

# Immediate reconstruction of nasal alar defects after malignant skin tumor excision without Mohs surgery

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## ABSTRACT

**Objectives:** The National Comprehensive Cancer Network guidelines state that any nasal region with squamous or basal cell skin cancer is at high risk. Although Mohs surgery is the gold-standard procedure for many types of skin cancer, it is not applicable worldwide. A mean of 1.7 Mohs surgery stage is performed in cases of tumors. Nasal obstruction is a problem with Mohs surgery. In this study, we aimed to investigate nasal alar region nonmelanoma malignant skin tumor excision using immediate reconstruction without Mohs surgery.

**Methods:** Ten patients underwent reconstruction surgery between 2018 and 2022. The inclusion criterion were ulcerated lesions in the nasal alar region measuring less than 1 cm in diameter, the lesions which were suspected either as basal cell carcinoma (BCC) or squamous cell carcinoma (SCC) on dermatoscopic examination, the patients who had intact nasal mucosa during anterior rhinoscopy.

**Results:** The mean follow-up duration was 26 months. No patient required re-operation because of an excisional biopsy result that involved border proximity. We observed no serious complications or long-term recurrences.

**Conclusions:** We recommend our algorithm for patients for whom Mohs surgery is not applicable.

**Keywords:** Malignant skin tumor, Mohs surgery, nasal alar defects, reconstruction

Mohs micrographic surgery (MMS) is the gold-standard technique for treating various cutaneous tumors, and it has numerous advantages [1]. Although it is a successful and cost-effective technique, it is time-consuming and has a tumor-seeding potential with repetitive stages [2-4]. Nose skin tumors require the most stages of MMS relative to other anatomical locations [5]. Furthermore, nasal obstruction commonly occurs after MMS [6, 7]. The nasal alar region has a unique anatomy that contains a thin skin surface, thin wavelike cartilage, and mucosa. Although the reconstruction of such a thin composite structure complicates the aesthetic result, reconstruc-

tion after skin tumor resection of its free margin can hamper stable functional conformation. Ultimately, the reconstruction of this region has two main goals: good aesthetic appearance and problem-free nasal breathing.

In this study, we aimed to reduce the number of surgeries and overcome complications related to MMS in the nasal alar region. We investigated nasal-alar region non-melanoma malignant skin tumor excision and immediate reconstruction without MMS in some patients. This study and the proposed algorithm are mostly based on the complications and technique selection.

Received: July 31, 2023; Accepted: August 6, 2023; Published Online: August 8, 2023



e-ISSN: 2149-3189

**How to cite this article:** Tapan M, Özkan Ö. Immediate reconstruction of nasal alar defects after malignant skin tumor excision without Mohs surgery. *Eur Res J* 2023;9(5):1027-1033. DOI: 10.18621/eurj.1335333

