

## Versatility of Nasolabial Flap in Orofacial Reconstruction

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### ABSTRACT

**Aim:** The nasolabial flap has been widely employed as a versatile reconstructive option for small to moderate sized defects of oral & perioral regions. The nasolabial flaps are very useful, simple, easy to harvest local flap that can cover a variety of defects of the face and has robust vascularity that can be readily elevated without delay. This study was undertaken to establish the application of nasolabial flaps for surgical management of small to moderate sized oro-facial defect.

**Materials and Methods:** A total of 10 patients were selected based on the size of surgical defect. Nasolabial flap was used to reconstruct defects of small to moderate size in the oro-facial region and post-operative follow up was done.

**Results:** All of the patients underwent inferiorly based Transposition Island flap for reconstruction of different oro-facial defects. Few complications like bulky size of the flap, slight donor site distortion (scar formation) and intra-oral hair growth were seen in six patients. Two incidences of infection in the transferred flap were seen.

**Conclusion:** It is a safe minor procedure done under general anesthesia with good reconstructive results over small or moderately sized maxillofacial defects. Proper attention to flap design, operative technique and post-operative management are useful in reducing the incidence of complications.

**Keywords:** Island flap, Nasolabial fold, Scar.

### INTRODUCTION

With the advent of musculo-cutaneous flaps and microsurgical free tissue transfers, intra oral reconstructions have entered an area of sophistication where by defect of any size and complexity can be corrected. However at times these techniques appear inappropriate as either the defect seems to be too small or the patient's age & medical status do not permit a lengthy anesthetic surgical procedure.



The Nasolabial flap was first described in the works of Sushruta in 600 BC. Variations since then have included a full thickness cheek flap tunneled through a buccal incision as described by Thiersch in 1868<sup>1</sup>. Esser (1918) described a flap consisting of only skin, which subsequently required a second procedure to divide the pedicle and insert the flap<sup>2</sup>. The multiple branches passing from the facial and angular vessels to overlying Nasolabial skin provides versatility in flap design (Cornack and Lamberty, 1986). Defect of palate upper alveolus and upper lip are closed by

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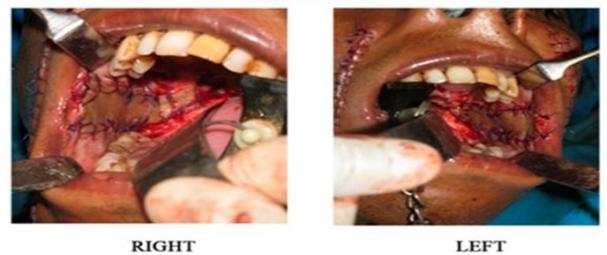
**Fig 1:** Pre-op Mouth Opening.



**Fig 4:** Flap Tunneling.



**Fig 2:** Markings for incision.



**Fig 5:** Flap placement.



**Fig 3:** Flap reflection.



**Fig 6:** Post-operative mouth opening.

superiorly oriented flap as this avoids twisting of the pedicle. Similarly, the reverse is true for lesions of floor of mouth, lower alveolus and lower lip. Therefore the Nasolabial flap proves itself to be a pedicled skin and musculo-cutaneous flap, inferiorly or superiorly based which can be used unilaterally or bilaterally for local extra and intra-oral reconstruction purposes. Hence this study was undertaken to establish the application of Nasolabial flaps for surgical reconstruction of small to moderate sized oro-facial defects. Also, this study was conducted to establish a simple direct logical

approach for reconstruction of various orofacial structures, to demonstrate the versatility of its use, to assess the flap vascularity, morbidity of donor site and to evaluate cosmetic and functional outcome of the flap.

**MATERIALS AND METHODS**

This study included 10 patients with different facial potential defect as a result of resection due to precancerous lesions. Patients were prospectively evaluated for suitability to nasolabial flap reconstructive technique by measuring the potential defect size, site and depth. All defects were small to moderate in size. Informed consent was taken. Preoperative laboratory and radiograph evaluations were done. Photographs were taken pre-operatively (Figure 1).

**PROCEDURE**

Nasolabial flap consists of a finger of tissue raised along the line of the nasolabial fold with its precise level on the cheek depending upon the geometry of transfer. It relies on the richness of subdermal circulation. All 10 patients were treated by single stage inferiorly based nasolabial flap surgery.

