

Let's Twist Again: Nasolabial Turnover Flap for Full-thickness Aesthetical Nasal Ala Reconstruction

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Background: The nasal ala has always been considered a difficult anatomical structure to restore, particularly when full-thickness reconstruction is needed. Although the forehead flap is considered the flap of choice, the nasolabial turnover flap, despite being a one-step surgical procedure, has been largely ignored for nasal ala reconstruction. We present our experience performing nasal ala full-thickness reconstruction with the nasolabial turnover flap, reporting on its advantages and comparing it with the most commonly used alternative techniques.

Methods: Between 2017 and 2022, 48 patients presenting full-thickness defects of the nasal ala after skin cancer resection underwent reconstruction with a nasolabial turnover flap at two large regional plastic surgery units. Surgical technique was presented in detail, with particular attention in describing the complex three-dimensional movement of the flap.

Results: All patients healed uneventfully, with good functional and cosmetic outcomes. No major complications were observed.

Conclusions: The nasolabial turnover flap is a reliable and valuable option for achieving full-thickness nasal ala reconstruction. Satisfactory results in terms of function and cosmetic appearance can be obtained in a one-stage operation. Based upon our experience, the nasal turnover flap could be considered a viable reconstruction option, even for less-experienced surgeons. (*Plast Reconstr Surg Glob Open* 2024; 12:e6128; doi: [10.1097/GOX.00000000000006128](https://doi.org/10.1097/GOX.00000000000006128); Published online 5 September 2024.)

INTRODUCTION

The nose is one of the most common areas affected by basal and squamous cell carcinoma of the head and neck region.¹⁻³ Nasal defects can be reconstructed using skin grafts, local flaps, or free flaps, according to defect location and extension.⁴⁻⁶

The nasal ala is a tridimensional structure consisting of multiple layers: skin, cartilage, fibro-fatty tissue, and mucosa.⁷ Full-thickness defects of the nasal ala may result from different causes, more frequently from oncological

surgery or animal attacks.^{8,9} Nasolabial flaps, thanks to their pliability, can easily be folded to reconstruct the nasal ala architecture. They are suitable for reconstruction of most soft tissue defects of the nasal ala, as their skin color and texture perfectly match those of the nasal alar subunit.¹⁰ Furthermore, skin redundancy and laxity of the surrounding tissues, proximity to the defect, and the possibility of hiding the scar in the nasolabial fold contribute to making the nasolabial flap a valuable option.

We present the experience of two large regional plastic surgery units with reconstruction of full-thickness nasal ala defects using the nasolabial turnover flap, describing in detail all the fundamental steps of this surgical technique.

PATIENT AND METHODS

From January 2017 to December 2022, 48 patients underwent surgery for nasal ala full-thickness reconstruction at two large regional plastic surgery units. All defects were secondary to elective excision of nonmelanoma skin

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cancers. Lesions were excised according to oncological guidelines.^{11,12} Full-thickness resection of the nasal ala was necessary because the inner mucosal lining seemed to be clinically involved by tumor. Patients gave written informed consent for data and photograph publication.

With the patient standing in an upright position, preoperative markings were outlined. Resection margins were designed according to the size and type of lesion to be removed. Precise positioning of the donor site scar was planned to make it fall exactly within the nasolabial fold. Surrounding excess skin and laxity were assessed. The skin paddle of the nasolabial flap was designed, conforming to the anticipated defect, marking the future internal and external aspects. The nasolabial flap was outlined with a proximally based subcutaneous pedicle (Fig. 1). Surgery was performed under magnification with 2.5× surgical loupes. The flap was harvested, preserving the most medial portion of its subcutaneous tissue. Pedicle width was 0.5–1 cm.

The distal part of the flap was gently defatted, leaving just a thin layer of subcutaneous tissue under the distal skin. Once satisfactory hemostasis was achieved with bipolar cautery, the flap was moved with a 3D movement to the defect. The flap base was firstly advanced toward the lateral aspect of the inner nasal ala defect (Fig. 2).

Starting from this point, the flap was inset from lateral to medial while turning it over and twisting it on its pedicle so that its skin went facing downward to restore the internal lining. The flap was secured with 5/0 Vicryl (Ethicon Inc; Johnson & Johnson, Somerville, N.J.) sutures to the nasal mucosa. Once the internal lining was restored, the caudal part of the flap was folded upward onto itself to recreate the alar rim contour and to resurface the external

Takeaways

Question: How to obtain good aesthetic results for full-thickness nasal ala reconstruction?

