Expanded Uses for the Nasolabial Flap

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Semin Plast Surg 2013;27:104–109.

Abstract

Keywords

- nasolabial flap
- nasal reconstruction
- Mohs surgery

The nasolabial flap is an excellent choice for use in reconstruction of the nasal alar subunit due to its inherent properties that match skin tone and the convexity of the nose. Often overlooked as an option to use in nasal reconstruction, the nasolabial flap can be very advantageous. Indications for the nasolabial flap can be expanded to include reconstruction of the nasal tip, dorsum, soft triangle, and partial alar defects.

The nasolabial flap is classically described and well suited for reconstruction of the alar subunit. The flap is soft, easily textured and has a convexity that matches well with that of the ala. This match is especially important. The nasolabial flap is designed so that the cheek scar is hidden within the nasolabial crease.

The nasolabial flap has certain qualities that make it ideal for nasal reconstruction. The color and texture of the cheek tissue are similar to that of the nose, due to roughly equivalent sun exposure and tissue characteristics. In addition, the proximity of the nasolabial fold to the nose facilitates easy transposition of the flap. The natural crease formed at the nasolabial fold results in minimal donor-site deformity.^{1,2} The use of the nasolabial flap is dependent on the presence of a well-defined, thick nasolabial crease with sufficient cheek laxity. The purpose of which is to hide the final scar exactly in the nasolabial fold. A rich subdermal plexus imparts this flap with a unique tolerance to shaping and contouring, enabling precise reconstruction of a defect.^{3–5}

Traditionally, the nasolabial flap has been used extensively for alar reconstruction and is viewed by many as the procedure of choice for this defect. The nasolabial flap is also commonly used in sidewall, columella, and intraoral reconstruction.^{3,6–8} Recently, reconstructive surgeons have expanded the use of the nasolabial flap to include nasal reconstruction of the tip and dorsum.^{1,2} In addition, the soft triangle and partial alar defects, without having to reconstruct the entire alar subunit, can be reconstructed using the nasolabial flap.

Technique

During flap preparation, the edges of the defect should be reverticalized. Mohs excisions can leave behind flat or obtuse edges, which make flap inset more difficult. After marking the fold, a reverse Gillie test with a lap pad is performed to ensure adequate rotation and determine the length of the flap design (►Fig. 1). The rotation is always medial. Foil is used to create a template of the defect, which is then marked along the superior border of the nasolabial fold (►Fig. 2). The cheek is placed under a small amount of tension when marking to release cheek laxity and ensure design of an appropriately sized flap. The inferior margin of the incision is always placed along the nasolabial fold. After injecting the flap and defect vigorously with a lidocaine and epinephrine solution, the flap is sharply dissected along its borders. It is then elevated sharply to the level of the mid cheek and dissected bluntly to the base of the flap (►Fig. 3). Though it is not an axial pattern flap, the nasolabial flap is harvested as a thin, pedicled flap with no consideration given to a 3:1 width ratio, as typically done with a random patterned flap.

The flap is thinned to the deep dermal layer, leaving minimal subcutaneous fat (►Fig. 4). Once thinned, the flap is carefully inset under a slight amount of tension with 5–0 black nylon vertical mattress sutures (►Fig. 5). Anchoring sutures and contouring the flap to be slightly smaller than the defect will facilitate flap inset under a slight degree tension. It is imperative to minimize flap manipulation throughout the procedure. The distal portion of the flap is excised and the

Fig. 1 A reverse Gillie test is performed to ensure adequate flap length.

Fig. 2 A foil template of the defect is used.

remaining nasal defect is reconstructed by advancing the flap with 5-0 black nylon sutures (→**Fig. 6**). Close the donor site with multiple layers of deep dermal sutures and skin sutures.

After inset, the entire posterior flap, including the exposed fat area is liberally coated with Avitene (Davol, Inc., Warwick, RI), a hemostatic agent to help control bleeding. The flap is then coated with NitroBid (E. Fougera and Co., Melville, NY), which acts as a venodilator, and wrapped in Surgicel (Johnson & Johnson Inc., New Brunswick, NJ) (→**Fig. 7**). The dressing remains in place for 2 to 3 days, after which the patient can

gently remove the dressing in the shower. The remaining wound and defect is treated with antibiotic ointment only after the dressing is off. The sutures are removed in 5 days, and division and inset is performed in no less than 3 weeks.

At 3 weeks, the flap has a tendency to pincushion, which is advantageous for the reconstruction of the nasal ala. However, pincushioning poses a problem for re-creation of the nasal tip and other flat surfaces. For re-creation of nonalar surfaces, the flap must be aggressively elevated ~80 to 85% of its maximal volume and thinned vigorously to achieve the appropriate contour. The subcutaneous tissue underneath is sharply removed and the flap is inset under a slight amount of tension with 5-0 black nylon. The NitroBid is applied at this point. Dermabrasion is performed at inset down to the level of deep punctate bleeding. This is useful for enhancing color match and disguising the scar edges. Lastly, the donor site is excised, discarded, and closed.

