Nasal Reconstruction

Foot

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Learning Objectives: After studying this article, the participant should be able to: 1. Understand nasal wound healing and develop an organized approach to defect analysis. 2. Understand a regional unit approach to nasal repair. 3. Understand the appropriate use and advantages and disadvantages of the two- and three-stage vertical paramedian forehead flap. 4. Appreciate the uses and design of nasal support grafts. 5. Differentiate old and new lining methods and their advantages and disadvantages and develop an approach to the revision of a nasal reconstruction.

Summary: The face tells the world who we are and materially influences what we can become. The nose is a primary feature. Thin, supple cover and lining are shaped by a middle layer of bone and cartilage support to create its characteristic skin quality, border outline, and three-dimensional contour. The delicacy of its tissues, its central projecting location, and the need to reestablish both a normal appearance and functional breathing make its reconstruction difficult. Nasal repair requires careful analysis of the anatomical and aesthetic deficiencies. Because the wound does not accurately reflect the tissue deficiency, the repair is determined by the "normal." A preliminary operation may be required to ensure clear margins, recreate the defect, reestablish a stable nasal platform on which to build the nose, and prepare tissues for transfer. Major nasal defects require resurfacing with forehead tissue; support with septal, ear, or rib grafts; and replacement of missing lining. This requires a staged approach. (*Plast. Reconstr. Surg.* 125: 1, 2010.)

A face without its nose is as lost as a sundial without its gnomon. The nose provides a center of focus: Its color, size, and shape indicate the character of a man. Thus one is willing to pay a high price to obtain a new one.

—Sir Harold D. Gillies and D. Ralph Millard, Jr., 1957[1]

THE NOSE

Anatomically, the nose is covered with skin, a thin layer of subcutaneous fat, and nasalis muscle; and supported by a middle layer composed of paired nasal bones, upper lateral cartilages, and alar cartilages within the columella and tip. The ala contains no cartilage but is shaped and supported by a compact layer of fibrofatty tissue. The midline septal cartilage and bone separate the nasal cavities and support the bony cartilaginous dorsum and septal angle. The nose is lined by stratified squamous epithelium within the vestibules and mucous membrane internally. The nose sits on the facial soft tissue and bony platform of the cheek and upper lip.

AQ: 1 *From the University of Arizona.*

Received for publication May 6, 2009; accepted July 10, 2009.

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DOI: 10.1097/PRS.0b013e3181d0ae2b

THE WOUND

Wounds do not reflect what is missing.[2] A fresh wound is enlarged by gravity, tension, edema, or local anesthesia. A healed wound may be contracted by scar or distorted by a prior repair and tissue transfer. Thus, a pattern of the defect, based on the wound, does not reflect what needs to be replaced. Missing tissues must be replaced exactly in dimension and outline as they were before injury. If not, the residual nasal landmarks will be pulled inward or pushed outward by replacement tissues, the airway constricted or stuffed, or the nose malpositioned (Fig. 1). F1

THE COMPOSITE WOUND

A composite wound of the nose is one that encompasses the nose and adjacent cheek and

Disclosure: *The author has no financial interest to declare in relation to the content of this article.*

Related Video content is available for this article. The videos can be found under the "Related Videos" section of the full-text article. AQ: 1

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F2

Fig. 1. Skin is missing over most of the nasal surface, with a full-thickness loss of the left ala and sidewall, which extends onto the medial cheek. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

lip.[3,4] The nose sits on the midface in a precise location, projection, and angle. If the nose is reconstructed on a distorted or unstable platform, it will appear abnormal, even if the nose itself is well formed. The cheek and lip must be reestablished first. Then, the nose is restored. If the defect is superficial, the nasal repair may begin simultaneously. If deep and unstable and subject to shift because of tension, edema resolution, or scar contracture, the nasal repair is delayed. The cheek is repaired with a cheek flap. The soft-tissue sweep of the cheek and nasal sidewall and the premaxillary soft tissue of the lip are repaired with a fat flip-flap. The upper lip is resurfaced with a nasolabial extension of the cheek flap or a cross-lip subunit at the flap. A free flap may be used to rebuild the massive midface loss (Fig. 2).

THE NORMAL

All defects are different but, fortunately, the "normal" is unchanging. The contralateral normal or ideal can be used as a guide to determine the exact dimension, outline, and position of missing facial landmarks. Practically, the normal can be described in terms of regional units[2,3,5]: characteristic topographic areas of skin quality, border outline, and three-dimensional contour. The nose

