

# Reconstruction of Nasal Defects in Patients with Non-Melanocytic Skin Cancers

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## Abstract

Most of malign tumors of head and neck region often occur at the nose. Surgical methods such as primary closure, skin grafts, local flaps and free tissue transfer can be used for reconstruction of these defects. Nasal dorsum, nasal tip, sidewalls, alar regions, columella and soft triangles are described as nine subunits of the nose and various reconstruction methods are described for each subunit. Local flaps can be advanced on the pivot point by rotating or advancing. The most commonly used local flaps in nasal reconstruction; bilobed, rhomboid, advancement, dorsal nasal and transposition flaps. Nasal dorsum skin is thin and mobile. Dorsal nasal flap, glabellar flap, forehead and full thickness skin graft may be preferred for reconstruction of this region. Nasolabial flaps are the most preferred method for reconstruction of the nasal sidewall. Bilobed flap, dorsal nasal flap and forehead flap are the most preferred flap techniques in the nasal tip. Bilobed flap, nasolabial flap, paramedian forehead flap and Millard's "gull-wing" flap are the preferred methods to make reconstruction of alar region. The size of the defect, its relation with neighboring structures, comorbid diseases of the patient, smoking and alcohol use are other important factors.

**Keywords:** Nasal Reconstruction; Skin Cancer; Flap; Graft

## Introduction

Most of malign tumors of head and neck region often occur at the nose [1]. These tumors leave large defects after resection. Surgical methods such as primary closure, skin grafts, local flaps and free tissue transfer can be used for reconstruction of these defects.

The history of nasal reconstructions dates back to Susruta Samhita in 600 BC [2]. Different surgical techniques have been defined over the past century. In researches that made, it was seen that defect size, location, depth and type of defective tissue were important variables in reconstruction. In addition, three dimensional reconstruction of the nose has own unique features because of the obvious anatomic structure in the center of the face. Gonzalez and Ulloa have divided the entire face region into

aesthetic sub-units [3]. Burget and Menick published the first series of nasal reconstruction using subunits in 1985 [4]. Nose ridge (dorsum), nose tip, sidewalls, alar regions, columella and soft triangles are described as 9 subunits of the nose and various reconstruction methods are described for each subunit [1-4].

Another important consideration in the nasal reconstruction is; to provide an aesthetically acceptable view by using tissue in the color and thickness closest to the nose skin, to form a support frame, to avoid distortion in neighboring tissues and to obtain a functional repair without obstructing the respiration [1]. In this article, reconstruction techniques and our experience will be discussed in the context of the literature in non-melanom malign skin cancers resection defects.

## Secondary Healing and Primary Repair

The best results in nasal reconstruction; cases where the lesion is removed in accordance with the nasal subunits and by following the tension lines described by Langer [5]. Again, according to Burget and Menick; if the defect formed after operation is more than 50% of the subunit than it is more suitable to reconstruct defect by increase the defect to the entire subunit [2]. Secondary healing, which is the first step in reconstruction, is not a preferred method for nasal reconstruction. However, Zitellive, et al. have reported satisfactory results in superficial and small-diameter lesions on the concave surfaces of the nose [6]. Our clinical experiences also confirm these studies. Secondary healing of wounds with a diameter of about 0.5 cm was preferred on concave surfaces such as nasal ala and nasolabial grooves and good results were obtained. However, scarring can be seen in deep-seated lesions. It is also important that the patient be informed that exposure to extreme sunlight may cause discoloration during the healing period. There are conditions where we prefer primary repair for reconstruction in cases where the post-surgical defect

is close to 1.5 cm. However, they are preferably lesions located in the nasal dorsum and side walls. Alar region, alar notch, nasal tip is not preferred for primary closure because it can cause nasal tip deformations. In other regions, primary closure can be fixed to the cartilaginous tissue in underneath and cause distortion so that why not suitable.

### Reconstruction Techniques According to Nasal Subunits

Surgical flaps must preserve vascularization to make tissue transfer from one region to another defect region. Flaps may contain skin and subcutaneous tissue, as well as any tissue. Local flaps can be advanced on the pivot point by rotating or advancing. The most commonly used local flaps in nasal reconstruction; bilobed, rhomboid, advancement, dorsal nasal and transposition flaps [7]. The most important advantage of local flaps is that they are often in appropriate color and structure, as they are close to the defect site. The disadvantages are that they cause an extra scar in the defect area. The most common nasal reconstruction methods applied in our clinic are local flaps.

### Nasal Dorsum Reconstruction Techniques

Nasal dorsum is the most common site of malignant skin

tumors of the nose [7]. Nasal dorsum skin is thin and mobile. Dorsal nasal flap, glabellar flap, forehead and full thickness skin graft may be preferred for reconstruction of this region [8]. Dorsal nasal flap, glabellar flap, forehead and full thickness skin graft may be preferred for reconstruction of this region [8]. The dorsal nasal flap (Reiger-flap) started to be applied by Reiger in 1967 is the rotation and advancement of the skin [9]. In defects requiring reconstruction in the nasal bones, iliac crest grafts can be taken. In our clinic, small and medium sized (< 2 cm) bone grafts are preferred for defects in the middle and distal third of the nose. The glabellar flap was more acceptable for lesions in the proximal third of the nasal dorsum. The glabellar flap is described by Gillies and modified by Reiger [10-11]. For reconstruction of the lesions covering close to whole nasal dorsum, the forehead flap and full thickness skin grafts are preferred (Figure 1-2). In flap techniques of nasal dorsum reconstruction, according to the technique; Vertical incisions are made extending from both eyebrows to the scalp hairline. Vertical hypertrophic scars can develop during the healing period due to these incisions. The most important factor here is the tension of the suture line. Hypertrophic scar development due to excessive tension is more frequent in flaps harvested wider than 3 cm.