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## METHODS

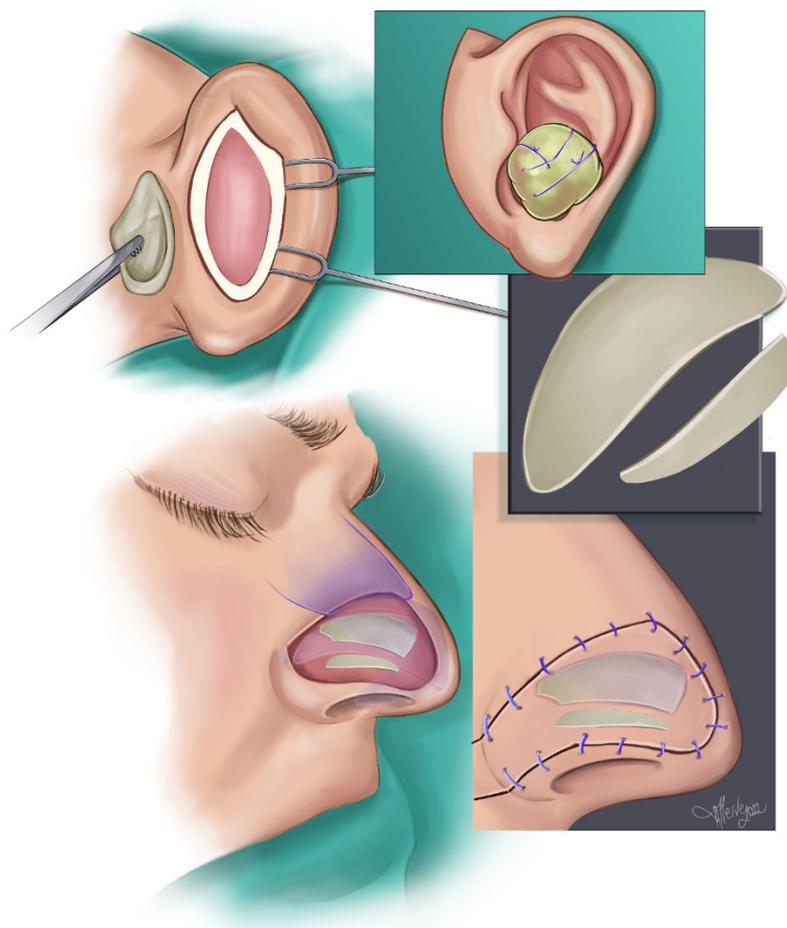
Ten patients underwent tumor extirpation in the nasal alar region, preserving the nasal mucosa, between April 2018 and December 2022. The inclusion criterion were ulcerated lesions in the nasal alar region measuring less than 1 cm in diameter, the lesions which were suspected either as basal cell carcinoma (BCC) or squamous cell carcinoma (SCC) on dermatoscopic examination, the patients who had intact nasal mucosa during anterior rhinoscopy. The exclusion criterion were lesions with indefinite borders, dermatologic examination of the patient was not compatible with BCC or SCC, lesions which invaded the nasal mucosa during the anterior rhinoscopy.

This study was performed in accordance with the Helsinki Declaration. Ethics committee approval was obtained. All patients signed informed consent form and accepted photographic permission.

## Surgical Technique and Plan

A free skin margin of at least 6 mm was planned for the excision of BCC defects and at least 10 mm for that of SCC defects, based on dermatoscopic examination or incisional biopsy. The lesions were excised en bloc in a beveled manner, with the underlying subcutaneous tissue and cartilage. After that, the surgical instruments were changed to avoid tumor tissue seeding.

The posterior auricular skin on the conchal cartilage was incised. The graft border was defined as the graft passing from the anterior surface of the auricle using 27 G needles. We aimed for the cartilage graft positions to meet the following criteria. The first large piece was the lower lateral cartilage (LLC), which should be similar in shape. The position of this large piece should preserve the function of the internal nasal valve. If the cartilage excision includes a part of the upper cartilage, the large piece should be located more



**Fig. 1.** Illustration of harvesting and inseting the conchal cartilage. This graft has two different surface type. The helical rim side with smooth surface of the graft is used as large piece and the cavum concha side with protruding surface of the graft is small piece (the alar rim graft).

cranially, near the upper lateral cartilage. Second, the small piece is the alar rim graft, which should be located near the alar rim despite the defect being away from it (Fig. 1). A 5/0 PDS (Ethicon, USA) was used to fix the graft onto the nasal mucosa.

The nasolabial flaps were superiorly positioned with transposition or interpolation inseting based on the patients' preference or the distance of the defect from the planned flap. The second stage of the interpolation-type flap was performed after a minimum of three weeks, whereas the other aesthetic operations were performed after a minimum of three months.

Revision surgeries have two main purposes, flap defatting and scar inversion, to resemble natural creases. Curvilinear excision was used to create inverted scars in the foreseen alar crease area that were later inverted.