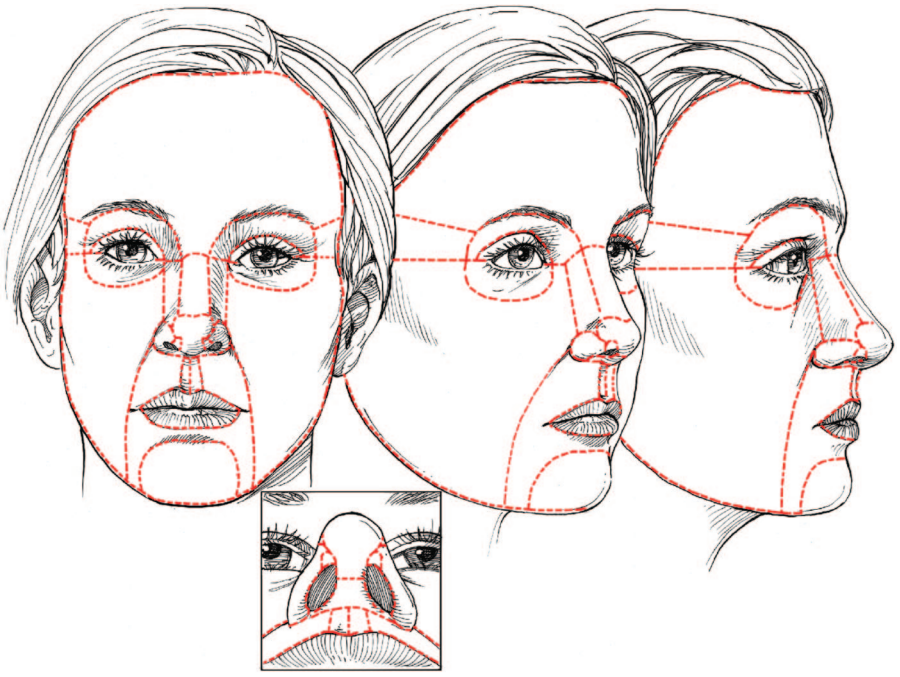

Fig. 2. First, the cheek defect was repaired with a fat flip-flap and cheek rotation flap. The raw surface of the nose was temporarily skin grafted. This reestablished a stable nasal base, closed the wound, and allowed both patient and surgeon to consider the pros and cons of a complex reconstruction in this elderly patient with some medical problems. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

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is a facial unit and can be subdivided into subunits: the dorsum, tip, columella, paired ala, soft triangles, and sidewalls. Intraoperative templates, based on the contralateral normal or ideal, provide precise guides to repair (Fig. 3).

F3

ANALYZING THE PROBLEM

Reconstruction should be a thoughtful, comprehensive process that evaluates the defect, the disease process, past treatments, and overall patient health.[1–3,6] The wound and patient are examined. This includes a review of the patient's old and new photographs, calibrated photographs, a facial moulage and model, and normative measurements, as needed. What is missing anatomically (e.g., cover, lining, or support)? What is missing aesthetically (e.g., the facial landmarks, practically described as regional units)? Is the underlying disease process controlled (e.g., trauma, infection, ischemia, or cancer)? Are donor tissues available or depleted or devascularized by prior injury or surgery? Does the patient's health limit surgical stages, anesthesia, materials, or techniques?

A REGIONAL UNIT APPROACH TO NASAL RECONSTRUCTION

Reconstruction is about choices. Any wound will heal by secondary intention or can be closed with a skin graft or a local or regional flap. However, if the goal is the restoration of normal, principles of regional unit repair are applied.[2,3]

1. Assume patients wish to appear normal. Rarely will unassociated medical illness preclude a repair.
2. The normal is defined as regional units (i.e., characteristic skin quality; border outline; and three-dimensional contour of the forehead, cheek, eyelids, lips, nose, and chin).
3. Use the contralateral normal or ideal as a guide.
4. Use exact templates to define replacement dimension, outline, and landmark position.
5. Consider discarding adjacent normal tissue within subunits, when reconstructing convex nasal subunits (ala, tip), to position scars in the joints between subunits and, most importantly, to control the contour distortion caused by pincushioning.
6. Build on a stable platform.
7. Position primary and delayed primary support before pedicle division, if possible, to support, shape, and brace soft tissue.
8. Use soft-tissue excisional sculpting to augment contour.
9. Use surgical staging to advantage—delay, prefabricate, modify donor materials during transfer, and rebuild adjacent missing lip and cheek.

Fig. 3. Visually, the face and nose can be described in terms of skin quality, border outline, and three-dimensional shape. The normal—the contralateral normal or ideal—serves as a guiding vision to the final result. (From Menick F. *Nasal Reconstruction: Art and Practice*. New York: Elsevier, 2008.)

A PRELIMINARY OPERATION

A preliminary operation[2] may be helpful to:

1. Ensure clear cancer margins by routine surgical excision or Mohs' surgery.
2. Débride necrotic tissue or control infection.
3. Return normal to normal, perform an intraoperative evaluation, or reopen the airway.
4. Reestablish a stable platform on which to build the nose.
5. Surgically delay discardable excess tissue for use as cover or lining.

RESURFACING THE NOSE

Small superficial defects will heal by secondary intention or can be resurfaced with a skin graft or a local flap. Large deep defects require a regional flap—a nasolabial[7] or, most often, a forehead flap.[8]

A forehead flap is required when the defect is larger than 1.5 cm, requires replacement of support or lining, or is adversely located within the infratip or columella. If the defect is larger than 1.5 cm, especially if within 0.5 to 1 cm of the nostril margin, there is not enough residual skin to re-

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distribute over the remaining nose. The mobile nostril rim is easily distorted by the tension of local flap wound closure. A local flap will crush delicate cartilage replacements and cannot reach the infratip of columella. If lining is missing, covering must be supplied by a vascularized regional flap.

Excess skin in the nasolabial fold can be advanced to resurface the sidewall or transferred in one stage as an extension of an advancing cheek flap or in two stages based on axial vessels from the facial and angular arteries to resurface the entire ala. The soft nasolabial flap tends to pincushion because of contracting scar within its recipient bed. Thus, rather than patching the defect, a significant defect within the ala is best constructed as a subunit with a two-stage nasolabial flap.

However, available tissue within the nasolabial fold is limited. A nasolabial flap cannot resurface a defect larger than 2 cm and will not reach the dorsum or tip. A superficial defect larger than 1.5 cm, or one within the tip or dorsum, or requiring support replacement or lining requires a forehead flap.