After the surgical excision, outline of the proposed nasolabial flap was measured using Boney’s Blue solution. A banner shaped flap was designed to be centered over the nasolabial groove (Figure 2). Appropriate measurements were taken.

The usual width is 1.5-2cm which was raised according to the nasolabial fold and cheek lateral to it. The distal tips of flaps were tapered at an acute angle of 35° or less. The length was

determined by the medial canthus so as to avoid ectropion of the lower eyelid. The flap was elevated at two levels. 1) At a level which included skin and some subdermal fat and 2) at a deeper level which included skin, subdermal fat and facial muscles, making it a musculocutaneous flap.

Flap elevation (Figure 3) was carried from superior to an inferior direction. Delicate handling of the flap is essential during elevation so that injury to any arteries is prevented. Following elevation of the flap and after securing complete hemostasis, the flap was rotated anteroinferiorly and tunneled (Figure 4) transbuccally. After tunneling the flap, capillary refill and viability were reassured. The base of pedicle as it enters the oral cavity was stabilized and secured. The flap was then sutured in place (Figure 5) over the surgical defect using 4-0 chromic catgut. The donor area of the nasolabial groove was closed in interrupted 4-0 dissolvable sutures in a subcuticular layer. Satisfactory healing of skin was achieved in 5-7days so the skin sutures were removed. Postoperatively functional and esthetic outcome of reconstruction of the concerned site was evaluated by clinical examination and post-treatment healing (Figure 6). In all the cases, patient review/follow-up was done at 2<sup>nd</sup> week, 4<sup>th</sup> week and 8<sup>th</sup> week post-operatively.

**RESULTS**

A total of 10 patients were selected for this study which included 7 male and 3 female patients in the mean age of 39.7±20.8. Out of ten patients, six were diagnosed to have oral submucous fibrosis and four patients had mild to moderate sized malignant lesions of oral cavity based on clinical and histopathological examinations. All the 10 patients underwent a single stage, inferiorly based

**Table 1:** Complications encountered by patients.

	Partial flap loss	Intra Oral Hair Growth	Donor site Distortion/Scar formation	Infection/Wound Dehiscence	Bulky Appearance
Absent	9	4	8	8	8
Present	1	6	2	2	2
Percent Absent	90	40	80	80	80
Percent Present	10	60	20	20	20

**Table 2:** Response of the patients for individual complication.

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
Partial flap loss	No	Yes	No	No						
Intra oral hair growth	Yes	Yes	Yes	No	Yes	No	Yes	No	No	Yes
Donor site Distortion/Scar formation	No	No	No	Yes	No	No	No	No	Yes	No
Infection/wound dehiscence	No	No	Yes	No	No	No	No	No	Yes	No
Bulky appearance	No	No	Yes	No	No	No	No	Yes	No	No

transposition island flap repair with a very satisfactory outcome.

Few complications like bulky size of the flap, slight donor site distortion (scar formation), intra-oral hair growth were seen in six patients, two patients had infection in the transferred flap. Complications due to vascularity (blue flap or white flap) were not encountered, except for slight ecchymosis at the flap tips and suture margins, which subsided after 2 - 3 days postoperatively.

All the 10 cases showed the prominent extra oral scars which became readily perceptible one month postoperatively and no incidence of hypertrophic scars was seen. Although the scars were perceptible in all cases, they were acceptable to the patients (Table- 1 and 2).

None of the cases showed flap loss, results were good and it was ideal local flap for small to moderate sized defect of oro-facial region and also for intra oral reconstruction. Flap acceptance was 100% in all the cases. It is a safe minor procedure which can be done under general anesthesia with which good reconstructive result can be achieved in patients having small or moderately sized maxillofacial defects.

## DISCUSSION

The past few decades have witnessed a sea of change in the development and usage of various reconstructive surgical techniques for the maxillofacial region. From the use of distant flaps to the present day, microsurgical free flaps, there has been a resolution in the field of oro-facial reconstruction.

The rationale for this study was based on a desire to bring out a solution which is simple, least technique sensitive and which gives excellent esthetic result with minimal number of

complications, thereby satisfying both the patient and the surgeon.

Various text and papers devoted to reconstructive surgery illustrate a wide variety of techniques using the nasolabial flap in oro-facial reconstruction. A number of recent publications have dealt with more specific defects, which lend themselves to correction by ingenious use of this flap. A total of 10 adult patients were taken up for study, in which there was adequate amount of lax skin which could be used for a cosmetic advantage. Patients who demonstrated small to moderately sized defects of the anterior oro-facial structures were taken in to consideration. Since it was described by Dupuytren and popularized by Diffenbach (1833) the nasolabial flap has been utilized extensively as a subcutaneous "random pattern" flap. For oral reconstruction, the nasolabial flap has been described in a more reliable two-stage procedure in which 1st stage involves initial development and subsequent detachment of the tunneled pedicle.

