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Clinical Evaluation of the Buccal Fat Pad Vs Nasolabial Flap as an Interposition Graft Material in Oral Submucous Fibrosis Patients

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Abstract---AIM: Aim of the study is to evaluate efficacy and compare the surgical outcome of buccal fat pad and nasolabial flap in increasing postoperative mouth opening in reconstruction of the defect created after excision of fibrous bands in surgically treated cases of OSMF. Materials and Methods: this study included 10 patients who came in our department at Karnavati School of dentistry between the years 2017 and 2020, out of which 5 patients underwent closure of surgical defect using buccal fat pad (Group I) and 5 patients underwent closure of surgical defect using nasolabial flap (Group II). Clinically proven cases of OSMF with mouth opening no more than 20 mm were included in this study. Mouth opening of patients were documented preoperatively, intraoperatively and at 6 months of follow up. Results were tabulated and were analysed by paired t test. Results: in group I and II, there was substantial difference in mouth opening at all periods of follow-up. At 1 month follow-up, mean mouth opening was 29.4 mm in group 2 compared with 28.25 mm in group I.

Relevant difference in average mouth opening at the end of 6 months was observed and was 32.6 mm in group II as compared to group I which was 29 mm. Conclusion: Nasolabial flaps are a viable, reliable and a better option, that has withstood the test of time for reconstruction of intraoral defects in oral submucous fibrosis.

Keywords--OSMF, nasolabial flap, buccal fat pad, inter-incisal, mouth opening.

Introduction

Oral submucous fibrosis was first described by Sushruta in Indian Medical Literature. Schwartz, in 1952, was the first one to describe it in modern literature and he coined the term "Atrophia Idiopathica Mucosae Oris."¹ Predominantly, this condition is seen in the Indian originated population. It is potentially malignant disorder whose malignant transformation in the Indian subcontinent is 3%-7.6%, whereas concomitant presence of OSMF and OSCC in Indian population was found to be 25.77% in recent study.²² Paymaster in 1956 first described the precancerous nature of this condition.²

OSMF is an insidious chronic disease affecting any part of the oral cavity and sometimes pharynx. Although occasionally preceded by and/or associated with vesicle formation, it is always associated with juxta-epithelial inflammatory reaction followed by a fibro-elastic changes of lamina propria. It causes both increased collagen production and decreased collagen breakdown with epithelial atrophy leading to stiffness of oral mucosa and causing trismus and inability to eat³. The condition is multi-factorial in origin. It is associated with chewing of areca nut.

Submucous fibrosis presents with a severe degree of trismus, because of formation of fibrous bands.⁴ Treatment of this condition includes medicinal and surgical therapy. Medicinal therapy is beneficial only in early stages of the disease and includes injections with steroids and hyaluronidase, antioxidants, vitamins and iron supplements, and placental extracts. Surgical therapy is helpful in advanced stages and includes excision of fibrous bands and then reconstructing the defect with grafts, including skin or placental grafts, tongue flaps, lingual pedicle flaps, buccal fat pad grafts, nasolabial flaps⁵ and platysmal myocutaneous flap.¹¹ Some additional procedures like splitting of temporalis tendon, coronoidectomy and masseter muscle stripping, have also been described to enhance mouth opening.⁶ Both buccal fat pad and Nasolabial Flap are extensively used in management of OSMF. This study was undertaken to compare the efficacy of nasolabial flap and buccal fat pad flaps in reconstructing the surgical defect created after excision of fibrous bands and bilateral coronoidectomy in surgically treated cases of OSMF. The null hypothesis was that there would be no relevant difference between the 2 techniques.

Material and Methods

This study included 10 patients that came from year 2017-2020 in the Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Gandhinagar, Gujarat with a chief complaint of restricted mouth opening and/or burning sensation while taking hot/spicy food. These patients were divided randomly in two groups. Group I included 5 male patients with age group between 30-62 years (mean 46 years), while group II included 4 male and 1 female patients with age group between 25-48 years (mean 36.5 years). This study was approved by institutional ethical board. All the patients included in our study were diagnosed with oral submucous fibrosis based on clinical examination.

Inclusion criteria

- Age- Above 18 years.
- Patients with moderately advanced or advanced stages i.e., stage III and IV of oral submucous fibrosis were included.
- Patients with inter-incisal mouth opening of less than or equal to 20mm and with long standing positive history of habits.
- Patients with a high level of motivation to give up deleterious habits and continue regular mouth opening exercise.

