

# Nasal reconstruction with composite axial paramedian forehead flap – case report

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## ABSTRACT

**Background.** Post-traumatic, acute or secondary nasal reconstruction or after tumor ablation involves various techniques that use local, loco-regional or distant flaps, transpositioned or freely transferred.

The reconstruction can be performed at the same time in the case of acute trauma of the nasal pyramid or secondary, at a later time if the local and general situation of the patient requires this. The median frontal flap, simple or composite, ensures a good quality reconstruction of all the aesthetic subunits of the nasal pyramid. The versatility of the flap and the aesthetic quality of the reconstruction result make the median frontal flap a choice solution for nasal pyramid reconstructions where local flaps are not indicated. The reconstruction can be done in two steps or in one step if the pedicle flap is subcutaneous.

**Case report.** The article presents a case of total reconstruction of the nasal lobe after a complex dog bite trauma in which a composite median frontal flap, doubled with auricular cartilage, was used to restore the alar and columella cartilages.

**Conclusion.** The axial paramedian forehead flap is a valuable technique in nasal reconstruction, offering favorable aesthetic outcomes when performed by skilled surgeons.

**Keywords:** nasal reconstruction, axial paramedian forehead flap, composite forehead flap

## INTRODUCTION

The axial paramedian forehead flap is a versatile reconstructive option for the aesthetic subunits of the nose. This flap can be used both in acute cases and in post-traumatic sequels or after tumor ablation. This type of flap is very useful in the reconstruction of the nasal lobe because it ensures an excellent aesthetic result. It can be used as an axial skin flap or as a composite flap in association with costal or auricular cartilage [1].

The vascular support of axial paramedian forehead flap is provided by the vertical branches of the angular and supratrochlear arteries. These arterial branches cross the superior orbital rim, being located deep to the corrugator and frontalis muscles. In their vertical path towards the forehead they placed subcutaneously. In the upper forehead the fine arteries from these branches lie in the subcutaneous fat very close to the skin.

The forehead paramedian axial flap is designed vertically in the long axis of the vessels [2,3]. In rare cases we need Doppler pulse amplifier to locate the supra-trochlear vessels but in most cases the surgeons experience is enough. The estimated operating time is about 2 hours and general anesthesia is needed. The section of the pedicle of the flap is done after 14-21 days. Another stage of aesthetic remodeling of the contour of the reconstructed nasal area can also be considered if it is necessary after 2-3 month.

## CASE REPORT

This article presents the case of a 28-year-old patient who suffered trauma from a dog bite resulting in a complex nasal wound with a total nasal lobe defect.

At the time of admission, the patient was reanimated, blood analysis and the necessary paraclinical explorations were performed.

In the operating room, we started with surgical debridement of the wound and hemostasis. After the analysis of the lesions, we found a total defect of the nasal lobe that affected both the tip of the nose and the alar cartilages and the columella.

We decided to perform the reconstruction at the same time with an axial paramedian forehead flap and a cartilaginous graft from the level of the ear for the reconstruction of the alar cartilages and the columella.

The base of the flap was 1.5 cm wide and the proximal part of the flap will be narrow and then expand to fit the pattern of the nasal defect. Proximally we need to elevate the frontalis muscle at that level to protect de vessels. If we need more length of the flap pedicle we can extend the dissection across the orbital rim. In some cases is useful to dissect the corrugator muscle fibers preserving vascular branches.

At the same time we harvest auricular cartilage and make a tripod pattern for the columella and alar reconstruction. We reconstruct first the columella and then the alar cartilages before the transposition of the axial paramedian forehead flap. The secondary defect at the level of the forehead and ear was closed by interrupted nonabsorbable suture.

In the second stage, after 21 days we cut the pedicle of the flap and a third stage was necessary after 3 month to redefine the aesthetic shape of the nose.

## DISCUSSIONS

Nasal reconstruction is a delicate and intricate field of plastic surgery, often required after trauma, cancer resection, or congenital anomalies. Among the various techniques employed, the axial forehead flap has emerged as a remarkable and reliable method for achieving aesthetically pleasing and functional nasal reconstruction. This article explores the principles and outcomes of nasal reconstruction using the axial paramedian forehead flap, highlighting its effectiveness in restoring both form and function of the nose.

The axial forehead flap, also known as the paramedian forehead flap, is a versatile and time-tested reconstructive option. It involves harvesting a skin flap from the forehead based on the supratrochlear and supraorbital arteries. The blood supply to the flap ensures its viability and allows for a robust reconstruction of the nasal defect [4,5].

Careful patient selection and evaluation are crucial. Factors such as the size and location of the nasal defect, patient's general health, and cosmetic considerations are taken into account.

The surgeon marks the paramedian forehead flap based on the vascular supply of the supratrochlear vessels. The design is customized to match the specific nasal defect.

The flap is elevated with meticulous attention to preserving the vascular pedicle. Care is taken to avoid damage to the frontal branch of supratrochlear vessels.



**FIGURE 1.** Nasal Reconstruction with Axial Paramedian Forehead Flap

The nasal defect is prepared by excising scar tissue or remnants of the previous nasal structure, ensuring a clean and healthy bed for the flap [2].

The flap is transposed to the nasal defect, and meticulous suturing is performed to achieve precise alignment. The surgeon carefully shapes the flap to recreate the nasal contours. We used in the case presented above a composite cartilaginous graft for the reconstruction of the columella and alar cartilages.

The donor site on the forehead is closed with a layered approach to minimize scarring and achieve an aesthetically pleasing result. A second stage and occasionally a third stage are necessarily to fix the result.

The axial paramedian forehead flap allows for the recreation of natural nasal contours, leading to excellent aesthetic outcomes. The color and texture of the forehead skin closely resemble that of the nasal skin, contributing to a harmonious appearance. The axial forehead flap provides a robust blood supply, promoting optimal healing and tissue integration. This enhances the functional aspects of nasal reconstruction, including breathing and nasal support [3,5].

While the axial forehead flap is a reliable technique, potential complications include flap necrosis, partial loss, or issues related to the donor site. Surgeons take preventive measures and closely monitor patients during the postoperative period.

The axial paramedian forehead flap is a common technique used in nasal reconstruction to address complex defects, particularly those involving the nasal dorsum, tip, or sidewalls.

The flap is designed based on the blood supply from the supratrochlear vessels, providing a reliable source of tissue for reconstruction. The aesthetic results following nasal reconstruction with an axial paramedian

forehead flap can be generally positive, but individual outcomes may vary.

The forehead flap provides a tissue match in terms of color, thickness, and texture, making it a suitable option for nasal reconstruction.

The surgeon carefully designs and positions the flap to mimic the natural contours of the nose, striving for a harmonious and aesthetically pleasing result.

Careful attention is given to reconstructing the nasal lining, support structures, and external contours to ensure both functional and cosmetic integration.

The donor site for the forehead flap is the forehead, and while the scar is typically positioned in the natural forehead creases, some scarring may be noticeable. However, this scar tends to fade over time.

Scar management techniques, such as laser therapy or topical treatments, may be employed to optimize the cosmetic outcome.

The healing process is crucial, and patients are often advised to follow postoperative care.

## CONCLUSIONS

The axial paramedian forehead flap is a valuable technique in nasal reconstruction, offering favorable aesthetic outcomes when performed by skilled surgeons. However, individual results can vary, and patient satisfaction is influenced by both functional and cosmetic considerations.

Aesthetic outcomes are subjective and depend on the patient's expectations and individual perception.

Open communication between the patient and the surgeon is essential to ensure realistic expectations and satisfaction with the final results.

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