Findings: Here, a step by step description of the surgical technique of the nasolabial turnover flap is provided. Retrospective analysis of our case series showed good results with high levels of patient satisfaction. Although forehead flap and composite helical graft are more popular options, nasolabial turnover flap may be considered as a valuable alternative, even for less-experienced surgeons.

Meaning: The nasolabial turnover flap is a reliable and valuable option for achieving full-thickness nasal ala reconstruction. Satisfactory results in terms of function and cosmetic appearance can be obtained in a one-stage operation.

aspect of the defect (Fig. 3). No cartilage graft was used as structural support.

Eventually, 5/0 Prolene (Ethicon Inc; Johnson & Johnson, Somerville, N.J.) was used for external aspect inset and donor site closure (Fig. 4). [See Video (online), which displays how flap movement was carefully reproduced and explained: the flap was advanced, turned, and twisted on its pedicle so that its skin faced downward to restore the internal lining. The caudal part of the flap was folded upward onto itself to recreate the alar rim and the external aspect of the defect.]

At 1-year follow-up, patients were asked to evaluate their results completing the FACE-Q Skin Cancer module (copyright 2016, Memorial Sloan Kettering Cancer Center). For statistical analysis, the data from the FACE-Q

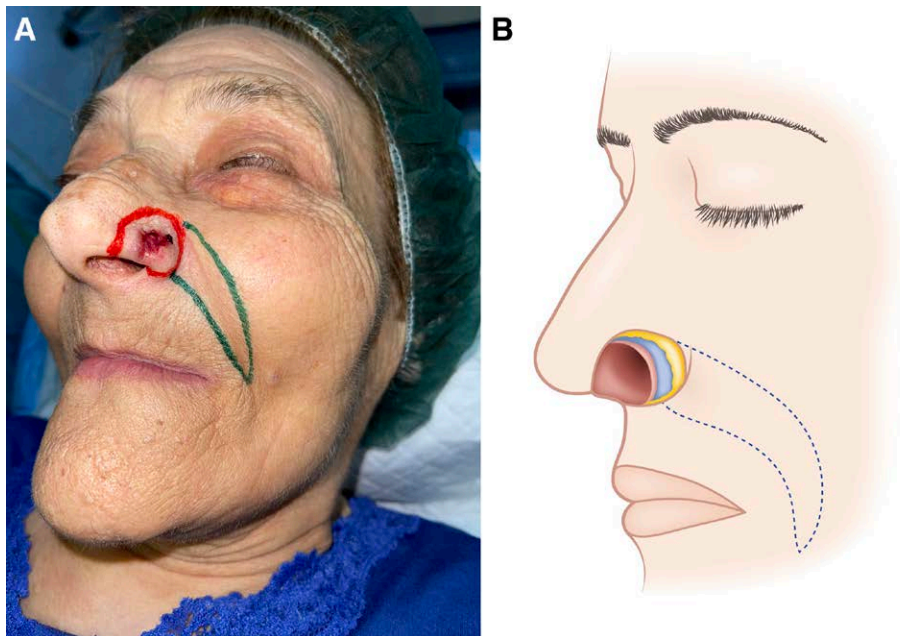


Fig. 1. Case 1. A, Preoperative markings: the area to be resected was outlined in red with 3-mm surgical excision margins. The flap was designed according to the expected defect and outlined in green. B, Schematic representation of the flap and the defect to be reconstructed.

