

## Pedicle nasolabial flap as graft in oral submucous fibrosis

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### Abstract

**Introduction:** Oral submucous fibrosis (OSMF) is chronic, insidious, debilitating condition of oral cavity and sometimes pharynx, characterized by progressive hyalinization of juxtaepithelial tissue and progressive fibrosis of the oral cavity. This precancerous condition is caused by betelnut chewing and is mainly endemic to the Asian subcontinent. Arecanut is identified as group one carcinogen by International Agency for research on cancer (IARC). OSMF has a high malignant transformation rate of 7-30%.<sup>5</sup> A variety of treatment modalities are suggested. None of the modalities provide the complete remission of the disease and are aimed at improving the functions of the mouth like chewing and opening of mouth.

**Materials and Methods:** Five patients in stage III or IV were treated with the incision of bands, and reconstruction with pedicle nasolabial flap.

**Results:** The preoperative, intraoperative and post-operative mouth opening were compared. There was significant increase in intraoperative and post operative mouth opening. The mean increase of intraoperative mouth opening was 25.6mm and mean increase of post-operative mouth opening was 19.2mm.

**Discussion:** Nasolabial flap has been used for reconstruction of many extraoral and intraoral defects. This versatile flap is well vascularized supplied by facial artery and angular artery. There is a minimal donor site deformity and good esthetic results postoperatively. We used a single stage nasolabial island flap to reconstruct the tissue in OSMF. We did this study to evaluate the outcomes of a nasolabial island flap pedicle on facial artery postoperatively.

**Keywords:** OSMF, Nasolabial flap.

### Introduction

Oral submucous fibrosis (OSMF) is chronic, insidious, debilitating condition of oral cavity and sometimes pharynx, characterized by progressive hyalinization of juxtaepithelial tissue and progressive fibrosis of the oral cavity. This precancerous condition is caused by betelnut chewing and is mainly endemic to the Asian subcontinent.<sup>1,2</sup> The habit of chewing betel quid, containing fresh, dried or cured areca nut, catechu with or without tobacco, slaked lime and flavoring ingredients wrapped in betel leaf is widespread in India, Pakistan, Bangladesh and Sri Lanka and in immigrant populations from these regions. Epidemiological data show that the number of cases has increased rapidly in India from an estimated 250,000 cases in 1980 to 2 million cases in 1993.<sup>3</sup> Arecanut is identified as group one carcinogen by International Agency for research on cancer (IARC).<sup>3-5</sup> OSMF has a high malignant transformation rate of 7-30%.<sup>1-5</sup> OSMF was first reported by Schwartz in 1952 among 5 Indian females from Kenya and he coined the term 'AtropicalIdiopathica Mucosae Oris' to this condition. In 1953, Joshi described this condition as 'Submucousfibrosis'.<sup>6,7</sup> A condition resembling OSMF was described as early as 600BC by Sushruta, and it was named as 'Vidari' having features of progressive narrowing of mouth, depigmentation of oral mucosa and pain on having food.<sup>8</sup> The pathogenesis of OSMF is that the alkaloid contents of betel nut like arecoline, arecaidine, guvacine, and guvacoline stimulate fibroblasts to produce collagen Flavonoids

inhibit collagenase, stabilise the collagen fibrils, and render them resistant to degradation by collagenase. This increased collagen formation leads to formation of fibrous bands in oral mucosa and are responsible for progressive reduction of mouth opening. A variety of treatment modalities are suggested.<sup>4,9</sup> None of the modalities provide the complete remission of the disease and are aimed at improving the functions of the mouth like chewing and opening of mouth. Nasolabial flap has been used for reconstruction of many extraoral and intraoral defects. This versatile flap is well vascularized supplied by facial artery and angular artery.<sup>10</sup> There is a minimal donor site deformity and good esthetic results postoperatively. We used a single stage nasolabial island flap to reconstruct the tissue in OSMF. We did this study to evaluate the outcomes of a nasolabial island flap pedicle on facial artery postoperatively.