## RESULTS

Our patients included six men and four women, with a median age of 56.4 years. The mean follow-up duration was 26 months. Our algorithm had an average of 1.5 stages per case. Table 1 summarizes patient characteristics.

None of the patients required reoperation because of an excisional biopsy result involving border proximity. At least 6-mm and 4-mm clinically cutaneous

tumor-free margins were obtained for patients with SCC and BCC, respectively. Pathological examination revealed no cases of cartilage invasion or base margin contiguity. No patient experienced a recurrence.

No severe complications were observed, such as partial or total flap loss, infection, wound dehiscence, or donor-site morbidity such as hematoma. To prevent hematoma formation, we used bolster dressing for a three-day period in the cartilage donor site (Fig.1). In one patient (Patient 1) with a history of multiple non-melanoma malignant skin tumors on the face, actinic keratosis at the lateral margin was observed after 40 months. Cryotherapy was selected as the treatment of choice. In one patient (Patient 3), the alar rim graft was exposed and removed during the second operation. No functional problems occurred postoperatively.

All patients showed greater aesthetic satisfaction after the second procedure. (Fig. 2). Only the Patient 1 underwent three times to create much more natural nasal appearance. (Fig. 3). Only Patient 7, who did not accept the conchal cartilage graft, was dissatisfied with the functional results of the first operation.

In only one patient (Patient 7), the nasal alar defect was reconstructed using only a nasolabial flap. The patient did not consent to conchal cartilage harvesting and wanted functional nasal airway reconstruction using only a nasolabial flap. The length of the LLC defect was 10 mm. She complained of nasal airway dysfunction immediately after the first operation and

**Table 1. Patient summary**

Patient number	Age (years)	Sex	Diagnosis	Defect size (cm)	Nasolabial flap inseting type	Total operation (reconstruicton and flap revisions)	Follow-up (months)
1	58	M	BCC	20×18	Transposition	3	53
2	38	F	SCC	25×25	Interpolation	2	45
3	55	M	SCC	30×25	Transposition	2	33
4	72	M	BCC	20×20	Transposition	1	30
5	37	M	SCC	25×22	Transposition	1	25
6	76	F	SCC	28×25	Transposition	1	21
7	56	F	BCC	17×17	Transposition	2	16
8	54	M	BCC	18×15	Transposition	1	16
9	63	M	BCC	19×19	Transposition	1	15
10	55	M	BCC	15×15	Transposition	1	14

M = male, F = female, BCC = basal cell carcinoma, SCC =squamous cell carcinoma



**Fig. 2.** (a) Patient 2, preoperatively. (b, c) Her left nasal alar region was reconstructed with the interpolation flap inset type. The photographs show 11 months after second stage interpolation flap.

requested a conchal cartilage graft in the revision surgery performed three months later.

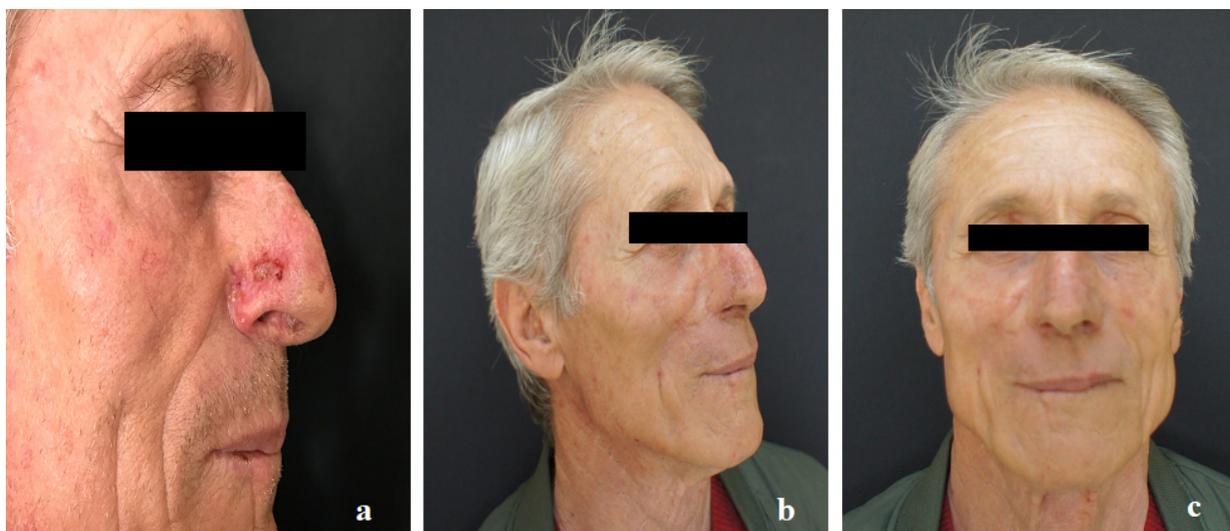
Fig. 4 shows our proposed algorithm.