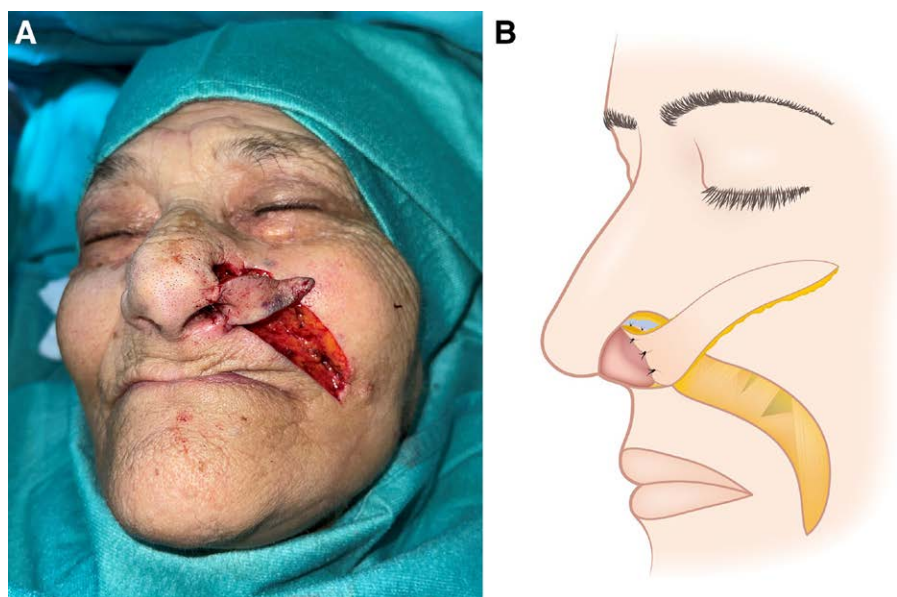


Fig. 2. Case 1. A, The flap was advanced, turned, and twisted on its pedicle so that its skin faced downward to restore the internal lining. B, Schematic representation of the flap movement and its initial inseting.

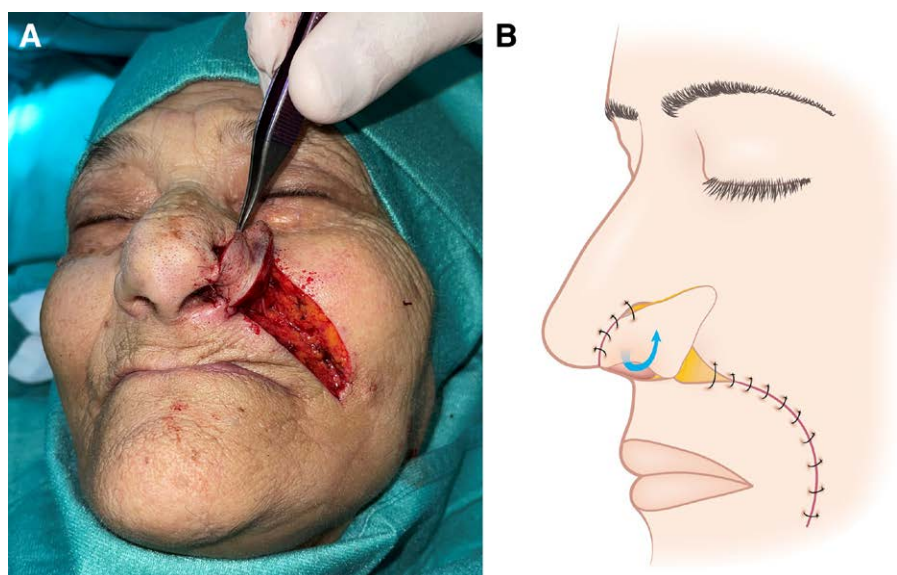


Fig. 3. Case 1. A, The caudal part of the flap was folded upward onto itself to recreate the alar rim and the external aspect of the defect. B, Schematic representation of the caudal part of the flap movement to restore the external aspect of the defect.

Skin Cancer module were converted into an equivalent Rasch transformed score using the conversion table, ranging from 0, the worst possible outcome, to 100, the best possible outcome.^{13,14}

During the 1-year follow-up visit, functional outcome was evaluated with a dynamic physical examination, asking the patient to take a deep inspiration through the nose and then an expiration through the mouth to observe the nasal alae movement and the external valve function.¹⁵

RESULTS

From January 2017 to December 2022, 48 patients (22 men and 26 women) underwent nasal ala reconstruction with a turnover nasolabial flap. Patients' mean age was 61 years (± 9.8). All reconstructed defects were due to skin cancer excisions. Histology of the resected lesions revealed 28 basal cell carcinomas, eight basal cell carcinoma recurrences, nine squamous cell carcinomas and three squamous cell carcinoma recurrences. Twenty-nine patients were active smokers (>10 cigarettes/day) and six

