

Comparative Analysis between Nasolabial and Island Pedicle Flaps in the Ala Nose Reconstruction. Prospective Study

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Abstract. *The goals of reconstructing deformities of the face secondary to skin cancer include reconstructing the area with similar tissue. The comparison between different types of local flaps for reconstruction of nasal ala is presented in a prospective, randomized study. The objective of this study was to compare the functional and esthetic outcomes between the nasolabial and island flaps. A total of 60 patients with skin cancer of the nose underwent ala reconstruction: 30 cases by nasolabial flap (group A) and 30 by island flap (group B). The two groups were homogeneous for sex, age, and anatomical area. Complications, scarring according to the scale of Vancouver, cosmetic appearance, and disorders of sensations were analyzed and statistical analysis was performed. In group A, early complications were more common than in group B. The scars of group B patients were more like those of undamaged skin. A total of 10% patients of group A evaluated the cosmetic appearance of their nose as very good, while in group B, 30% patients gave such an evaluation. Local flaps provide better reconstruction and the island flap appears to have more efficacy when compared with nasolabial flap for nasal ala reconstruction.*

Surgical excision of tumors from the face may create a defect that is difficult to restore. Skin grafts can only cover superficial defects and have a natural tendency to contract and may not take properly. Moreover, because of the color mismatch, the graft is not cosmetically identical to the surrounding face (1, 2). The use of regional flaps is very

useful and versatile, with robust vascularity. Generally, flaps to repair an extensive defect of the lower third of the nose are cheek-based and median forehead flaps (3).

In this study, we evaluated nasal ala reconstruction by comparative analysis between nasolabial and island pedicle flaps, highlighting the ease of performing the surgical techniques, the complication rate, and the results, both functional and esthetical. The aim of this paper is to comment on the experience gained from 60 nasal procedures in 60 patients over a two-year period.

Patients and Methods

A total of 60 patients eligible for nasal ala reconstruction were recruited in the study from January 2009 to January 2011, from a sample of patients scheduled for excision of carcinoma of the nasal ala, selecting the same number of males and females by random method. The study protocol conformed to the ethical guidelines of the Declaration of Helsinki. An informed consent was obtained from each patient.

Inclusion criteria were: suspected skin cancer of the nasal ala; previously untreated, removable tumor with 3-5 mm of healthy skin; Caucasian; age not less than 50 years and not more than 80 years; informed consent to participate in the study.

Patients were randomized for treatment allocation, at 1:1 ratio, resulting in 30 patients in group A, reconstruction by nasolabial flap, and 30 patients in group B, reconstruction by island flap.

The two groups were homogeneous for sex, age, and characteristics. There were 30 men and 30 women. The youngest patient was 54 years old and the oldest was 75 years old (average age, 63.35 years). Lesions were similar between the two groups for size (from 0.5 to 2.5 cm diameter) and anatomical area (Table I). All patients underwent radical excision of the lesion and reconstructive surgery under local anesthesia in combination with adrenaline (1:200000).

Operative technique in group A (Figure 1). The nasolabial flap was raised as for a superiorly based flap; with care taken to place the donor scar of the flap within the nasolabial fold. The flap was

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Key Words: Nasal ala, skin cancer, nasolabial flap, island flap, nose reconstruction.

undermined superiorly and laterally and dissected beyond the upper border of the flap to gain enough laxity for closure without upper lip distortion. The nasolabial flap was cut to be a millimeter in excess of ala defects. The flap was then carefully thinned under the dermal layer, preserving the subdermal plexus. The flap was inset under a slight degree of stretch to prevent late pivot-cushioning deformity. The flap itself was carefully elevated over 85% of its maximum length, carefully thinned, the donor edge refreshed, and then inset into the defect. Everting suture was used because the flap tends toward introversion.

Operative technique in group B (Figure 2). The flap design was oriented with the axis parallel to the relaxed skin lines. The flap width was 50% greater than the defect diameter. Flap dissection started with submuscular and supraperiosteal/perichondrial plane of dissection. The flap raising continued in this plane beyond the flap skin markings, rostral, and across the midline. The flap borders were then incised through the full thickness of the skin. The surrounding skin was undermined until enough rotation in the flap was gained with respect to the defect. The proximal and distal margins were cut to allow proper mobility and the skin surrounding the nose is released. The flap was then rotated into the defect. Balancing stitch was used to orient and position the flap after dissection was complete. A caudal view allowed an appropriate vision of nasal symmetry. Balancing the rotational and translation flap's motion through an accurate submuscular and subcutaneous dissection allowed a satisfactory outcome to be achieved.

