

# Reconstruction of the Nasal Defects by Nasolabial Flaps

Jalal Ali Hassan

*Department of Surgery, University of Sulaimani, Sulaimani 46001, Iraq*

**Abstract:** **BACKGROUND:** Nasal reconstruction remains one of the most challenging aspects of facial plastic surgery. Resurfacing of nasal defect should include a consideration of the principle of aesthetic subunits. Nasal defect can be reconstructed by local, regional, and distant flaps and the size and depth of the defects (partial or full thickness) are important for choosing the flap. Although nasolabial flap cannot cover a large defect but it can be used successfully for small to moderate size nasal defect with a good aesthetic and functional result. **OBJECTIVE:** The aim of this study is to show the reliability of the nasolabial flap either superiorly based or inferiorly based according to the site and size of the defect. **PATIENT and METHOD:** A total number of 40 patients (24 females and 16 males) were included in this study with nasal defect in Burn and Plastic Surgery of sulaimania and Private Clinics, all the cases were treated by nasolabial flap. The majority (36 cases) underwent procedure under local anesthesia, only in 4 cases the procedure carried out under general anesthesia. Superiorly based was performed in 35 cases while inferiorly based flap carried out in 5 cases. Majority of cases (36 cases) treated by one stage nasolabial flap, while in 4 cases second stage was performed for treating pin cushioning and debulking. **RESULTS:** All the cases were treated with nasolabial flap with a good functional and aesthetic outcome. No post operative complications like wound dehiscence, flap necrosis, bleeding, haematoma, and infection were recorded. **CONCLUSION:** Superiorly based nasolabial flap is more reliable and suitable than the inferiorly based flap in case of full thickness alar reconstruction, while inferiorly based is more acceptable in case of small and partial thickness nasal defect of the ala and nasal side wall with less chance of pin cushioning and edema formation. Superiorly based flap can cover a larger defect of the nasal side wall, dorsum, alar region, and columella if compared to inferiorly based flap.

**Key words:** Nasal reconstruction, nasal defect, nasolabial flap.

## 1. Introduction

The nose is the most prominent feature of the human face. Its central location and projection emphasize its overall aesthetic importance but also contribute to its frequent injury. Loss of tissue may be caused by congenital malformation, infection, trauma, or neoplasm [1], and even its minor defects or deformity is highly perceptible [2]. Nasal reconstruction remains one of the most challenging aspects of facial plastic surgery especially reconstruction of subtotal and total defects [3, 4].

Resurfacing of a nasal defect should include a consideration of the principle of aesthetic subunits [5], Millard adapted Gonzales-Ulloas concept of (regional esthetic units) to nasal reconstruction (Fig. 1).

The lobule itself has been subdivided into (subunits) by Burget and by Burget and Menick (Figs.

2 and 3) [6].

It has been suggested that a defect occupying less than 50% of a given subunit should simply be patched with appropriate skin cover [7]. If a sub unit involves more than 50% of a subunit, Burget and Menick recommend excising the remainder of the subunit and replacing its entire cover as one unit [7]. Anatomically, the nose is made up of an inner lining, a middle support layer of bone and cartilage, and an outer covering of skin [8].

The goal of the reconstructive surgery is three fold, maintain the function of the nose, preventing airway obstruction, and maintain an aesthetically inconspicuous nose in the cosmetic reconstruction [9]. The use of nasolabial tissue as a transposition flap was popularized by Dieffenbach [10].

The nasolabial region is made of cheek tissue surrounding the nasolabial crease from the ala to the oral commissure [3].

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**Corresponding author:** Jalal Ali Hassan, F.I.C.M.S., research field: plastic surgery.

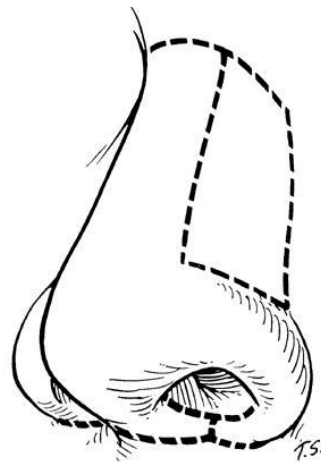


Fig. 1 Aesthetic units and aesthetic junction lines of the nose [8].

