

# Surgical Management of Oral Submucous Fibrosis by Comparing Two Flaps: A Comparative Study

Aneela Amjad, Uzair bin Akhtar, Nighat Zahid, Asad Aizaz Chatha

## ABSTRACT

**Background:** Oral submucous fibrosis is a chronic disease which is slow and progressive in nature and results in reduced mouth opening. A lot of treatments options such as physiotherapy, medicinal management and surgical therapy have been used with varying amount of success, but not any of them have been found to be a definitive management option. **Objective:** To compare the efficacy of buccal fat pad against extended nasolabial flap in the surgical correction of oral submucous fibrosis. **Settings and Design:** This comparative study was conducted in the Department of Oral and Maxillofacial Surgery, Sharif Medical and Dental College, Lahore, Pakistan during 2013-2016. **Methodology:** Patients with a total of 12 (8 male and 4 female) having age ranging from 17 to 50 years and fulfilling the criteria were included in study. Out of 12, six patients were allotted to each group namely group 1 and group 2. In group 1 patients, the defect was reconstructed by buccal fat pad and in group 2 patients; the defect was reconstructed by extended nasolabial flaps. Statistical Analysis Used Paired t test, Independent sample t test. **Results:** The mean mouth opening preoperatively in group 1 was 7.67 mm and in group 2 was 7.83 mm. The mean mouth opening in group 1 was 29.83 mm and in group 2 was 34.67 mm after one year postoperatively. **Conclusions:** In this study, extended nasolabial flap is slightly better than buccal fat pad in terms of mouth opening. However buccal fat pad is esthetically more acceptable than extended nasolabial flap.

**Keywords:** Oral submucous fibrosis, Buccal fat pad, Nasolabial flap, inter incisal mouth opening

### Corresponding Author

**Dr. Uzair bin Akhtar**

Assistant Professor of OMFS  
Sharif Medical & Dental College Lahore  
Contact: +92 321-7344153  
Email: druzairgill@gmail.com

Submitted for Publication: 02-08-2017

Accepted for Publication: 19-09-2017

**Article Citation:** Amjad A, Akhtar U, Zahid N, Chatha AA. Surgical Management of Oral Submucous Fibrosis by Comparing Two Flaps: A Comparative Study. APMC 2017;11(3):191-5.

## INTRODUCTION

Oral submucous fibrosis(OSMF) was first reported by Schwartz, as an insidious disease predominately affecting buccal mucosa, floor of the mouth and soft palate. Bands of fibrosis appear which gradually widen to form sheets of fibrosis producing trismus which is progressive and irreversible.<sup>1</sup>

The disease is primarily seen in India, Pakistan, Sri Lanka, Bangladesh, Southern China, Taiwan, Polynesia and Micronesia. A number of case-series are published among Asian immigrants to the South and East Africa and UK. A remarkable variation has been reported about the frequency of OSMF in different countries.<sup>1,2</sup>

The pathological process of the disease is not well known, but it is considered that multiple factors are involved like areca nut chewing, use of chillies, nutritional deficiencies, immunologic and genetic processes resulting in juxta epithelial inflammatory reaction.<sup>2</sup> It is logical to hypothesize that the development of the disease possibly results from reduced collagen degradation and increased collagen synthesis<sup>1</sup> and it seems that regulatory

mechanisms are either down regulated or up regulated at different stages of the disease.<sup>3</sup>

The presence of HLA DR-positive immunocompetent cells and increased ratio of CD8 and CD4 in oral submucous fibrosis have suggested an ongoing cellular immune process leading to a most likely imbalanced immunoregulation and alteration in local tissue architecture.<sup>3</sup>

Management options range from conservative including medicinal therapy, physical therapy,<sup>1,4</sup> combination of medicinal and surgical therapy to aggressive surgical procedures.

