
Case Report

Interpolated Subcutaneous Fat Pedicle Melolabial Flap for Large Nasal Lining Defects

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Full-thickness nasal deformities are a reconstructive challenge. Restoration of a reliable internal lining is critical for a successful reconstruction. Septal hinge flaps are the workhorse for internal lining defects. However, these and other intranasal mucosal flaps are sometimes unavailable due to prior harvest or previous oncologic resection. We present the two-stage interpolated subcutaneous fat pedicle melolabial flap for lining large defects when traditional intranasal flaps are unavailable. This approach is particularly useful when one forehead flap has already been expended, preserving the patient's remaining forehead tissue for external cover.

Key Words: nasal reconstruction, melolabial flap.

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INTRODUCTION

The goal of nasal reconstruction should be restoration of a symmetric, anatomically appropriate nose with patent nasal airways. Full-thickness nasal defects require reconstitution of external skin, internal lining, and structural support. Forehead flaps can provide external coverage in nearly all cases, and auricular cartilage, costal cartilage, or split calvarial bone grafts will yield reliable structure so long as they are surrounded by vascularized tissue. Internal lining is arguably the most critical of the three layers to rebuild. Loss or absence of internal lining leads to cicatricial contraction, and exposed structural grafts can become infected causing graft loss. Both contracture and structural loss will result in aesthetic deformity and nasal obstruction, negating any benefit from the reconstructive effort.

Like all defects, internal lining deficiencies should be approached using the reconstructive ladder. Small defects (<1-cm diameter) can be closed using primary closure, full-thickness skin grafts, or bipedicle mucosal advancement flaps.^{1,2} Epithelial turn-in flaps were popu-

larized by Park et al., but require excision of adjacent nasal or cheek skin, which may be in short supply.³

Septal hinge flaps replace missing mucosa with tissue of similar characteristics and are the workhorse for reconstituting larger internal lining defects of the lower third of the nose. In the middle vault, a contralateral septal hinge flap can reconstruct internal lining, and the removed window of cartilage can be also be used for structural support. These different local mucosal flaps depend on branches from the superior labial or anterior ethmoid arteries, which may have been destroyed by surgery or trauma, or made less effective by radiation to the area.⁴ In such cases, a different source of pliable, vascularized tissue is required. Some authors have utilized the galeal or pericranial components of the forehead flap for internal lining, with mixed results.⁵ Near-total defects of internal lining have been addressed with a second forehead flap⁶ or even a radial forearm free flap for reconstruction.⁷

In this report, we describe the use of a two-stage interpolated subcutaneous fat pedicle melolabial flap to reconstruct large defects of internal lining when septal hinge flaps were unavailable. This technique is particularly useful to salvage patients with full-thickness nasal defects who have already expended their first forehead flap. This preserves the second forehead flap for restoring external cover. In some cases, the two-stage interpolated melolabial flap may be an alternative to the free radial forearm flap for large internal lining defects.

SURGICAL TECHNIQUE

A template is used to assess the mucosal defect (Fig. 1). The template is transposed to the melolabial fold, similar to when an interpolated melolabial flap is being used for external cover, except that the flap is