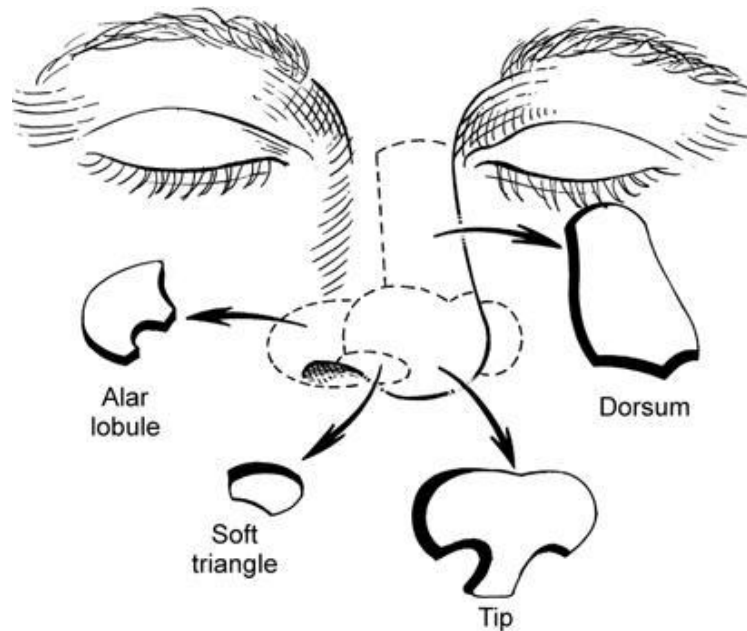


Fig. 2 The nasal lobule and its aesthetic sub units [8].

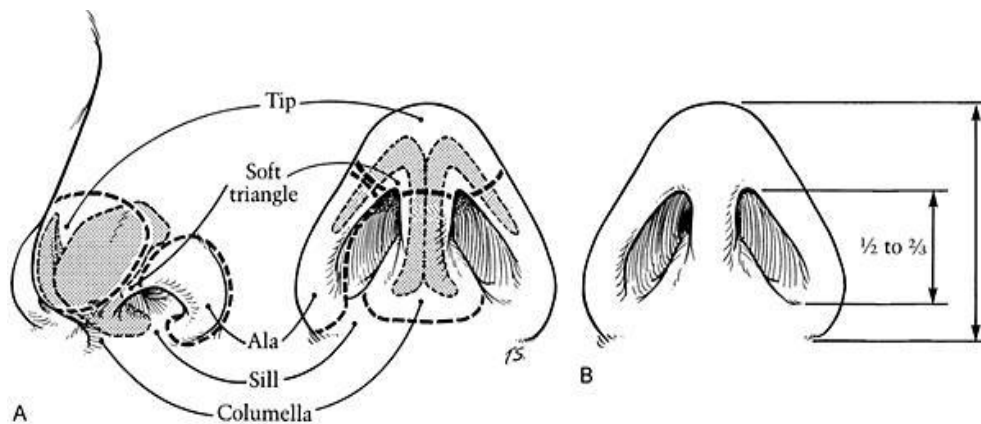


Fig. 3 Anatomy of the nasal lobule. A. Subunits of the lobule and alar cartilages. B. Proportions of the nostril to the overall height of the lobule [8].

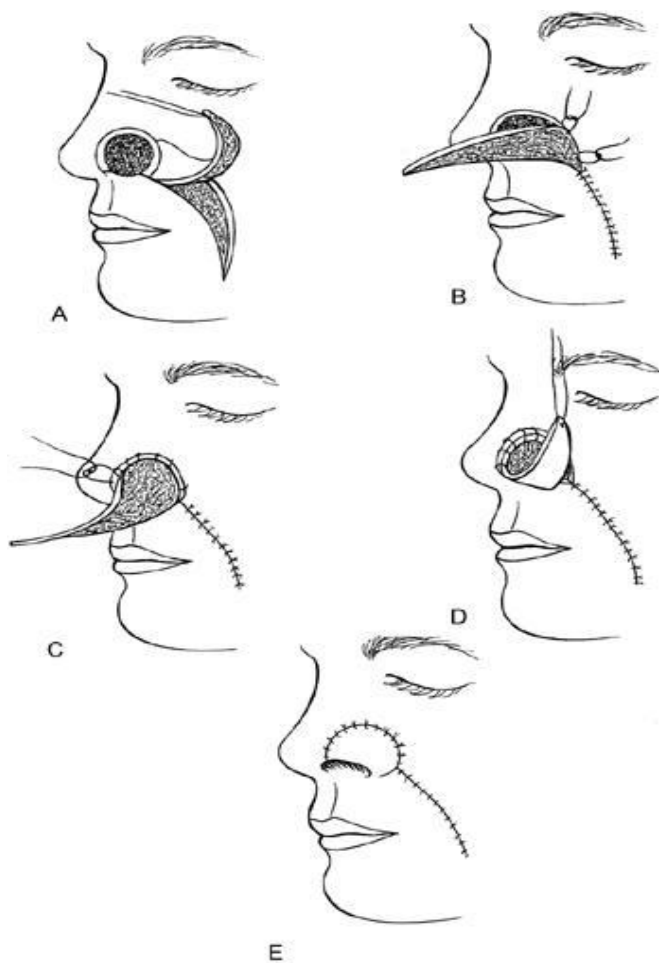
The nasolabial flap can be taken from the area of redundancy that extends from the inner canthus to the inferior margin of the mandible, especially in old patients, this area is considered the good donor area to cover nasal defects because of its proximity, the color match and the simplicity of transfer to the recipient areas of the nose [11]. The skin medial to the nasolabial fold should not be undermined because this might result in distortion of the alae, lip, or oral commissure [1].