FOREHEAD FLAP DESIGN

The forehead is acknowledged as the ideal donor site for nasal resurfacing because of its skin quality, size, and vascularity. The forehead is perfused inferiorly from the supratrochlear and supraorbital vessels and superiorly and laterally from the superficial temporal, postauricular, and occipital vessels[9–11] (Fig. 4). F4

Historically, the forehead has been transferred as follows:

1. Median forehead flap: Midline forehead, based on paired supratrochlear vessels, is pivoted on a high, wide base above the eyebrows. This limits the length of available skin without transferring hair on its distal end.[12]
2. Oblique, Gillies up-and-down flap: Horizontal forehead flaps were designed to increase flap length. All add additional scarring to the donor site and make a second flap harvest from the opposite forehead difficult because of the transection of potential axial vessels or additional scars within the opposite forehead.[1]
3. The sickle flap and Converse's scalping flap: These flaps carry forehead skin on the ipsilateral or contralateral superficial temporal vessels, respectively. Both increase morbidity and leave a donor site repaired with a permanent skin graft.[13,14]
4. Vertical paramedian forehead flap: This flap is based on the ipsilateral or contralateral supratrochlear vessels and has become standard. Its low pivot point provides easy flap reach to the defect without transferring hair-bearing scalp. Its narrow pedicle, less than 1.5 cm, permits primary closure of the inferior forehead,

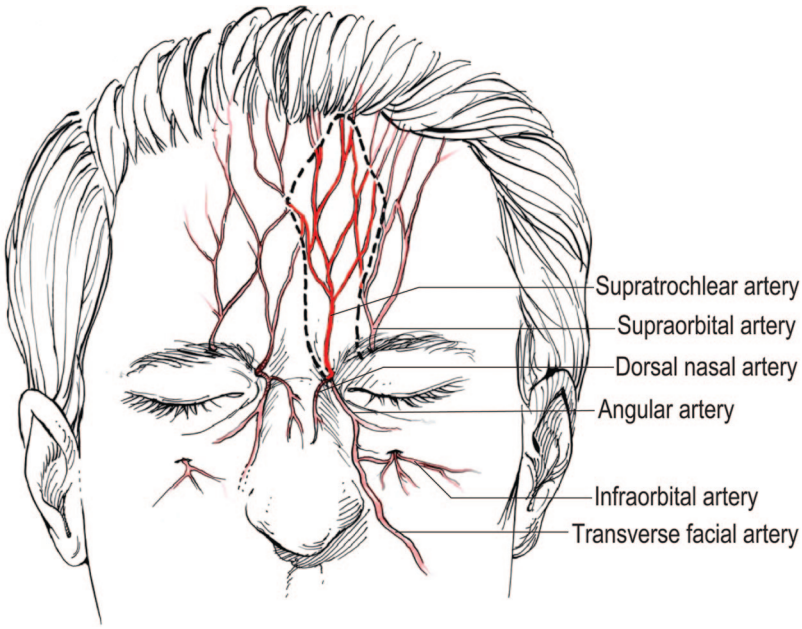

Fig. 4. The vertical paramedian forehead flap is centered over the supratrochlear vessels and is richly perfused by a random, axial, and frontalis muscle blood supply. (From Menick F. *Nasal Reconstruction: Art and Practice*. New York: Elsevier, 2008.)

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leaving any residual defect high under the hairline, which heals secondarily. It is highly vascular and can provide skin to resurface any nasal defect.[1–3,15–17] (**See Video 1, which demonstrates the forehead flap transfer, available in the "Related Videos" section of the full-text article on www.PRSJournal.com.**)

LINING

The nose can be lined with the following:

1. Hinge-over flaps of adjacent skin from the residual nose or within the medial cheek are turned over to line a full-thickness defect, after healing along the edge of the defect. Such flaps are poorly vascularized and may not survive if longer than 1.5 cm. They are thick, occluding the airway, and stiff and difficult to mold with cartilage grafts.[15–17]
2. A second flap, usually a forehead or nasolabial flap, has been used for lining. Both add facial additional scars. The facial artery myomucosal flap, described by Pribaz et al.,[18,19] transfers intraoral mucosa based on the facial artery and is useful to line an isolated loss within the midvault in the nose injured by cocaine or Wegener disease.
3. A composite skin graft can be applied to provide both cover and lining along the nostril margin.[20,21] These are most reliable if the defect is less than 1.5 cm in size. Larger composite grafts with an "add-on" full-thickness skin graft extension have been recommended for more extensive defects. Survival is unpredictable.
4. A skin graft can be applied, at the time of transfer, to the raw surface of the forehead flap. However, it has no intrinsic blood supply and must be placed against the flap's vascular bed for survival, precluding placement of primary support. Traditionally, these unsupported skin grafts led to distorting contracture. Gillies and Millard[1] developed a skin graft inlay technique for the syphilitic and leprotic saddlenose. The scar on the undersurface of the contracted skin envelope was released and a skin graft applied for lining. If permanently splinted with an internal prosthesis, the airway remained patent and the nasal shape satisfactory. More recently, Burget and Menick [2] tunneled a cartilage graft within a vascularized subcutaneous tunnel between the frontalis and external skin of a full-thickness flap to support the nostril margin as a soft-tissue splint. The deep surface of the frontalis muscle, which remained well vascularized, was skin grafted. In small defects, only modest contraction followed. Menick[3] modified the skin graft lining method by applying a skin graft, without support, to the deep surface of a full-thickness three-stage flap. Once the skin graft healed to residual adjacent lining, the forehead skin was elevated during an intermediate operation, excess soft tissue excised, and the underlying skin graft supported with delayed primary cartilage grafts.
5. The prelamination (prefabrication) technique "builds the nose on the forehead."[1,6,21] Six weeks before transfer, a full-thickness skin graft, with separate cartilage pieces positioned within the subcutaneous layer (or a composite skin graft) is placed on the deep surface of the forehead flap. Once skin graft take is ensured, the flap is transferred from the forehead to the nasal defect. Unfortunately, such support is limited and provides minimal rim support.
6. The traditional folded flap folded the forehead onto itself to line the nostril rim or the columella and both nostril margins. However, the poor exposure and stiff soft tissues make it impossible to position delicate support or shape a thin rim or tip. The Menick modified folded lining technique[22] adds a full-thickness lining extension to the distal end of the covering forehead flap that is folded inward to provide cover and lining. Cartilage is not placed within the folded aspect of the repair. During an intermediate operation, the nostril margin is incised, separating the proximal and

Video 1. Video demonstrating the forehead flap transfer is available in the "Related Videos" section of the full-text article on www.PRSJournal.com.