Evaluation of the results. Postoperative follow-up was at 7 days, and then at 1, 3, 6 and 12 months. We analyzed of early and late complications. In particular, in order to evaluate the results of treatment 12 months after the surgery, the formed scar was evaluated (its pigmentation, color, height, and elasticity). The pigmentation of the scar, its height, and color were evaluated on a scale from 0 to 3. Elasticity was evaluated on a scale from 0 to 5 according to the Vancouver scale. The cosmetic appearance of nose was evaluated subjectively by the patients them selves, based on a scale of 1 to 4 (1, the cosmetic appearance is close to normal; 4, unsatisfactory cosmetic appearance). Moreover, in examining disorders of sensation, the discrimination of two points was evaluated using needles fixed by standard distances (two-point test). At the beginning of the examination, the distance between needles was 2 mm, later it was increased up to 15 mm by 1 mm until the patient started feeling the touch of both needles (not only one). This examination was repeated three times, and the best result was recorded.

Statistical analysis. The chi-square test was performed to compare discrete variables of the early and late complications of the two groups, and analysis of variance (ANOVA) to compare the cosmetic outcome of the two groups. For p -values <0.005 , the differences were significant. Excel® was the software program used.

Results

A total of 60 patients with tumor of the nasal ala participated in the prospective study of comparison between nasolabial and island flaps for nose reconstruction. All these patients were treated at our Department of Plastic Surgery, from 2009 to 2011. Thirty patients were assigned to group A that

received nasolabial flap as surgical treatment, and 30 to group B that received island flap. The average operative duration was about 30 minutes. The follow-up time ranged from 7 days to 12 months.

Histology showed basal cell carcinoma in most patients, both in group A and group B (Table I).

At short-term follow-up (Figure 3), viability of the flap, functions of the reconstructed nasal ala and the early complications were analyzed. In group A, the complications recorded were: 6 cases of congestion of the flap (which resolved spontaneously); 4 cases of necrosis of the apex flap (2 of which requested surgical revision); 2 cases of hematoma; 1 infection. There were no case of bleeding or wound dehiscence.

In group B, there was 1 case of hematoma and 2 cases of congestion of the flap.

This difference in complications between the groups was significant ($p<0.005$).

At long-term follow-up (Figures 4-6), we evaluated both functional and esthetic results of the surgical procedures, late complication, and tumor recurrence. In both the groups, we observed preservation of the characteristics of the patient's face and a normal function of the nose and facial tissues. Evaluating the late complications, we analyzed the state of formed scars according to the Vancouver scale (Table II). There was a significant difference comparing the mean scores between the groups. We noticed that for group B patients the color of scars, pigmentation, the height of scars, and elasticity were more like those of undamaged skin. Scars that formed in group A patients were thicker, less elastic, and with greater changes of pigmentation. In particular, the difference of pigmentation was significant ($p<0.005$).

In the cosmetic assessment, three patients of group A evaluated the cosmetic appearance of their nose as very good (10.0%), 11 evaluated it as good (36.6%), 8 as satisfactory (26.6%) and 8 as unsatisfactory (26.6%). In the group B, the scoring was as follows: 9 patients evaluated it as very good (30.0%), 18 as good (60.0%), 2 as satisfactory (6.6%), and 1 as unsatisfactory (3.3%). The difference of cosmetic evaluation between the two groups was significant ($p<0.005$).

Finally, the analysis of discrimination of two points to evaluating disorders of sensation showed that the discrimination of two points was better in group B patients, but this was not statistically significant.

There was no recurrence of disease in either group.