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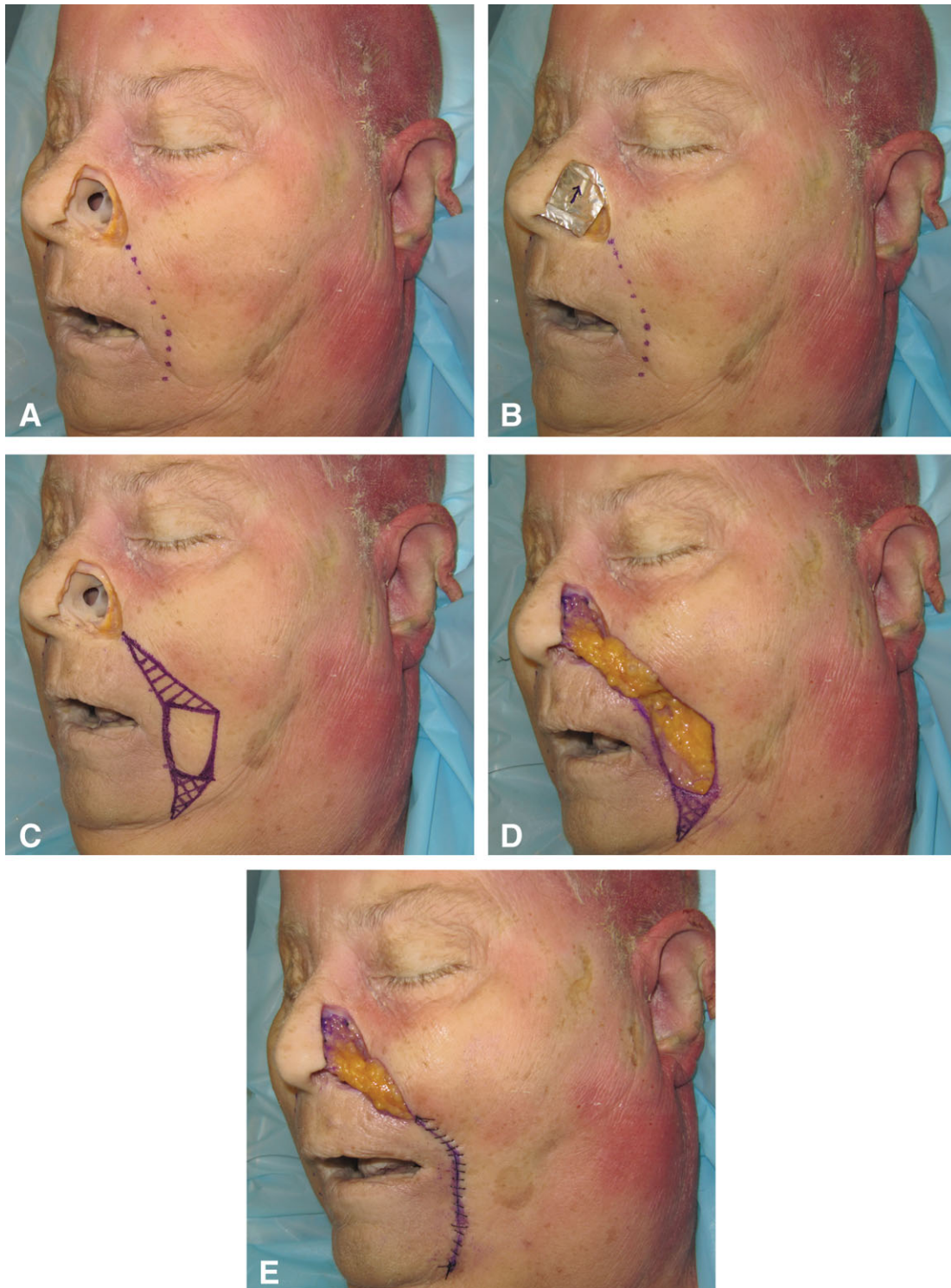


Fig. 1. Cadaveric dissection depicting surgical technique. (A) Full-thickness nasal resection with a 2 × 3-cm defect of internal lining. Septal perforation makes septal hinge flap a poor option. The melolabial fold is dotted out and will represent the medial aspect of the planned flap. (B) Template of the defect with suture pack foil. (C) Template transposed to the melolabial crease. (D) Melolabial flap is incised and raised in a plane just superficial to the facial musculature. The distal part of the flap is thinned and sutured circumferentially into defect. (E) Standing cutaneous deformity inferior to flap is excised and the donor site is closed.

designed and inset with the skin facing internally. Thus, the pedicle is not twisted, which maximizes blood supply and the flap's superior reach. The melolabial fold itself serves as the medial border of the flap. The portion to be

used for internal lining must be far enough inferior that it can be moved superiorly to the mucosal defect without tension; this usually places the midpoint of the skin paddle at the level of the oral commissure or slightly



Fig. 2. Patient from the case report. (A, B) Frontal and profile views after failed original attempt at reconstruction. The initial forehead flap has experienced significant contraction and would no longer provide adequate external cover. A left-sided 3 × 5-cm melolabial flap has been delayed. (C) Interpolated melolabial flap raised and inset, suspended from osseocartilaginous rib graft with polydioxanone suture. The patient's second forehead flap is outlined. (D, E) Profile and frontal views 2 years from reconstruction. The patient has good cosmesis, can wear his glasses, and the melolabial donor site is inconspicuous.

below. The skin is incised into the subcutaneous fat. The skin paddle is raised from inferior to superior, leaving 1- to 3-mm thickness of fat on the distal or inferior portion of the skin. As one moves superiorly, more fat is left attached, creating a superiorly based subcutaneous fat pedicle. Over the zygomaticus major and nearby intrinsic facial musculature, the pedicle is elevated in a plane just superficial to the muscle. The superior-most third of the raised flap is left attached to the underlying muscle. The skin paddle is flipped into the defect and sewn to the edges of the mucosal defect circumferentially with an absorbable monofilament suture.