### Materials and Methods

Our protocol to address the OSMF is as follows –

1. Stop the areca nut, betel quid and any other tobacco habits
2. Medicinal treatment with lycopene 16 mg per day for three months for the patient with mouth opening more than 20mm and surgical treatment for patients with mouth opening less than 20mm.

This was the prospective study done from 2010 to 2017 in which the patients treated with single stage nasolabial island flaps were evaluated. The study was approved by institutional review board and the protocol

complied with the world medical association declaration of helsinki. Five patients with OSMF were included in this study.

**The inclusion criteria were:**

1. Age group – 20 to 50 years
2. Mouth opening – less than 20 mm

**The exclusion criteria were:**

1. Immunocompromised patient
2. Patient underwent radiotherapy in head and neck region

**Surgical protocol**

1. The surgical procedure is carried out under antibiotic coverage. The fiberoptic nasotracheal intubation done for all the patients.
2. Fibrous bands incised along the occlusal plane from corner of mouth anteriorly to soft palate posteriorly with electrocautery.
3. Biopsy of the relevant tissue.
4. Bilateral coronoidectomy or coronoidotomy.
5. Removal of ipsilateral maxillary third molar or any other buccally malposed teeth which might impinge on graft.
6. Grafting with the nasolabial island flap based on facial artery.
7. Aggressive physiotherapy from 10<sup>th</sup> day to six months postoperatively.
8. Educating the patient about OSMF and counselling to stop the habit at every visit.

A variety of treatment modalities are suggested depending on the stage of the disease. Our protocol to treat this disease is as follows:

1. Stop the habit.
2. If the mouth opening is more than 20 mm, we do the medicinal treatment for three months with the lycopen tablets.

3. If it is less than 20 mm we do the surgical treatment.

The surgical protocol is as follows:

1. Incise the bands along the occlusal plane from corner of mouth to posteriorly till pterygomandibular raphae.
2. Ipsilateral upper third molar removal if erupted in oral cavity or other buccally malposed teeth which might impinge on graft.
3. Grafting with the pedicled nasolabial flap.
4. Aggressive physiotherapy for six months

Technique of harvesting the graft: The marking of nasolabial flap is done medially along the nasolabial fold. The lateral marking depends on the pinch test after determining the laxity of adjacent tissue for the tension free closure. Superiorly the marking is extended just below the inferior orbital rim. Inferiorly the extent depends on the length of tissue required for the closure intraorally. The incision is marked and dissection carried out while preserving the facial artery which runs superiorly and medially from anterior border of masseter to half a cm from angle of mouth and terminates as angular artery close to medial canthus. The flap is elevated from superior to inferior and the facial artery is followed. Inferiorly the flap is skeltanized to facial artery. Medially near modiolous, around 2cm wide tunnel is made and the whole flap is tunneled in. The superior margin abuts the palate and the inferior margin abuts the corner of mouth. Closure is done with 3-0 vicryl.

The patients were evaluated preoperatively and five were selected, 3 were in stage III and 2 were in stage Iva (Table 1).

**Table 1: Pre-operative evaluation**

Case	Age /gender	Chief complaint	Duration of habit	Stage of presentation and mouth opening
1	38/m	Inability to eat spicy food and reduced mouth opening	20 years	IVa/ 5mm
2	42/m	Inability to eat spicy food and reduced mouth opening	8years	III/18mm
3	28/m	Inability to eat spicy food and reduced mouth opening	10years	IVa/11mm
4	24/m	Inability to eat spicy food and reduced mouth opening	7years	III/16mm
5	36/f	Inability to eat spicy	5 years	III/20mm

		food and reduced mouth opening		
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## Results

Patients with stage III (mouth opening 15 - 25mm) and stage IV (mouth opening less than 15 mm) were treated in this study. The preoperative, intraoperative and post-operative mouth opening were compared. There was significant increase in intraoperative and post operative mouth opening. The mean increase of intraoperative mouth opening was 25.6mm and mean increase of post-operative mouth opening was 19.2mm (Table 2).