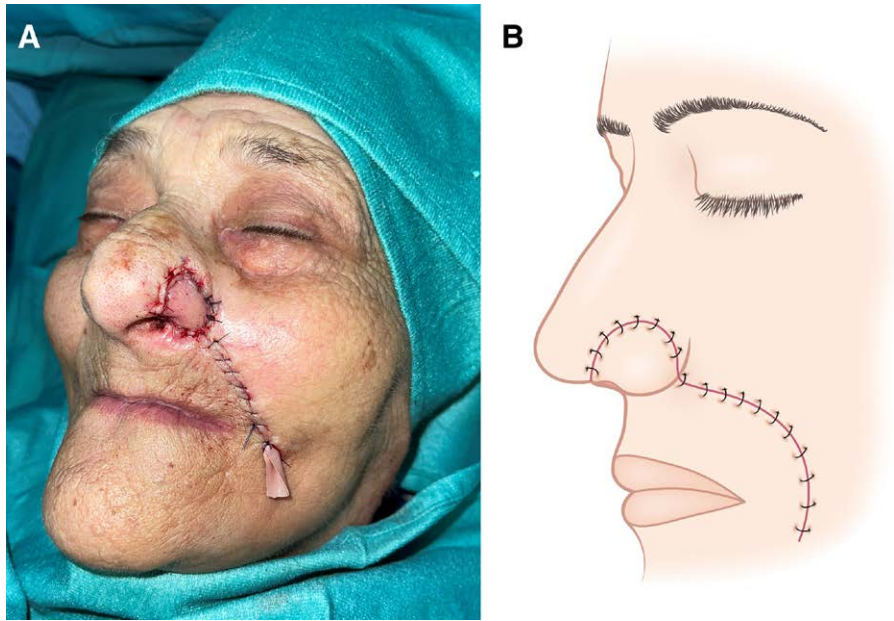


Fig. 4. Case 1. A, The flap was insetted with simple 5/0 Prolene stitches, and the donor site was closed with an over-and-over 5/0 Prolene suture. A Penn-Rose drain was placed. B, Schematic representation of the insetted flap and donor site closure.

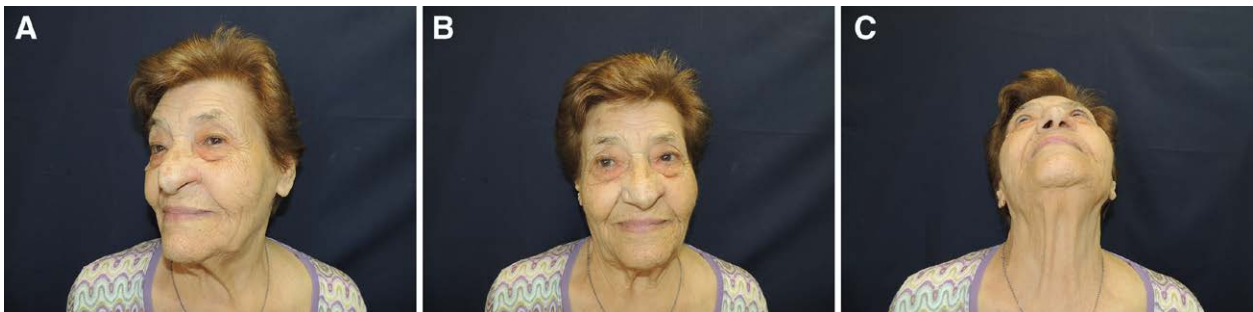


Fig. 5. Case 1. A–C, Patient showing good cosmetic and functional outcomes at her 1-year follow-up visit.

patients had type 2 diabetes. Fifteen patients were under anticoagulant therapy.

Defect size ranged from 1.8cm² to 3.1×9.9cm² [mean 4.1 (± 2) cm²]. Mean follow-up was 14 (±6) months. One flap developed postoperative venous congestion immediately after surgery, which resolved spontaneously during the following week. Skin necrosis of the most distal part of the flap was observed in one patient but did not require surgical revision and healed uneventfully by second intention. Trapdoor deformity was observed in one patient at 1-year follow-up. In two patients, due to the width of the defect and its proximity to the cheek, reconstruction with the nasolabial turnover flap produced a disruption of the nasal ala borders. Nevertheless, these patients refused any additional procedure, taking into consideration their age and comorbidities. Three patients underwent flap defatting after 6 months.

