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The Egyptian Journal of Otolaryngology (2023) 39:146
https://doi.org/10.1186/s43163-023-00510-3

The Egyptian Journal of Otolaryngology

CASE REPORT Open Access

Nasal columella reconstruction using philtrum advancement flap: a case report of treatment of nasal stenosis

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Abstract

Background Nasal columella reconstruction is a challenging procedure, and the main goal is to maintain function as well as a satisfactory aesthetic outcome. Several surgical techniques have been described for the reconstruction of nasal columella. However, there is a paucity of literature on these techniques in our environment, and the use of superiorly based philtrum advancement flaps is extremely rare in African literature.

Case presentation A 60-year-old man presented with nasal obstruction and nasal deformity following facial trauma 6 months prior to presentation. Examination revealed bilateral stenosed nasal cavities and a very short columella with a healed nasal scar. The diagnosis of nasal stenosis was made. Intra-operatively, a superiorly based philtrum advancement flap was designed and elevated, granulation tissues in the nasal cavities were excised, the septum was repositioned, the base of the flap was sutured at the midline of the floor of the nose, and the donor site was approximated. A bilateral nasal stent was applied for 4 weeks. Postoperatively, the recipient and donor sites healed completely with an aesthetically acceptable appearance, and the patient was satisfied with the outcome.

Conclusion Nasal columellar reconstruction is a complex procedure. The superiorly based philtrum advancement flap is a simple and aesthetically acceptable method of treating nasal stenosis. This method demonstrated an adequate nasal airway and a good cosmetic appearance.

Keywords Columellar reconstruction, Philtrum advancement flap, Nasal reconstruction, Nasal stenosis, Case report

Background

The nose is the first organ of the respiratory system. It is situated at the entrance of the upper airway, and it contains the peripheral organ of smell. The nose is the most noticeable structure of the face and a key component of its aesthetic appearance. Due to its prominent location, it may be exposed to trauma, infections, or burns [1]. Numerous aesthetic subunits exist on the surface of the nose, which are divided into paired and unpaired subunits. The nasal alar, lateral wall, and soft triangle of the nose are the paired subunits. While the nasal tip, dorsum, and columella are the unpaired ones. These subunits are specific topographic segments of the nose that play

Presentation at a meeting: This case was presented at the British Academic Conference in Otolaryngology (BACO) in February 2023 at Birmingham, UK.

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an essential role in the concept and principles of nasal reconstruction [2].

The columella is a composite structure made up of skin, subcutaneous tissues, and cartilage. It plays a crucial role in maintaining the projection, contour, and patency of the nose. Among the nasal aesthetic subunits, columella has been described as one of the most difficult subunits to reconstruct, due to its peculiar features such as the shape, narrow horizontal dimension, insubstantial vascularity, and insufficient surrounding tissues [2, 3]. Surgical reconstruction is required for a deformed or defective nasal columella. Numerous surgical techniques have been documented for columella reconstruction, including the use of a bilateral nasolabial flap [1], a free flap from the radial artery of the forearm [3], and a free flap from the foot's web space [4]. However, there is a paucity of literature regarding the use of flaps for nasal columella reconstruction in our environment. Therefore, the aim of this report is to highlight a successful case of nasal columella reconstruction using a superiorly based philtrum advancement flap.

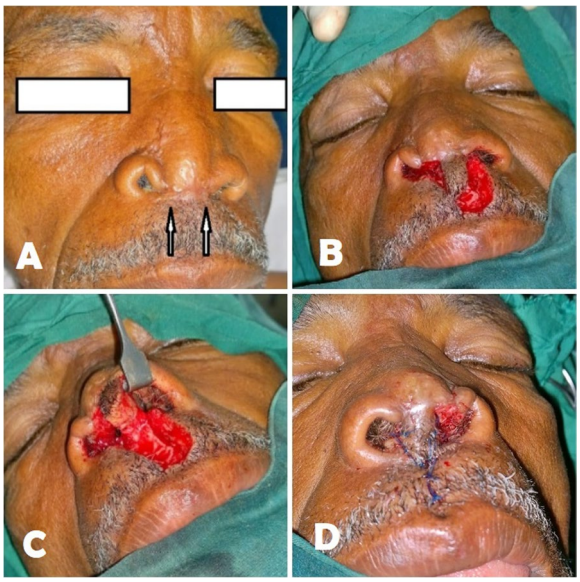

Fig. 1 **A**–**D** Pictures of surgical technique of nasal columella reconstruction using philtrum advancement flap