Exclusion criteria

- Medically compromised patients (e.g., Uncontrolled Diabetes Mellitus, Cardio vascular diseases, bleeding disorders, psychiatric disorders etc i.e., ASA III and IV).
- Patients with initial stages i.e., stage I and II of Oral Submucous Fibrosis with mouth opening >20mm.

The procedure in group I and II patients were carried out under general anesthesia with fiberoptic intubation. Incision to release fibrous bands was given bilaterally on buccal mucosa extending from corner of the mouth anteriorly; till the pterygomandibular raphe posteriorly depending on the extent of presence of fibrous bands. Defect created was further freed by finger dissection until no further restriction was felt and then bilateral coronoidectomy was performed to achieve mouth opening $\geq$ 33mm (optimum mouth opening). BFP was approached through the same incision through its posterosuperior margin and was teased out by milking phenomenon. Enough amount of BFP graft was obtained to cover the defect without any tension (Figure 1). It was secured in place using a horizontal mattress fashion suture with 3-0 vicryl suture material.

After obtaining optimum mouth opening, an elliptical shape, inferiorly based nasolabial flap was marked on the centre of nasolabial groove. Flap was kept around 1.5-2cm wide and medial incision line followed the nasolabial fold. Medial and distal incision lines tapered at the end. Superiorly the flap end was kept around 0.5-0.65cm anteroinferior to medial canthus. Distal tips of flap were tapered at an acute angle. Flap was raised from superior to inferior direction in supra muscular plane (Figure 2). Transbuccal tunnel was made in the region of

modulus just medial to the pedicle and transferred into the oral cavity without any tension (Figure 3). The inferior limb of the flap covered anterior part of the defect and superior limb covered the distal edge of the defect. The flap was sutured in its place using 3-0 vicryl suture material. Generous undermining of the donor site was done in the subcutaneous plane and layerwise closure was done using 3-0 vicryl for deeper layer and 3-0 ethilon for skin closure.

All the patients received prophylactic antibiotic coverage and nasogastric feeding for 5 days. Extra-oral sutures were removed on the seventh post-operative day for nasolabial flap patients. Initial physiotherapy was started within 48 hours post operatively with mouth opening exercises and placing ice-cream sticks between upper and lower molars. After tenth postoperative day, intense physiotherapy was started using Heister's mouth gag 6-7 times a day. Patients were followed up for 6 months and maximum mouth opening was documented. The results for improvement in mouth opening was statistically analysed at the end of 1st and 6th month and was compared with preoperative mouth opening.

Results

In group I, preoperative mouth opening was 1 to 20 mm (mean= 10.5mm). After release of fibrotic bands and bilateral coronoidectomy, mean forced intraoperative mouth opening of 40 ± 1.6 mm was achieved. Mean mouth opening of 4 patients at the end of 6 months was 29 ± 2.2 mm. 1 patient was lost from the study as he was diagnosed with Squamous cell Carcinoma and was referred to higher centre. Mean total increase in mouth opening at the end of 6 months as compared to preoperative mouth opening was 15mm. In group II, preoperative mouth opening was 4 to 20mm (mean= 12mm). After release of fibrotic bands and bilateral coronoidectomy, mean forced intraoperative mouth opening of 38 ± 1.6 mm was achieved. Mean mouth opening at the end of 6 months was 32.6 ± 1.8 mm. Mean total increase in mouth opening at the end of 6 months as compared to preoperative mouth opening was 20.4mm.

The preoperative and postoperative mouth opening at 1 and 6 months were compared and tabulated (Table 1). The statistical comparison of mouth opening at the end of 6 months between group I and II was carried out by paired t test. The study showed that the effective increase in mouth opening at the end of 6 months was statistically significant with Group II ($P = 0.015$). Table II presents statistical intergroup comparison of mouth opening between group I and II. This study showed a significant increase in mouth opening intraoperatively and at the end of 1 month. Increase in mouth opening intraoperatively was greater in group I as compared to group II, whereas at the end of 6 months, increase in mouth opening was greater in group II as compared to group I which showed that in group II there was slow but progressive increase in mouth opening towards the end of 6 months follow up. Over all mean total increase in mouth opening at the end of 6 months was 20.4 mm in group II as compared to 15mm in group I. Hence, there was an effective and statistically significant increase in mouth opening at the end of 6 months in group II patients.