The vascular anatomy of the nasolabial flaps is based on the angular artery (a branch from the anterior facial artery), the infra orbital artery, the transverse facial artery and the infra trochlear artery. Because of the rich vascular supplies and the free anastomosis between the terminal branches of the supplying vessels of the flap, superior, inferior, medial and lateral based flaps can be raised, due to rich sub dermal plexus the flap can

be used either a random flap based or as axial pattern flap [11].

The flap is elevated with only 2 mm to 3 mm thickness of the subcutaneous tissue [12], nasolabial flap can be staged as one stage for small defects < 1.5 cm within the ala or side wall [13] or as two stages or more for larger, deeper defects, nasolabial flap tissues are elevated and transposed (shifted) on a vascular pedicle and the pedicle is divided about three weeks later [13] and the remaining flap can be reinserted in to the cheek [11].

Modified nasolabial flap is the nasolabial flap in which the distal part of the flap is defatted leaving only the dermis and epidermis intact, the distal part of the flap is then folded and used as inner or outer lining which creates a reconstruction that is thinner than the original folded flap [14] (Fig. 4).



**Fig. 4** Reconstruction of the nasal ala with a nasolabial turnover flap [8].

The donor sites are usually closed by primary closure without noticeable facial distortion. Superiorly based nasolabial flap (Burget flap) is based upon angular artery and suitable for closure of defects involving the lower two thirds of the nose, which is important to prevent excessive wound tension when closing the donor site in the superiorly based flap to prevent ectropion of the lower eye lid [15]. Superiorly based flap may be used for defects of the nasal side wall, alar lobules, nasal dorsum and nasal tip.

The flap is designed so the final scar will lie exactly in the nasolabial crease, potential disadvantages include pin cushioning in the superiorly based flap and blunting or obliteration of the nasolabial sulcus.

Inferiorly based flap is most useful for reconstruction of the defects of the lower thirds of the nose (columella, nasal alae, nasal tip and floor of the nose). The rotation point of the inferiorly based flap is usually located just superolateral to the oral commissure. Because this is not a fixed anatomic point, it can usually be repositioned without distortion of the mouth and upper lip [1].

In addition to nasal defects, nasolabial flap can be used for reconstruction of the defects in the cheek, lips and eye lids as well.

The flap is traced 1 mm larger in all dimensions to allow for slight postoperative contraction [16], and the orientation of the pedicle is usually determined by the location of the defect and the requirement of rotation or advancement of appropriate tissues to the defects [11].

The flap thickness is also determined by the needs of the defect as well as the thickness of the donor tissues, the flap can be as thin as deep to the sub dermal plexus, and can be as thick as superficial to the facial musculature with their nerve supply intact. Sensory innervation comes from the infra orbital and mentalis branches of the trigeminal nerve [3].

The flap elevation can be easily done under local anaesthesia.

## 2. Patients and Methods

This study includes 40 patients with different nasal defects as a result of resection of nasal tumor and trauma in Burn and Plastic Surgery Hospital of Sulaimani and Private Clinic during the period of March 2005 to January 2015.

### 2.1 Surgical Technique

After evaluation of the site, size, and depth of the defects, reconstruction was done by nasolabial flaps. The flaps were designed according to the measured nasal defects, either superiorly based or inferiorly based according to the pattern of the nasal defects. In some cases especially with the alar defects, the nasal tissue (skin and subcutaneous tissue) between the nasal defects and the medial border of the flaps are removed in one stage nasal reconstruction. In case of a full-thickness alar defect, the distal end of the flap is thinned by defatting and the distal part is folded and used as an inner lining. The inner layer sutured from proximal to distal by absorbable suture (4-O Vicryl) and the outer layer is sutured by (5-O Prolene). Loose nasal pack is placed for two days and pressure dressing is placed and checked postoperatively.

