

# Efficacy of Buccal Fat Pad and Nasolabial Flap in Management of Oral Submucous Fibrosis: A Systematic Review

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**Abstract:** *Background:* Oral submucous fibrosis (OSMF) is a potentially malignant disorder of the oral cavity. The surgical management of this condition involves excision of the fibrotic bands and interpositional grafts to retain the increased oral opening. Various procedures and graft material have been utilized with differing success rates. *OBJECTIVE:* is to collect and analyze from world literature two different techniques that is the buccal fat pad and nasolabial flap in the surgical management of OSMF. The reasons for the choice of a particular surgical procedure, the study protocol, the average follow-up period and the results were analyzed. *Study Eligibility Criteria:* Inclusion criteria include articles in English literature, articles published between from Jan 2000 to Dec 2017, RCT, and clinical trials. Exclusion criteria includes reviews, case reports, letters, abstracts, editorials, historical reviews and in vitro studies, full text articles not available in spite of writing to authors. *Materials and Methods:* The PRISMA protocol was followed for the systematic review. Search engines and medical databases like PubMed, Google Institutional Library was conducted. The search words OSMF, Buccal fat pad, nasolabial flap, interincisal opening, were used for retrieval of data. *Results:* The review resulted in a total of 3 articles. A total of 78 surgically treated cases were included in the analysis. The choice of procedure seems to be determined entirely by the preference of the surgeon. This review shows that buccal fat pad offers better interincisal opening than nasolabial flap as seen in all the three articles.

**Keywords:** Buccal fat pad, Nasolabial flap, Oral submucous fibrosis, Interincisal opening

## 1. Introduction

The dawn of civilization heralded the ascent of science. Human science is the relationship between various humanistic modes of enquiring within the field such as history, sociology, anthropology and economics.

The advancement has lead towards evolution of mankind from the caves to the modern world. Thus science has developed many ways in improving knowledge and lifestyle in humans. Scientific knowledge and studies have proved remarkable advances in diagnosis and treatment of various diseases. Thereafter untreated diseases are made possible to be cured.

With the progress of technology, mechanization and development, there is increased workload with elevation of stress levels among people. To find refreshment and relaxation from work man began to indulge in deleterious habits like tobacco chewing, alcohol and smoking. These habits made man their slave, which is known as addiction. Such habits cause dependency and harmful effects to the body. One of

the reactions of chewing gutka/betel nut is Oral Submucous Fibrosis (OSMF).

Uptil the year 1952, there was no data describing this condition. Schwartz gave it re-cognition as 'atrophicaidiopathica mucosa oris'.<sup>4</sup> In 1953 Joshi coined the term 'Oral Submucous fibrosis.'<sup>4</sup>

This condition is defined as - 'a chronic insidious disease affecting any part of the oral cavity and may extend to the pharynx and the oesophagus, and may be preceded or associated with vesicle formation. It is always associated with juxta-epithelial inflammation and followed by fibro-elastic change of the lamina propria with epithelial atrophy leading to stiffness.'<sup>6</sup>

Paymaster in 1956 was first to described the precancerous nature of this condition with malignant transformation risk of 1.9–7.6 %.<sup>5</sup>

Surgical management of OSMF has involved excision of the fibrotic bands i.e fibrotomy followed by bilateral coronoi-

dectomy and interposition of graft using buccal fat pad / nasolabial fat pad.<sup>2</sup>

Sushruta Samhita first mentioned the use of the nasolabial flap.<sup>8</sup>Thiersch (1868) was the first to use a transbuccal transfer of a nasolabial flap for closure of an oral cavity defect.<sup>9</sup>

Buccal fat pad was first revealed by Heister in 1732 and described in 1801 by famous French anatomist Xavier Bichat and was introduced in medical literature as the "boule de Bichat".<sup>10</sup>

The present review aimed at accessing information regarding the surgical modalities for treatment of OSMF from the available literature.

## 2. Materials and Methods

### 2.1 Focused Question

Is buccal fat pad a better option compared to nasolabial flap in improving the interincisal opening of patient in Oral submucous fibrosis?

### 2.2 Study Objective

To evaluate and compare the nasolabial flap and buccal fat pad in management of oral submucous fibrosis.