**Table 2: Evaluation of mouth opening**

Mouth opening	Case 1	Case 2	Case 3	Case 4	Case 5
Initial	5mm	18mm	11mm	16mm	20mm
Intra operative	35 mm	40mm	38mm	40 mm	45mm
Post-operative	25mm	32mm	35mm	36mm	38mm

Patients were also evaluated for wound dehiscence, wound infection, scar, facial nerve damage extraorally and intraorally for dehiscence, infection, vascularity of flap and hair growth (Table 3).

The complication which we encountered were minimal intraoral hair growth, mild dehiscence and wide scar in one case. There were no incidences of flap necrosis and flap failure.

**Table 3: Post-operative evaluation of the patient**

Criteria	Case 1	Case 2	Case 3	Case 4	Case 5
Extraoral					
1. wound dehiscence	Not present	Mild medially	Not present	Not present	Not present
2. Wound infection	Not present	Not present	Not present	Not present	Not present
3. Scar	Acceptable	Wide scar	Acceptable	Acceptable	Acceptable
4. facial nerve damage	Not present	Not present	Not present	Not present	Not present
Intraoral					
1. wound dehiscence	Not present	Not present	Not present	Not present	Not present
2. wound infection	Not present	Not present	Not present	Not present	Not present
3. hair growth	Present	Present	Not present	Present	Not present
4. vascularity of flap	Good	Good	Good	Good	Good

Pedicled nasolabial flap is a vascular flap based on the facial artery. It is a versatile flap used for reconstruction of multiple defects in orofacial region. It is ideally suited for the reconstruction of buccal mucosa in OSMF as

1. The tissue is locally available and can be easily tunneled in oral cavity.
2. The tissue is not native to oral cavity hence, recurrence of OSMF in this tissue does not usually occur

## Discussion

The treatment of Oral submucous fibrosis is mainly aimed at relieving the symptoms of the disease and to detect the malignant changes at the early stage. A variety of surgical and nonsurgical treatment modalities have been suggested in literature. Habit cessation is considered a single most important factor for the

resolution of symptoms of OSMF. Nonsurgical methods mainly use antioxidants and are reserved for initial mild cases. In surgical treatments, the excision of fibrous bands with split thickness skin grafting, buccal fat pad grafting, tongue graft, nasolabial flap and freeflaps have been used. The concept of using the excess tissue of the nasolabial fold to reconstruct nearby defects dates back to 1830 when Dieffenbach used superiorly based nasolabial flaps to reconstruct defects of the ala of the nose. In 1917 Esser used inferiorly based nasolabial flaps to repair palatal fistulae. Since then, various modifications of the flaps have been used, ranging from the conventional pedicled flap (superiorly or inferiorly based) to subcutaneously pedicled flaps and facial-artery island flaps.<sup>11</sup> The results of split thickness skin grafting have been very disappointing because of postoperative contracture of graft during healing period. In our centre we did not get

good results with the buccal fat pad grafting and tongue flaps also. In buccal fat pad graft, the amount of graft available is highly variable and many a times insufficient. The BFP also heals by secondary epithelization which leads to relapse of the mouth opening achieved. The tongue is usually involved by the disease and the transfer of this tissue did not give a good postoperative mouth opening. The nasolabial flap is nourished by alar branch of the superiorlabial artery, which is a branch of the facial artery, and by the terminal branches of the facial artery, which is called the angular artery near the dorsum of the nose. Further superolaterally the skin is nourished by the infraorbital artery (a branch of the ophthalmic artery) and the transverse facial artery, both the superior and inferior based flaps can be used. Before we were doing a two-stage inferiorly based nasolabial flap and sometimes we had failures because of strangulation of the pedicle leading to the fibrosis of flap. It was also uncomfortable for the patients to undergo two surgeries. The pedicled single stage nasolabial flap has minimal chances of strangulation of feeder vessel, postoperative mouth opening is maintained and comparatively more comfortable for the patient. The only complication is minimal postoperative scar which was acceptable for most of the patients.

#### **Compliance with ethical standards**

**Funding:** none

**Conflict of interest:** Author declares there is no conflict of interest

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with

the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards

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