

# UTILIZATION OF NASOLABIAL FLAP FOR RECONSTRUCTION OF ORAL CAVITY DEFECTS

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## ABSTRACT

*Objective of this study was to highlight the utilization of nasolabial flap for reconstruction of oral cavity defects. The study revealed the results of 21 nasolabial flaps in 14 patients over the period of two and a half year. The patients presented at the Department of Oral & Maxillofacial Surgery, King Edward Medical University/ Mayo Hospital, Lahore from November 2009 to November 2011 and at the Department of Oral & Maxillofacial Surgery, Fatima Memorial Hospital Lahore from May 2012 to October 2012.*

*In 08(57.14%) patients the defects were secondary to Oral Submucous Fibrosis of buccal mucosae; 03(21.43%) patients were with biopsy proven Squamous Cell Carcinoma of the oral cavity and in 02(14.28%) patients flap was used to cover the post traumatic oro-antral defects secondary to firearm and machine injuries to the maxilla. One patient (7.14%) had the defect after resection of the cystic lesion of the maxilla. Uneventful flap healing was observed in 20(95.24%) and partial flap loss occurred in only 01(4.76%).*

*It was concluded that the nasolabial flap is a reliable and minimally traumatic local flap for reconstruction of small-to-medium sized oral cavity defects with predictable functional and good aesthetic results.*

**Key Words:** Nasolabial flap, intraoral reconstruction, oral cavity defects.

## INTRODUCTION

Oral mucosal defects may be caused by many etiologies like benign and malignant epithelial lesions, infections like osteomyelitis, traumatic and firearm injuries to the orofacial region. Surgical defects of oral cavity and orofacial region are challenging because of the aesthetic and functional demands and dynamic nature of the area. A multitude of reconstructive options are available and with the advent of musculo-cutaneous flaps and free microvascular tissue transfer, orofacial reconstruction has entered an era of sophistication whereby repair of defects of all types and sizes has become possible. However, these techniques are not suitable for every patient, as at times, either the defect is too small or the patient's age and medical status do not permit a prolonged general anesthesia and lengthy surgical procedure. The nasolabial flap represents the available local tissue that often avoids these problems for repair of small or medium sized extra or intra-oral defects.<sup>1</sup>

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The first reported use of nasolabial flap as fascio-cutaneous flap dates back to 600BC, as described by Pers and then for many centuries it has been used for nasal and lateral lip reconstruction.<sup>2</sup> Thiersch was the first to use a transbuccal transfer of this flap for closure of palatal fistula and intraoral defects while Esser did a cutaneous nasolabial flap transfer in two stages to increase its reliability.<sup>3</sup> Wallace and Rose later introduced various modifications of the basic flap for single-stage transfer. Further flap modifications were introduced to obtain better cosmetic results and to cover relatively larger defects.<sup>3,4,6</sup>

The nasolabial flap is a local arterialized flap with an axial blood supply provided either by the facial artery (inferiorly based flap), or by the superficial temporal artery through its transverse facial branch, and the infraorbital artery (superiorly based flap).<sup>3,4,5</sup> Superiorly based nasolabial flaps can be used for reconstruction of nasal, lower eyelid, and cheek defects; whereas inferiorly based flaps are considered appropriate in reconstruction of defects of the lip, oral commissure and anterior oral cavity.<sup>8</sup> It is a reliable, versatile, and easy to raise flap for a variety of small to medium sized defects in the orofacial region. The first nasolabial flap for intraoral reconstruction was reported toward the end of the 19<sup>th</sup> century.<sup>6,7</sup>

Currently the proven reliability of the nasolabial flap, with its predictable functional and acceptable aesthetic results, makes it the ideal local flap for reconstruction of oral defects that are too large for primary closure and too small for conventional musculo-cutaneous and micro vascular free flaps.<sup>8</sup> Other major advantages of this flap are its versatility, easy to raise flap, a quick single stage procedure; and, its viability is not affected by facial artery ligation when synchronous neck dissection is performed in SCC patients.<sup>9,10</sup>

Though numerous large case series are available internationally but enough published data is lacking nationally as far as the usefulness of nasolabial flap is concerned for reconstruction of defects of oral cavity. This study showed useful results and showed the efficacy of this flap.