### 2.3 Eligibility Criteria

- Articles published between from 2000 to 2017
- RCT, clinical trials were included.

### 2.4 Exclusion criteria

- Reviews, case reports, letters, abstracts, editorials, historical reviews and in vitro studies were excluded from the study.
- Full text articles not available in spite writing to authors.
- Articles other than English literature.

### 2.5 Study Variables

Participants-Patients with oral submucous fibrosis.  
Intervention- Treatment done using buccal fat pad.  
Comparison- Treatment done using nasolabial flap.  
Outcome- Interincisal opening.

#### a) Database search and search strategy

Multiple internet sources were used in the search of appropriate articles satisfying the purpose of the study. The PubMed databases (Medline database, free open access of PubMed central and free full text articles) and the Cochrane databases (the Database of Abstracts of Reviews of Effects and and the central register of controlled trials) , Google Scholar, Google and manual search using DPU college library resources were used. All cross reference lists of selected studies were screened for additional papers that could meet the eligibility criteria of the study. English language limit was applied. Only studies carried out on humans were included. The databases were searched for studies carried out from 1/1/2000 to 31/05/2017 using the search strategy.

**Table 1**

Keyword	Synonyms
Buccal fat pad	sucking pad, bichat`s flap
Nasolabial flap	
Oral submucous fibrosis	fibrosis of submucosal tissue, submucous fibrosis
Interincisal opening	Interincisal distance

**Table 2: Search Strategies Used**

Sr. No	Search strategy	Number of articles found	Number of articles selected	No. after Duplicate removal
1	buccal fat pad AND nasolabial flap	5	3	3
2	bichat`s flap AND nasolabial flap	0	0	0
3	buccal fat pad AND nasolabial flap AND oral submucous fibrosis	3	3	3
4	buccal fat pad AND nasolabial flap AND interincisal distance	1	1	1
5	buccal fat pad AND nasolabial flap AND interincisal opening	1	1	1
6	bichat`s flap AND nasolabial flap AND oral submucous fibrosis	0	0	0
7	bichat`s flap AND nasolabial flap AND interincisal opening	0	0	0
8	(buccal fat pad OR bichat`s flap) AND nasolabial flap	10	4	1
9	(buccal fat pad OR sucking pad) AND nasolabial flap	10	5	1
10	Other sources	0	0	0
	Total	30	17	10

### 2.6 Study Selection

Preliminary screening consisted total of 30 articles out of which 17 articles were selected. Data was extracted independently by PB and the data extraction was confirmed by invigilators PW and SB. At first the papers were screened by title and abstract. As a second step, full text papers were obtained when they fulfilled the criteria of the study aim. Any disagreement between the two reviewers was resolved after additional discussion. For full-text screening, the following criteria were taken into consideration: randomized controlled trials, controlled clinical trials, and the key words in their various permutations and combinations. After the full text articles were reviewed, cross references were checked and a total of 3 articles were found and included in the study.

### 2.7 Data Collection Process

A standard pilot form in excel sheet was initially used. Data extraction was done for one article and this form was reviewed by an expert and finalized. This was followed by data extraction of the remaining article.

Data Items Included-

- Study ID
- Location- The city/country where the study was conducted.

- 3) Author- The names of the authors who conducted the study.
- 4) Year of publication- Year in which the study was published
- 5) Study design- Randomised control trial/Retrospective clinical study/ case report
- 6) Sample size- Number of patients included in the study.
- 7) Setting- Hospital/Maxillofacial department.
- 8) Population- The group OSMF patients.
- 9) Intervention- The treatments that were given i.e buccal fat pad.
- 10) Comparison- nasolabial flap.
- 11) Operating time ( in minutes)- Time taken for completion of each of the procedures
- 12) Outcome – interincisal opening.
- 13) Results
- 14) Remarks

### 3. Discussion

The purpose of the study is to evaluate and compare the efficacy of buccal fat pad and nasolabial flap in surgical management of oral submucous fibrosis (OSMF).