Discussion

The goals of reconstructing deformities of the face, acquired secondary to skin tumors, include optimizing donor-site esthetics and reconstructing the area with similar types of tissue when possible (3). Nasal reconstruction has reached a point in its evolution such that its goals no longer include simply filling the defect. The contemporary facial

Table I. *Clinical data of study cases.*

Group	Nasal ala		Gender		Surgery (flap)		Histology (carcinoma)		Complication
	Right	Left	M	F	Nasolabial	Island	Basal cell	Squamous cell	
A	18	12	15	15	30	0	23	7	13
B	16	14	15	15	0	30	21	9	3
<i>p</i> -Value							0.34		<0.005

reconstructive surgeon aims for an esthetic and functional result in the vast majority of cases. Nasal skin defects most often result from oncologic surgery, or, less commonly, traumatic or iatrogenic injury (4). This article focuses on reconstruction of oncologic defects, and compares two reconstructive techniques.

Numerous methods have been described for reconstructing ala nose defects, including local or regional flaps and grafts (5-10). Traditionally, ala reconstruction involves a nasolabial flap (11-13). This flap is easy to harvest and provides a large volume of tissue. However, controversial results are reported including that it is difficult to precisely reconstruct the complex configuration of the ala eminence, or it restores a very natural appearance. In recent years, several authors reported reconstruction with the island flap as a reasonable alternative (14-19). We performed a comparative analysis between nasolabial and island flap. For island flap we observed a greater success, reporting lower morbidity, shorter operating room time, reduced blood loss and complications, and improved morphofunctional outcome. Advantages of this flap include the great ease of harvest, obtaining a long pedicle, and a large volume. The island flap preserves the nasolabial folds. We also found that the mobility of the island flap ensured the reconstruction of skin loss of substance with good esthetic and functional results. In our series, we were able to obtain excellent esthetic outcomes. We believe that the use of an island flap can lead to an improved outcome compared with a simple nasolabial flap, and especially in a more natural recovery (Figures 4-6).

Lastly, according to Sukop *et al.*, due to the versatility of an island flap the outcome of an unsatisfactory previously carved nasolabial flap may be improved. In detail, these authors used a nasolabial flap to resolve the defect and one year after the first operation, the relief of natural transition of the new wing of the nostril and cheek was created with an island flap. They demonstrated that the reconstruction of a wing of the nostril in multistage procedures with combined nasolabial and island flaps allows precise modeling of the nostril with the natural transition to the cheek; moreover, an island flap with its scars creates the required contour of a nostril wing and prevents the collapse and flattening of the nostril wing externally (20).

Table II. *Evaluation of the scar according to the Vancouver scale.*

Score	Pigmentation group		Height group		Flexibility group		Color group	
	A	B	A	B	A	B	A	B
0	5	14	11	14	8	10	17	11
1	5	9	16	15	18	10	11	14
2	8	5	3	1	2	6	2	5
3	12	2	0	0	1	2	0	0
4	0	0	0	0	1	1	0	0
5	0	0	0	0	0	1	0	0
<i>p</i> -Value	<0.005							

Conclusion

The reconstruction of the nose is one of the most complicated esthetic-functional surgical procedures. Oncological radicality and good reconstruction are crucial on a nose that presents a tumor early. Local flaps provide better reconstruction and, of these, we prefer the island flap, both functionally and esthetically. We believe the island flap is more advantageous, with less risk of distortion of the tip of the nose (Figure 6B), better recovery of the ala groove (Figure 5B), and it avoids the risk of edema that can often create the pivot of rotation of the nasolabial flap. The island flap is also advisable because it avoids contracture of the reconstructed area and prevents the risk of collapse of the ala of the nose during inspiration.

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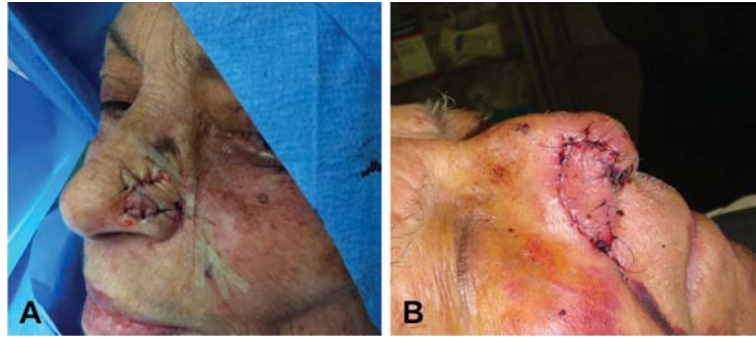


Figure 1. Nasolabial flap. Operative technique. Note the transposition of the flap.