Sutures are removed after 5-7 days postoperatively, Thirteen patients underwent superiorly based flap and 2 patient underwent inferiorly based flap. All the cases were operated on under local anaesthesia except two cases operated on under general anaesthesia due to extent of the defects. Drain was not used in any case. Photos were taken for all the cases (preoperative, intraoperative, and postoperative) for assessing the final results of the reconstruction functionally and aesthetically, the outcome was assessed objectively as well as subjectively.

All the cases discharged from the hospital at the same day of operation.

Follow up of the patients was done weekly for the first month and monthly for the next three months and then once for each three months.

### 3. Results

A total number of 40 patients (24 females and 16 males) were included (Fig. 5).

The male female ratio was 2:3 and the age ranged from 30 to 83 years. All the cases were treated by nasolabial flap for nasal defects (32 cases were partial thickness and 8 cases were full thickness) (Fig. 6).

The majority of the nasal defects were due to nasal tumor resection (35 cases of basal cell carcinoma) representing 87.5% and 5 cases due to trauma (3 cases road traffic accident (RTA) and 2 cases old burn) (Fig. 7).

The majority (36 cases) underwent procedure under local anesthesia by given of xylocaine 1% and adrenaline 1/200000, while in 4 cases, the procedure

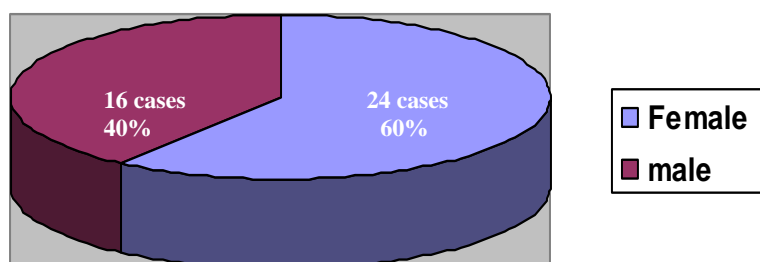


Fig. 5 Male/female ratio.

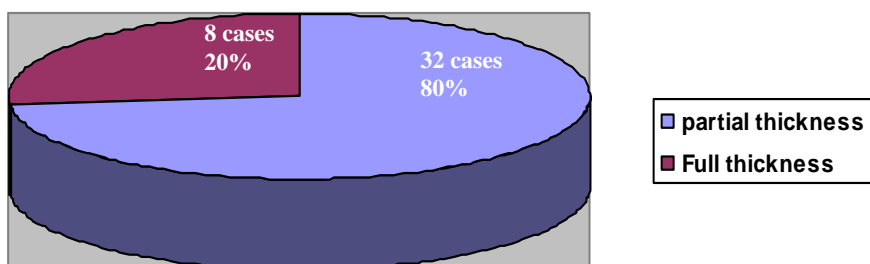


Fig. 6 Patterns of nasal defect.

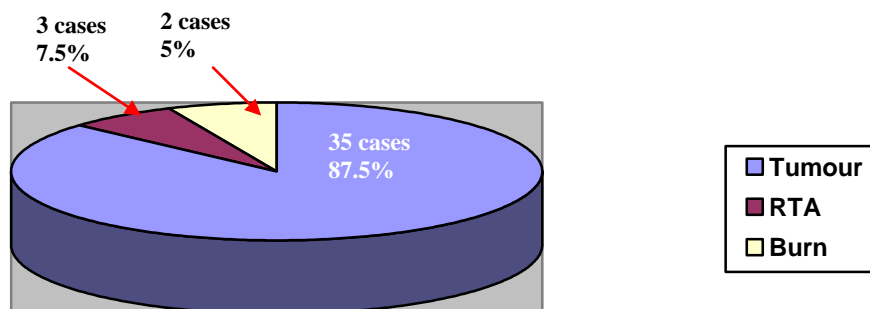


Fig. 7 Causes of nasal defect.

carried out under general anaesthesia due to extent of the defect.

A superiorly based flap was performed in 35 cases (87.5%) and in 2 cases as a modified superiorly based flap for full thickness alar defect as in Appendix A (Case No.1).

