

Oral Submucous Fibrosis: Successful Management of Fifty Cases with Interpositioning Buccal Fat Pad Flap

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Abstract

Objective: The aim of this study was to evaluate the clinical and anatomical application of buccal fat pad as an interpositional material in the surgical treatment of oral submucous fibrosis (OSMF) for improvement of mouth opening and its movements.

Methods: OSMF has become a chronic, distressing condition of uncertain aetiology in Pakistan which rapidly involves the oral structures along with other parts of upper gastrointestinal tract. The study was conducted in Department of Oral & Maxillofacial Surgery, Ziauddin College of Dentistry, Ziauddin University, Karachi, from December 2013 till July 2015. We evaluated 50 diagnosed OSMF patients, with history of chewing areca/betal nut or other similar products, with burning sensation on having spicy ingredient, trismus 4-25mm with palpable fibrous bands on the buccal mucosa intraorally with rigidity and blanching were included in the study. Good clinical improvement with minimal morbidity by the use of buccal fat pad was noticed in patients with severe limited mouth opening along with regular and vigorous physiotherapy.

Results: In 50 patients, the range of preoperative mouth opening was 4-24mm (14 ± 4.90), the intra operative mouth opening was 25-38mm (33.25 ± 4.17). The patients were discharged after 72 hours at this time mouth opening was 25-36mm (30.63 ± 3.82). Comparison of pre-operative with intra and post-operative mouth opening was statistically significant.

Conclusion: This study has shown that use of interpositioning buccal fat pad flap improves the mouth opening and movement in OSMF patients.

Keywords: Oral submucous fibrosis, premalignant condition, buccal fat pad, physiotherapy

IRB: Approved by Ziauddin University. Dated: 2nd March 2016.

(ASH & KMDC 21(3):171;2016).

Introduction

Oral submucous fibrosis (OSMF) is a chronic condition involving the submucosal part of the oral cavity with or without extension to involve other parts of upper gastrointestinal tract.

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Date of Submission: 11th June 2016

Date of Acceptance: 16th August 2016

"Atrophicaidiopathica mucosa oris" term was described by Schwartz in 1952, and was diagnosed in five Indian women residing in Kenya¹. Later Joshi² in 1953 referred the terminology as oral submucous fibrosis (OSF). In Indo-Pakistan subcontinent² more than 2.5 million people of all age groups suffer from oral submucous fibrosis. Though the exact aetiology is unknown but the prevalence of OSMF is seen more in patients after chronic irritation due to habit of chewing betel nut and pan in different forms. An OSMF patient presents with burning sensation which doesn't allow them to take spicy ingredients, and along with it they have rigid and blanched buccal mucosa which leads to difficulty in mouth opening and movement of tongue^{3,4}.

The treatment modalities of OSMF patients depend on clinical involvement of oral cavity and related sign and symptoms. When the condition is diagnosed in the early stages symptomatic treatment is sufficient. Medical treatment is symptomatic and its aim is to improve mouth opening⁵. The medical treatment strategies as mentioned by Kerr et al⁶ include multiphase injections of steroids, hyaluronidase, placental extract, IFN-gamma, lycopene, pentoxifylline plus vitamin, and iron supplements. Diagnosed cases of dysplastic or neoplastic pathology are associated with limited mouth opening and are treated surgically⁷. Surgical methods used are incision of the fibrotic bands, split-thickness skin grafting following bilateral temporalis myotomy or coronoidectomy use of bilateral nasolabial flaps, palatal island flaps, lingual pedicle flaps and use of KTP-532 laser therapy⁷.

No standardized surgical procedures for improvement of mouth opening has been described in the literature. Undoubtedly; the buccal fat pad remains the most versatile because of its excellent blood supply and minimal donor site morbidity. The buccal fat pad is a limber having lobules and is easily approachable in various maxillofacial surgeries like submucosal fibrosis, oroantral fistula, scar tissue adhesions in the buccal mucosa and after tumor resections with good results^{8,9}.

The objective of the study was to evaluate the clinical and anatomical application of buccal fat pad as an interpositional material in the surgical treatment of OSMF which improves its mouth opening and movements.

Materials and Methods

The study was carried out by the Department of Oral and Maxillofacial Surgery, College of Dentistry, Ziauddin University, Karachi from December 2013 till July 2015. Patients diagnosed clinically and histopathologically as a case of oral submucous fibrosis with reduced mouth opening ranging from 4 mm to 25 mm with no comorbidities were included in this study. A comprehensive history reference to the betel nut and pan chewing habits was

obtained. Patients fulfilling the inclusion criteria were given written consent form before including them in study and only those patients who gave written consent were part of the sample. Patients with histopathological or clinical signs of malignancy and who did not give consent were excluded from the study.