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distal aspects of the flap. The covering flap is reelevated. After excision of excess soft tissue, the folded lining, now dependent on residual adjacent lining for blood supply, is supported with delayed primary cartilage grafts. The covering flap is returned to the defect and divided at a later stage. The donor defect is minimally enlarged because the lining extension is harvested in the area normally discarded as a dog-ear deformity on forehead closure. The soft tissues within a folded three-stage flap remain soft and are easily shaped by delayed primary cartilage support. The interior of the nose is not injured. The initial transfer is less complicated and time consuming than intranasal lining flaps.

7. Intranasal lining flaps revolutionized nasal repair. Although there appears to be little

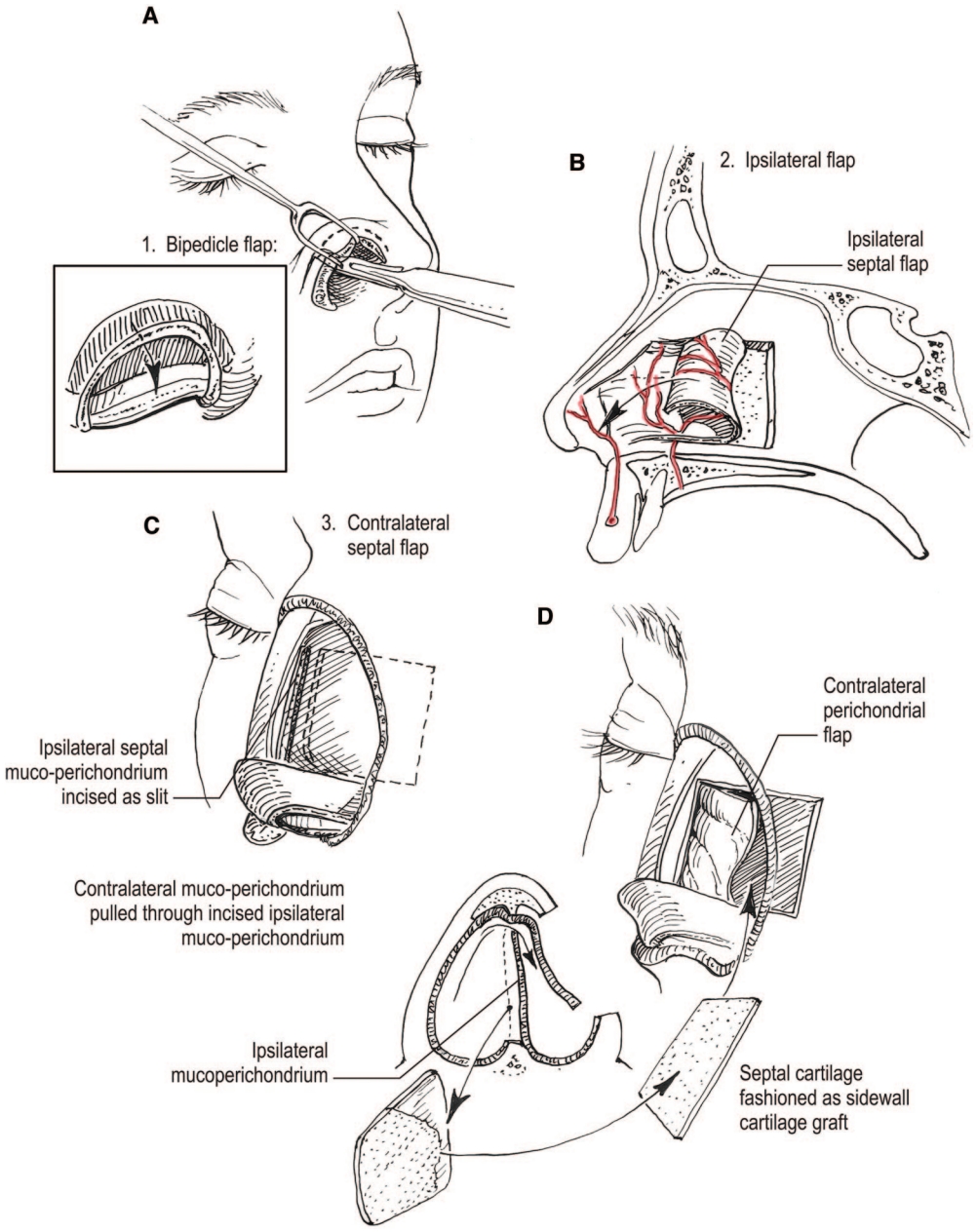

Fig. 5. Residual intranasal lining can be transferred to fill a lining defect based on the septal branch of the superior labial artery, the angular artery branches at the nasal base, and the dorsally positioned anterior ethmoidal vessels. (From Menick F. *Nasal Reconstruction: Art and Practice*. New York: Elsevier, 2008.)

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excess lining within the nose, Kazanjian[23] and Millard[15–17] used limited flaps. Burget and Menick[3,24] found that residual intranasal lining could be elevated, based on axial vessels. Because the lining is thin, supple, and highly vascular, primary cartilage grafts with a nasal contour could be placed to support and shape these lining flaps at the time of transfer. When combined with a regional unit approach, the quality, border outline, and three-dimensional contour of the nose was reestablished. In smaller defects, a bipedicle flap of residual vestibular lining can be incised at the intercartilaginous line and swung inferiorly to replace the nostril margin. In larger defects, the ipsilateral septal mucosa can be pivoted from the septal surface to line the lower lateral nose, based on the septal branch of the superior labial artery. The contralateral septal mucosa can be swung laterally, based dorsally on the superior ethmoidal vessels, passing through a slit in the ipsilateral septum or through the septal fistula created by the simultaneous elevation of the ipsilateral septal flap, to line the midvault. A composite flap of bilateral septal mucosa and septal cartilage and bone can be swung out of the piriform aperture, based on right and left branches of the superior labial arteries to support the central bridge and line the upper nose and parts of the vestibule. These intranasal lining flaps are thin and supple and support primary cartilage grafts, establishing external nasal contour. They are destructive to the residual intranasal anatomy, may be unavailable because of previous injury, and are limited in dimension (Figs. 5 through 7). F5-7