The surgical excision of the fibrotic band to improve the limited mouth opening is the first line of surgical intervention and consists of excision of fibrotic bands bilaterally and reconstruction of the defect with different grafts which have their own morbidities and complications.<sup>5</sup> Surgical options to close the defect produced after removal of fibrous bands include split thickness skin graft, buccal fat pad, palatal island flaps, temporalis flaps, nasolabial flaps and radial forearm flaps.

Rationale of this research was to evaluate the outcome of two flaps in the surgical treatment of oral

submucous fibrosis to achieve acceptable mouth opening.

## METHODOLOGY

This comparative study included those patients who reported to the department of Oral and Maxillofacial Surgery, Sharif Medical and Dental College, Lahore, Pakistan during 2013-2016 and was diagnosed oral submucous fibrosis clinically.

Patients of oral submucous fibrosis with less than 15 mm mouth opening and without any malignant transformation and who were medically uncompromised were included in the study.

Patients not willing for consent and to quit habit and with previous history of surgery were excluded from the study.

Patients with a total of 12 (8 male and 4 female) having age ranging from 17 to 50 years and fulfilling the criteria were included in study. Out of 12, six patients were allotted to each group namely group 1 and group 2. In group 1 patients, the defect was reconstructed by buccal fat pad and in group 2 patients; the defect was reconstructed by extended nasolabial flaps respectively. Thorough examination, routine lab investigations and x-rays were done for every patient. Informed consent was taken from every patient after explaining the procedure and possible complications. Simple ruler was used to measure the preoperative inter incisal opening in millimeters.

### Surgical Procedure:

General anesthesia was used and nasotracheal intubation was done using fiber optic method in all patients. Incision was given bilaterally by 15 no blade while taking care of stenson's duct opening to remove fibrous bands. Mouth was opened forcefully using mouth gag.

In group 1 patients, in whom reconstruction was to be done by buccal fat pad. Buccal fat pad was exposed through the existing defect. Flap was mobilized through blunt dissection brought into the defect. Simple interrupted sutures with 3/0 Vicryl were used to secure the buccal fat pad in place. (figure 1)

In group 2 patients, in whom reconstruction was to be done by extended nasolabial flap, bilateral inferiorly based nasiolabial flap was raised in the redundant tissue of nasiolabial fold. Dissection was done in subcutaneous fat plane and then transferred to oral cavity through a hole in the buccal mucosa. Layered closure was done after advancement to close the defect at the donor site and flap was secured in defect with vicryl 3/0. (figure 2)



Figure 1: Buccal fat pad covering the defect



Figure 2: Nasolabial flap covering the defect

## RESULTS

The mean age of group 1 and group 2 was 31.50 years and 31.33 years respectively. The mean preoperative mouth opening in group 1 was 7.67 mm with SD  $\pm 2.582$  and in group 2 was 7.83 mm with SD  $\pm 3.061$ . In group 1, mean one-year postoperative mouth opening was 29.83 mm with standard deviation 4.491 and in group 2 mean one-year postoperative mouth opening was 34.61 mm with SD  $\pm 5.680$ . (Tables 1,2,3) The results reveal that Buccal fat pad and Extended Nasolabial flap led to statistically significant changes in the mouth opening over a period of time with p value less than 0.05 (paired t test). However, extended nasiolabial flap was slightly better than buccal fat pad in terms of mouth opening but this difference was statistically insignificant with p value of 0.921 (independent sample t test). On other hand buccal fat pad is better in rapid epithelization, donor site morbidity and post op complications. Intraoral hair growth was observed in male patients in group 2 which was managed by regular trimming.