Figure 2. Island flap. Operative technique. Note the advancement of the flap.

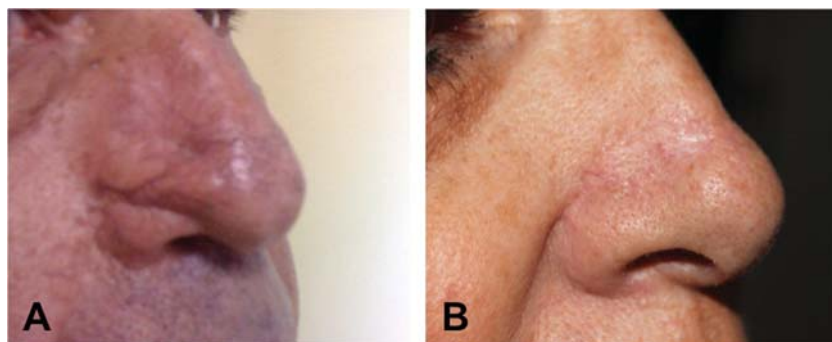


Figure 3. Immediate results of surgery. A: Nasolabial flap. B: Island flap.



Figure 4. Status at 6-month follow-up. A: Nasolabial flap. B: Island flap.

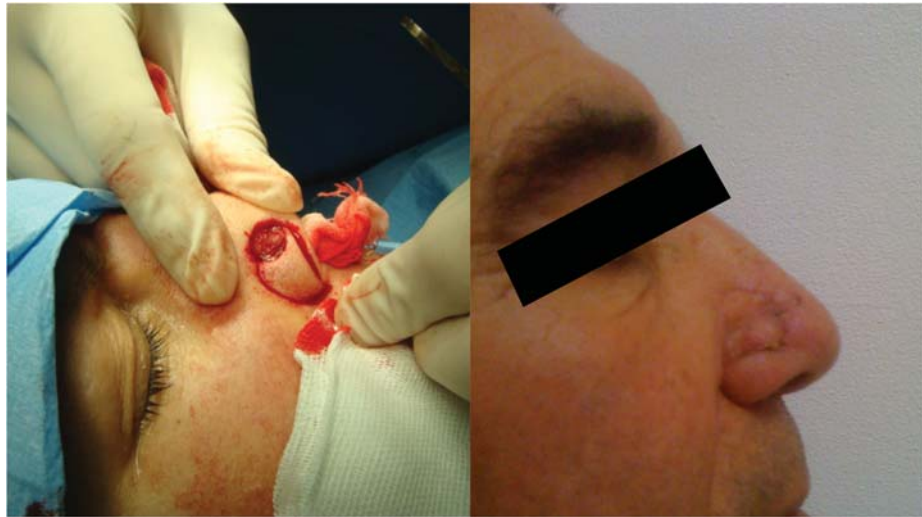


Figure 5. Status at 12-month follow-up. Detail of the profile. A: Nasolabial flap. B: Island flap.

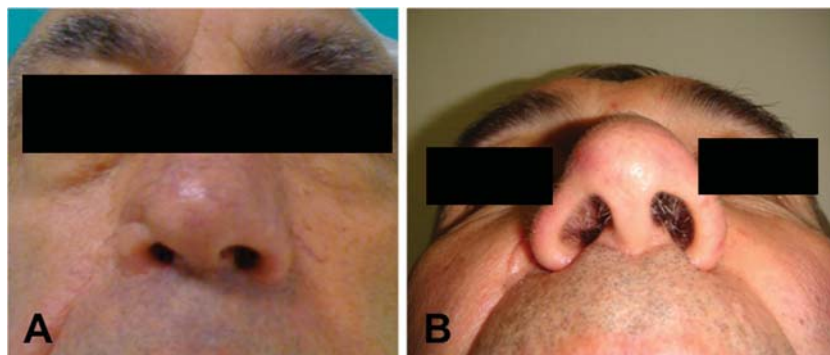


Figure 6. Status at 12-month follow-up. Detail of the tip. A: Nasolabial flap. B: Island flap.

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Received August 8, 2011
Revised September 30, 2011
Accepted October 3, 2011