

## NASOLABIAL FLAP: A WORKHORSE FOR THE RECONSTRUCTION OF NASAL ALA AFTER TUMOR RESECTION

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### ABSTRACT

**Objective:** To share our experience of the superiorly based nasolabial flap in the reconstruction of nasal ala.

**Materials and Methods:** This experimental study was conducted at the Plastic Surgery and Burn Unit, Khyber Teaching Hospital, Peshawar from June 2011 to December 2013. A total of 56 patients underwent reconstruction of nasal ala after excision of malignant skin tumors. Superiorly based nasolabial flap was performed in all the patients who underwent tumor excision and required reconstruction of nasal ala. The flap was designed immediately lateral to the nasolabial fold. The flap then dissected, elevated and set into the defect.

**Results:** Out of 56 patients, 39 were males and 17 were female. Forty nine patients had basal carcinoma and 7 patients had squamous cell carcinoma. In all patients the flaps survived completely. Complications observed were scar hypertrophy in 3 patients, bulkier ala in two patients and partial dehiscence in 2 patients.

**Conclusions:** In our experience nasolabial flap is a very reliable flap for the alar defects after tumor resection. Besides providing a good colour match, the flap is easy to dissect and inset.

**Key words:** Nasolabial flap, Ala reconstruction, skin tumors

### INTRODUCTION

Nasal reconstruction is a challenging task because of its notable prominence and aesthetic concern<sup>1</sup>. Soft tissue defects of the nose result from trauma, infections and after tumor resection. Defects resulting from tumor excision are usually difficult to restore, especially the full thickness defects of the nasal ala pose a great challenge to the plastic surgeon<sup>2</sup>. Depending upon the degree of soft tissue defect, reconstructive methods such as skin grafts, local flaps, distant flaps and free flaps can be performed<sup>2</sup>.

Disfigurement of the nose not only plunders the beauty of the face but also sets an untoward effect on patient's psychology. Moreover the restoration of the anatomy in such defects is a dilemma for the recon-

structive surgeon<sup>4,5,6</sup>. Attempts at nasal restoration were made thousands of years ago by Indian and Egyptian surgeons who tried to reconstruct the cut part or the entire nose with distant flaps. Those ancient surgeons made use of either soft tissue from the forearm or forehead to reconstruct the amputated nose<sup>7</sup>. In the contemporary practice there are several options for the reconstruction of nose which include skin grafts for superficial defects and certain fasciocutaneous flaps for deeper defects and turnover or folded flaps for full thickness defects.

Full thickness skin grafts are usually used for superficial defects. The advantage is the ease to apply the graft and better graft take due to good vascularity of the nose. However the graft hypertrophy, contracture and color mismatch are certain associated disadvantages<sup>7</sup>. The forehead flap is currently the mainstay in reconstruction of full thickness defects. Although standard results have been achieved with forehead flap however it often leads to a bulky repair of the ala<sup>8</sup>. Various flaps like free style facial artery

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perforator flap, lateral nasal artery pedicle flap, microvascular reconstruction of nasal ala by using a reversed superficial temporal artery auricular flap, cheek to nose interpolation flap, and frontonasal flap are all have been described with optimal results, however these flaps require expert hands for execution<sup>9-13</sup>.

Taking into consideration the nasal subunit principle, local flaps with adequate donor site has become a well-accepted option in the reconstruction of nose<sup>13</sup>. The nasolabial flap is a time tested flap for reconstructing moderate facial defects<sup>14,15</sup>. This flap can be used to reconstruct many areas of the nose<sup>16</sup>. The flap is based on the angular branch of facial artery, the infraorbital artery and the transverse facial artery<sup>12</sup>. The flap can be superiorly based to reconstruct defects on the cheek, sidewall or dorsum of the nose, alae, columella and the lower eyelid. Inferiorly based flaps can be used to reconstruct defects in the upper lip, anterior floor of the mouth and the lower lip<sup>2</sup>. The nasolabial flaps are easy to dissect, elevate and inset and is a single stage procedure. Its proximity to the nose provides a good color and texture match when used for ala reconstruction. Additional advantages are the robust vascularity of the flap, simplicity of the flap and the satisfactory contour created from the relatively hairless skin utilized from the nasolabial fold<sup>2</sup>. In fact this flap withstands radiotherapy due to its excellent vascularity. The procedure can be performed under local anesthesia.

In this work we have outlined our experience with the versatile nasolabial flap for ipsilateral nasal ala reconstruction after tumor excision.