## METHODOLOGY

This study was conducted in the Department of Oral and Maxillofacial Surgery, King Edward Medical University/Mayo Hospital, Lahore, from November 2009 to November 2011, and at the Department of Oral & Maxillofacial Surgery, Fatima Memorial Hospital Lahore, from May 2012 to October 2012. A total of 14 patients were subjected to reconstruction of intraoral mucosal defects with 21 nasolabial flaps; 08(57.14%) were male and 06 (42.85%) were female patients with mean age of 27 years $\pm$ 10.31SD (range 21-62 years).

Patients with diagnosed oral squamous cell carcinoma (n = 03) underwent trans-oral tumor resection, supraomohyoid neck dissection (SOHND) and simultaneous reconstruction was done with nasolabial flap on left side in two patients and on right side in one patient. These OSCC Patients were also assessed for evidence of metastasis in the lungs or the liver by chest X-ray and abdominal Ultrasound. Bleeding and coagulation profiles, ECG, liver and kidney functions tests were routinely performed for the OSCC patients prior to surgery.

The reconstructive flap technique, procedure and the flap design was thoroughly discussed with the patients pre-operatively. An informed consent was signed by the patient and countersigned by the surgeon undertaking the procedure. Defects were either small sized (2cm) or small to moderate sized (2-4cm).

Nasolabial flaps were raised unilaterally in seven patients, bilaterally also in seven patients, comprising a total of 21 flaps. Flaps in all patients were performed as single-stage inferiorly-based nasolabial flaps. Complete surgical procedure was carried out in all patients under general anesthesia with nasotracheal intubation.

An inferiorly based nasolabial flap was marked and outlined in the cheek and flap marking was infiltrated with Xylocaine containing epinephrine with a ratio of 1:100,000 to achieve good hemostasis. The tip of the flap situated caudally to the medial canthus of eye depending on the required length of the flap. The flap base was situated little below or just above the commissure of the mouth. This flap design allowed a flap length of 5-7cm while width of the flap could be of up to 3-5cm as per requirement of the defect; the donor site was closed primarily with 5/0 Nylon (Polypropylene) sutures without tension at the donor site. The flap was raised in the supramuscular plane, keeping the flap base as thick as possible. Entrance of the flap into the oral cavity was gained by dissecting a transbuccal tunnel just opposite to the oral cavity defect. Care was taken not to injure the parotid duct while dissecting the tunnel. For the single-stage procedure, those parts of the flap pedicle were de-epithelialized carefully which were placed in the tunnel. Ultimately, the skin island covering the intraoral defect was sutured carefully into its final and definitive position with interrupted resorbable sutures. The mean operating time for flap was 30 minutes  $\pm$ 10 and the range was 25-40 minutes.

All patients were followed up for an average of 9 months postoperatively (range 6-15 months) for the functional and aesthetic outcome. Functional outcome was assessed based on wound infection, dehiscence, marginal necrosis and flap failure; and cosmetically donor site scar was assessed as patients' satisfaction whether excellent, good, fair or bad.

The collected data was entered into SPSS version 12.0 and analyzed. The variables of demography (age and sex) were presented as frequency tables giving mean and standard deviation of the age of the subjects. Any association between variables was tested for significance by applying the Chi square test. A p-value of 0.05 or less accepted as significant.

## RESULTS

Amongst a total of 21 flaps performed in 14 patients; uneventful flap healing was observed in 95.24% of the flaps. Partial flap loss was observed in one nasolabial flap (4.76%) of a patient showing a success rate of 95.24%. No patient reported with hypertrophied scar or major donor site morbidity. Aesthetically, postoperative scars were fair (six patients) to-good (eight patients) in all 14 patients. Only two patients needed a revision surgery for flap adjustments and correction of a dog ear in the donor site, three weeks after surgery.

