

Nasal Reconstruction with a Forehead Flap

Frederick J. Menick, MD^{a,b,c}

KEYWORDS

- Forehead flap • Two-stage forehead flap
- Three-stage forehead flap • Nasal reconstruction
- Nasal defects

“The tint of forehead skin so exactly matches that of the face and nose that a forehead flap must be the first choice for reconstruction of a nasal defect.”

—H.D. Gillies and D.R. Millard

The forehead makes by far the best nose. With some plastic surgery juggling, the forehead defect can be camouflaged effectively.

The use of a forehead flap, however, is not particularly indicated where only a new surface of the nose is required. Although its color is natural, the flap is liable to be a little too thick; if time and opportunity allow it to be thinned adequately, however, an acceptable contour can be achieved.¹

PRINCIPLES

The forehead and scalp are richly perfused by the supraorbital, supratrochlear, superficial temporal, postauricular, and occipital vessels. These axial vessels permit its safe and effective transfer on multiple individual vascular pedicles.² The first “Indian” flap transferred forehead tissue on both the right and left supratrochlear vessels.³ The midline forehead was pivoted on a high, wide base, positioned above the eyebrow. This technique, however, limited the length of available skin, if hair-bearing scalp was to be avoided on its distal end.

Employing a modern design, Millard⁴⁻⁶ designed a “seagull”-shaped flap on a unilateral pedicle, centered on the medial canthus. A narrow, proximal, vertical stalk resurfaced the dorsum, and its distal wings covered the alae. Its

low base brought the flap closer to the defect and effectively lengthened the flap’s reach. It harvested forehead tissue in both vertical and horizontal directions. The majority of the donor site was closed as a T-shaped scar. The flap could resurface the entire nose. This paramedian flap has vascularity, size, reach, reliability, efficiency, and relatively minimal morbidity. It can be elevated on a right or left supratrochlear pedicle.

The supratrochlear vessels exit the orbit over the periosteum and then pass through the corrugator muscles. About 2 cm above the superior orbital rim, the vessels pass through the frontalis muscle to run vertically upward, within the subcutaneous fat, almost adherent to skin at the hairline and into the scalp. The flap is perfused from three sources: randomly, through the frontalis muscle, and, most importantly, through its vertical axial vessels. Because of its axial blood supply, the width of the pedicle can be narrowed to 1.0 to 1.2 cm or less at its base.⁷

The shortest distance between two points is a straight line. If skin harvest is not precluded by scar or pedicle injury, central nasal defects can be repaired, based on either the right or left brow. Lateral defects, however, are repaired with an ipsilateral rather than a contralateral pedicle. An ipsilateral pedicle places the base of the flap closer to a unilateral defect and shortens the distance from the donor site to the recipient site. The base of a contralateral pedicle is farther from the defect, making the recipient site harder to reach, so the flap must be longer.

Some suggest that a contralateral flap is easier to rotate, but the difference in “twist” is minimal,

^a Division of Plastic Surgery, St. Joseph’s Hospital, Tucson, AZ, USA

^b University of Arizona College of Medicine, Tucson, AZ, USA

^c Private Practice, Tucson, AZ, USA

E-mail address: drmenick@drmenick.com

perhaps 180° versus 160°. The most important maneuver in flap rotation is to incise the flap lower on its medial edge than on its lateral edge. It then is rotated, medially, toward the nose, regardless of flap's base. The problem with a contralateral flap is the extra length required, not the ease or difficulty of transfer.

To increase the length, some elevate a forehead flap obliquely, to slant across the forehead, or raise a vertical flap, which then passes transversely under the hairline. Unfortunately, both designs cross the midline and transect the vertical axial vessels. The "working" paddle becomes random. Although it may survive, the distal aspect is at greater risk. It is less vascularized, is more vulnerable to tension, and is more likely to necrose.

Patients often need a second nasal repair. A new cancer may develop in sun-injured skin, or an old cancer may recur. Occasionally, the initial reconstruction is inadequate, and the old forehead flap must be discarded and a second one harvested to improve the result. In most instances, a second flap can be taken easily from the contralateral

forehead after a prior vertical flap, but an initial oblique or angled design into the opposite forehead makes a second flap repair much more difficult. The pedicle is destroyed on one side, and the opposite hemi-forehead is scarred so that donor skin is unavailable. Pre-expansion or surgical delay may allow a second flap, but the repair will be delayed and more morbid. The potential need for a second flap may be the most important clinical reason to use a vertical flap.

The assumption, obvious in many discussions of nasal repair, is that most foreheads are short. Most foreheads, however, are 5 cm or more in height from eyebrow to hairline. A vertical paramedian flap can resurface the entire nasal unit easily without extending significantly into the hairline.

Most often, a template of the cover requirement is positioned just under the hairline, and the vascular pedicle is drawn downward and through the medial eyebrow. The distal flap is incised and elevated until it reaches the defect. The dissection is continued, little by little, incising skin, releasing fibrous restraints, and snipping corrugator muscles, while maintaining the visible vessels.

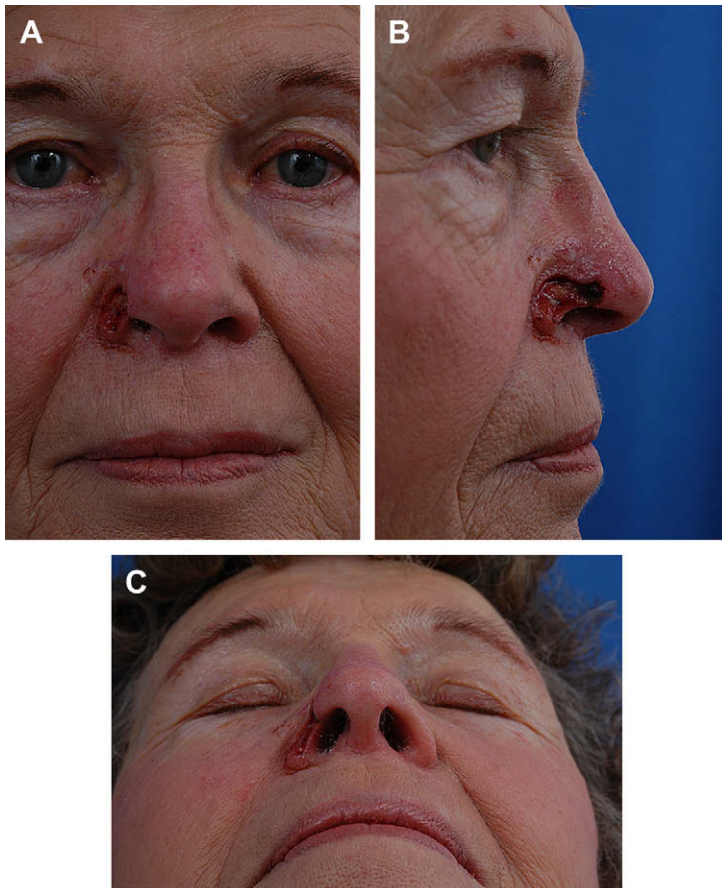


Fig. 1. (A–C) Skin over most of the right ala is missing after excision of a basal cell carcinoma by Mohs technique. This defect could be repaired with a nasolabial or forehead flap. Both will create linear scars, but a scar within the forehead will be less visible postoperatively than a distorted nasolabial fold. Because the defect is small, a forehead flap can be thinned at the time of transfer without risk to its vascularity and with the expectation that the final contour will be good.

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