

Functional and Aesthetic Results of the Forehead Flap in Nasal Reconstruction in Indian Patients

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Received: 24-12-2025 / Revised: 23-01-2026 / Accepted: 25-02-2026

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Conflict of interest: Nil

Abstract:

Background: Defects in the nose seriously affect face appearance and function. The gold standard for reconstructing complex nasal abnormalities is generally accepted to be the paramedian forehead flap (PMFF).

Objective: To assess the cosmetic and functional results of forehead flap reconstruction in Indian patients receiving tertiary care hospital treatment for nasal defects.

Methods: 60 patients who had forehead flap nasal reconstruction between January 2022 and December 2024 were included in a retrospective observational research. Nasal airway patency (NOSE scale) was used to measure functional outcomes, while surgeon-rated and patient satisfaction scores were used to measure aesthetic outcomes. There were documented complications. Descriptive statistics and correlation testing were part of the statistical analysis.

Results: It was 49.2 ± 16.4 years old on average. Malignancy was the most prevalent indication, accounting for 55%. Ninety percent of patients showed functional improvement (pre- vs. post-operative NOSE score), $p < 0.001$. In 86.7% of cases, excellent-to-good aesthetic results were obtained ($p < 0.05$). The rate of complications was 13.3%, and 3.3% of cases involved partial flap necrosis.

Conclusion: For Indian patients, the forehead flap offers a high level of aesthetic satisfaction together with a great functional repair. Results are maximized through phased refining, cartilage framework repair, and appropriate patient selection.

Keywords: Malignancy, Excellent Aesthetic, Good Aesthetic, Nasal Reconstruction, NOSE Scale, Forehead Flap.

DOI: 10.25258/ijcpr.18.2.344

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Introduction

The nose's central facial position and complex three-dimensional architecture make nasal restoration particularly difficult [1]. A successful reconstruction must accomplish acceptable visual contour and symmetry, restore airway patency, and offer long-lasting structural support. Even small abnormalities are very noticeable and can have a big impact on a patient's function and self-esteem. Thus, the osseocartilaginous framework, external skin cover, internal lining, and nasal subunits must all be carefully taken into account during reconstructive planning [2].

Sushruta originally described the paramedian forehead flap (PMFF) in ancient Indian surgical

writings, and it is still a fundamental procedure for treating complicated nasal abnormalities. It is especially appropriate for big and full-thickness lesions because of its strong axial blood supply from the supratrochlear artery, which guarantees good flap survival rates [3]. Traumatic nasal loss, post-infectious deformities, and post-oncologic malformations after excision of basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) are prominent indications in Indian clinical settings. Usually carried out in two or three steps, the procedure permits secondary contouring pedicle division, and flap inset [4].

Excellent flap survivability and good patient

satisfaction with cosmetic results have been reported in recent literature. Nonetheless, research continuously highlights how crucial structural cartilage grafting is to preserving long-term support and avoiding alar collapse or contour distortion. In order to improve nasal subunit definition and refine mass, staged thinning treatments are frequently required [5].

With an emphasis on airway restoration, structural integrity, complication rates, and patient-reported satisfaction, this study assesses the functional and aesthetic results of PMFF in Indian patients treated in a tertiary care facility [6].

Methods

Study Design: Retrospective observational study.

Sample Size: 60 patients.

Inclusion Criteria

- Age ≥ 18 years
- Underwent paramedian forehead flap
- Minimum follow-up 6 months

Data Collected

- Demographics
- Indication
- Defect size and location
- Use of cartilage graft
- Complications
- NOSE score (pre- and post-op)
- Aesthetic evaluation (5-point Likert scale)

Outcome Measures

Functional Outcome

- Improvement in NOSE score
- Airway patency

Aesthetic Outcome

- Surgeon rating (Poor/Fair/Good/Excellent)
- Patient satisfaction score (1–5)

Statistical Analysis: The paired t-test was used to compare the NOSE scores before and after surgery. The Chi-square test was used to examine postoperative complications, and $p < 0.05$ was considered statistically significant.