**Table 1: Mouth opening at different time intervals in group 1 (buccal fat pad)**

Serial no.	Age /gender	Preoperative (mm)	Intra-operative (mm)	1-month post – operative (mm)	6-month post – operative (mm)	1-year post – operative (mm)
1	19/F	8	40	32	30	30
2	24/M	6	42	30	27	26
3	29/M	7	40	33	33	31
4	32/M	10	44	39	37	38
5	40/F	11	42	25	27	26
6	45/M	4	40	29	30	28

**Table 2: Mouth opening at different time intervals in group 2 (extended nasiolabial fat pad)**

Serial no.	Age /gender	Preoperative (mm)	Intra-operative (mm)	1-month post – operative (mm)	6-month post – operative (mm)	1-year post – operative (mm)
1	50/F	7	42	40	38	39
2	17/M	12	44	36	38	37
3	26/M	10	40	35	33	31
4	16/F	5	39	37	37	36
5	34/M	9	43	40	39	40
6	45/M	4	40	31	26	25

**Table 3: mean values in group 1 and group 2**

Group		N	Mean	Std. Deviation
Group 1 Buccal fat pad	Age	6	31.50	9.731
	Pre-op mouth opening	6	7.67	2.582
	Per op mouth opening	6	40.50	1.225
	Post op mouth opening (1year)	6	29.83	4.491
Group 2 Extended nasiolabial	Age	6	31.33	14.222
	Pre-op mouth opening	6	7.83	3.061
	Per op mouth opening	6	41.33	1.966
	Post op mouth opening (1 year)	6	34.67	5.680

## DISCUSSION

Khanna and Andrade evolved a group classification system for the surgical treatment of limited mouth opening.

Yen reported a surgical excision of the fibrotic band and grafting with a split-thickness skin graft, the results were satisfactory during 4-year follow-up, and the same technique was being followed up by different surgeons over the next few years including: Morawetz et al. in 1987, Lai et al. and Khanna & Andrade in 1995. Huang et al. in 2008 and Mehrotra et al. in 2009.

In 1986 Tepan et al. reported that tongue flaps can be used to correct trismus caused by oral submucous fibrosis in retromolar region. He showed it was effective in twenty-five cases, and the results were quite encouraging with follow-up for up to three years without any complications. Later, these procedures were followed by Golhar et al. in 1989 and Ramadass et al. in 2005. It has been reported that the tongue flaps required revision surgery for detachment and were found to be bulky to cover the buccal defects. Post-operative complications like severe dysphasia and disarticulation is reported with

bilateral tongue flaps and carries a risk of postoperative aspiration. And the tongue can also be involved with the same disease in 38% cases.

In 1987, Kavarana & Bhathena successfully used naso-labial flaps on three patients and reported that long-term relief of the limited mouth opening caused by OSMF can be achieved by using this technique.<sup>6</sup> Borle et al selected cases for nasolabial flap, age range 18 to 44 with inter incisal distance of 3-23mm (14mm). Cosmetically not suitable for those who are esthetic conscious particularly young patients. In 1995 Lai et al. compared patients by reconstructing the defect with fresh human amnion, split-thickness skin, or buccal fat pad(BFP) and concluded that BFP was markedly successful in reducing scarring after one year. Yen in 1996 utilized BFP in 10 patients with mouth opening 9-18mm, age range of 20-69 years and had good result as compared to split thickness skin graft or fibrotic tissue release only. Chao et al. reported 20 patients treated by BFP and examined them histologically. After 5 weeks stratified squamous epithelium completely covered the BFP. Mehrotra et al. reported that after fibrectomy, surgical correction of mucosal defect

was done by, buccal fat pad, nasolabial flap, tongue flap, and split skin graft. They concluded that buccal fat pad is better than other procedures, because it offers less complications, ease of surgery, shows less morbidity, and better patient tolerance.<sup>7</sup>

Huang et al reported that patients with a mean age of 46.5 were taken for anterior lateral thigh flap. Interincisal opening was from 0-8mm preoperatively. After incision of bands, myotomy and coronoidectomy<sup>8</sup> was done, flaps taken from the thigh, mostly anterior-lateral,<sup>9</sup> were sutured over the defects. Lai et al selected 75 patients having interincisal opening less than 25mm, all of them were male and operated with split thickness skin graft, buccal fat pad and fresh amnion graft. He concluded that best results were seen in BFP grafts, then STSG and in last amnion grafts.

