Reliability of the Melolabial Flap for Alar Reconstruction

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Objective: To review a series of alar reconstruction cases in which the melolabial flap was used.

Design: Case series.

Setting: University medical center and private practice.

Patients: One hundred five consecutive patients with alar defects, resulting from oncologic resection, in whom melolabial flap reconstruction was suitable.


Main Outcome Measure: Viability of the flap and presence or absence of surgical complications.

Results: There were no complete flap failures. Seven patients had partial necrosis of the distal end of the flap, and 3 of these instances occurred when the flap was rolled back onto itself to reconstruct the nasal vestibule; however, none of the patients required a subsequent operation or notching. Three patients developed hematoma, and 2 of them required a return to the operating room for control of bleeding. Four patients developed superficial infection, and 1 developed cellulitis of the cheek requiring opening of the wound and later revision of the flap. This was the only flap requiring revision. Fifteen patients required 3 or fewer corticosteroid infiltrations postoperatively for flap pin-cushioning or scar hypertrophy.

Conclusion: The melolabial flap is a reliable tool in the reconstructive armamentarium of the facial plastic surgeon.

Arch Facial Plast Surg. 2001;3:33-37

NASAL reconstruction remains one of the most challenging aspects of facial plastic surgery. Considerations of complex skin contours, cutaneous color, and texture take on unique nuances when trying to achieve a functional airway overlying a 3-dimensional structural framework. Because of limited local or adjacent tissue useful for reconstruction, regional interpolated flaps have become the mainstay of inferior-third nasal reconstruction procedures. The nasal ala, bordered laterally by the alar groove, medially by the nasal tip, and superiorly by the nasal sidewall and adjoining the nasojugal crease, poses unique reconstruction challenges. Commonly, the paramedian forehead flap allows for superb alar reconstruction, yet it requires a second stage and an intervening period during which the pedicle can be troublesome to many patients.

Alternatively, the melolabial flap can provide an excellent reconstruction of even full-thickness alar defects up to 2.5 cm in width with a single stage. The melolabial region is made of cheek tissue surrounding the melolabial crease from the ala to the oral commissure. Sometimes referred to as nasolabial, melolabial is an anatomically more precise description. Historically, the melolabial flap has most frequently been used as a 2-stage procedure. It may be that the fairly high reported incidence of pin-cushioning and trapdoor formation with the pedicled technique has resulted in the melolabial flap often being considered a secondary choice in alar reconstruction. As a single-staged procedure, however, we have found alar reconstruction success not limited by these drawbacks.

RESULTS

Review of patient documentation of 105 consecutive melolabial flap alar reconstructions after oncologic resection suggests that this flap is an excellent option when considering nasal reconstructive op-
PATIENTS AND METHODS

PATIENTS

A retrospective review of medical records and perioperative photographs of all patients who underwent alar reconstruction for oncologic resection by a single surgeon (W.H.L.) was performed. One hundred five cases dating back 41⁄2 years were identified, and all patients had a minimum of 6 months of follow-up. Most patients were still active patients, although this was often for treatment of new cutaneous malignant neoplasms elsewhere on the head and neck. Medical records were examined for the presence of postoperative complications and the treatment rendered. Photographs were examined for overall result quality and inspected for complications.

SURGICAL TECHNIQUE

The melolabial flap designed in this reconstructive series functions as a superiorly based random-pattern transposition-advancement flap. Its blood supply is random, although usually quite redundant, on multiple perforating branches of the distal facial and angular arteries perforating through the levator labii musculature. Drainage proceeds to the facial vein. Sensory innervation comes from the infraorbital and mentalis branches of the trigeminal nerve.

In preparation for flap design, the alar defect is measured and then lateral nasal tissue between the nasofacial border and the defect is removed (Figure 1A). The tissue excised will be a trapezoidal shape, from defect to nasojugal crease, precisely the maximum width of the defect itself. The excised nasal sidewall skin should reach the nasojugal sulcus at a maximum of 30° to eliminate a standing cone at the point of rotation and avoid compromise of blood supply to the melolabial flap. This facilitates a single-stage melolabial flap transfer. The medial aspect of the melolabial flap corresponds to the melolabial crease itself, and the most distal aspect of the flap should allow for a tapering 30° point. The lateral cheek incision should be placed precisely the width of the defect (when rotation is considered) lateral to the nasojugal sulcus and medial to the melolabial incision line. The lateral cheek incision should extend no higher than the point at which the nasal defect meets the nasojugal crease. This ensures a wide vascular base for the donor flap. Adequate flap length will be required for alar reconstruction. The distance from the point of rotation to the distal defect should be maintained before tapering.

The flap is elevated defatted and then advanced medially, transposing the flap into the nasal defect over a peninsula of remaining alar skin (Figure 1B). Plication of the cheek superficial musculoaponeurotic system facilitates a tension-free advancement and a tension-free closure of the donor site. The nasojugal sulcus is then reconstructed with 2 buried permanent clear nylon sutures from the deep flap to the piriform aperture periosteum. Tightening of the suture pulls the flap medially and holds it down into the concave nasojugal sulcus, restoring the normal contour and minimizing wound tension. As the donor site is closed, care is taken to avoid overeversion of the melolabial crease.