Two patients developed squamous cell carcinoma recurrence at 8 and 12 months follow-up, respectively. Good functional and cosmetic outcomes were achieved (Figs. 5–7).

At 1-year follow-up, patients were satisfied with their facial appearance, with a mean score of 86 ± 3. Patients were not disturbed by the scars, with a mean score of 73 ± 6, and showed low levels of appearance-related psychosocial distress, with a mean score of 29 ± 5.

They showed satisfaction with the information they received before and after the surgery, with a mean score of 91 ± 4. The mean score regarding their worry about cancer was 67 ± 6. The mean score regarding the adverse events related to reconstruction was 16 ± 2. Patients' attitude regarding sun protection behaviors showed a mean score of 10 ± 4. Dynamic physical examination for external nasal valve competence assessment showed no difference between the two sides.

DISCUSSION

The nasal ala is considered to be one of the most challenging nasal subunits to restore.^{16–18} The forehead flap has always been considered a “workhorse” flap, providing an abundant amount of pliable tissue for reconstruction of



Fig. 6. Case 2. A, Preoperative photograph of a patient presenting a basal cell carcinoma of the left nasal ala. Resection margins and flap markings were outlined. B, Postoperative photograph of the patient showing good cosmetic and functional outcomes at her 16-month follow-up visit.



Fig. 7. Case 3. A, Preoperative photograph of a young patient presenting a nodular basal cell carcinoma of the left nasal ala. Resection margins and flap markings were outlined. B, Postoperative photograph of the patient showing good cosmetic and functional outcomes at her 18-month follow-up visit.

large full-thickness defects.¹⁹ However, reconstruction with the forehead flap requires at least a two-stage procedure, as the forehead flap must be integrated with a local flap for the internal lining; furthermore, a cartilaginous support mostly taken from the concha of the ear is often needed. Moreover, the forehead flap is usually performed under general anesthesia, requiring hospitalization stays and recovery.

Another drawback is the donor site scar, left on the forehead, which can be aesthetically displeasing, especially in younger and female patients; furthermore, the flap pedicle can cause discomfort which, though present for the first 3 weeks, may be poorly tolerated by patients.^{20,21}

A composite helical graft may also be effective for reconstruction of full-thickness defects. The helical rim anatomy resembles the nasal ala anatomy and provides a composite

graft (skin-cartilage-skin) allowing reconstruction of all three layers of the nasal ala.^{8,22,23} Nevertheless, this composite graft is suitable for small defects, usually less than 2 cm.

The nasolabial turnover flap was first described in 1967 by Pers.²⁴ In 1975, Herbert and Harrison modified the flap described by Pers, adding a small nasolabial island flap with its base located inferiorly in the upper lip region for donor site closure.²⁵ Spear et al contributed to making it popular in 1987, describing its complex movement in detail. Notwithstanding these favorable reports, the nasolabial turnover flap “remained in the shadow” for a long time and was not widely adopted by plastic surgeons.²⁶

The nasolabial turnover flap represents a valuable option for reconstruction of full-thickness defects of the nasal ala.²⁷ Due to the nasal ala’s rather complex anatomy,

its reconstruction should include at least an internal mucous layer (lining) and an external skin layer. Thanks to its pliability, thickness and tridimensional movement, it can replicate the nasal ala anatomical structure with no need for a cartilaginous support.

Vascularization of the nasolabial flap is ensured by the numerous anastomoses present in the subcutaneous tissue referable to the vessels originating from the facial artery, the infraorbital artery and the dorsal branch of the ophthalmic artery. Thanks to these anastomoses, the flap's pedicle can be reduced up to 0.5 cm in width. Some authors have also described using a perforator based nasolabial flap for nasal ala reconstruction.⁶

Our results with the nasolabial turnover flap technique have proven satisfactory both functionally and aesthetically; however, it must be stressed that great attention should be paid to the inseting procedure to reproduce an adequate alar-nasolabial sulcus.

CONCLUSIONS

The nasolabial turnover flap ensures a single-stage reconstruction that can be performed under local anesthesia as an ambulatory procedure, thereby reducing hospitalization time and maximizing its cost/benefit ratio with regards to efficient management of healthcare resources. Furthermore, its low complication rate and satisfactory aesthetic and functional outcome can prove beneficial to both the surgeon and the patient, as our experience tells us.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

PATIENT CONSENT

Patients provided written consent for the use of their images.

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