In 1995 Khanna and Andrade used palatal island flap in combination with bilateral coronoidectomy and temporalis myotomy. This surgical intervention was applied on 40 patients with advanced disease with 6 months to 4 year follow up, showed satisfactory results. They mentioned that the skin graft has the incidence of contracture, shrinkage, and failure of the graft due to the poor oral condition and recurrence of symptoms were also seen in few patients. They pointed out that the hard palate has a low percentage of fibrosis of OSMF (6-7%), closely proximate, pedicled mucoperiosteal flap has less chances of shrinkage, and requires no second surgery.

In 2005 Mokal et al. introduced a new technique of reconstruction using split thickness skin graft and superficial temporal fascia flap on ten patients after release of fibrous bands. The procedure was performed bilaterally on all patients with inter incisal opening ranging between 0-8mm.<sup>10</sup>

Omura and Mizoki introduced a newly evolved silicone/collagen bilayer membrane as a mucosal substitute and observed that not only the repair was effective but postoperative period was also uneventful. The outer layer of membrane is comprised of silicone and inner layer of hydrothermal cross-linked composites of fibrillar and denatured collagen sponge.<sup>11</sup> The oral mucosal defects were covered with membrane after 2 weeks when outer layer was removed.

The buccal fat pad (BFP) is easily accessible. It is the most widely used and accepted graft for surgical correction of oral submucous fibrosis to reconstruct the defects after incision of fibrotic bands. Yeh was the first to report the use of BFP for the defect created during surgery of OSMF and got good results.

BFP can be easily teased out and can be easily approached through the postero superior part of the same horizontal incision. The advantages of BFP being easily available, can be easily mobilized and the biggest advantage of having no morbidity to secondary donor site and no second surgical procedures is required for debulking the graft as compared to full thickness skin grafts. The harvesting technique is simple since it is easily accessible from the same horizontal incision.<sup>10</sup> Epithelization over the buccal pad of fat takes place by the 7th postoperative day and is completed by the end of 4th week. Major disadvantage observed is it is sometimes not of sufficient amount to be used for big wounds. Otherwise BFP proved a wide range of success in treating OSMF.

The nasolabial flap has multiple advantages such as; dependable and highly vascular, gives versatility in design, easy to elevate, flexible skin, thus improving mouth opening and causing lesser cosmetic defect, but the disadvantages include intraoral hair growth, transient enlargement of oral commissure and donor site scarring.<sup>9</sup>

Split-skin grafting has been tested but high failure rate has been observed as fibrotic areas have less vascular supply besides retaining the coloration of skin. Also associated with intraoral hair growth. Due to atrophy and inelasticity as being associated with ageing, skin is not a good option for elderly patients. Bilateral radial forearm flaps can be used for reconstruction, but it requires two microsurgeries. The procedure is very lengthy and technique sensitive, and furthermore both the right and left radial arteries are sacrificed. Island palatal flaps give inadequate coverage of defect.

It should be emphasized that surgical interventions should be combined with public awareness on areca nut consumption cessation programs, medical treatments, stretch therapies, cancer chemoprevention and related health promotions.<sup>12</sup> Although clinical trials on surgical interventions for OSMF should be established scientifically as multicenter randomized controlled trials, with regards to the surgical intervention, it is quite difficult to have quality assurance in surgical intervention, postoperative care and surgical outcomes. Randomized clinical trials with no bias are difficult for both surgeons and patients. Nonetheless well-designed trials seem to be highly desirable to elucidate the role of surgery in oral submucous fibrosis and further for cancer prevention and quality of life of these patients.<sup>13</sup>

The issue of fibrosis and subsequent clinical manifestation of OSMF due to areca nut is a major public health issue in many countries where areca

nuts are consumed.<sup>14</sup> There are various surgical methods for repairing the defect after surgical excision of the fibrotic band in the cheek for limited mouth opening, however, the attempts for surgical intervention it should be simple, low cost with low rate of recurrence and should improve their QOLs.<sup>14</sup>

## CONCLUSION

In terms of mouth opening, extended nasolabial flap is slightly better than buccal fat pad. However buccal fat pad is esthetically more acceptable than extended nasolabial flap because of visible scar mark on face.