**METHODS AND MATERIALS**

This descriptive case series was conducted over a period of 2 ½ years from June 2011 to December 2013 at the Plastic & Reconstructive Surgery Unit, Khyber Teaching Hospital Peshawar. A total of 56 adult patients were included in the study. All the patients had soft tissue defects of the nasal alae due to excision of malignant skin tumors. An ipsilateral nasolabial flap was used to cover these defects. The patients, planned for reconstruction with nasolabial flap, were admitted to the hospital for day care surgery. Detailed history, complete examination and necessary investigations were performed. All the patients were counseled pre-operatively regarding flap coverage, visibility and occasional stretching of the scar. Informed consent was taken from all the patients. All the patients were

operated under local anesthesia. Inj. Lignocaine (2%) mixed with adrenaline 1:200000 was used as anesthetic agent. Patients were prospectively evaluated for suitability to nasolabial flap reconstructive technique by measuring the potential defect size and depth. All the defects were either small to moderate size (2-4 cm) in size.

The flap was designed immediately lateral to the nasolabial fold, such that the medial edge of the flap laid within the fold. The flap was tapered inferiorly for good closure of the donor defect. The flap elevation started distally in the plane between the subcutaneous fat and the underlying muscles. The plane of dissection was kept just beneath the subcutaneous fat of the flap, superficial to the underlying facial musculature. Where needed, minimal undermining of the adjacent cheek was done to close the donor defect primarily resulting in a linear wound nicely placed within the nasolabial fold. The flap was transposed with a skin pedicle to the recipient defect and in-setting carried out in layers. Subdermal stitches applied with absorbable sutures (Vicryl) and skin closed with nonabsorbable (Prolene). Post-operatively the flap was clinically monitored for any colour or temperature change and capillary refill time. Oral antibiotics and analgesics were given. Cephadrin (velosef) was prescribed to all the patients in a dose of 500mg thrice daily along with NSAID (Brufen 400mg) for three days only. The patients were discharged on the same day and reviewed after 5-7 days for removal of stitches. Patients were advised to avoid excessive sun exposure and sunblock cream were advised to prevent depigmentation at the site of surgery. SPSS version 17 was used for the analysis of the data.

**RESULTS**

A total of 56 patients 39 (69.64%) males and 17 (30.36%) females were recruited. The age ranged from 47 years to 81 years. Among these 49 patients(87.5%) were Basal cell carcinoma while 7 patients(12.5%) had

**Table-1: Complications**

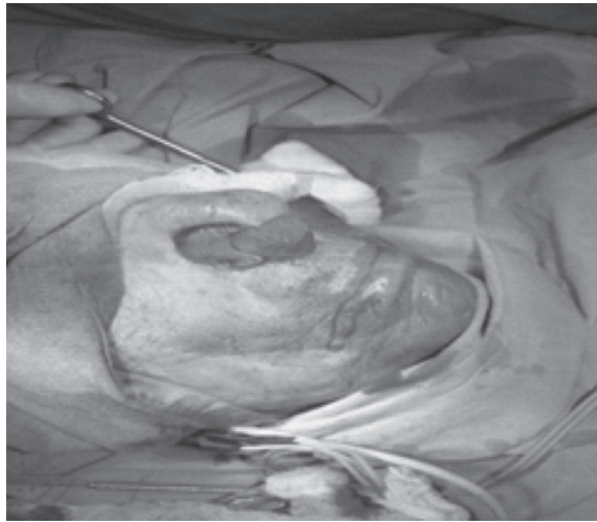
Complication	n	%
Donor site Scar hypertrophy	03	30
Donor site wound dehiscence	02	20
Bulkier ala	02	20
Stitch sinus	01	10
Depigmentation	01	10
Alar collapse	01	10
<b>Total</b>	<b>10</b>	<b>100</b>



(a) Pre-operative



(a) Pre-operative



(b) Defect after tumor excision



(b) Defect after tumor excision



(c) Post-operative



(c) Post-operative

squamous cell carcinoma

The size of the malignant skin tumors ranged from 0.5cm to 1.2cm occurring on the nasal ala. Basal cell carcinomas were excised with 4mm normal



skin margins whereas squamous cell carcinomas were excised with 6mm normal skin margins. The histopathology revealed all margins free of tumor in the excised specimens.

The average operating time was 40 minutes. In all the cases a superiorly based nasolabial flap was performed. The flap was designed as transposition flap for partial thickness defects in which the alar cartilages were preserved. For full thickness defects a turnover nasolabial flap was performed. All the flaps survived completely and no partial or marginal flap necrosis in any of the patients was observed. Similarly no conspicuous flap contracture was observed. Donor site defects were closed primarily in all the patients.

In this study 10 patients (17.85%) developed complications. The most common of them was scar hypertrophy at donor site in 3 patients. This was followed by donor site wound dehiscence (partial) in 2 patients and alar collapse in one patient in descending order of frequency. The details are given in Table-1.