Oral submucous fibrosis is a precancerous condition with high prevalence in the Indian subcontinent.<sup>1</sup> Chewing of betel nut and tobacco is the most common etiological factor.<sup>2,13</sup>

The most frequently affected locations in fibrosis are the buccal mucosa and soft palate, palatal fauces, uvula, tongue, the retromolar region.<sup>11</sup>

Inability in mouth opening due to fibrosis leads to difficulty in mastication, swallowing food bolus, pain in throat and burning sensation in oral cavity.<sup>3</sup> In beginning, fibrosis is seen anteriorly surrounding the lip, then extending posteriorly to retromolar region and spreading throughout soft and hard palate including floor of the mouth and restricted tongue movement.<sup>3</sup>

There are various treatment options available for management of OSMF. Conservative methods include, topical application of steroid ointment, intralesional injection of steroids- hyaluronidase.<sup>2,13</sup> Conservative adjunctive surgical procedures like bilateral coronoidectomy, third molar extraction in addition to excision of fibrous bands and interpositional grafts are used in areas of band excision. Various local flap used were tongue flap and palatal island flaps, buccal fat pad, nasolabial flap, temporalis fascia flap.<sup>2,11</sup>

Biwinged nasolabial flap is standard surgical procedure for reconstruction of defect in OSMF.<sup>10</sup> Advantages of nasolabial flap are rich in vascularity, versatility in design, proximity to the defect, flap elevation is easy, supple skin, which results in increased mouth opening and minimal esthetic deformity.<sup>12</sup> Disadvantages of this flap are intraoral hair growth and occasional hypertrophic scar at the donor site<sup>10</sup>

Buccal fat pad is very logical, convenient and reliable technique for treatment of OSMF. Buccal fat pad provides excellent function without deteriorating the esthetics.<sup>3</sup> On average,

the volume of BFP is 9.6 mL (range, 8.3-11.9 mL).<sup>14,15</sup> Disadvantage is severe atrophy in chronic cases.

A retrospective study was done in Lucknow in which they included 50 patients of OSMF with age range from 17-68 years. Patient with clinical signs like blanched oral mucosa, involving tongue, mouth opening up to 6-25 mm were included in the study. Fibrotomy was done by giving incision along occlusal line starting from angle of mouth to retromolar region. Ferguson's mouth gag was used to achieve maximum interincisal opening. Patients were divided in two groups. In group I blunt dissection was carried out through the buccinator muscle to reach the body or the buccal extension of the buccal fat pad. The buccal fat pad was then gently teased into the defect, taking care not to rupture its delicate capsule. Adequate volume was harvested to ensure tension-free closure. In group II flap of about 4 x 1.5 cm in size was designed on the nasolabial fold area with sufficient length and width to fill the defect without tension.<sup>10</sup> Incision was carried out up to the subdermal tissues. The flap was raised by blunt dissection, taking care not to disturb the facial muscles. After raising the flap, a liberal tunnel was made near the base of the flap, to facilitate uncompressed entry of flap into the oral cavity. The flap was then de-epithelialized at its base; along the portion that would rest in the myomucosal tunnel, followed by its rotation in the oral cavity, and sutured using 3-0 black silk. The lateral skin flaps were then undermined just beneath the dermis to facilitate subcuticular closure using 4-0 prolene. Pressure dressing of sterile gauze wrapped in Framycetin gauze was then placed intraorally over the graft to maintain intimate relationship of the graft to the mucosal defect. The outcome of this study was assessed by pain, esthetic and function. Author in this study found mean preoperative and postoperative mouth opening 14mm, 34.36mm respectively and 2 year postop 34.36mm. They concluded that buccal fat pad served as the best substitute, because it provides excellent function without deteriorating the esthetics. Nasolabial flap provided both function and esthetics and was extremely good in older patients, it offered ease of surgery. Mouth opening and function achieved with nasolabial flap was long term. The most unwanted outcome is extra-oral scarring which hampered the facial esthetics.<sup>2</sup>