Inferiorly based flap carried out in 5 cases (4 cases for a defect involving part of the right ala and nasal side wall due to tumor resection as in Appendix A (Case No.2), and in another case used bilaterally for reconstruction of nasal alae in a burn patient). The procedure carried out in about 40 minutes only in one case. The operation time was about 1 hour due to extent of the defect to involve tip, dorsum and nasal alae as in Appendix A (Case No.3). All of the patients were discharged at the same day of operation except 2 cases in which the procedure performed under general anaesthesia, and they were discharged next morning.

The majority of the cases (36 patients) were treated by one stage nasolabial flap, while in 4 cases, second stage was performed for treating pin cushioning and dog ear.

In 2 cases in addition to nasolabial flap dorsal skin advancement with Z-plasty was done as in Appendix A (Case No.4), the skin flap was hinged to cover the defect inside the nose, and covered by inferiorly based nasolabial flap at both side as an outer layer.

No patient developed post operative complications like wound dehiscence, wound infection, haematoma, and flap failure.

All of the patients followed up post operatively for about 6 months to 10 years.

The majority of the cases were highly satisfied with the result; only 2 cases were satisfied that is due to extent of the defect. None of the cases showed dissatisfaction with the outcome of the surgery.

#### 4. Discussion

The goal of nasal reconstruction is functional with a good aesthetic out come. Nasal reconstruction is not an easy job in the field of plastic surgery.

Although the nasolabial flap cannot cover or repair a sever nasal defect but it has a great role in mild to moderate nasal defect reconstruction.

In 35 cases out of 40 cases, nasal defect location obliged us to use superiorly based flap and this is comparable with the other studies. All the flaps were done swith one stage procedure except two cases of them which demand second stage procedure for treating pin cushioning and dog ear after few months .

Superiorly based flap is more liable for developing pin cushioning and edema than inferiorly based because of flap design lymphatic and venous drainage are more liable for congestion, and this congestion is more if the patient is wearing eye glasses as it may aggravate flap edema. So we can use inferiorly based flap successfully for nasal side wall, partial-thickness alar defect and columella with good aesthetic outcome.

While superiorly based is more reliable in case of full-thickness alar defect than inferiorly based flap. In three cases with full-thickness alar defect, reconstruction were done by superiorly based flap with no use of chondrocutaneous graft with a good functional and aesthetic outcome and this is not comparable to the study the study by Massoud [17].

All the cases were treated with this flap without post operative complications like (wound dehiscence, flap necrosis, bleeding, haematoma and infection). This may be due to proper flap design, well intra operative haemostasis, good dressing and follow up and using of antibiotics (local ointment and systemic) and this is not going with other studies with post operative complications, e.g. Elliot, T. study [18].

#### 5. Conclusion

Superiorly based nasolabial flap is more reliable and suitable than the inferiorly based flap in case of complete alar reconstruction, while inferiorly based flap is more acceptable in case of small and partial nasal defect of the ala and nasal side wall with less chance of pin cushioning and edema formation.

Superiorly based flap can cover a larger defect of the

nasal side wall, dorsum, alar region and columella if compared to the inferiorly based flap because of the limited size of the inferiorly based flap.

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Appendix A Cases treated by Nasolabial Flaps



Case No. 1-a Pigmented BCC.



Case No. 1-b Design of superiorly based NLF.



Case No. 1-c Nasal defect after resection of the lesion.





Case No. 1-d Insertion of the flap to the nasal defect.



Case No. 1-e Postoperatively after 3 weeks.



Case No. 1-f Postoperatively after 3 weeks.



Case No. 2-a Nodular BCC.



Case No. 2-b Design of inferiorly based NLF.



Case No. 2-c Excision of the lesion with elevation of the flap.



Case No. 2-d Inserting of the flap.



Case No. 2-e Postoperatively after 5 months.



Case No. 3-a Superficial spreading BCC.



Case No. 3-b Design of superiorly based NLF.



Case No. 3-c Lesion excised with elevation of the flap.



Case No. 3-d Excised lesion.





Case No. 3-e Insertion of the flap.



Case No. 3-f Directly postoperatively.



Case No. 3-g One week postoperatively.



Case No. 3-h Three months postoperatively.



Case No. 4-a Pigmented BCC with ulceration.



Case No. 4-b Lesion marked with the safe margin.



**Case No. 4-c Lesion excised with the safe margin.**



**Case No. 4-d Lesion excised.**



**Case No. 4-e Lesion excised with elevation of the flap.**





Case No. 4-f Inserting of the flap.



Case No. 4-g Immediately postoperative.



Case No. 4-h Postoperative, after 6 months.