

## VERSATILITY OF PARAMEDIAN FOREHEAD FLAP IN RECONSTRUCTION OF NOSE DEFECTS – REVISITED

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### Abstract

**Background:** Precise paramedian forehead flap is used primarily for reconstruction of various defect of nose. Nose reconstruction was first described by sushruta samhita in early 700 BC. Vertically oriented median forehead flap based on paired supratrochlear arteries was popularized by Kozanjian in 1946. Concept of aesthetic facial subunit was first described by Gonzalez-Ulloa. Burger and Menick classified the subunit of nose and face based on skin quality, border outline, and 3D contour and popularized the concept of paramedian forehead flap for nose reconstruction. Nose defects mostly result from trauma, post-infective, human and animal bite, after resection of tumours of nose and rarely congenital like Binder's syndrome. Paramedian forehead flap is known as the best donor site for reconstruction nose defects because of its size, axial pattern of blood flow, pliability to tailor to defect, projection of the nasal tip, skin colour, texture and thickness. **Objective:** The objective is to re-evaluate the reliability of paramedian forehead flap for various defects of nasal subunits. **Materials and Methods:** 10 patients (4 female and 6 male) with age group between 5 to 55 year. Etiology – 4 cases due to human bite, 6 cases due to post excision defects of Benign lesions. Defect sizes ranged from 1.5cm to 4cm with thickness varied from partial to full thickness. All underwent paramedian forehead flap in 2 stages. Study period from 2021 to 2023. **Result:** All flaps survived well. Few minor complications: 1 case had hematoma, 1 case had wound dehiscence, 2 case had late complication of hair growth in recipient site. **Conclusion:** Paramedian forehead flap is one of the versatile flap for nose reconstruction. Cartilage graft can also be combined with full thickness defect of ala and nasal tip, columella subunit, which might require 3 or more stages to complete. The total flap failure is very rare. The paramedian forehead flap is one of the best flap option for nose reconstruction with reasonable aesthetic and functional outcome.

## INTRODUCTION

Reconstruction of the nasal defect remains a major challenge for all plastic surgeons to address both function and aesthetics.<sup>[1]</sup> Nasal defects occur due to trauma, human and animal bite, and post-surgical excision of tumours, post-infective, post-burn sequelae and rarely congenital. Though they are treated with various local flaps like bilobed flaps, rotation flaps, and sometimes with FTSG, have their drawbacks of scar crossing nasal subunits, colour match, contour mismatch, contour disparity and failure rate. This article reviews the use of paramedian forehead flaps for various sizes of defects of nose. Creating aesthetic subunits is crucial during

the reconstruction of nose. Paramedian Forehead flap considers having a good color match, and texture and with superior vascularity and thickness.<sup>[2]</sup> It is done in 2 stage and scar placement is placed along the border of adjacent subunits of the nose. In this study, we present our experience with the use of a paramedian forehead flap for various defect of nose.

### Objective:

To assess the reliability of paramedian forehead flap for various defects of nasal subunits.

## MATERIALS AND METHODS

Total patients were 10 with a nasal defect of size varying from 1.5 cm to 4cm. These patients

underwent reconstruction of the nose defects with a paramedian forehead flap in Madras Medical College, RGGGH, Chennai from August 2021 to August 2023. Four patients were women and six were men, aged between 5 years to 55 year (Table -1). Inclusion criteria – defect confined to nose alone , exclusion criteria – defect extending to adjacent area, no scar or previous surgeries at forehead region. The study was conducted after institutional ethical committee approval. For all the cases prior flap design was made based on bio- geometry of the paramedian forehead flap and Doppler marking. Procedure: 1) Under general anaesthesia, with the patient in the supine position, and the supratrochlear artery was identified using a hand-held Doppler at the medial brow border on the contralateral side of the nasal defect. After excision or debridement of the nose, the real defect size was measured and marked at the donor site. The missing subunits are marked carefully. The medial end of superior orbital rim was the pivot point. The incision is made around the marked border of the flap and raised from distal to proximal. Pedicle is raised in the subgaleal plane, leaving the periosteum down, until 1cm superior to the level of the eyebrow. It is then transitioned down to the subperiosteal plane to keep the supratrochlear artery protected. Once the adequate rotation of the flap has been achieved, the distal portion is folded to create the subunits of the nose and inset is given and secured with sutures. The donor site is closed primarily to the extent possible. After 3 weeks, the patient returns for flap division. 2) Under general anaesthesia, the distal end is divided at the superior edge of the nasal defect and contoured well into the defect and the proximal end is returned near the medial border of the eyebrow and secured with fine suture aesthetically. Post op care after the first stage daily dressing of the pedicle is done and suture removed after 1 week to 10 days. After the second stage, suture removal is done after 1-week. Debulking refinement done after 3months.