### DISCUSSION

The National Comprehensive Cancer Network guidelines indicate that the heads of any size with SCC and BCC in the nose region are high-risk cases [8, 9]. A study reported that nasal tip skin thickness was  $3.32 \pm 0.78$  mm [10]. Therefore, we hypothesized that en bloc

excision that spares the nasal mucosa without MMS provides a safe deep margin when a lesion is ulcerated and not fixed to the LLC and the nasal mucosa is intact.

According to a study, MMS has a 5-year disease-free survival rate of 99.3% [11]. The American College of Mohs Surgery Improving Wisely Quality Collaborative revealed that 2305 physicians practicing MMS had a national average of 1.7 stages per case for the head, neck, genitalia, hand, and foot regions [12]. We had no cases of repetitive surgeries due to skin margins of the specimen after the first excisional



**Fig. 3.** (a) Patient 1, preoperatively. (b, c) The patient, 30 months after his last operation. Inverted scars like natural creases were created in the second and third stages.

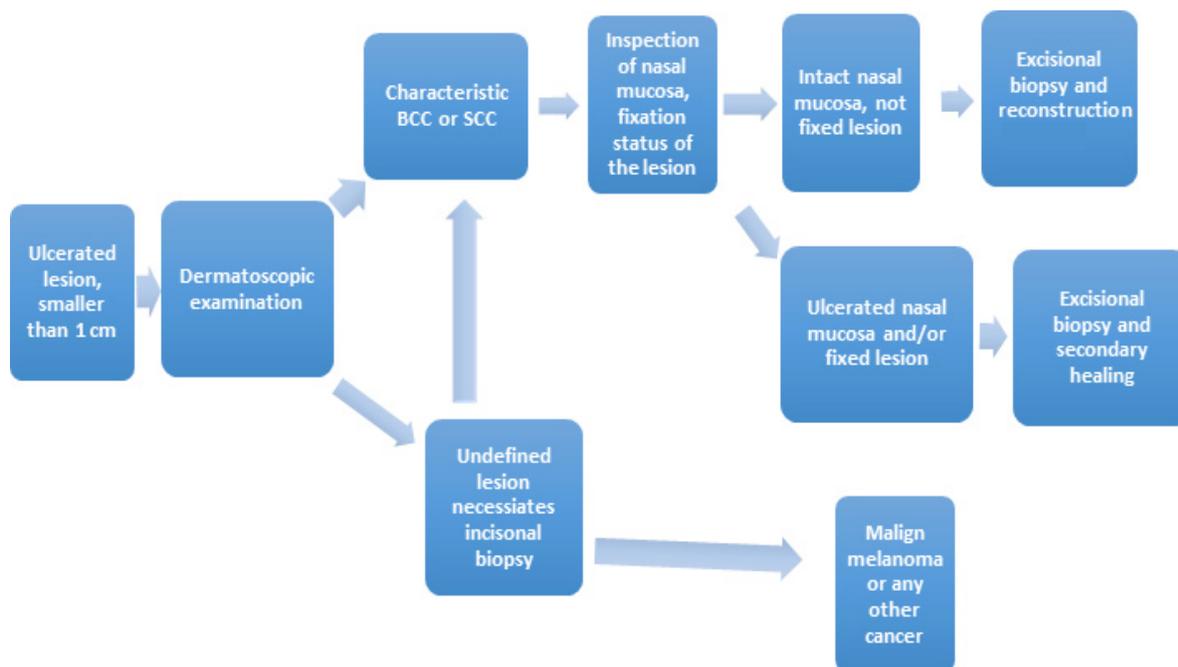


Fig. 4. Our algorithm

biopsy. Our staged surgeries were performed mainly for aesthetic reasons. No cases of functional or aesthetic complaints or donor-site morbidities were present.

The principle “like with like” is the primary goal of every kind of reconstructive surgery. The nasolabial flap contained the most tissue adjacent to the nasal alar defect. Although other well-known options, such as composite grafts, local flaps, regional flaps, prefabricated flaps, and free flaps, for reconstruction of nasal alar defects are available [13-25], the nasolabial flap has good color and texture matching, forming a natural-looking alar contour with minimal donor area scarring.

To maintain a good nasal passage, an appropriate framework should be established that mimics the precise position of the cartilage grafts. The conchal cartilage, as a donor site, has a natural arch of the nasal alar and good elasticity [26-28]. We recommend a plan to maximize the benefit of the conchal cartilage graft (Fig. 1). Inserting a cartilage graft into the mucosal layer provides stable breathing function and resistance to flap weight. None of the patients complained of nasal airway dysfunction after reconstruction using a nasolabial flap or conchal cartilage. We encountered a case where the patient asked for reconstruction without a conchal cartilage graft; the functional result was insufficient, as expected.