A comparative study of 20 patients of OSMF with age range from 18-49 years was conducted. Patients with mouth opening of less than 20 mm, painful ulcerations, burning sensation, intolerance to spices, a habit of betel nut or tobacco chewing were included. Patients were divided in two groups (Group I and Group II). Incision was made with cutting diathermy from corner of the mouth to soft palate. Fibrotomy and coronoidectomy was done bilaterally. The maxillary and mandibular third molars were extracted. In group I (n- 10) Nasolabial flaps were raised bilaterally in the plane of superficial muscular-aponeurotic system. The flap was transposed intraorally through a small transbuccal tunnel near the commissure of mouth and sutured without tension. In (group II) the BFP was teased out gently until enough was obtained to cover the raw area without tension. They found the mean pre and postoperative interincisal opening in Group I were 10 mm and 32 mm respectively, while in Group II the values were 12 mm and 29 mm. They concluded that BFP was superior to nasolabial flap in reconstruction of the defect with

improved mouth opening. Extraoral scarring and intraoral hair growth were most of the common complications. Due to extraoral scarring the patient's compliance was not very good as far as facial aesthetic is concerned in Group I patients.<sup>3</sup>

A comparative study was carried out in 8 patients of OSMF with age range from 21-65years. Patients had an advanced stage of OSMF with mouth opening less than or equal to 15mm. Incision was taken along the occlusal line away from Stenson's duct orifice. Incision extends from anteriorly corner of the mouth to posteriorly pterygomandibular raphe. Then by using Fergusson's mouth gag, mouth was forcefully opened to achieve 40-45mm of interincisal opening. In group I, extraction of upper and lower third molars was done. After incising the fibrous bands and achieving acceptable range of mouth opening, bilateral elliptical shaped nasolabial flaps were marked, extended from the tip of the nasolabial fold to the inferior border of the mandible. The medial incision line followed the nasolabial folds till the inferior third and the width of the flap was kept 1.5-2 cm with medial and lateral limbs. Bilaterally, flaps were raised in the plane of superficial musculoaponeurotic system from both ends to the region of central pedicle 1 cm away from the corner of the mouth. A trans-buccal tunnel was created near the region of modulus. The flap was then transposed intraorally in a tension free manner and sutured to the anterior edge of the defect using 3-0 monocryl suture. The donor site was in the subcutaneous plane and layerwise closure done with 3-0 Vicryl for deeper layer and 5-0 prolene for skin. In group II buccal fat pad was approached through the postero-superior margin. After blunt dissection, buccal fat pad was teased out gently with index finger until sufficient amount was obtained to cover the defect without tension. Buccal fat pad was then secured over the defect with 3-0 Vicryl sutures. Initial physiotherapy was started within 48 h post operatively. Intense physiotherapy was started using Heister's mouth gag. The mean preoperative mouth opening in group I was 8.5 mm and in group II was 11.75 mm. In group I, mean one year postoperative mouth opening was 30 mm and in group II was 36.50 mm. The results revealed that extended nasolabial flap led to statistically non-significant changes in the mouth opening over a period of time with p value of 0.265. However, buccal fat pad graft method showed statistically significant improvement in the mouth opening over a period of time with p value of 0.043.<sup>7</sup>

In this systematic review all studies included were from India from year 2000 to 2017. Each study was carried out in hospital. Total number of 78 patients were studied. Patients included in these studies were suffering from reduced mouth opening, blanched mucosa, and fibrosis of lip, reduced tongue movement, ulcerations and burning sensation and intolerance of spicy food. Patients developed this condition were due to repeated use of betel nut, tobacco chewing habits. Patients were taken under general anesthesia, forceful mouth opening was done using Fergusson's jaw opener, fibrotomy was done along occlusal line followed by coronoidectomy. Extractions with all four third molars were carried out and buccal fat pad was teased out and sutured into the defect in group I patients. In group II patient's nasolabial flap was used for covering the defect. Initial physiotherapy was carried out with Heister's jaw opener postoperatively. Post-

operative complications like intraoral hair growth, and extraoral scarring in nasolabial flap patients were not acceptable in some patients. Increased mouth opening was achieved in both surgical procedures. From this systematic review authors have recommended that buccal fat pad provides increased interincisal opening with better patient compliance compared to nasolabial flap.

#### 4. Limitations

This systematic review comes with a few limitations. One of the most glaring limitation of this review is that less comparative studies were done till date. This is due to very less people are ready to undergo surgeries and get treated. Long term prospective randomized control trial studies, comparing the nasolabial flap with buccal fat pad needs to be carried out. In this review all studies were carried out in Indian population, hence conclusion of these studies cannot be applied globally.