**Figure 1-2:** Nasal dorsum lesion excision and reconstruction with right paramedian flap

### Sidewall Reconstruction Techniques of the Nose

Inferior and superior based nasolabial flaps are the most preferred method for reconstruction of the nasal sidewall. It can be used easily in small and medium sized defects. However, because of the loss of naso-facial sulcus, a second surgery may be needed to reconstruct the sulcus. In some cases in our clinic we have seen that sulcus disappear. However, due to the fact that the patients were not complaining, no second surgery was performed on any patients. In areas close to the medial canthus, glabellar flap is still one of the preferred methods. However, the skin near the medial canthus is thin and the glabellar flap is thick, that's why it's not the technique we prefer. Whenever possible, primer suturing is our primary choice.

### Nasal Tip Reconstruction Techniques

From the aesthetic point of view, the nasal tip skin, which is the most remarkable region of the face, is rich and thick in fat tissue. For this reason, the use of local flaps in this region is more difficult than cranial 2/3 portion of the nose. Bilobed flap, dorsal nasal flap and forehead flap are the most preferred flap techniques in the nasal tip. In our clinical approach, bilobed flap were preferred for lesions lesser than 1.5 cm. In some cases, however, we have encountered with alar retraction and pinching deformities. Flap planning should be done well for prevent these complications. The dorsal nasal flap preferred more often for defects larger than 2 cm. We have some cases with mild tip rotation due to dorsal nasal flap. The most important point here is to pay attention

to the flap tension. The paramedian forehead flap is the gold standard method for large defects including the nasal tip and extending to the infra-tip [12]. Attention should be paid to flap vascularization in forehead flaps. Vascularization of forehead flap realized through supratrochlear and supraorbital arteries and veins. These vessels should be preserved during the harvesting of flap. The main disadvantages of forehead flaps are that they require two or three sessions of surgery. In addition, the cosmetic appearance of the patients after first flap surgery negatively affects the psychology of patients and their relatives. However, it is a very useful method for reconstruction of large defects.

### Alar Region Reconstruction Techniques

The alar region is not a suitable site for primer suturing due to its three-dimensional structure. Bilobed flap, nasolabial flap, paramedian forehead flap and Millard's "gull-wing" flap are the preferred methods. In our clinic we use bilobed flaps primarily

in cases with defects less than 1.5 cm where there is no alar rim content. Nasolabial flaps have been preferred in cases of larger and deep defects. In the cases of deeply located and/or nasal rim located lesion, it is necessary to use cartilage grafts in order to obtain better results both cosmetically and functionally beside the skin flaps. Otherwise, it may be encountered with alar notching and contractures. Millard's gull-wing flap is the most preferred method for defects that occur after extensive resection. Lesions originating from the alar region usually show rapid spread in neighboring subunits. In Figure-3, lesion which originated from the left nasal alar region and spread to the soft triangle and nasal sidewall is seen, in Figure-4 defect after resection is seen, and in Figure-5 reconstruction of defect with a paramedian forehead flap is seen. A second session of operation, pedicle of the forehead pedicle was cut and a cartilage graft which harvested from the ear was placed to create a nasal rim (Figure 6-7).



Figure 3-4-5-6-7: Lesion originated from the left nasal alar region and spread to the soft triangle and nasal sidewall, resection and reconstruction

### Columella and Soft Triangle Reconstruction Techniques

Isolated columellar or soft triangular region malignant tumors usually seen rare. Lesions in these subunits occur as a result of spreading of lesions in neighboring regions to these regions. Unilateral and / or paired nasolabial flaps may be preferred for columella reconstructions. If nasal tip support is necessary, a columellar strut may be placed by harvesting the cartilage graft. In the case of large lesions, the best choice is the distal-thinned forehead flap [13]. The soft triangle is the smallest subunit but perhaps the most difficult reconstructing area. The slightest deformity of the soft triangle that combines the nasal tip with nasal ala affects these two regions. Nasolabial flap for small defects, paramedian forehead flap and Millard's gull wing flap are preferred in large lesions. Because of the tendency of

this region to notching, cartilage-supported flaps should be preferred even in the smallest defects. As a cartilage graft; nasal septal cartilage and due to concave form and soft structure ear cartilage can also be used. In case of existence of mucosal defects conchal flaps can also be used. We prefer Millard's gull wing flap and paramedian forehead flap for reconstructions of lesions including neighboring regions. We did not need any cartilage grafts in cases not included cartilage resection because of the sufficient thickness of the forehead. In our department isolated soft triangular region malignancy has never encountered, but only one columellar originate lesion excision and reconstruction made. The lesion was resected together with the nasal septum and then reconstructed with costal cartilage graft, rotational lower conchal flap and Millard's gull wing flap (Figure: 8-12).



**Figure 8-9-10-11-12:** Reconstruction of isolated columellar lesion resection with cartilaginous graft, rotational lower conchal flap and Millard's gull wing flap

In nasal reconstruction surgery, the same technique could not always be applied to the same sized defects. Again, the size of recovery and scarring is not the same in every patient undergoing the same technique. This includes patients with comorbid diseases such as diabetes and hypertension; the effect of smoking and alcohol use is quite high. Our clinical observations suggest that wound healing is better in young patients which are not smoking and not use alcohol without co-morbid disease.

## Conclusion

The best results in the reconstruction of skin defects after nasal malignancy resections are obtained by proper excision of the nasal subunits created by Burget and Menick. The size of the defect, its relation with neighboring structures, co-morbid diseases of the patient, smoking and alcohol use are other important factors. The preferred flap technique for closing the skin defect should be selected in the direction of the patient's expectation with the patient before surgery.

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