Wide undermining of the entire nasal tip and dorsum along with the cheek facilitates an easy tension-free closure and limits pin-cushioning and trapdoor formation. The distal flap is then thinned aggressively, similarly to forehead flap thinning. Fat transposed with the flap tends to fibrose and contract, lending itself to trapdoor formation.

As the flap is placed into the nasal defect, it should be anchored from proximal to distal with subcutaneous sutures (Figure 1C). When the alar crease region is reached, 2 buried permanent nylon sutures are used to recreate the alar crease itself. In addition, as the flap is trimmed and laid into the caudal ala, the flap is left slightly redundant, which tends to push back the ala and accentuate the alar crease. Cartilage grafts and hinged turn-in flaps are performed as needed.Unless vestibular reconstruction is performed, no nasal packing is placed. A pressure dressing is placed over the nose and cheek for 24 hours. All patients are prescribed a 5-day course of an antistaphylococcal antibiotic and perform suture line care 3 times daily. Drains have not been necessary. Sutures are removed on day 5.

Tions. Fifty-one flaps were used for reconstruction of soft tissue defects of the nasal ala, and 37 required a cartilage graft to maintain proper positioning of the alar rim and prevent retraction collapse of the nasal valve. An additional 17 patients had reconstruction of a full-thickness alar defect, with the distal end of the flap rolled over a cartilage graft for vestibular reconstruction.

As expected in this patient population, most patients had potentially complicating medical factors. Many patients took aspirin daily for cardiovascular benefits. Sixteen patients, however, were required to maintain their daily aspirin regimen for cardiac issues on recommendation from their primary care physician. Twenty-three patients had diabetes mellitus, 40 were smokers, and 8 were smokers and had diabetes. Five patients had diabetes and required aspirin, and 4 smoked, had diabetes, and required daily aspirin.

There were no complete flap failures. Seven patients had partial necrosis of the distal end of the flap, and 3 of these instances occurred when the distal flap was rolled into the vestibule for reconstruction. No patients with distal flap necrosis required anything greater than local wound care, consisting of hygiene and topical antibiotic ointment therapy. Of these 7 patients, 4 were smokers and 1 was a smoker and had diabetes.

Three patients developed postoperative hematoma, and 2 of these required a return to the operating room for control of bleeding. Surprisingly, neither patient was taking aspirin; however, one of the patients was found to have previously undiagnosed uncontrolled hypertension, requiring a prolonged inpatient workup by the primary care physician. The remaining hematoma was treated by gentle expression through the suture line and pressure.

Four patients developed superficial infection, and 1 developed cellulitis of the cheek, requiring reopening of the wound and later a revision of the flap. This was the only flap that required revision, and it occurred in the patient with a postoperative hematoma who also had uncontrolled hypertension requiring inpatient therapy.

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Fifteen patients required 3 or fewer corticosteroid infiltrations (triamcinolone, 25 mg/mL) for postoperative pin-cushioning or scar hypertrophy. There were no cases of alar retraction requiring revision or that concerned the patient enough to request additional procedures.

**COMMENT**

Nasal reconstruction remains one of the most challenging areas of facial plastic surgery. Although the forehead flap is the workhorse technique for repairing complex tissue losses involving multiple nasal subunits, for defects of limited size, the melolabial flap can provide equal or superior results in a single stage (Figure 2). Sufficient redundant cheek tissue is often found in the deep melolabial folds characteristic of the aged population most commonly affected by cutaneous malignant neoplasms of the nasal ala, to reconstruct defects up to 2.5 cm in width. Zitelli,1 in an excellent description of his experience, agrees with the 2.5-cm capability of the melolabial flap for alar reconstruction. Its primary, non-size-related limitation in this role, however, is that the incision line placement prohibits restoration of far-lateral alar defects that abut or cross the alar crease as it meets the cheek. To prevent alteration of this critical landmark, some native tissue must remain to allow flap transposition and donor site closure. The melolabial flap’s length, which can be extended down the cheek as needed, also allows for reining of the nasal vestibule for full-thickness defects. It is important to maintain a reasonably wide pedicle, but we did not find that a 1.3 width-length ratio was an absolute requirement. It is, however, extremely important when using these turn-in flaps to remember that actinically exposed skin is being rolled into a location not easily examined by the patient. Careful follow-up is necessary to detect any intranasal cutaneous malignant neoplasms from rolled-in skin.