## RESULTS

In our study, a total of 10 cases, out of which 4 were human bites and 6 were after excision of a benign lesion. One case had hematoma, 1 case had wound dehiscence and 2 cases had late complications of hair growth in the tip of the nose. Flap failure was nil. No functional compromise. The results were very much satisfying for the patients and relatives.



Case – 1



Case – 2



Case - 3

Table 1: Demographics, Defect size, Flap design and Complication

S. No	Age	Sex	Location	Size	Anesthesia	Flap Design	Complication
1	45 yrs	Male	Nasal tip	1.5x1.5cm	General anaesthesia	Paramedian forehead flap	Nil
2	32 yrs	Male	Columella + left alae	2cmx1.8cm	General anaesthesia	Paramedian forehead flap	Hematoma

3	55 yrs	Male	Nasal tip	1.5cmx1.5cm	General anaesthesia	Paramedian forehead flap	Nil
4	35 yrs	Female	Left alae	1.3cmx1.3cm	General anaesthesia	Paramedian forehead flap	Nil
5	48 yrs	Male	Right alae	1.8cmx1.5cm	General anaesthesia	Paramedian forehead flap	Hair growth at business end
6	22 yrs	Female	Columella + right alae	2cmx1.5cm	General anaesthesia	Paramedian forehead flap	Hair growth at the business end
7	5 yrs	Male	Lateral wall of nose	2cmx2cm	General anaesthesia	Paramedian forehead flap	Nil
8	45 yrs	Female	Right alae + lateral wall of nose	1.5x1.5cm, 2cmx2cm	General anaesthesia	Paramedian forehead flap	Wound dehiscence
9	52 yrs	Male	Nasal tip + columella + upper B/L alae	2cmx2cm	General anaesthesia	Paramedian forehead flap	Nil
10	33 yrs	Female	Right alae + columella	1.5cmx1.5cm	General anaesthesia	Paramedian forehead flap	Nil

## DISCUSSION

Early in 700 BC, nasal repair was first performed by Sushruta.<sup>[3]</sup> In the 1400s Italian surgeons Branca and Tagliocozzi reconstructed the nose with skin from the upper arm.<sup>[4]</sup> The first English description of the flap was given in The Madras Gazette-1793 and a year later in the Gentleman's Magazine of London.<sup>[5,6]</sup> McCarthy and Reece's anatomical studies reveal the arcade of vessels around the eyeball. The median forehead flap was first designed by Labat, with base placed over unilateral supratrochlear artery.<sup>[7-9]</sup> Burget and Menick divided the nose into topographic subunits of dorsum,<sup>[7,8]</sup> tip, columella, alae, sidewalls, and soft triangles. Nose defects can be closed by a variety of local flaps like bilobed, V-Y advancement and FTSG, but these flaps causes a certain degree of distortion of the nasal aesthetic subunit. Historically 4 types of the flap have been described – 1) Median forehead flap, 2) Oblique forehead flap, 3) Sickel flap and 4) Vertical paramedian forehead flap.<sup>[5]</sup> The paramedian forehead flap is ideal for large nasal tip defects and allows the placement of scars along the border of subunits. It also preserves the nasofacial sulcus and alar groove. It also allows secondary procedures like the placement of cartilage for ala and columella, thinning, augmentation. It has a very good vascular pedicle supratrochlear artery. The perfusion happens randomly in the distal aspect through the frontal muscle<sup>[2]</sup> Venous drainage is through the venae comitantes and subdermal plexus as well. Depending on the laxity of the patient's skin, flaps as wide as 4.5 cm can be harvested and the donor site closed primarily, if not distal end can be left for secondary intention. Mostly donor site is closed primarily.<sup>[10]</sup>

## CONCLUSION

The paramedian forehead flap is a versatile regional interpolation flap with a good vascularity and aesthetic match to the nose. It is an excellent option for large nasal defects with 2-stage reconstruction. The distal aspect of the flap is sculpted to a better aesthetic unit of the nasal tip, alae and columella. The outcomes are good with this flap with negligible failure rate.

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