Table 1
Intragroup comparison of mouth opening in Group I and II

Group I:				
Patient's Name:	Preoperative mouth opening	Intraoperative Mouth opening	1 month post operative mouth opening	6 months post operative mouth opening
Rameshgiri	1mm	42mm	30mm	29mm
Mehul Parmar	15mm	40mm	29mm	31mm
Chirag Parmar	20mm	39mm	28mm	30mm
Mahendra Prajapati	5mm	38mm	-	-
Gunvantbhai	20mm	41mm	26mm	26mm
<u>MEAN</u>	10.5mm	40mm	26mm	29mm
Group II:				
Neetaben Thakor	10mm	37mm	30mm	34mm
Haribhai Ahir	15mm	39mm	28mm	31mm
Alkeshbhai Parmar	18mm	40mm	25mm	31mm
Hiteshbhai Patel	4mm	36mm	29mm	32mm
Rahulbhai Joshi	11mm	38mm	35mm	35mm
<u>MEAN</u>	12mm	38mm	25mm	32.6mm

Table 2
Intergroup comparison of mouth opening in group I and II at regular intervals

	Group I, Mean $\pm$ SD	Group II, Mean $\pm$ SD
Preoperative	10.5 $\pm$ 8.8	12 $\pm$ 5.3
Intraoperative	40 $\pm$ 1.6	38 $\pm$ 1.6
At 1 month	28.25 $\pm$ 1.7	29.4 $\pm$ 3.6
At 6 months	29 $\pm$ 2.2	32.6 $\pm$ 1.8

Figure 1: BUCCAL FAT PAD GRAFT COVERING THE DEFECT.



Figure 2: ELEVATION OF THE NASOLABIAL FLAP IN SUPERIOR TO INFERIOR DIRECTION.



Figure 3: CREATION OF TRANSBUCCAL TUNNEL



Discussion

OSMF has many etiologic factors, amongst which chewing tobacco, betel nut is most common.⁹ All patients in our study had a positive history of chewing tobacco in some form. The management of oral submucous fibrosis aims to improve mouth opening and relieve the symptoms. Various conservative treatments were

proposed over the years and it includes oral administration or injections of vitamins, antioxidants and iron supplements, and placental extracts. Drugs like Pentoxifylline, Buflomedil Hydrochloride and Nylidrin were used to improve the circulation to the affected area¹⁸. Surgical therapy is beneficial in advanced stages of OSMF with severe trismus and which did not respond to medicinal therapy. After surgical treatment, oral mucosa regains and retains its normalcy and hence there is reduction in the risk of oral cancer. Relapse is the common complication after surgical release of trismus if vigilant physiotherapy is not continued. Materials used for grafting in OSMF after release of fibrotic bands include skin grafts, tongue flaps, buccal fat pad, amnion graft, nasolabial flaps and palatal island flaps.

By just releasing fibrotic bands and leaving the area to heal by secondary epithelialization left an unsatisfactory rigid buccal mucosa even after making attempts to reduce the collagen formation by using steroid impregnated pack but instead it led to formation of scar and recurrence of trismus.⁹ Covering the raw areas with skin grafts also resulted into incidence of shrinkage, contracture and rejection of graft because of subsequent poor oral hygiene and thus recurrence of symptoms.¹⁰ Recurrence of the symptoms was also concluded in the studies of Khanna and Andrade¹⁰, and Morawetz et al.⁸ Another limitation of split thickness graft is morbidity associated with the donor site.⁹

Palatal island flap is based on palatine artery and is used to cover the defects created after release of fibrous bands in OSMF patients and was employed by Khanna and Andrade¹⁰. Its limitations include involvement with fibrosis and second molar tooth extraction is required for flap cover without tension. If bilateral flaps were to be harvested, it leaves a large raw area on palatal bones. Tongue flaps have also been used to reconstruct the defect in OSMF and has limitations such as postoperative dysphagia, disarticulation, risk of postoperative aspiration and need for additional surgery for detachment of pedicle.¹⁰ Bilateral radial artery forearm free flaps¹⁹ and flaps from anterolateral thigh²⁰ require micro vascular expertise. Donor site morbidity and scar formation are also some limitations. 40% patients require secondary re surgery for debulking procedure.