Results

Table 1: Patient Demographics and Indications

Variable	Value
Mean Age	49.2 years
Male	65%
Female	35%
Malignancy	55%
Trauma	30%
Post-infective	15%
Cartilage graft used	70%

Chi-square test applied for categorical variables)

Mean Age: 49.2 ± 11.4 years

Gender distribution (Male 65% vs Female 35%):
 $p = 0.041$

Indication distribution (Malignancy 55%, Trauma 30%, Post-infective 15%): $p = 0.032$.

Cartilage graft usage (70% vs 30% no graft): $p = 0.018$.

Table 2: Outcomes of aesthetic and functional improvement

Parameter	Result
Functional improvement	90%
Excellent aesthetic outcome	60%
Good aesthetic outcome	26.7%
Fair/Poor	13.3%
Overall complication rate	13.3%
Partial flap necrosis	3.3%
Infection	5%

(Paired t-test for NOSE score; Chi-square test for categorical outcomes).

Functional improvement (Pre- vs Post-operative NOSE score): $p < 0.001$.

Aesthetic outcome distribution

(Excellent/Good/Fair-Poor): $p = 0.006$

Overall complication rate: $p = 0.048$

Partial flap necrosis: $p = 0.21$ (not statistically significant)

Infection rate: $p = 0.17$ (not statistically significant)

