# Transposition Flaps in Nasal Reconstruction

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• Nasal defect • Nasal reconstruction • Transposition flap
• Local flap • Forehead flap

## ETIOLOGY

The challenge of nasal reconstruction is related to the complexity of the defect in an organ in which function, structural integrity, and contour are to be maintained. The differences in color, texture, and thickness between the nasal remnants and resources of skin available for the reconstruction pose aesthetic limits that are often difficult to overcome. The age, general health, and aesthetic goals of the patient should also be included in the decision-making process. These multifactorial problems can be approached with several reconstructive options, ranging from primary closure, healing by secondary intention, and skin grafting to the use of local or regional skin flaps. The decision as to which flap to use is based on a careful consideration of which tissue may be borrowed, how it can be repositioned, what the immediate- and long-term effects of moving that tissue will be, and how the scars may be hidden.

Flaps are the only reliable way to transfer bulk tissue for nasal reconstruction because their own source of nutrient blood makes them relatively independent of the vascularity of the recipient site for their survival. Flaps may therefore be used to cover nonvascular structures such as bare bone and cartilage. Nasal cutaneous flaps used to repair the nose provide excellent camouflage because of skin match in terms of texture, color, and thickness.[1,2] Excess skin in the cephalic two-thirds of the nose can be moved into adjacent defects. The alar region is less suited for local transposition flaps or rotation flaps because the alar crease is often distorted or obliterated by the flap.

This article discusses the major principles of nasal reconstruction and describes the local and regional transposition flaps for the reconstruction of nasal defects.

## CONSIDERATIONS IN NASAL RECONSTRUCTION

Nasal units are covered by skin of a specific color, texture, and thickness. In addition, each unit has specific contours determined by soft and hard tissues. The decision-making process in reconstruction of nasal defects should include consideration of which tissue can be harvested for reconstruction, how it may be transferred to the nose, what the immediate- and long-term effects on the donor site will be, and how the scars may best be camouflaged. The nose must be restored

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to as normal appearing and functioning structure as possible. The following are the 3 principles that form the basis for this reconstructive process[3–5]:

1. Replace missing tissue with like tissue.
2. Replace missing portions of the nasal skeleton with cartilage designed to precisely replicate the missing part.
3. Divide the topography of the nose into aesthetic units for planning incisions and flaps. For units with convex contours (alae, tip, columella), resurface the entire unit with a skin flap if most of the skin of the unit is lost.

## Replace Missing Tissue with Like Tissue

Nasal skin varies in texture, color, and appearance within different areas of the nose. The nasal dorsum, sidewalls, columella, alar margins, and soft triangles are covered with thin smooth skin. The nasal tip and ala are covered with thick pitted skin because of the presence of sebaceous glands. The color of the skin may vary from pale with a matt texture on the side of the nose to a shade of red-pink with a shiny appearance over the nasal tip.

In an attempt to replace nasal skin with like tissue, cheek flaps (unlike skin grafts) are especially useful in thick-skinned zones of the nose because medial cheek skin has similar color and texture. Paramedian forehead flaps are used to repair larger deeper defects because they provide sufficient surface area to completely cover the defect and provide adequate vascularity to support structural framework grafts. Loss of internal nasal lining should be restored with septal mucosa or adjacent vestibular skin.

## Replace Missing Portions of the Nasal Skeleton

Loss of cartilage support because of removal of the upper or lower lateral cartilages should be restored by replacing the missing portions of the nasal skeleton with septal or auricular cartilage. Defects extending to the alar margin may result in retraction or partial collapse of the nostril if the ala is not properly supported with a batten in the form of a cartilage graft. Structural alar grafts are usually obtained from the contralateral conchal cartilage. These grafts are positioned between the lateral crura and alar base.

Alar batten grafts give support to and prevent retraction of the nostril margin and prevent constriction of the external nasal valve. Auricular cartilage is usually used to replace missing portions of the alar cartilages. Septal cartilage is typically used to replace the upper lateral cartilage. When bone is missing, it is usually replaced with cranial bone grafts or costal bone and cartilage grafts.

## Aesthetic Units

### Strategic incision placement

Although there is no control over wound healing, the surgeon can select flap donor sites with preferred skin color, texture, and thickness. The surgeon also has control over the size, configuration, and placement of incisions used to harvest and transfer skin flaps so that scars are most ideally located for maximal camouflage.[6] Incisions are placed strategically so that they are parallel to relaxed skin tension lines (RSTLs) or are positioned at the junction of aesthetic facial regions (**Fig. 1**). When possible, skin flaps are positioned so that their borders lie along the ridges and valleys of the nasal aesthetic units.[7]

### The unit principle

The aesthetic unit theory is important in nasal reconstruction. If a line of light or shadow (caused by scarring) crosses a smooth surface where it is not expected, it will be noticed at a glance (**Fig. 2**). A good scar remains hidden from view because it is perceived visually as a normal facial fold or contour line. If a scar is placed between nasal topographic units, where it follows the join of normal lighted ridges and shallowed valleys, it will also be taken as normal. Equally important, the bulge of a flap caused by trapdoor contractions will mirror the normal contour of convex nasal units.

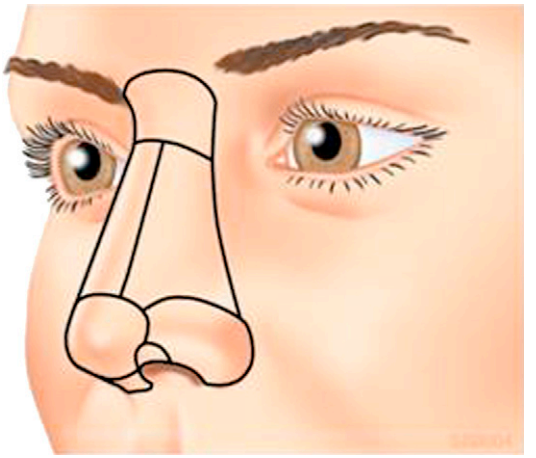

**Fig. 1.** The aesthetic unit principle in nasal reconstruction. Placing scars between topographic units, where they follow the join of the normal lighted ridges and shallowed valleys, will make scars less visible.