



Case Report

Nose reconstructions using pinna cartilage and interpolated paramedian forehead flap: our experience

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ABSTRACT

Intact nose plays important role in perceptible beauty of face. Any amount of loss of nose has ruinous effect on quality of life. Surgical correction is by reconstruction of nasal pyramid by various surgical techniques. Six hundred years before Christ, Sushruta had described mid-forehead flap, which has an important role in reconstruction of the nose. Here we present our experience of two cases, where reconstruction of nose was done using interpolated paramedian forehead flap (IPFF) and cartilage from conchal region of pinna.

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1. Introduction

In antiquity the nose was considered as “the organ of reputation” and it was amputated as a form of punishment, with the certainty that this would irreparably compromise the social life of the convicted.¹ Partial or total loss of nose, as a result of trauma or tumor excision, has great impact on beauty of a face resulting in limited social life.

Since the Vedic period (2000-500BC) in ancient India, amputation of the nose was punishment for infidelity.² In 600 BC, Sushruta, mentioned a procedure for total nasal reconstruction using mid-forehead flap, also called “Indian flap”.² In 1597, Gaspare Tagliacozzi, gave a technique of using upper third of the inner side of the arm for nose reconstruction. It is now called “Italian method”.² Gillies, in 1943 and Converse in 1956, advocated forming inner lining by, chondrocutaneous composite graft from pinna, chondromucosal graft from nasal septum and nasolabial flaps thus supporting the mid forehead flap.²

We present a series of two cases with nasal reconstruction using the forehead flap and conchal cartilage grafts.

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2. Case Report 1

A 28 year old male, presented to ENT out patient, with complaint of loss of tip nose, following dog bite 9 months back. On examination, the lower lateral alar cartilage medial crura, lobule and part of lateral crura were missing, bilaterally. There was also loss of septal quadrilateral cartilage, as seen on lateral view (Figure 1). There was no open wound, granulations or mass seen. The area was non tender with normal temperature. After routine investigations and informed consent, patient was taken up for reconstruction with cartilage grafting and right interpolated paramedian frontal flap.

The skin overlying residual tip and dorsum was elevated antero-inferiorly based and used to form inner lining. Septal extension graft and batten graft was placed using posterior septal cartilage (Figure 2). Bilateral conchal cartilages were used for reconstruction of lower lateral cartilages. Right side IPFF, based on supratrochlear artery was raised and sutured in place. After 3 weeks flap pedicle was cut and replaced (Figure 3). The patient was satisfied with end result.

3. Case Report 2

73 year old male patient came with non healing ulcer over tip, dorsum and left ala (Figure 4). The margins were rounded and biopsy confirmed basal cell carcinoma. After routine investigations and informed consent, the mass was excised under general anaesthesia (Figure 5) repair was done with conchal cartilage (Figure 6) and left IPFF (Figure 7). After 3 weeks pedicle was divided and flap repositioned back (Figure 8), with good result and no recurrence in one year follow up.

Both the patients expressed that decent nasal reconstruction both functionally and aesthetically have been achieved, with no evidence of ischemia, infection or necrosis.



Fig. 1: Preoperative clinical picture of 1st case, showing loss of lower lateral cartilage bilaterally and lateral picture showing loss of tip and septum.

4. Discussion

Following nose, tumor resection or accidental chopping, the most common complaint of these patients is cosmetic deformity. The three layered repair is considered ideal, for the restoration. In this, outer layer reconstruction by forehead flap, gives tissue with identical quality as original.

The interpolated paramedian forehead flap (IPFF) is being used since centuries for nasal reconstruction. Over the years, various alterations have been specified to improve its end result.³ The IPFF chief indication is large and deep wound based on the distal nose (tip and ala). It can entirely reconstruct nasal contour, texture of skin, tip projection and alar convexity, when used along with cartilage graft. The large bulk of IPFF makes it less preferable for upper nose reconstruction, where thin skin is required.

The use of IPFF for nose reconstruction needs good knowledge of anatomy, surgical skill and plan. The IPFF nutrition relies on the supratrochlear artery, which is located at the medial border of the eyebrow, 1.5 to 2 cm from the vertical facial midline.⁴ Sometimes, Doppler may be used to further confirm the location of the artery. After coming out from supratrochlear foramen, the artery lies deep to periorbital muscles (orbicularis oculi and frontalis).