To close the donor defect, the skin lateral to the melolabial incision is undermined to allow a tension-free closure. The medial skin is undermined only 1 to 2 mm to preserve the attachments of the facial musculature to the dermis in this area. The wound is closed in two layers, and the standing cutaneous deformity inferior to the donor site is excised.

For full-thickness nasal defects, the melolabial flap can be used for internal lining at an initial stage and skin-grafted to prevent contraction, or can be done simultaneously with structural grafting and external cover. The flap can be suspended from the structural

grafts using polydioxanone suture, much like an A-frame tent is suspended from its poles (Fig. 2C). At a later stage, the cheek fat pedicle is divided and the flap is thinned. If the alar base has been altered during the resection, this can be reconstructed as well.

CASE REPORT

A 69-year-old male with a history of ethmoid sinus squamous cell carcinoma with nasal skin and medial orbital invasion underwent an external approach for resection, which included a subtotal rhinectomy, subtotal septectomy, bilateral middle turbinate excision, and external frontal ethmoidectomies. Negative margins were not achieved and he underwent postoperative radiation to the anterior skull base to 66 Gy. Following radiation, the patient's ablative surgeon attempted nasal reconstruction using split calvarial bone grafts and a forehead flap with a pericranial flap for internal lining. The pericranial flap failed and the split calvarial bone became exposed and was lost, creating a large nasocutaneous fistula. The original forehead flap contracted and could no longer cover the nasal surface.

Once this had healed, the senior authors planned a second attempt at reconstruction using a 5 × 3-cm two-staged subcutaneous fat pedicle melolabial flap. Given his history of radiation to the area, the flap was initially delayed. This was raised 3 weeks later and placed under dorsal and columellar costal osseocartilaginous grafts with the patient's second forehead flap for external cover.

The patient's reconstruction was completed 4 years ago, and he has continued to do well. He has a good cosmetic result with good nasal projection (Fig. 2). His Nasal Obstruction Symptoms Evaluation scale score is 1/20, reflecting widely patent nasal airways.

DISCUSSION

Trauma and oncologic resection can create large full-thickness nasal defects. Reconstruction of these defects depends on successfully rebuilding the internal nasal lining with vascularized tissue, without which contracture, functional obstruction, and nasal deformity will recur. Moderate to large defects of internal lining can be reconstructed with septal mucosal flaps if the tissue is present and their superior labial (anteriorly-based) and/or anterior ethmoidal (posteriorly based) artery pedicles remain intact. When the anterior septum has been resected and other intranasal mucosa is unavailable, as in the case above, an alternative source of vascularized tissue is required. Two separate interpolated forehead flaps have been used to provide both lining and cover, and can be a good option.⁸ However, if a prior forehead flap has already been expended for some reason, raising two more (the patient's second and third) forehead flaps can be problematic. In these cases, interpolated subcutaneous fat pedicle flaps can provide internal lining, thus preserving the remaining forehead tissue for external covering. Potential drawbacks of the interpolated melolabial flap compared to an interpolated forehead flap are that it lacks a true axial vascular pedicle, and that it

may be hair-bearing in men. The melolabial flap can be depilated at the time of inset, and our patient has had no problems with excessive hair growth. Although the flap lacks a true axial vessel, the tissue in this area is very vascular, supplied and drained by tributaries of the facial artery and vein. The cheek jowl complex is also the facial region with the greatest quantity of redundant skin. This makes the interpolated subcutaneous fat pedicle melolabial flap ideal in middle-aged or older patients with at least mild jowling. This technique is less optimal in young patients without obvious melolabial creases because the melolabial incision will create facial asymmetry.

Several permutations of the small, single-stage melolabial flap for internal lining have been described in the literature. Roberto Farina was a Brazilian plastic surgeon who wrote extensively on reconstruction of the nose destroyed by leprosy.⁹ He popularized both the forehead flap and melolabial turn-up flap for reconstruction of internal lining. These smaller flaps, as described by Farina and later Millard,¹⁰ were used to reline the vestibule only and are essentially an epithelial turn-in flap. To our knowledge, the present report is the first description of using a two-staged interpolated melolabial flap based off a sizeable subcutaneous fat pedicle to reconstruct large (15 cm² in this case) defects of internal nasal lining.

CONCLUSION

Reconstruction of full-thickness nasal defects will fail if internal lining is not effectively reproduced. In many patients, septal hinge flaps can reconstruct defects of the internal lining in the lower third of the nose. The two-stage interpolated subcutaneous fat pedicle melolabial flap described herein was used to reconstruct a near-total nasal lining defect in a patient with unavailable septal hinge flaps. This technique offers an alternative to using a forehead flap for internal lining when one forehead flap has already been expended, and may be an alternative to a free radial forearm flap in select patients.

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