8. Microvascular distant flaps can line the nose and oral cavities and supply soft-tissue bulk and vascularity. However, distant skin does not match facial skin quality. Thus, although free flaps can line the nose, the external surface must be restored, at a later stage, with a forehead flap.[2–4,25–27] Most critical is a careful preoperative analysis of the anatomical defect (i.e., the site, size, and position of missing tissues) and the aesthetic deficiencies that require replacement (i.e., the nose and the lip cheek platform). The specific microvascular donor or the number of paddles is secondary. When other options are unavailable or in the massive, irradiated, or composite defect, free tissue transfer using a radial free forearm flap, the anterior thigh flap, or a truncal flap for larger, deeper

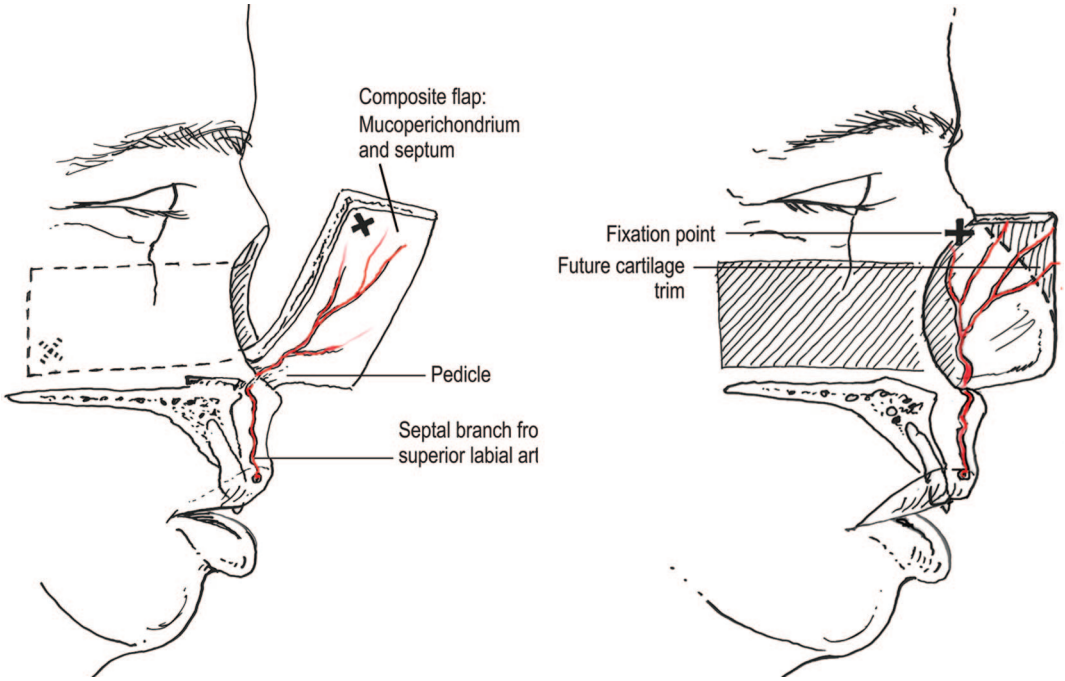

Fig. 6. The residual septum within the piriform aperture can be transposed on bilateral septal branches of the superior labial artery at the nasal spine to provide modest dorsal support and lining to the midvault and part of the ala. (From Menick F. *Nasal Reconstruction: Art and Practice*. New York: Elsevier, 2008.)

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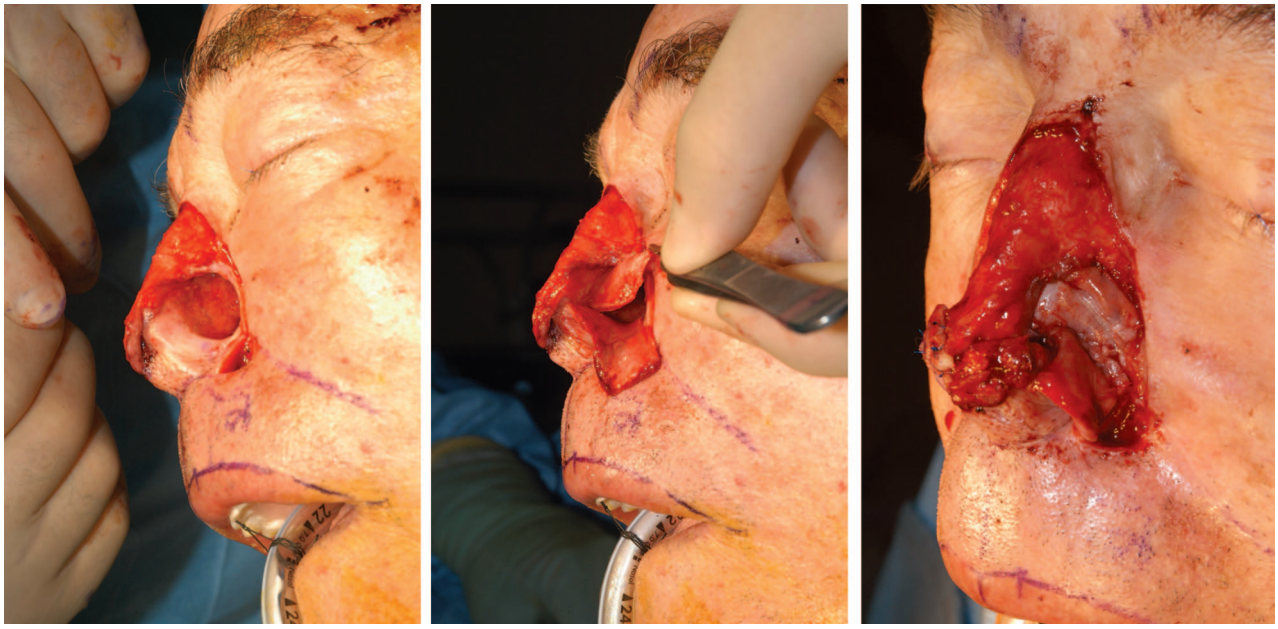