## REFERENCES

1. Mathew P, Austin RD, Varghese SS, Manojkumar AD. Role of areca nut and its commercial products in oral submucous fibrosis - A review. J Adv Med Dent Sci Res 2014;2:192-200.
2. Burungale SU, Durge PM, Burungale DS, Zambare MB. Epidemiological study of premalignant and malignant lesions of the oral cavity. J Acad Ind Res 2014;2:519-23.
3. Bansal SK, Leekha S, Puri D. Biochemical changes in OSMF. J Adv Med Dent Sci 2013;1:101-5.
4. Tai YS, Liu BY, Wang JT, Sun A, Kwan HW, Chiang CP. Oral administration of milk from cows immunized with human intestinal bacteria leads to significant improvements of symptoms and signs in patients with oral submucous fibrosis. J Oral Pathol Med 2001; 30(10):618-25.
5. Mehrotra D, Pradhan R, Gupta S. Retrospective comparison of surgical treatment modalities in 100 patients with oral submucous fibrosis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009;107:e1-10
6. Arakeri G, Brennan PA. Oral submucous fibrosis: an overview of the aetiology, pathogenesis, classification, and principles of management. Br J Oral Maxillofac Surg 2013; 51(7):587-593.
7. Chien CY, Hwang CF, Chuang HC, Jeng SF, Su CY. Comparison of radial forearm free flap, pedicled buccal fat pad flap and split-thickness skin graft in reconstruction of buccal mucosal defect. Oral Oncol 2005;41:694-7.
8. Chang YM, Tsai CY, Kildal M, Wei FC. Importance of coronoidotomy and masticatory muscle myotomy in surgical release of trismus caused by submucous fibrosis. Plast Reconstr Surg 2004; 113: 1949-54
9. Kimura N, Satoh K, Hasumi T, et al. Clinical application of the free thin anterolateral thigh flap in 31 consecutive patients. Plast Reconstr Surg 2001;108:1197.
10. Mokhal NJ, Raje RS, Ranade SV, et al. Release of oral submucous fibrosis and reconstruction using superficial temporal fascia flap and split skin graft: a new technique. Br J Plast Surg 2005;58:1055e60
11. Deepak A, Shrivastava BM, Vilas N, Rajesh W, Bharat M, Amit R. Management of Oral Submucosal Fibrosis with Fibrous Release and Defect coverage with Buccal Pad of Fat and Collagen Sheath; NJMDR 2012;1(1):14-18.
12. More CB, Gupta S, Joshi J, Varma SN. Classification system for oral submucous fibrosis. J Indian Acad Oral Med Radiol 2012;24:24-9.
13. Kamath V. Surgical Interventions in Oral Submucous Fibrosis: A Systematic Analysis of the Literature. J Maxillofac Oral Surg 2014;14(3):521-31.
14. Ekanayaka RP, Tilakaratne WM. Oral submucous fibrosis: Review on mechanisms of pathogenesis and malignant transformation. J Carcinog Mutagen 2013;S5:002

## AUTHORSHIP AND CONTRIBUTION DECLARATION

AUTHORS	Contribution to The Paper	Signatures
<b>Dr. Aneela Amjad</b> Assistant Professor of Oral Medicine Sharif Medical & Dental College Lahore	Principal author data collection & analysis	
<b>Dr. Uzair bin Akhtar</b> Assistant Professor of Oral & Maxillofacial Surgery, Sharif Medical & Dental College Lahore	Principal author data collection & analysis	
<b>Dr. Nighat Zahid</b> Assistant Professor of Oral Medicine Lahore Medical & Dental College Lahore	Literature review, Reference writing	
<b>Dr. Asad Aizaz Chatha</b> Assistant Professor of Oral & Maxillofacial Surgery, King Edward Medical University Lahore	Literature review, Reference writing	