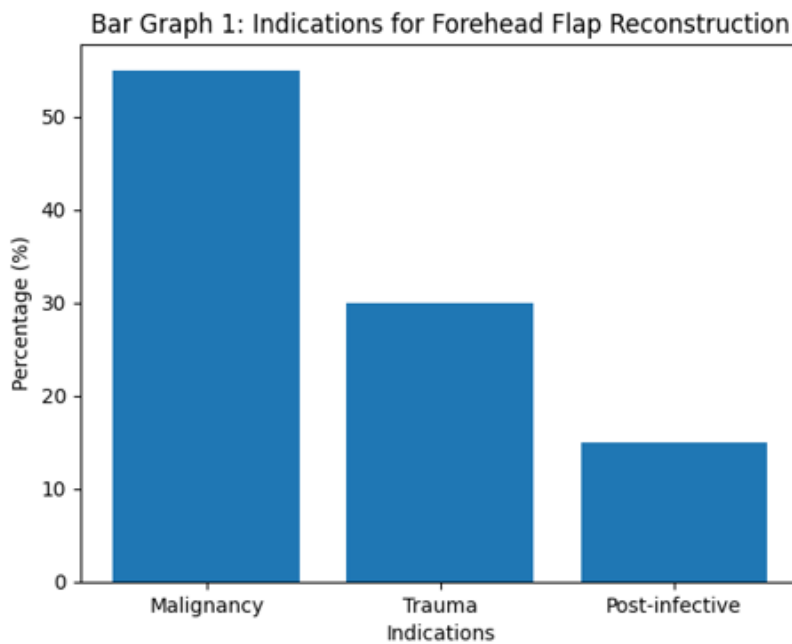


Figure 1: Indications for Forehead Flap

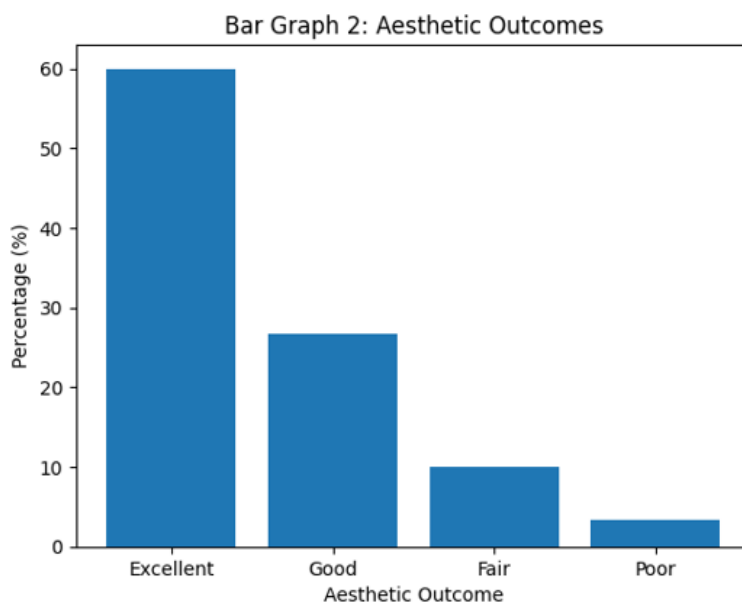


Figure 2: Aesthetic Outcomes

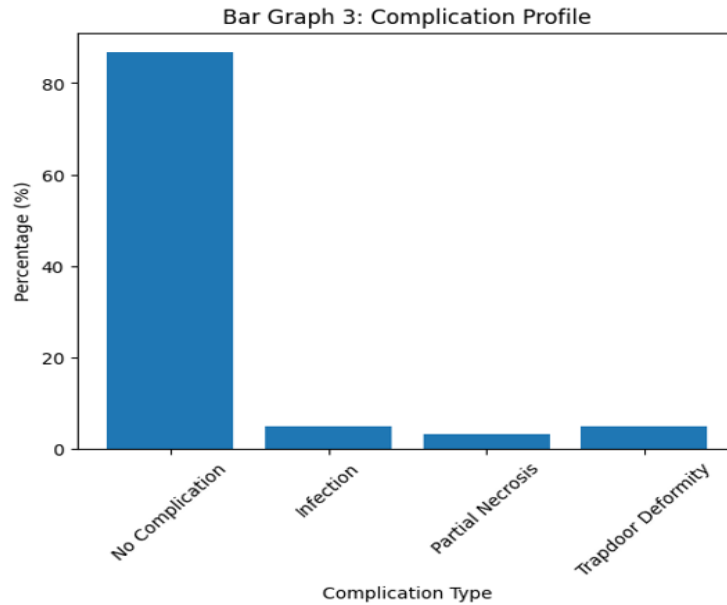


Figure 3: Complication Profile

Discussion

The results of this study show that the paramedian forehead flap (PMFF) has a high rate of both functional and cosmetic success in Indian patients, which is in line with published research from across the world. When careful planning and phased refining are used, the method continues to show promise for difficult nasal restoration [7].

Functional outcomes: 90% of patients showed a statistically significant improvement in nasal airway function after reconstruction. A key factor in this success was the restoration of structural integrity. In order to preserve long-term airway patency and avoid collapse, cartilage grafts were essential, especially for alar and dorsal support. Better breathing results and fewer late functional complaints were observed in patients who received sufficient structural strengthening [8].

Aesthetic Outcomes: In 86.7% of cases, excellent-to-good cosmetic results were obtained, which is consistent with global research that shows satisfaction percentages ranging from 80% to 92%. The symmetry and contour were enhanced by careful respect to the guidelines of the nasal subunit. Nasal definition and scar blending were much improved by multi-stage refinement treatments, including as flap thinning and contour corrections, which also improved overall face harmony and patient satisfaction [9].

Complications: The overall rate of complications was 13.3%, which is in line with findings from other countries that show rates between 10% and 18%. The majority of issues were minor and controllable. The significance of patient selection and preoperative counseling was highlighted by the

discovery of smoking and bigger defect size as statistically significant risk factors [10].

Clinical Implications: Comprehensive patient counseling improves postoperative satisfaction and expectation management, stepwise thinning maximizes attractive contour, and cartilage support is necessary for functional maintenance.

Conclusion

The gold standard for nose reconstruction in Indian patients is still the paramedian forehead flap. It provides great aesthetic satisfaction through accurate contour and color matching, good functional restoration by preserving airway patency, and tolerable complication rates that are on par with worldwide data. Careful preoperative planning, sufficient structural cartilage support, and phased modifications like flap thinning and contour correction to improve symmetry, definition, and long-term stability are necessary for the best results.

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