Fig. 7. (*Left*) The defect is recreated by excision of the skin graft and residual normal skin within the remnant of the right ala. Based on a template of the contralateral upper lip, the site of the new left alar base is identified and a small hinge flap developed. (*Center*) The ipsilateral septum is elevated, based on the septal branch of the superior labial artery at the nasal spine. Underlying septal cartilage is removed, maintaining a strong septal L to support the dorsum and columella. The contralateral right septal mucosa is incised, maintaining a dorsal base on the superior ethmoidal vessels. (*Right*) The ipsilateral and contralateral septal flaps are sutured together to line the left sidewall and the ala. The permanent septal fistula will be well tolerated. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

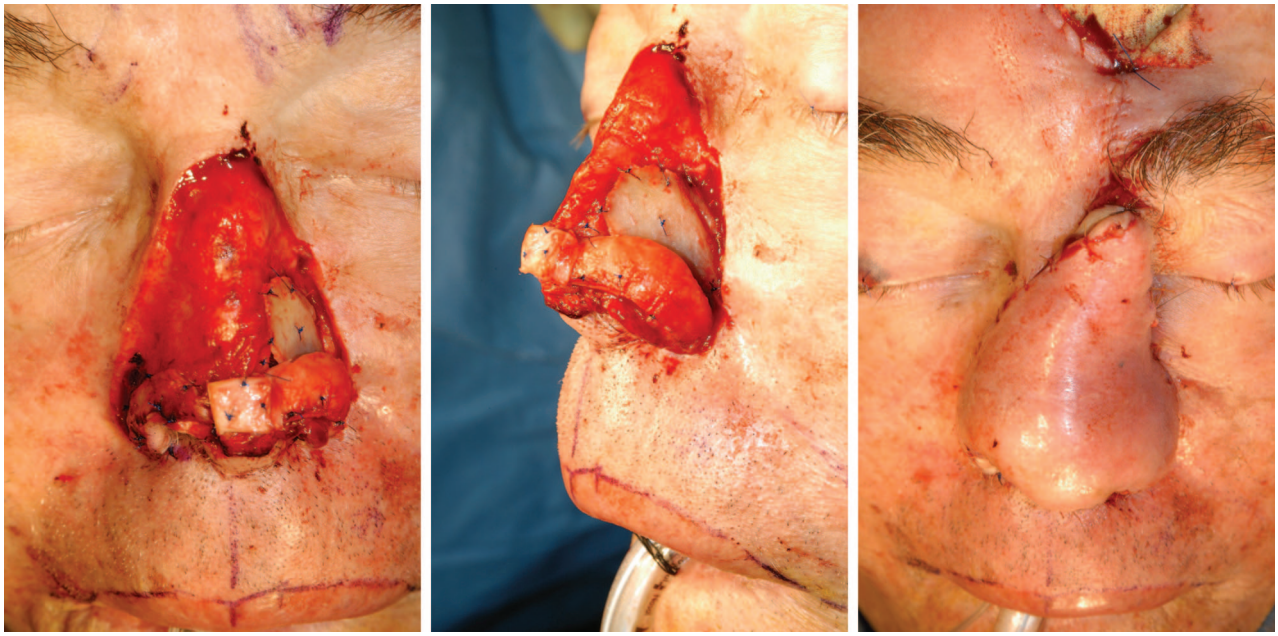

Fig. 8. Septal and ear cartilage grafts are fixed to the underlying lining to support, shape, and brace the soft tissues of both lining and cover against gravity and contraction. This midlayer support includes a left sidewall brace, bilateral alar margin battens, a columellar strut, and a tip graft. They are designed in a subunit shape to reestablish the dimension, outline, and contour of their respective subunits. A full-thickness vertical paramedian forehead flap is transposed to cover the repair. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

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platform defects can supply nasal lining and reestablish the cheek and lip. Nasal lining is used to restore the nasal vault, columella, or nasal floor. Several rules apply: the nasal platform must be restored before nasal reconstruction; the septal partition is not restored to prevent soft-tissue obstruction to the airway; and residual discardable skin excess from the injured nose can be used for other purposes (nasal floor skin or columella lining).

SUPPORT

The nasal bones, upper lateral cartilages, cartilage, septum, and fibrofatty ala support and shape the normal nose. If missing, a supportive middle layer must be in place to shape both cover and lining and to brace the reconstruction against scar contraction, edema, and tension. Although the normal ala contains no cartilage, if the defect within ala is significant, cartilage must be supplied (Fig. 8). F8

Traditionally, support was not supplied at the time of forehead flap transfer. Lining flaps were thick, stiff, and poorly vascularized. Lining necrosis led to cartilage necrosis or infection. Most often, support was placed secondarily, once the flap was healed. Unfortunately, it is difficult to mold fibrotic soft tissue after pedicle division. It became apparent that a complete hard-tissue framework must be placed, before pedicle division, to create a subsurface architecture with a nasal shape that shows through a conforming skin envelope, reestablishes nasal shape, and supports underlying lining to maintain an open airway. For success, cover and lining must be thin and vascular to allow the contour of support grafts to "show through" externally and not "stuffing" the airway.