Case presentation

A 60-year-old man presented with nasal obstruction and deformity following facial trauma from a road traffic accident 6 months prior to presentation. The facial trauma was poorly managed at a peripheral hospital. He complained of nasal obstruction, mouth breathing, and dryness of the throat. He was not a known hypertensive or diabetic patient, and no family history of such illnesses. On physical examination, he was not febrile, pale, icteric, or dehydrated. Examination of the nose revealed stenosed bilateral nasal cavities and a very short columella with a healed scar extending from the columella to the forehead (Fig. 1A). Patient could not afford a CT scan, but an X-ray of the paranasal sinuses showed septal deviation on the anterior part of the nasal cavity, and no fracture or other deformity was identified. The diagnosis of post-traumatic nasal stenosis was made. The patient was prepared for surgery, and the full blood count and renal function test were normal and suitable for patient management under general anesthesia. Intra-operatively, the patient was placed under general anesthesia with orotracheal intubation and throat packing. The patient was positioned 15° head-up. Routine cleaning and draping were done, and an examination under general anesthesia was performed. A superiorly based philtrum advancement flap was designed and elevated as follows (Fig. 1A–C); an ink was used to make the flap drawing on the philtrum, a skin incision was made along the drawings, and the incision was deepened into the subcutaneous tissues and muscles. The flap was elevated upward and that lengthened the columella. The granulation tissues in the nasal cavities were excised, the nasal septum was repositioned, and the base of the flap was sutured at the midline of the floor of the nose. The columella was then repositioned, and the donor site was undermined and approximated with nylon 3.0 suture (Fig. 1D). Bilateral nasal stent was applied (size 7.5 endotracheal tube was improvised as a stent, due to a lack of appropriate nasal stent), and the wound was dressed with povidone-iodine (Fig. 2 A, B). Postoperatively, the patient has done very well, the flap has been taken, adequate nasal openings were created, and the stent was removed 4 weeks postoperatively (Fig. 3A). Anterior rhinoscopy with thudicum nasal speculum showed that the septum is central. At follow-up 4 months postoperatively, the recipient and donor sites healed completely with an aesthetically acceptable appearance, and the patient was satisfied with the outcome (Fig. 3B).

Discussion

Nasal columella is an important landmark of the face, it provides support and projection to the tip of the nose. It has a three-dimensional anatomy and a three-layer structure made up of the cartilage, subcutaneous tissue, and skin. It extends from the tip of the nose to the upper lip, thereby separating the nose into two cavities [1]. A defect or total loss of nasal columella results in severe aesthetic and functional deformity [5]. Patients with nasal columella deformity may present with nasal obstruction, mouth breathing, partial columella defect, or total loss of columella tissues. This is in keeping with the presentation

Fig. 2 **A**, **B** Postoperative pictures showing nasal stent in situ

Fig. 3 **A**, **B** Postoperative pictures showing cosmetically acceptable reconstructed columella (**A** 4 weeks post-op, **B** 4 months post-op)

of our patient, who presented with nasal obstruction, mouth breathing, and dryness of the throat.

Nasal columella reconstruction is a difficult and complex procedure because the nasal columella has been one of the most difficult facial subunits to reconstruct due to its peculiar features [2, 3]. The characteristics of a good reconstructed nasal columella include color and texture matched to the surrounding tissue, should be narrow enough to prevent nasal obstruction and provide adequate nasal airway passages, should be long enough to give a good projection of the nose, should be strong enough to provide support, and overall should be aesthetically acceptable in term of function and cosmesis [1, 3]. Considering these characteristics, we opted to use a philtrum advancement flap for the reconstruction of the nasal columella in this study. The flap was taken as narrow-based with good color and texture matching because of the proximity of the donor to the recipient site. Eventually, the flap provided good projection and support for the nose, which was aesthetically acceptable.

Numerous surgical techniques have been described for the reconstruction of nasal columella. These include the use of bilateral nasolabial flaps [1], radial forearm free flaps [3], and free flaps from the foot's web space [4]. The technique of bilateral nasolabial flaps has been used for very large or entire columella defects because it provides adequate tissue for the reconstruction of the columellar and nasal vestibular linings. However, this technique has the disadvantage of insufficient columella projection. It also has the disadvantage of leaving an obvious scar, which can have the tendency to develop keloid and hypertrophic scar. It may also cause an asymmetric appearance between the alae, and usually, this technique requires a multi-staged surgical procedure [6, 7]. The radial forearm free flap can also be used for nasal columella reconstruction [3]. However, it is a distant flap and requires microsurgical reconstruction, which may not be performed successfully in our setting due to the paucity of equipment and personnel. The use of a free flap from the web space of the foot was also reported [4], but this technique also requires microvascular reconstruction, and color/texture matching may be poor. Di Santo et al. [8] reported a similar case of nasal columella reconstruction using a philtrum advancement flap in cocaine

abuser; however, they use an inferiorly based flap, contrary to the superiorly based flap used in this study. We opted for a superiorly based philtrum advancement flap because of its several advantages such as the contiguous nature of the donor and recipient site, minimal scarring, simple harvesting technique, and overall good aesthetic and functional outcome. Limitations of this technique include lack or extensive loss of columella and upper lip.

Conclusion

Nasal columellar reconstruction is a complex procedure. The superiorly based philtrum advancement flap is a simple and aesthetically acceptable method of treating nasal stenosis. This method demonstrated an adequate nasal airway and a good cosmetic appearance.

Acknowledgements
None.

Authors' contributions
AA, AMK, and SNA conceived and designed the case report. AA, AMK, SNA, and IYS did the data collection and analysis. AA, AMK, SNA, IYS, and OGBN contributed to the literature review and writing of the manuscript. OGBN supervised the whole work and revised the final manuscript. All the authors have read and agreed to the final manuscript.

Funding
No funding was received for this work.

Availability of data and materials
The data used during this case report are available from the corresponding author on request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Research and Ethics Committee of the Federal University of Health Sciences Azare with reference number HREC/SUB/12A/P-3/2398 dated on 16 January 2023. Written informed consent was obtained from the patient for participation in this study.

Consent for publication
A written informed consent was obtained from the patient to publish his data including images used in this article.

Competing interests
The authors declare that they have no competing interests.

Received: 16 May 2023 Accepted: 8 September 2023
Published online: 25 September 2023

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