Complete Alar Reconstruction

The nasolabial flap represents a “tried and true” technique for complete nasal ala soft tissue reconstruction. The nasal ala is a complex structure whose inherent convexity and skin characteristics make reconstruction of this area a challenge. The unique fibrofatty soft tissues of the alar lobules provide support to this three-dimensional structure with negligible underlying native cartilage. The nasolabial flap is ideal for repair of full-thickness defects as it provides soft, pliable skin that when used simultaneously with a cartilage graft can

Fig. 3 (A) The flap is elevated sharply to the mid cheek. (B) Blunt dissection is used for the base of the flap.

Fig. 4 The flap is thinned to the deep dermal layer.

Fig. 5 Anchoring sutures are used to facilitate flap inset under tension.

easily recreate the three-dimensional shape of the nasal ala. In addition, the skin match provided by the nasolabial fold is exceptionally suitable for the alar region. These characteristics make the nasolabial flap invaluable for alar reconstruction (► **Fig. 8**).

Reconstruction of the ala using the nasolabial flap can be performed utilizing the subunit principle, as described by Burget and Menick, or using a defect-only approach.⁹ The flap is designed to be slightly smaller than the defect when performing a defect-only repair. Using the contralateral ala

Fig. 7 Avitene (Davol, Inc., Warwick, RI), NitroBid (E. Fougera and Co., Melville, NY), and Surgicel (Johnson & Johnson Inc., New Brunswick, NJ) are used liberally to coat the flap.

as a template for size and shape can facilitate design when the defect encompasses the entire ala subunit. Again, the template should be designed slightly smaller than the intact ala.

The nasolabial flap is not ideal for the nasal lining of the ala, as this has produced inferior results in the senior author's experience. If lining is required, a forehead flap should be utilized. Reconstruction of the nasal ala using the nasolabial flap represents a well-established technique for nasal reconstruction; however, our focus will now shift to the expanded uses for this versatile flap.

Nasal Tip Reconstruction

The nasolabial flap is particularly useful in reconstruction of isolated nasal tip defects. It was previously considered a poor reconstruction option for the nasal tip given its tendency to pinch during healing. However, modifications to the flap have broadened its uses beyond the nasal ala.

Traditionally, nasal tip defects are corrected with either the paramedian forehead flap or the dorsal nasal flap. The forehead flap is a workhorse for nasal reconstruction and remains the flap of choice for most nasal soft tissue reconstruction. In certain situations, a forehead flap may be less desirable than a

Fig. 6 (A) Contour distal portion of the flap. (B) Flap should be slightly smaller than defect. (C) Inset the flap under a slight degree of tension.

Fig. 8 Complete alar reconstruction. (A) Initial defect. (B) 2-weeks postop. (C) 3-months postop.

smaller nasolabial flap. If the patient is elderly, sick, or requires a continuous positive airway pressure mask, the nasolabial flap may provide an acceptable alternative. The dorsonasal flap has been used for many years as a reconstructive method for the nasal tip. For tip defects below the tip-defining points, the dorsonasal flap can cause unwanted tip elevation regardless of extensive undermining. The nasolabial flap is an excellent alternative in these situations and will provide the patient with an exceptional result.

The senior author has a rich experience with the nasolabial flap for nasal tip reconstruction. Using four key technical concepts, a surgeon can execute a nasolabial flap for tip reconstruction with superior results. First, take care to vigorously thin the flap prior to primary inset. Leave a thin layer of dermal fat to preserve the subdermal plexus. Second, do not hesitate to use a small cartilage graft. This will help prevent cicatricial distortion of the scar. Third, inset the flap under a slight degree of tension. Inset of the flap under tension should be done for all uses of the nasolabial flap. Fourth, take care to thin the flap once again at the time of division and inset (► Fig. 9).¹⁰ These considerations will help achieve an optimal result when using the nasolabial flap for tip reconstruction.

Nasal Dorsum Reconstruction

The nasal dorsum is an aesthetic subunit that extends from the deepest point of the radix of the nose to the nasal supratip depression.¹¹ The lateral borders are defined by the ridges or lateral sidewall. Normally, reconstruction of the nasal dorsum is undertaken using a banner flap, a dorsal nasal flap, or a paramedian forehead flap depending on the size of the defect and patient input. Nasal dorsum reconstruction using the nasolabial flap is particularly useful for patients that would need a CPAP (continuous positive airway pressure) machine.

Fig. 9 (A) Nasal tip defect. (B) 2 weeks after initial operation. (C) 6-months postop.

In reconstructing the nasal dorsum, we are essentially recreating a flat defect. The technique used for nasolabial flap reconstruction of the nasal dorsum is similar to that of tip reconstruction, but little or no fat is carried with the flap at the inset. At division and inset, the flap should be elevated and thinned aggressively. With proper technique, the nasolabial flap can provide excellent and repeatable results when reconstructing a defect on the dorsum (► Fig. 10).

Partial Ala Reconstruction

As we mentioned before, the nasolabial flap is well suited for reconstruction of the ala. However, nasolabial flaps are not frequently used to repair partial alar defects. This is partly due to the misconception that they are inferior to other reconstructive options such as skin grafting.