Younger2 reported that the exploitation of naturally redundant tissue is enhanced by the superb tissue match of the melolabial flap with cheek skin. Other researchers6,7 also agree with this high degree of tissue similarity. In a comparison of melolabial with forehead flaps used for alar reconstruction, Arden et al8 objectively rated tissue match and found the melolabial flap superior. Interestingly, they also evaluated scar length and width for the 2 procedures and believed that the melolabial scar was more acceptable. They reported that 1 of 3 patients was dissatisfied with the forehead scar result. Other reconstructive techniques, such as skin grafts or bilobed flaps, often result in a poor tissue match or violation of more subunit boundaries, without the melolabial flap’s ability to camouflage incision line placement.5,6,9

The reliability of the single-stage melolabial flap appears to be maintained in the face of potential complicating risk factors. There was no obvious trend toward postoperative infection or necrosis from either smoking or diabetes in this series. Younger,2 however, in his review of 2-stage melolabial flaps, found increased complication risks with smoking, diabetes, male patients, and previous radiation therapy. His flaps however, ranged up to 4 cm and were used in nasal and nonnasal reconstructions. Arden et al8 also suggest that smoking and previous radiation therapy may warrant the forehead flap’s axial blood supply. The smaller flap size and minimal wound closure tension in transposing the melolabial flap onto the nearby nose likely prevented many potential complications in this series. In addition, our series had no

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**Figure 1.** Construction of the single-staged melolabial flap useful for alar reconstruction. A, Lateral nasal skin (shaded) is excised to the nasofacial border to facilitate flap insertion. Maximal defect width a is maintained to distal defect length b so that sufficient tissue is transferred. B, Flap incision and lateral retraction allows plication of the superficial musculoaponeurotic system. Rim-stabilizing cartilage graft prevents alar retraction. Nasojugal crease reconstruction is secured by permanent sutures anchoring the flap to the periosteum. C, The resultant suture line is camouflaged by the melolabial crease. Precise reconstruction of the alar crease is enhanced by permanent suture fixation (x marks) of the flap to deep tissue (see the “Surgical Technique” subsection of the “Patients and Methods” section).
previously irradiated patients. Alar-supporting grafts did not seem to influence wound complications either. There was, however, a higher incidence of distal flap superficial necrosis when the melolabial flap was rolled in for vestibular lining. Attempts were made to prevent overcompression of the alar margin, yet local wound complications still occurred. Fortunately, no patient required revision or had any apparent long-lasting complication as a result of superficial tissue loss in the vestibule.

Proper flap design and execution appears to be successful in minimizing potential for postoperative alar distortion. Wide undermining of the nasal tissue surrounding the defect in the supraperichondral plane limits trapdoor formation. Zitelli believed that a “plate-like” scar formed beneath the entire surgical field, limiting local contraction. Alar crease formation and retraction-prevention are also enhanced by retaining flap length as it is inset into the defect. The flap is inset from the nasofacial border distally with permanent buried sutures. When the alar crease is reached (corresponding to the contralateral crease when viewed from above), 2 deep permanent sutures are placed from the deep side of the flap into the nasal vestibular skin (Figure 1B). It is important to use a small purchase of deep flap tissue to prevent vascular compromise to the flap tip. We have tried temporary through-and-through mattress sutures, with less success in maintaining this crease. After these 2 sutures are placed, a subcutaneous permanent suture is placed at either lateral flap edge precisely at the alar crease. Then, as the distal flap is inset, it is left slightly long, which tends to create alar fullness. This fullness, when compared with the tightly attached alar crease, creates an excellent alar appearance.

Alar retraction can be decreased with the placement of rim-stabilizing cartilage grafts. Conchal bowl and septal cartilage are locally available. The curvature of the conchal bowl cartilage is often more suitable for alar reconstruction, and the donor site is practically invisible on postoperative inspection. We have never experienced a donor site complication including scar formation and, therefore, our preference is the conchal bowl.

Care should be taken to consider the rim and external valve support as 2 separate problems. Cartilage placed to support the valve, and mimic the lower lateral cartilage, will not maintain alar position. Either a separate cartilage graft at the rim or a wide graft spanning the distance from the rim to the valve is required. We found that a graft wide enough to accomplish both of these tasks.
is difficult to harvest from limited cartilage supplies available from the conchal bowl. A wide cartilage graft also appears to prevent deep alar crease formation, thereby diminishing postoperative alar symmetry.

Reconstruction of the nasofacial border and nasojugal sulcus is critical to achieving overall nasal symmetry. Two buried permanent sutures anchored on the piriform aperture periosteum, and secured to the deep surface of the advanced cheek tissue, facilitate crease reconstruction (Figure 1B). Both sutures are placed and left untied after plication of the cheek superficial musculoaponeurotic system. The anchoring sutures are then tightened until a slight overcorrection of the nasojugal sulcus is created. Finally, it is important not to overcorrect the melolabial crease during donor site to closure. The facial plastic surgeon, in an attempt to create a nice eversion closure, can actually overcorrect and essentially remove this natural facial crease during closure. Rather than an eversion closure typical to most skin incision repairs, the melolabial crease is closed with slight inversion, allowing this natural facial rhytid to remain.

This review of consecutive melolabial flap reconstructions for alar defects illustrates that the melolabial flap is a safe, reliable, and cosmetically acceptable option to consider in nasal reconstruction. With proper flap design and execution, functional and aesthetic complications can be minimized.

Accepted for publication August 8, 2000.

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