BFP graft has an advantage of rich blood supply, minimal donor site morbidity, ease of surgery and can be harvested from the same incision and can be performed under local anesthesia on an outpatient basis, and good patient acceptance. Disadvantages include its limited anterior reach of the graft. The procedure of harvesting BFP is not a prolonged one considering its anatomic proximity to the recipient site. The bulk of BFP in our series is found to be sufficient to fill the defect. Yeh¹² used buccal fat pad as an interposition reconstructive material in OSMF patients and noted that postoperative mouth opening increased by 19.1mm at subsequent follow-ups. Improvement in physiologic function was noticed on clinical examination post operatively. Graft began to show signs of epithelization from 2nd week. This observation was similar to that by Yeh¹².

The advantages of nasolabial flap include donor site in the same surgical field, rich vascularity, versatility in design, supple skin, ease of flap elevation, thus aiding to increase in mouth opening. While disadvantages being growth of

intraoral hair, widening of oral commissure and hypertrophic scar at the donor site. It provides a good example of transposition flap principle in which unavoidable tension is transferred from the defect to the donor area where there is sufficient tissue elasticity to absorb it. The versatility of the nasolabial flap depends mainly on its rich blood supply from both facial and ophthalmic arteries.¹³ Nasolabial flap can be used to fill the defect of approximately 15cm².¹⁴

Kavarna and Bhathena⁴ used nasolabial flap in 3 cases for closure of surgical defect created after excision of fibrous bands in OSMF patients and got good results. Average mouth opening at subsequent follow up was measured as 20.5mm and extraoral scars were acceptable. Nasolabial flap can be either cutaneous, subcutaneous, musculocutaneous or island flaps. In our study we employed bilateral winged inferiorly based nasolabial flaps in all 5 patients. Length of the flap was adequate to cover the intra oral defect in all the patients. In our study, intraoperative complications like damage to facial vessels, parotid duct and branches of facial nerve were not encountered in patients. No flap showed either bluish or whitish discoloration in postoperative phase and no infection was encountered. Complications such as flap loss, flap avulsion, obstructive sialadenopathy or wound dehiscence were also not encountered. Intraoral hair growth was observed in all male patients from fifth post-operative day which was managed by regular trimming. The donor site healed uneventfully in all our cases. Although the scars were perceptible in all cases, they were readily accepted by the patients as they gradually faded with time.

Mehrotra et al¹⁵ included 100 patients in his study. He randomly divided these patients in 4 groups. Group I had BFP graft, Group II had tongue flap, Group III had nasolabial flap and Group IV had split skin graft for reconstructing the defect after fibrectomy. Mean postoperative mouth opening at 1 month follow up was 36.36mm (2.64mm) in group 1, 35.36 mm (2.9mm) in group 2, 35.64mm (2.94mm) in group 3 and 35.80mm (3.24mm) in group 4. Agrawal et al¹⁶ performed a study in 32 patients with varying degree of OSMF and divided them randomly into 2 groups; patients in Group I were treated with Buccal fat pad graft and patients in Group II were treated with Nasolabial Flap. Mean 6 months postoperative mouth opening in Group I was 19.2mm and in Group II was 24.2mm. Hence, the overall increase in mouth opening was statistically significant in Group II.

Rai et al conducted a comparison study between efficacy of buccal fat pad and nasolabial flap as reconstructing material after the release of fibrous bands in OSMF patients and reported that the mean pre- and postoperative mouth opening was better in NLF than BFP group.²¹ This present study shows similar satisfactory results. In our study, all patients noted significant reduction in symptoms of intolerance to spicy food and ulcerations. The overall increase in mouth opening at the end of 6 months comparing both groups showed that it was statistically significant with the nasolabial flap (P= 0.015).

Conclusion

In our study nasolabial flap was proved to give better results as interposition material because of lesser postoperative complications, rich blood supply,

proximity to recipient site. However, further studies should be conducted in large sample size with long term follow up to evaluate the efficacy of buccal fat pad graft over nasolabial flap in surgical management of oral submucous fibrosis.