The requirements of the defect and donor availability determine the choice of septal, ear, rib bone or cartilage, or cranial bone, depending on the volume, shape, strength, and malleability required to restore support. Support grafts are designed from templates of the contralateral normal or ideal.[2,3,24,28] AQ: 4

TWO- OR THREE-STAGE VERTICAL PARAMEDIAN FOREHEAD FLAP

The supratrochlear vessels exit the orbit over the periosteum and then pass through the corrugator muscles. Approximately 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 the skin at the hairline. The flap is perfused randomly from adjacent skin, through the frontalis muscle, and axially through its vertical vessels. It can be thinned distally without injuring the axial vessels or diminishing flap perfusion. The supratrochlear vessels are the primary blood supply, with multiple anastomoses to the dorsal nasal, supraorbital, and angular arteries. Forehead flaps are traditionally transferred in two stages.[2,29] Because the forehead, containing skin, subcutaneous fat, and frontalis muscle, is thicker than nasal skin, it is thinned distally before recipient inset. Three weeks later, once vascularized at the inset, the pedicle is divided and the proximal flap debulked. The two-stage flap is especially useful in smaller and more superficial defects. (**See Video 2, which demonstrates the intermediate operation, available in the "Related Videos" section of the Full-Text article page on www.PRSJournal.com.**) F13

To avoid piecemeal thinning and to increase vascularity and greater soft-tissue excisional sculpting and delayed primary support for contour, the paramedian forehead flap has been transferred as a full-thickness flap without initial thinning, in three stages with an intermediate operation.[5,18] During the second stage, the surgically delayed flap is completely reelevated with safety, excess fat and subcutaneous fat widely sculpted, and support grafts placed or modified (Figs. 9 and 10). Overall results seem improved, the need for revision decreased, and the opportunity to use a folded flap and skin graft for lining made available. The three-stage technique is especially useful when a large defect requires a large flap, complex contour restoration, or lining. Most foreheads are at least 5 cm in height from eyebrow to hairline. Unless the F9-10

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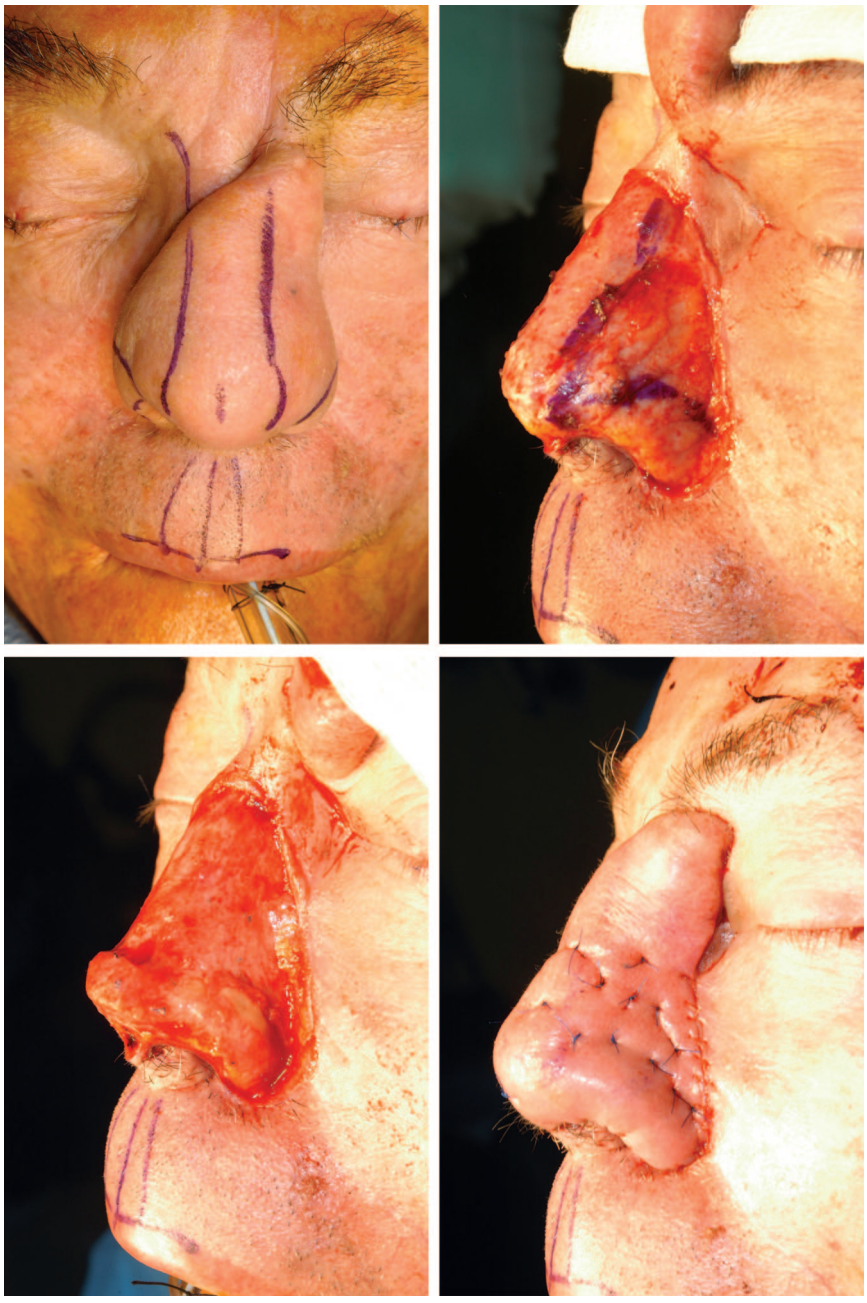

Fig. 9. Four weeks later, during the intermediate operation, cover, support, and lining are healed. The forehead flap is completely reelevated with 2 mm of subcutaneous fat to create thin, conforming nasal skin. The underlying excess subcutaneous fat of the flap and frontalis muscle is exposed. This healed construct of soft tissue, cartilage grafts, and lining is sculpted by excision to recreate the dimension, volume, outline, and contour of each nasal subunit, like a "bar of soap." The thin, supple forehead flap is returned to the recipient site. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

donor site has been previously injured by prior trauma, scars, or flap harvest, preliminary forehead expansion is infrequently required, thus avoiding an additional stage, extra morbidity, or the risk of extrusion or infection (Fig. 11) (**See Video 3, which demonstrates forehead flap division, available in the "Related Videos" section of the full-text article on www.PRSJournal.com.**) F11 F14

