An Alternative Method for Reconstruction of Large Intranasal Lining Defects

The Farina Method Revisited

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Objective: To examine use of the paramedian forehead flap for intranasal lining.

Methods: The medical records and photographs were reviewed for patients who underwent a nasal reconstruction involving a paramedian forehead flap used for internal lining.

Results: Three patients underwent this procedure. In all patients, the flap provided excellent intranasal lining. External incisions were acceptable in all the patients.

Conclusions: The paramedian forehead flap may be used for internal lining of large intranasal defects. An external rhinoplasty approach facilitates reconstruction.


Effects of the intranasal lining, either full-thickness defects or those involving only the internal lining, are a reconstructive challenge. Improper reconstruction of internal lining can lead to poor functional and aesthetic results. The 3 distinct layers of the nose are internal lining, a firm structural foundation, and an outer covering of skin. Each of these layers, if missing after trauma or ablative surgery, must be addressed to achieve an optimal result. The goals of internal lining reconstruction include (1) covering the entire mucosal defect, (2) providing a bed of vascularized lining for bone or cartilage grafts, (3) restoring maximal nasal airflow, and (4) minimizing the defect at the donor site.1

There are several options for reconstruction of internal nasal lining, and the surgeon’s choice will depend on the defect size and depth. The first option is to use free grafts such as full-thickness skin grafts or free mucosal grafts. These tend to contract and require a vascularized bed, precluding use in full-thickness defects or in defects requiring free cartilage grafts.

If the reconstruction is full-thickness or requires free grafts of cartilage or bone, the preferred method is use of a vascularized flap. There are several options tailored to specific defect locations, each with its own advantages and disadvantages. The major intranasal flaps are bipedicled vestibular, ipsilateral septal mucosal, contralateral septal mucosal, composite septal pivotal, and inferior turbinate. Finally, cutaneous flaps for internal lining repair are available when intranasal mucosal sources are absent or the defects are large and complex.

In the 1950s, the Brazilian plastic surgeon Roberto Farina, MD,2 used the forehead flap to replace lost nasal lining in patients with leprosy. This 2-stage technique was called the “frontal flap method” and involved tunneling the flap pedicle under the glabellar skin. We have developed a modification of the Farina method for use in large intranasal defects. This modification includes an external rhinoplasty approach for exposure. Herein, we describe how we used the technique in 3 consecutive patients.

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A 62-year-old man underwent a total septectomy for intranasal squamous cell carcinoma. Primary reconstruction was performed. An external rhinoplasty approach was used to gain wide exposure for reconstruction. A cantilevered calvarial bone graft was used to reconstruct the dorsal support. A forehead flap was designed to provide coverage of the cranial bone graft and intranasal lining. The distal flap was elevated in the subcutaneous plane, transitioning to a subgaleal plane proximally. To provide internal lining, we made a 1.5-cm skin incision in the nasal sidewall at the level of the bony-cartilaginous junction, parallel to the same. The flap was tunneled intranasally through this entry point and sutured along its inferior and distal lateral extent. No packing was used. Flap takedown was performed 4 weeks after the initial surgery. The patient underwent postoperative radiation therapy and died of unrelated causes 10 months after this reconstruction.
CASE 2

A 44-year-old woman was seen with recurrent high-grade mucoepidermoid cancer of the septum after primary radiotherapy. She underwent septectomy and reconstruction by an external rhinoplasty approach for wide exposure. Cranial bone graft was used to reconstruct the dorsal L-strut of the nose and anterior septum. A forehead flap was designed to provide coverage of the cranial bone graft and intranasal lining. The distal flap was elevated in the subcutaneous plane, transitioning to a subgaleal plane proximally. To provide internal lining, we made a 1.5-cm skin incision in the nasal sidewall at the level of the bony cartilaginous junction, parallel to the same. The flap was tunneled intranasally through this entry point and sutured along its inferior and distal lateral extent. No packing was used. The flap was taken down 4 weeks after primary surgery, and the entry site closed without complication. Unfortunately, the tumor recurred and required further excision and local reconstruction.

CASE 3

A 55-year-old white man was seen with an intranasal squamous cell carcinoma grossly involving the right columella and membranous septum, with extension on to the right nasal floor (Figure 1). After excision, the defect included the right lower lateral cartilages, the caudal septal cartilage extending to the maxillary spine, the mucosa of the anterior nasal floor, and the upper lip.

An external rhinoplasty approach provided excellent access for reconstruction. A posteriorly based septal-hinge flap was designed to reconstruct the anterior septal strut. A left auricular cartilage graft was harvested to replace the structural framework of the right ala. A forehead flap was designed to provide coverage of the cranial bone graft and intranasal lining. The distal flap was elevated in the subcutaneous plane, transitioning to a subgaleal plane proximally (Figure 2). To provide internal lining, we made a 1.5-cm skin incision in the nasal sidewall at the level of the bony cartilaginous junction, parallel to the same. The flap was tunneled intranasally through this entry point and sutured along its inferior and distal lateral extent (Figure 3).

Bilateral sponge packing was placed for 5 days. A wedge excision was performed to close the defect in the upper lip. The flap was taken down 4 weeks after primary surgery, and the entry site closed without complication. The patient underwent postoperative irradiation and was without evidence of disease 6 months after surgery (Figure 4).

COMMENT

Nasal reconstruction of large defects presents formidable challenges. The modified Farina technique de-
scribed herein uses an external rhinoplasty approach and is reliable, efficient, and effective in repairing unilateral defects of nasal lining larger than 2 cm. It avoids the use of microvascular free tissue transfer and allows coverage of a large intranasal defect using a paramedian forehead flap.

Although a forehead flap is bulky and thicker than nasal mucosa, the flap can be thinned down considerably before inset. The forehead flap is considered the workhorse of nasal reconstruction and is primarily used for resurfacing large nasal cutaneous defects. Its advantages include robust vascularity, abundant tissue availability, and low donor site morbidity. Use of the forehead flap to address internal lining defects is not common, but it is a viable option for the surgeon confronted with challenging defects. Combining the forehead flap with an external rhinoplasty approach allows excellent exposure for assessment and reconstruction of the nasal framework.

A disadvantage of this method is the bulkiness of the forehead flap, which can cause nasal obstruction if not thinned adequately. In addition, donor site morbidity should also be discussed with patients. In our experience using this technique and traditional forehead flap reconstructions, the scars on the forehead and external nose are very well tolerated. One way to minimize scarring is to limit the pedicle base to 1.5 cm or less in width. Meticulous closure of the nose at the second stage also minimizes the scar.

In conclusion, the nasal lining is critical in the healing and support of structural grafts. If not addressed adequately, failure of internal lining can lead to distortion of the aesthetic and functional result. When insufficient lining is available from intranasal mucosal flaps or other cutaneous flaps, a reliable alternative is the forehead flap. We have combined the Farina flap with a novel technique of exposing the area to be reconstructed via external rhinoplasty incisions. This offers the patient an excellent aesthetic outcome without compromising functionality.

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REFERENCES