## DISCUSSION

There are numerous options available for reconstruction of the oral cavity defects, depending upon the site, size and other requirements of the defect. For reconstruction of smaller defects of the oral cavity options range from primary closure to secondary healing from mucosalisation, or covering the defect site with split thickness skin grafts. Most of these modalities may result in speech and swallowing problems. The versatility and the usefulness of nasolabial flap is now well recognized in oro-facial reconstruction and intraoral use of the nasolabial flap is a simple, fast and reliable procedure and minimizes the morbidity related to speech and swallowing difficulties to a great extent.<sup>10,11,13</sup>

Varghese et al, (2001) published the largest case series of his work and experience of nasolabial flaps for intraoral reconstruction on 224 patients.<sup>10</sup> They used an inferiorly based nasolabial flap in 198 patients, whereas 24 patients were subjected to use a superiorly based flap. They reported significantly higher complications in post-irradiated patients than in primary cases ( $p = 0.03$ ). Van Wijk et al (2000) on the contrary, found no correlation between flap survival and radiotherapy. They actually relate this finding mainly to the excellent and robust vascularity of the nasolabial flap.<sup>11</sup> The complication rate of nasolabial flaps is generally low and post-operative results are acceptable even when compared to other distant reconstruction options.<sup>12</sup> Varghese et al. (2001) reported a flap loss rate of 5.5% (partial flap loss) and 6.3% (complete flap loss) respectively in their case series of 238 patients.<sup>10</sup> Comparable results of 5% partial flap were reported by van Wijk et al. (2000).<sup>11</sup> In our study we achieved the flap success rate of 95.24% ( $n=14$ ) and minor wound infection was

observed initially in two flaps. We employed conservative measures like daily washing with normal saline and antibiotic coverage for ten days. Wound infection settled well in one patient but partial flap loss occurred in the second patient despite of these measures. We debrided the involved portion of the flap and then achieved healing by secondary intention. With partial flap loss rate of 4.76%, the results of our study are in the range of other published data regarding flap success.<sup>10,11</sup>

Hofstra et al (2004) in their study also described good oral function and esthetic results following reconstruction of small defects of the anterior floor of mouth with nasolabial flap.<sup>14</sup>

Eckardt et al in their recently published case series of 29 nasolabial flaps in 22 patients, concluded that the nasolabial flap is predictable and valuable alternative for reconstruction of smaller defects of the oral cavity, particularly in older and medically compromised patients. They reported a success rate of 93% ( $n=22$ ) while partial or complete flap loss was observed in 7% cases.<sup>15</sup>

A general consensus has been evolved about the validity of this flap that exceeds 90%.<sup>10,16,17</sup> Though a few authors also reported flap viability of 100% in their studies but we could have a flap success rate of more than 95.24%, that corresponds to many contemporary studies' results.<sup>15,17</sup>

Inferiorly based fascio-cutaneous flap is the most commonly used type of nasolabial flap for one stage, lip and intraoral reconstruction.<sup>1,16,18</sup> In this study all flaps were utilised as inferiorly based nasolabial flaps for intraoral reconstruction.

In past suspicion has been raised but now many authors support the notion that no adverse effects on blood supply of the flap were observed in cases who undergone neck dissection with simultaneous harvesting of a nasolabial flap on the same side.<sup>11,19</sup> This actually corresponds to the assumption that not only the facial artery, but probably a rich subdermal-plexus also supplies the flap.<sup>20</sup> With our own little experience of three patients with oral squamous cell carcinoma, simultaneous Supraomohyoid Neck Dissection (SOHND) on same side had no negative impact on flap vascularity, healing and overall survival.

Cosmetically donor site scar was assessed as patients' satisfaction whether excellent, good, fair or bad. All 14 patients looked fair (six patients)-to-good (eight patients) at the end of the study. Our aesthetic results correspond to those described by Ali H. Mebed, et al. (2009) in their study.<sup>17</sup>

Intraoral reconstruction using nasolabial flaps is a simple and fast procedure and can be recommended, particularly for the patients with medical co morbidity.

ties who are not good candidates for time-consuming operations including microsurgical reconstructions.

## CONCLUSION

The nasolabial flap is a reliable and minimally traumatic local flap for reconstruction of oral cavity defects with predictable functional and reasonably good aesthetic outcome.

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