Our patients were satisfied with their appearance after the surgery. The contouring of the alar defects was performed with the like tissue. The nasolabial flap provided a good texture and color. All the patients were satisfied with the less conspicuous donor site scar, well placed in the nasolabial fold.

## DISCUSSION

A number of reconstructive options are available for partial or full thickness soft tissue defects of the nose. Optimal aesthetic and functional outcomes are desired due to the visibility and social importance of this area. Local flaps are amongst the well accepted reconstructive options. The nasal subunit principle is important in planning of the reconstruction and certain aesthetic considerations such as texture, color and contour are essential in preoperative analysis<sup>17</sup>.

The reconstruction of the nasal ala needs to be performed with a thin pliable flap which possesses a good texture and color match. The skin of the nasolabial area suits the texture and color and hence considered as an ideal donor site<sup>18</sup>. A modified application of the flap is described by Spear et al<sup>19</sup> and Kroll<sup>20</sup> for total full-thickness defects of the alar margin. Moreover this area is in proximity and easily accessible with least donor site morbidity. We used the flap for reconstruction of defects of the ala after tumor resection. Majority of the tumors were basal carcinomas (87.5%). Defects

up to 4x2 cm in size were restored due to the laxity of the donor cheek.

A transposition flap was employed in all the patients. The flap thickness was decided according to the needs of the defect. The flap can be as thin as just deep to the sub dermal plexus, and as thick as superficial to the facial musculature<sup>21</sup>. Although the extent of the flap is limited by the available redundant tissue, primary closure of the donor site upto 5 cm is possible with wide undermining of the surrounding cheek tissue. Some authors have used the flap as pedicled flap where they needed to divide the pedicle after 2-3 weeks' time<sup>4</sup>. In the current study all the surgeries were performed as single stage procedure.

In this study we performed superiorly based nasolabial flap in all the patients. This type of flap has shown good results particularly for nasal reconstruction<sup>18</sup>. The nasolabial flap has been extensively utilized for nasal reconstruction in many ways. It has also been used as an island flap based on the lateral nasal artery for nasal reconstruction<sup>22</sup>. The flap has also been based on the infraorbital arteries to cover the nasal defects<sup>23</sup>. In nasal reconstruction one of the goals is to give good lining and nasolabial flap is also used for this purpose with other flaps<sup>24-25</sup>.

The turnover nasolabial flap has been described for reconstruction of full thickness alar defects<sup>5,8</sup>. Mas-saoud<sup>8</sup> described the use of turnover nasolabial flap for reconstruction of full thickness alar defects and reported the temporary flap congestion and bulkiness as the common complications. Sohn et al<sup>3</sup> made use of the nasolabial perforator for full thickness alar defects and they also reported the temporary congestion as common complication. In contrary in this study, no congestion was noticed in any of the flaps because of limited dissection and preservation of ample tissue around the feeding vessel.

Javaid et al<sup>26</sup> and his colleagues reported the outcome of nasolabial flap in reconstruction nasal alar defects. Although they achieved good results with the flap, alar retrusion occurred in 5.71% of patients and flap tip necrosis in 2.86% patients. In the present study these complications were not observed.

Rohrich et al<sup>18</sup> in their study made use of nonan-atomic alar strut grafts to prevent notching and cicatricial distortion of the nose after the reconstruction of the defect with nasolabial flap. In addition nitroglyc-

erine paste was used to avoid congestion in the flap. Although we did not perform any additional step to restore alar cartilage still we observed ala collapse in only one of our patient. El-Marakby<sup>2</sup> reported that mean operative time for nasolabial flap was 35±10.5 minutes and performed revision surgery in 20% of patients for correction and adjustment of the flap. We took 40 minutes time on average for nasolabial flap surgery and performed debulking of the flap in one concerned patient.

We achieved a good contour and colour match in our patients with no major complications like flap necrosis. Certain limitations of the study include: it is a single center study, randomization and blinding of the patients or treating doctors was not possible and so observer bias could not be eliminated completely. Long term functional and or aesthetic results could not be evaluated because many of the patients were lost to follow up. We recommend to conduct multicentre local study to confirm and improve upon our results

**CONCLUSIONS**

From this study it is concluded that:

1. Nasolabial flap is a very reliable flap for the soft tissue coverage of nasal defects. The flap can be manipulated according to the depth of defect and it possesses an excellent texture and color.
2. The flap donor site lies in the same operating field and can be closed primarily.
3. The least donor site morbidity and a lesser conspicuous scar have made it the preferred choice for nasal ala reconstruction.

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