Fig. 2: Intraoperative picture showing inner lining of vestibule and reconstructed cartilage framework.



Fig. 3: Postoperative, after 2nd surgery front view and lateral view, at stitch removal.

Above the superior orbital rim, the artery passes through the frontalis muscle and progressively comes to lie superficial within subcutaneous plane, halfway up the forehead. The flap is raised in three different planes.⁴ At the free end epithelium and subcutaneous tissue, middle including muscle and the lower third, near the orbital rim, including periosteum. It is preferred to raise flap ipsilaterally.⁴ It gives less torsion and twisting to the flap, has to cover less distance to reach the defect with no postoperative visual obstruction and increased flap reach. In our Case I since the defect was bilateral, so laterality of flap didn't matter, but in Case II we preferred ipsilateral forehead flap due to above mentioned reason.

The IPFF provides robust surface covering and adequately thick soft tissue but lacks structural support.



Fig. 4: Preoperative clinical picture of 2nd case, showing irregular ulcer with rolled out edges.



Fig. 6: Cartilage framework reconstruction following suturing.



Fig. 5: Intraoperative picture after excision of growth with safe margins.



Fig. 7: Interpolated paramedian forehead flap in position, after forehead closure.



Fig. 8: Intraoperative picture at 2nd stage, division of pedicle.

Both, the inner nasal lining and cartilaginous structure has to be intact or repaired before IPFF use.⁵

Cartilage grafts provide support to the heavy flap tissue, thus avoid tissue contraction and distortion, maintaining airway patency and contour of reconstructed nose.⁶ To reduce the alar collapse and retraction, it is advised the use of cartilage of adequate thickness (>2mm) and a minimal tension of the inner mucosal flaps. Cartilage graft may be harvested from antihelix or the conchal bowl of one or both ears. Incision for harvesting the cartilage is usually given on medial surface of pinna, to avoid scar visibility. If long, straight and flexible graft is required, antihelix is preferred, but if curved, rigid graft is needed, then concha is considered.⁴ As in our cases, Case I bilateral conchal cartilage was used to form the bilateral lower lateral cartilage. While in Case II contralateral pinna both helical and conchal cartilages were harvested to form upper and lower lateral cartilages. Some authors recommend costal cartilage, when septal or auricular cartilage is not sufficient or when large amount of cartilage is needed to reconstruct complete nose.⁷

In a lighter note some author recommend the delayed reconstruction, the phase allows the patient the psychological elaboration of the disfigurement caused by the disease, with better acceptance of nasal reconstruction, which is unlikely suffered as an insult, but rather experienced as a relief.⁸

The donor site morbidity is high when primary closure couldn't be achieved and wound heals by second intention, leaving the scar on a highly visible area. This problem can be limited using skin expanders that allow a primary closure of the wound after flap transposition. But, skin expansion delays reconstruction for months and is associated with some degree of discomfort and social isolation. Also, such expanded skin may be subject to uncontrollable shrinkage

and contracture. Recently another way to deal with inability to close forehead primarily has been described, it is a delayed full thickness skin graft, harvested from the unused part of the pedicle on the 2nd stage.⁹ The same we did in our Case I and in none did we used skin expanders. Another disadvantage related to forehead flap is necessity for two staged procedure. In first stage, the distal portion of the flap is debulked and applied, while thinning of the proximal part being done at the time of pedicle division, after 3 weeks.¹⁰ As being followed in our cases. But folded IPFF's that also restore nasal lining absolutely require three staged procedure.

Likely complications of the IPFF include haemorrhage, scarring over forehead, infection, stitch line gaping, hair growth on nose, flap necrosis, graft extrusion and postoperative distortion. We encountered mild bleeding in our Case II postoperatively, while none other complications were seen.

5. Conclusion

The interpolated paramedian forehead flap is useful for nasal reconstruction. It is being used for completely restoring complex nasal defects, in terms of curve, structure, projection of the nasal tip and convexity of the ala, principally when used along with cartilage graft.

6. Source of Funding

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7. Conflict of Interest

None.

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