The subunit principle is often applied to areas of the nose that have convex central subunits, such as the ala.⁹ The pervading dogma suggests that the entire subunit should be excised when greater than 50% of the subunit is involved in the defect, discarding adjacent healthy tissue. This may be unnecessary for partial alar defects. Anterior and posterior alar

Fig. 10 (A) Initial defect of the dorsum. (B) Nasolabial flap inset. (C) 7-months postop.

defects can be successfully reconstructed using defect-only nasolabial flaps. Liberal cartilage grafting is needed to provide support for these flaps and prevent alar collapse from scar contracture. The conchal bowl provides cartilage that has a

similar contour to the ala and is simple to harvest. For these reconstructions, a slightly undersized flap is needed to help recreate the alar convexity. As mentioned previously, the nasolabial flap should not be used for reconstruction of the nasal lining. For partial alar reconstruction, the nasolabial flap provides an acceptable reconstructive technique (► **Fig. 11**).

Soft Triangle Reconstruction

Repair of the soft triangle is challenging given its complex shape and ability to disfigure adjacent subunits if poorly reconstructed. A quadrilateral structure with varying contours, the soft triangle demands meticulous planning and surgical technique to reconstruct successfully. If the reconstruction fails, the entire ala is at risk, both functionally and aesthetically. For soft triangle reconstruction, the nasolabial flap is the preferred technique of the senior author.

Composite grafts, in the senior author's experience, provide varying results for soft triangle defects that involve adjacent subunits or external skin. These grafts are a combination of two materials, typically cartilage and skin. Composite grafts can be used to supply both nasal lining and support for soft triangle defects.¹² These grafts are not always perfect in their application, but do provide a suitable reconstruction for soft triangle defects involving the mucosal lining without an external skin defect. For a soft triangle defect that involves the external skin and soft tissues only, a two-staged nasolabial flap will provide the best reconstructive option (► **Fig. 12**). It should be noted that the nasolabial flap should not be used to repair the mucosal lining.

Fig. 11 (A) Partial ala defect. (B) Flap inset. (C) 3-months postop.

Fig. 12 (A) Soft triangle and partial tip defect. (B) Results from defect-only nasolabial flap.

Cartilage grafting is mandatory, as with partial alar reconstructions, when using the nasolabial flap to reconstruct the soft triangle. Through an anterior conchal bowl incision, a small, partial thickness cartilage graft can be harvested. This piece of cartilage is then sewn in place along the alar rim to maintain the patency of the alar rim, as well as the spanning soft tissue structure. Without this necessary support, the flap can contract, leading to notching and functional compromise of the nasal valve. Even if the patient has some asymmetry at the time of initial flap inset, this can be salvaged at division and inset by aggressive thinning and elevation, as discussed earlier.

Conclusion

The nasolabial flap is a versatile flap that can be used to reconstruct many areas of the nose. With slight modifications based on defect location, the flap can be used in the reconstruction of the nasal tip, dorsum, and soft triangle. General principles, such as aggressive thinning of the flap prior to inset and suturing the flap into position under a slight amount of tension, must be embraced and will improve overall results. Do not use this flap in active smokers. The risk of failure is too high and other reconstruction options are perfectly acceptable. Once considered only a reconstructive option for ala and sidewall defects, the nasolabial flap has come into its own as a robust flap with many applications.

References

- 1 Cameron RR, Latham WD, Dowling JA. Reconstructions of the nose and upper lip with nasolabial flaps. *Plast Reconstr Surg* 1973;52(2):145-150
- 2 McLaren LR. Nasolabial flap repair for alar margin defects. *Br J Plast Surg* 1963;16:234-238
- 3 Rohrich RJ, Conrad MH. The superiorly based nasolabial flap for simultaneous alar and cheek reconstruction. *Plast Reconstr Surg* 2001;108(6):1727-1730, quiz 1731
- 4 Hagerty RF, Smith W. The nasolabial cheek flap. *Am Surg* 1958;24(7):506-510
- 5 Barron JN, Emmett AJJ. Subcutaneous pedicle flaps. *Br J Plast Surg* 1965;18:51-78
- 6 Da Silva G. A new method of reconstructing the columella with a naso-labial flap. *Plast Reconstr Surg* 1964;34:63-65
- 7 Spear SL, Kroll SS, Romm S. A new twist to the nasolabial flap for reconstruction of lateral alar defects. *Plast Reconstr Surg* 1987;79(6):915-920
- 8 Kroll SS. Nasal alar reconstruction using the nasolabial turnover flap. *Laryngoscope* 1991;101(10):1127-1131
- 9 Burget GC, Menick FJ. The subunit principle in nasal reconstruction. *Plast Reconstr Surg* 1985;76(2):239-247
- 10 Thornton JF, Weathers WM. Nasolabial flap for nasal tip reconstruction. *Plast Reconstr Surg* 2008;122(3):775-781
- 11 Menick FJ. *Nasal Reconstruction: Art and Practice*. Edinburgh: Saunders; 2008:281
- 12 Menick FJ. *Nasal Reconstruction: Art and Practice*. Edinburgh: Saunders; 2008:309