#### 5. Conclusion

This systematic review answers the focused question and offers some definitive conclusions. This systematic review shows that buccal fat pad offers better mouth opening with good patient's compliance than nasolabial flap as seen in all the three articles included in this review, as it provides excellent closure without giving major complications extra-orally.

On the other hand, nasolabial flap is good alternative. But due to the complications such as facial scarring and intraoral hair growth, many authors divert towards buccal fat for defect closure.

Buccal fat pad also offers ease of surgery in terms of harvesting the fat and it is easily performed. However the need of post-operative physiotherapy should not be overlooked regardless of the method of coverage.

#### 6. Future Implications

Nasolabial flap and Buccal fat pad is a popular choice of treatment amongst surgeons across the world in treatment of OSMF. With its advent in the developing or underdeveloped countries it could be further utilized after a thorough training program for the trainee surgeons and even the well experienced ones. More Randomized studies are needed for proving right choice of treatment.

#### 7. List of Figures

Table 1 - Key Words

Table 2 - Search Strategies

Conflict of Interest - None

Funding Received - None

Sources of Support-None Declared

## References

- [1] Phatak A. Fibrin producing factor in oral sub-mucous fibrosis. *Indian J Otolaryngol Head Neck Surg.* 1979;31:103-4.
- [2] Rai A, Datarkar A, Rai M. Is buccal fat pad a better option than nasolabial flap for reconstruction of intraoral defects after surgical release of fibrous bands in patients with oral submucous fibrosis? A pilot study: A protocol for the management of oral submucous fibrosis. *J Craniomaxillofac Surg.* 2014;42:111-6.
- [3] Mehrotra D, Pradhan R, Gupta S. Retrospective comparison of surgical treatment modalities in patients with oral submucous fibrosis. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod.* 2009;107(3):1-10
- [4] Joshi SG. Submucous fibrosis of the palate and pillars. *Indian J Otolaryngol.* 1953;4:1-4.
- [5] Paymaster JC. Cancer of the buccal mucosa: clinical study of 650 cases in Indian patients. *Cancer.* 1956;9(3):431-5.
- [6] Pindborg JJ, Sirsat SM: Oral submucous fibrosis. *Oral Surg Oral Med Oral Pathol* 1996;22:764.
- [7] Patil SB, Durairaj D, Suresh Kumar G, Karthikeyan D, Pradeep D. Comparison of Extended Nasolabial Flap Versus Buccal Fat Pad Graft in the Surgical Management of Oral Submucous Fibrosis: A Prospective Pilot Study. *J Maxillofac Oral Surg.* 2017;16(3):312-321.
- [8] Pers M. Cheek flaps in partial rhinoplasty. *Scand J PlastReconstr Surg.* 1967;42:1.
- [9] Thiersch C. Verschlusseineslochesimhartengaumendurchdicweichtheile der wange. *Arch Heilkunde.* 1868;9:159.
- [10] Shah S, Tauro D The clinical & histological basis for the use of nasolabial tissues in the surgical management of oral submucous fibrosis. *J Maxillofac Oral Surg.* 2015;73:11.
- [11] Pradhan H, Gupta H, Sinha VP, Gupta S, Shashikanth MC. Two wound-covering materials in the surgical treatment of oral submucous fibrosis: a clinical comparison. 2: 10-4, 2012
- [12] Khanna JN, Andrade NN: Oral submucous fibrosis: A new concept in surgical management. Report of 100 cases. *Int J Oral MaxillofacSurg* 24:433, 1995
- [13] Borle RM, Nimonkar PV, Rajan R: Extended nasolabial flaps in the management of oral submucous fibrosis. *Br J Oral MaxillofacSurg* 47:382, 2009
- [14] Tideman H, Bosanquet A, Scott J: Use of the buccal fat pad as pedicled graft. *J Oral MaxillofacSurg* 44:435, 1986
- [15] Sharma R, Thapliyal GK, Sinha R, Menon S. Use of Buccal Fat Pad for Treatment of Oral Submucous Fibrosis. *J Oral MaxillofacSurg* 70:228-232, 2012