One patient experienced alar rim cartilage exposition. We believe this was caused by the suture technique, which concurrently passed through the alar rim skin, cartilage, and nasolabial flaps. We recommend using a skin suture that does not pass through the cartilage (Fig. 1) but fixes the cartilage to the mucosa.

Interpolation-type nasolabial flap insertion was performed in two stages, whereas transposition-type nasolabial flap insertion was performed in one stage. Every patient was informed that the nasolabial flaps may require revision based on the aesthetic results. One patient who underwent interpolation-type nasolabial flap insertion was satisfied with the results and did not need any other revision surgery. However, we believe that patients prefer receiving only a single-stage solution.

**Limitations**

Our study has some limitations. Our algorithm, without MMS in this region, which is a three-layered thin tissue with different characteristics, is applicable to early-stage BCC and SCC. Nevertheless, cases of early-stage BCC and SCC may have indefinite borders, for which an incisional or excisional biopsy with secondary healing is a wise approach. Although the mean follow-up period was 26 months, 10 patients represented a relatively small sample size.

## CONCLUSION

We found that mucosa-sparing nasal alar region excision, including the skin and LLC, is safe for ulcerated non-melanoma skin malignant tumors, and provides a free margin under the malignant tumor. We recommend our colleagues to utilize our algorithm when the gold-standard Mohs surgery is not applicable. However, further studies are needed.

### Authors' Contribution

Study Conception: MT; Study Design: MT; Supervision: ÖÖ; Funding: ÖÖ; Materials: MT; Data Collection and/or Processing: MT; Statistical Analysis and/or Data Interpretation: MT; Literature Review: MT; Manuscript Preparation: MT and Critical Review: ÖÖ.

### Conflict of interest

The author disclosed no conflict of interest during the preparation or publication of this manuscript.

### Financing

The author disclosed that they did not receive any grant during conduction or writing of this study.

### Acknowledgement

The authors thank to Ömer Özkan for scientific support and mentorship. They also thank to Yunus Emre Şeker and Mertcan Karagül. The illustration in Fig. 1 was created by Merve Evren for this study. The authors thank to the patients who approved the photographic permission.

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