C. Loannoides and E. Fossion (1990) describe the single stage reconstruction as opposed to the traditional two-stage procedure and concluded it be a good alternative for reconstruction of moderately sized defects with minimal number of complications<sup>3</sup>. All ten patients underwent single stage inferiorly based transposition flap for reconstruction of different oro-facial subunits. Deepithelization and transbuccal tunneling was done and the flap was transposed as island flap. The versatility of its design and application is well demonstrated by its use in different anatomical location.

V. Uglesic and M.Virag (1995) described the use of musculomucosal nasolabial island flap for floor of mouth reconstruction. A similar flap (musculo mucosal) flap has been used to

reconstruct a lower lip defect. The flap was used as an inferiorly based axial pattern flap (Facial artery) and therefore could be adequately skeletonized to reach the recipient site without difficulty<sup>4</sup>.

The maximum size of the flap depending upon age of the patient and quality of skin is 9×3.5 cm (C.loannides et al) and therefore the reach of this flap to various anatomical sites were not at all difficult<sup>5</sup>.

Few other advantages which point out to the versatility of its design are that the flap can be rotated over a pivot point or can be used as a transpositional flap. The nasolabial flap proved itself to be extremely vascular and thus a safe flap to use. This can be attributed to the extensive vascular anastomatic network involving the facial, transverse facial and infra-orbital arteries. This was supported by D.C. Herbert (1995) who made extensive observations on the flap's blood supply and concluded that the flap should be based laterally or inferiorly or both<sup>6</sup>.

Few complications like bulky size of the flap and slight donor site distortion in two patients and intra-oral hair growth were seen in six patients. However, the bulkiness of the inferiorly based nasolabial flap may have disadvantages and may cause some difficulties in wearing dentures<sup>7</sup>. In this study group, two patients had bulky flap that did not pose much problems and was managed post-operatively by deepithelization on outpatient basis<sup>8</sup>.

In this study four patients had intra oral hair growth. The single stage procedure offers one less operation but may have potential risk of vascular problems, but here this problem was not encountered. Tethering and puckering of de-epithelized pedicle can be stressing problem in single stage procedure, but flap elevation is quick and simple with minimal donor site deformity. These are factors of importance in many of these patients because of their advanced age or poor medical risk. The donor site appearance was very acceptable in most patients. Only two of the 15 were dissatisfied, one of whom covered his scars with a beard. Intraoral reconstruction with the nasolabial flap is a simple and fast procedure and minimizes the morbidity relating to speech and swallowing impairment to a great extent<sup>9,10</sup>. Adequate oral function and esthetic result following

reconstruction of smaller defect of anterior floor of mouth were conferred by Hofstra et al<sup>11</sup>. Two cases of this study that underwent intraoral reconstruction of floor of mouth had no speech and swallowing impairment.

The complication rate of nasolabial flap in general is low. Warghese et al reported of a flap loss rate of 5.5 % (partial loss) and 6.3% (complete loss) respectively in their series of 238 patients<sup>10</sup>. In this group also one patient had partial flap loss out of ten patients that constitutes 10% partial flap loss. Garatea et al stated the necessity for facial artery preservation in neck dissection if nasolabial flaps are to be used<sup>12</sup> and Mutimer and Poole suggested that it may be safer to avoid using nasolabial flaps if a neck dissection is required<sup>8</sup>.

The use of nasolabial flaps in patients with limited defect of the anterior floor of mouth after tumor resection showed adequate functional and esthetic results<sup>13</sup>. Intraoral reconstruction using nasolabial flaps is a simple and fast procedure and can be recommended particularly in patients with medical comorbidities who are not candidates for time consuming operations including microsurgical reconstructions<sup>14</sup>.

## CONCLUSION

It is a safe minor procedure which can be done under general anesthesia with which good reconstructive result can be achieved in –patients with small or moderately sized maxillofacial defects. So, proper attention to flap design, operative technique and post -operative management are useful in reducing the incidence of complications. To conclude the nasolabial flap is the choice for immediate reconstruction of anterior oro-nasal defects following extirpative surgery.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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