatch, and secondary contracture, particularly in high-visibility regions such as the nasal tip and ala.

Regional flaps have therefore become the cornerstone of nasal reconstruction. Among these, the paramedian forehead flap and the nasolabial flap are widely regarded as reliable, versatile, and reproducible options. The paramedian forehead flap, based on the supratrochlear artery, provides ample tissue with excellent vascularity and color match, making it especially suitable for large, multi-subunit, or full-thickness defects. The nasolabial flap, with its proximity, favorable skin characteristics, and concealed donor scar, is particularly effective for reconstruction of alar, sidewall, and columellar defects.

Despite the availability of multiple reconstructive options, optimal flap selection must be individualized, taking into account defect size, depth, subunit involvement, and the need for structural support. This case series aims to evaluate the clinical outcomes of nasal reconstruction using forehead and nasolabial flaps, focusing on surgical planning, complication profile, aesthetic integration, and functional results.

Materials and Methods

Study Design and Setting

This retrospective case series was conducted at a tertiary care center and included patients who underwent nasal reconstruction using either a paramedian forehead flap or a nasolabial flap over a defined study period.

Inclusion Criteria

- Patients with nasal defects requiring regional flap reconstruction
- Defects involving the nasal tip, ala, sidewall, dorsum, or columella
- Defects resulting from trauma or oncologic excision
- Minimum follow-up period of 6 months

Exclusion Criteria

- Small defects amenable to primary closure or skin grafting alone
- Patients with inadequate follow-up
- Patients who declined consent for inclusion

Preoperative Assessment

All patients underwent detailed preoperative evaluation, including assessment of:

- Defect size and location
- Aesthetic subunit involvement
- Depth of defect (skin only vs. cartilage or lining involvement)

- Need for structural support or staged reconstruction

Flap selection was based on defect characteristics:

- Forehead flap was preferred for large, multi-subunit, or full-thickness defects
- Nasolabial flap was selected for alar, sidewall, or columellar defects with moderate tissue loss

Surgical Technique

Forehead flaps were designed as paramedian flaps based on the supratrochlear artery and were performed in two or three stages depending on defect complexity. Nasolabial flaps were raised as superiorly or inferiorly based flaps, tailored to the defect location. Structural support using conchal or septal cartilage grafts was employed when necessary to maintain alar rim stability and prevent postoperative collapse.

Outcome Measures

Patients were assessed for:

- Flap viability
- Postoperative complications (minor or major)
- Aesthetic outcome (surgeon-assessed)
- Functional outcome (nasal airway patency)

Ethical Considerations

Written informed consent was obtained from all patients for surgical procedures and publication of anonymized clinical data and images. Patient confidentiality was strictly maintained.

Case Series

This case series included 15 patients (9 males and 6 females) with nasal defects requiring reconstruction using regional flaps. Patient ages ranged from early adulthood to elderly age groups. Etiologies included traumatic nasal injuries, basal cell carcinoma excision, squamous cell carcinoma excision, and animal bite injuries.

Forehead flaps were utilized in 9 cases, primarily for large, complex, or multi-subunit defects involving the

nasal tip, ala, and columella. Nasolabial flaps were used in 6 cases, mainly for alar and sidewall reconstruction. In selected cases, cartilage grafts harvested from the concha or septum were used to provide structural support. All patients demonstrated complete flap survival. Minor complications such as transient edema, hypertrophic scarring, and mild contour irregularities were observed in a small number of cases and were managed conservatively. No cases of total or partial flap loss were recorded. At follow-up, the majority of patients showed satisfactory aesthetic integration with preserved nasal airway function.

Figure 1. Forehead flap for nasal reconstruction.

(A) Preoperative nasal defect following excision. (B) Intraoperative elevation of the paramedian forehead flap. (C) Immediate postoperative appearance. (D) Follow-up showing acceptable contour and flap integration.