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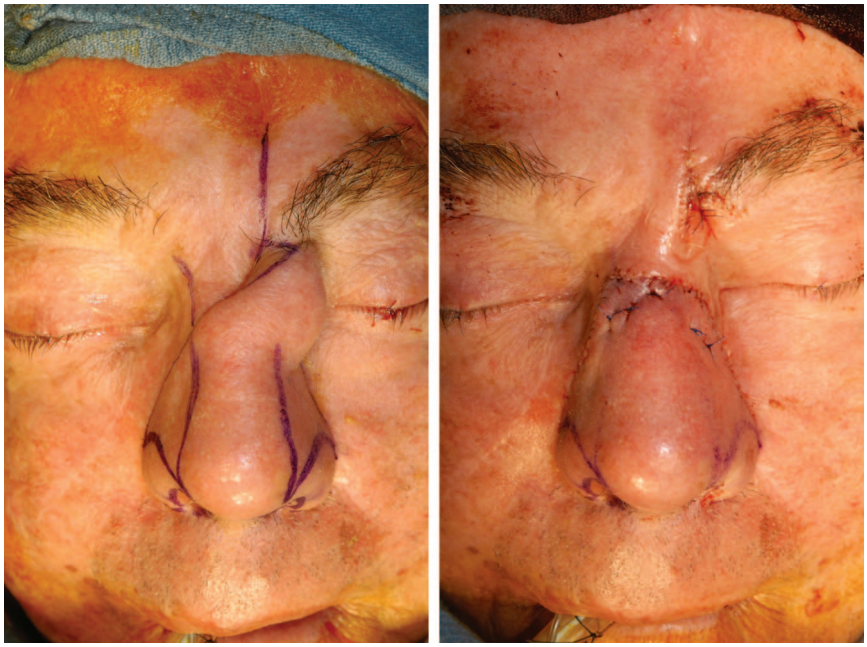

Fig. 10. Four weeks later (8 weeks after forehead flap transfer), the pedicle is divided. Its proximal aspect is trimmed and inset into the medial brow as a small inverted V, where it will simulate a frown crease. Its distal aspect is inset into the superior aspect of the nasal defect. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

Fig. 11. Postoperative result without further revision. The defect within the forehead that could not be closed primarily had been allowed to heal secondarily. (Courtesy of Frederick J. Menick, M.D. Used with permission.)

COMPLICATIONS

Because of its excellent blood supply, forehead flap necrosis is uncommon and usually is caused by excessive tension, a failure to identify past injury to its pedicle or scar within its territory, overzealous inset to the recipient site, or overaggressive flap thinning.[2,3] To avoid underlying cartilage infection and progressive injury, early dé-

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Video 3. Video demonstrating forehead flap division is available in the "Related Videos" section of the full-text article on www.PRSJournal.com.

bridement after flap demarcation and coverage with a second flap may be preferred to watchful waiting and secondary healing. Infection is uncommon. Acute infections are caused by a gross failure of aseptic technique or lining necrosis. If recognized before underlying cartilage exposure, ischemic lining can be excised early if a full-thickness forehead flap was used. Underlying support is removed in the area of lining loss, and the defect is skin grafted. Once healed, because the skin graft is revascularized from adjacent lining, the forehead flap can be reelevated and resupported with delayed primary support to salvage the repair. Chronic cartilage infection is treated with limited flap reelevation and cartilage débridement. Secondary support is replaced months later.

REVISION

A complex nasal reconstruction will often require a revision to reestablish nasal form and function.[2,3]

Revisions are classified as follows:

Minor: Essential quality, outline, and contour restored with inadequate landmark definition.
Major: Failure of dimension, volume, contour, and symmetry or function.
Redo: Cover and lining grossly deficient. Normal must be returned to normal and the repair redone with a second regional flap.

When the overall dimension and volume of the nose are correct, "finesse definition" can be achieved through direct incisions hidden in the joins between subunits, disregarding old scars. The alar crease or nasolabial fold is defined and secondary support placed. A minor revision can often be accomplished in one stage. When the nose is shapeless and bulky, "gross debulking" is approached through peripheral incisions around the border of the flap. The random blood supply of the old flap permits reelevation of at least 80 percent of inset, permitting wide exposure. Underlying soft tissue and support are modified by sculpting excision or cartilage grafting. When all anatomical layers are fibrotic, scarred soft tissue and poorly designed support are completely excised. The thinned cover and lining reexpand and are reshaped with a new, complete rigid support. Discardable excess is used to augment deficient lining and open the airway. A second revision through direct incisions will often be needed to improve landmark definition. Exact templates based on the contralateral normal, or ideal, guide the revision, which is performed under general anesthesia, without local anesthesia, to avoid intraoperative distortion and blanching. If tissues are grossly deficient, the repair must be redone using a second regional flap.

Table 1 lists CPT codes commonly used in nasal reconstruction.

Table 1. CPT Codes Commonly Used in Nasal Reconstruction

CPT Code	Descriptor
15731	Forehead flap with preservation of vascular pedicle
14060	Adjacent tissue transfer, eyelids, nose, ears, and/or lips; defect 10 sq cm or less
15260	Full-thickness skin graft, including direct closure of donor site, nose, ears, eyelids, and/or lips; 20 sq cm or less
20910	Cartilage graft; costochondral
20912	Cartilage graft; nasal septum
21235	Graft; ear cartilage, autogenous, to nose or ear (includes obtaining graft)

This information prepared by Dr. Raymond Janevicius is intended to provide coding guidance.

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AQ1: AUTHOR—Affiliation footnote: Institutional affiliation correct? As wanted? If not, please revise as needed.

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