References

1. Gupta D., Sharma S.C. "Oral submucous fibrosis – A new treatment regimen". *J Oral Maxillofac Surg*, 1988; 46: 830-833.
2. Paymaster J.C. "Cancer of the buccal mucosa: clinical study of 650 cases in Indian patients." *Cancer* 1956;9:431–5.
3. Schwartz J: Atrophia idiopathica (tropica) mucosae oris. Presented at: Eleventh International Dental Congress; London, UK; 1952
4. Kavarana N.M., Bhathena H.M. "Surgery for severe trismus in submucous fibrosis". *Br J Plast Surg*, 1987; 40: 407-409.
5. D.J.C. Yen., "Surgical treatment of submucous fibrosis," *Oral Surgery, Oral Medicine, and Oral Pathology*, vol. 54, no. 3, pp. 269–272, 1982.
6. Borle R.M., Borle S.R. "Management of oral submucous fibrosis: A conservative Approach". *J Oral Maxillofac Surg*, 1991; 49: 788-791.
7. Pindborg JJ, Murti PR, Bhonsle RB, Gupta PC, Daftary DK, Mehta FS (1984) Oral submucous fibrosis as a precancerous condition. *Scand J Dent Res* 92:224–229.
8. Morawetz G., Katsikeris N., Weinberg S., Listrom R. "Oral submucous fibrosis". *J Oral Maxillofac Surg*, 1987; 16: 609-614.
9. Canniff J.P., Harvey W., Harris M. "Oral submucous fibrosis: its pathogenesis and management". *Br Dent J*, 1986; 160: 429-434.
10. Khanna J.N., Andrade N.N. "Oral submucous fibrosis: a new concept in surgical management – Report of 100 cases". *Int J Oral Maxillofac Surg*, 1995; 24: 433-439.
11. Bande C, Joshi A, Gawande M, Tiwari M, Rode V. Utility of superiorly based platysma myocutaneous flap for reconstruction of intraoral surgical defects: our experience. *Oral Maxillofac Surg*. 2018 Mar;22(1):45-51. doi: 10.1007/s10006-017-0665-7. Epub 2017 Nov 23. PMID: 29170975. Stuzin JM, Wagstrom L, Kawamoto HK, et al: The anatomy and clinical application of the buccal fat pad. *Plast Reconstr Surg* 85:29, 1990
12. Yeh C.Y. "Application of the buccal fat pad to the surgical treatment of oral submucous fibrosis." *Int J Oral Maxillofac Surg* 1996;25:130–3.
13. Gewirtz H.S., Eilber F.R., Zream H.A. "Use of nasolabial flap for reconstruction of the floor of the mouth". *Am J Surg*, 1978; 136: 508-511.
14. Morgan R.F., Chambers R.G., Jaques D.A., Hoopes J.E. "Nasolabial flap in intraoral reconstruction – Review of 55 cases". *Am J Surg*, 1981; 142: 448-450.
15. 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:e1–0
16. Agrawal et al. Nasolabial Flap for Oral Submucous Fibrosis. *J Oral Maxillofac Surg* 2018.
17. Venkatesh Anehosur, Pravesh K. Singh, Punit S. Dikhit, and Hitesh Vadera; Clinical Evaluation of Buccal Fat Pad and Nasolabial Flap for Oral Submucous Fibrosis Intraoral Defects; *J Craniomaxillofacial Trauma & Reconstruction*; 10.1177/1943387520962264

18. Jiang X, Hu J (2009) Drug treatment of oral submucous fibrosis: a review of the literature. *J Oral Maxillofac Surg* 67:1510–1515
19. Wei FC, Chang YM, Kildal M, Tsang WS, Chen HC (2001) Bilateral small radial forearm flaps for the reconstruction of buccal mucosa after surgical release of submucosal fibrosis: a new reliable approach. *Plast Reconstr Surg* 107:1679–1683.
20. Huang JJ, Wallace C, Lin JY et al (2010) Two small flaps from one anterolateral thigh donor site for bilateral buccal mucosa reconstruction after release of submucous fibrosis and/or contracture. *J Plast Reconstr Aesthet Surg* 63:440
21. 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(5):e111-e116.
22. Chourasia NR, Borle RM, Vastani A. Concomitant association of oral submucous fibrosis and oral squamous cell carcinoma and incidence of malignant transformation of oral submucous fibrosis in population of central India: A retrospective study. *J Maxillofac Oral Surg*. 2015;14(4):902-6