Figure 2. Nasolabial flap for nasal reconstruction.

(A) Preoperative marking and defect. (B) Postoperative outcome demonstrating satisfactory aesthetic result.

Results

A total of 15 patients underwent nasal reconstruction using regional flaps during the study period. The cohort comprised 9 male and 6 female patients, with ages ranging from early adulthood to the elderly age group. The most common etiologies of nasal defects were trauma and oncologic excision, including basal cell carcinoma and squamous cell carcinoma.

Defect Characteristics

Defects involved various nasal aesthetic subunits, including the ala, tip, sidewall, dorsum, and columella. Several patients presented with multi-subunit involvement, particularly those requiring forehead flap reconstruction. Defect depth varied from skin-only loss to full-thickness defects involving cartilage and, in selected cases, internal lining.

Flap Utilization

- Forehead flaps were used in 9 cases, primarily for large, complex, or full-thickness defects involving the nasal tip, ala, or columella. These cases often required staged reconstruction.
- Nasolabial flaps were utilized in 6 cases, mainly for alar and sidewall defects where moderate tissue replacement and favorable color match were required.

Structural cartilage grafting was performed in selected patients using conchal or septal cartilage, particularly in cases involving alar rim or tip reconstruction to maintain contour and prevent postoperative collapse.

Flap Survival and Complications

All flaps demonstrated complete survival, with no instances of total or partial flap necrosis. Minor postoperative complications were observed in a small number of patients and included:

- Transient flap edema
- Mild hypertrophic scarring
- Minor contour irregularities

These complications were managed conservatively through observation, scar modulation, or minor outpatient interventions. No major complications such as infection, wound dehiscence, or functional airway compromise were recorded.

Aesthetic and Functional Outcomes

Aesthetic outcomes were assessed by the operating surgeons based on contour, symmetry, scar integration, and subunit harmony. The majority of patients achieved good to excellent aesthetic results, with scars well concealed along natural facial creases or subunit boundaries.

Functional outcomes were assessed clinically by evaluating nasal airway patency and patient-reported breathing comfort. Preservation of nasal airway function was noted in all patients, with no cases of significant postoperative nasal obstruction.

Follow-Up

The duration of follow-up ranged from 6 to 18 months. During follow-up, reconstructed nasal contours remained stable, and no late complications such as flap contracture or delayed alar collapse were observed.

Discussion

Nasal reconstruction demands a balance between aesthetic restoration and functional preservation. The choice of reconstructive technique must be guided by defect characteristics rather than surgeon preference alone. This case series reinforces the importance of regional flaps, particularly the forehead and nasolabial flaps, in achieving predictable and durable outcomes.

The paramedian forehead flap remains the gold standard for reconstruction of large or complex nasal defects. Its robust vascular supply allows for reliable tissue transfer even in compromised recipient beds. Additionally, its versatility permits contour refinement during staged reconstruction, resulting in superior aesthetic outcomes.

The nasolabial flap offers an excellent alternative for selected nasal defects, particularly those involving the ala and sidewall. Its color and texture match, combined with a well-concealed donor site, make it an attractive option for medium-sized defects. When combined with cartilage grafts, nasolabial flaps provide stable reconstruction with minimal donor-site morbidity.

Complications observed in this series were minor and consistent with those reported in existing literature. The absence of major flap loss highlights the reliability of these regional flaps when meticulous planning and surgical technique are employed.

Limitations of this study include its retrospective nature and lack of objective airflow measurements. However, the relatively large case number and consistent surgical approach strengthen the clinical relevance of the findings.

Conclusion

Forehead and nasolabial flaps remain reliable, versatile, and effective options for nasal reconstruction. Proper flap selection based on defect size, depth, and subunit involvement, combined with staged reconstruction and structural support when required, leads to favorable aesthetic and functional outcomes. This case series supports the continued use of these regional flaps as foundational techniques in modern nasal reconstructive surgery.

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