The prospective study was done on 50 patients which included 19 female and 31 male between 18 to 54 years. Sample size was estimated depending on a power calculation. At level of significance $\alpha = 0.05$ with estimated standard deviation 1.2 and power 0.9.

In every case the preoperative inter incisal distance was measured (Fig. 1.). For the patient compliance preoperatively a week before they were encouraged to do physiotherapy by means of sticks five times a day for 15 minutes bilaterally. Coverage of the raw surface exposed after the incision of the fibrotic bands was done by the pedicled buccal fat pad.

All patients were intubated using fibre-optic nasotracheal intubation under general anaesthesia. Bilateral horizontal incisions with monopolar diathermy were made at the occlusal level in the buccal mucosa away from Stensen's duct orifice. Anteriorly, a vertical releasing incision was made to prevent tearing of the commissure of lip and posteriorly incision till the pterygomandibular raphe or anterior pillar of fauces was made. The wounds created were further disrupted by digital manipulation and fibrous bands were sectioned till no further restriction. Recording of intraoperative forced mouth was done with a Fergusson mouth gag, as measured from the incisor edges; minimum 35mm in an adult. The anterior border of the ramus up to the coronoid process was then exposed through the same wound. Bilateral coronoidectomies were done, which further improved the mouth opening.

After haemostasis was achieved through the postero-superior margin of the surgical wound the buccal fat was gently teased out and mobilized with blunt dissection (Fig. 2.), interposed in the raw area

and secured to the margins of the wound using 3-0 vicryl sutures (Fig. 3.). The same procedure was carried out on the contralateral side. Coronoidectomy with the same incision was done on both sides along with extraction of upper and lower third molars were performed.



Fig 1. Preoperative, mouth opening measurement in a patient with Oral submucous fibrosis



Fig 3. Intraoperative Suturing of Buccal fat pad

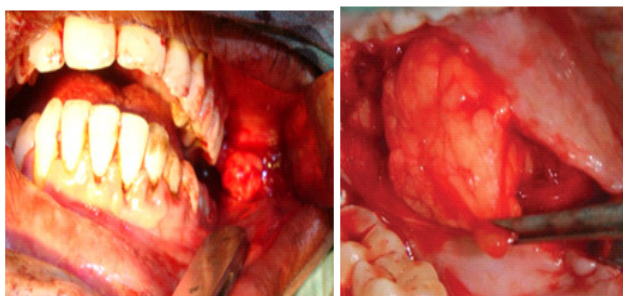
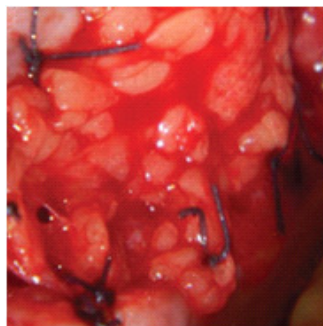


Fig 2. Harvesting the buccal fat pad



Fig 4. One week later



Fig 5. One month later

Table 1. Mean Interincisal mouth opening results

Preoperatively	14mm
Intraoperatively	33.25mm
At Discharge	30.63mm
After one week	30mm
After one month	31mm
After 6months	30mm

Table 2. Comparison of operative variables with application of Student's t-test

	Mean	SD	SE	T	p value
Preoperative	14.00	4.90	1.73	25.67	<0.001**
Intraoperative	33.25	4.17	1.47		
Preoperative	14.00	4.90	1.73	14.48	<0.001**
At Discharge	30.63	3.82	1.35		
Preoperative	14.00	4.90	1.73	23.48	<0.001**
After one week	30.00	5.37	1.90		
Preoperative	14.00	4.90	1.73	28.45	<0.001**
After one month	31.00	4.87	1.72		
Preoperative	14.00	4.90	1.73	23.48	<0.001**
After 6months	30.00	5.37	1.90		

Postoperative period was uneventful; all patients were given prophylactic antibiotics, Amoxicillin 500mg with metronidazole 400mg. On discharge instructions were given to maintain proper oral hygiene and to use 10 mL of chlorhexidine mouth rinse at 8 hourly and to start active oral dilatation exercises after 72 hours using tongue spatulas (wooden). Exercises were carried out at 15-20 minutes on each side for five times daily for at least 6 months for all patients. At every week for a month and for the next 6 months follow-up, the oral wounds had healed well (Fig. 4,5). The patients were instructed strictly to stop the betel nut, pan chewing habits. The patient reported no pain or intolerance to spicy foods. A passive mouth opening of 35 mm and a forceful mouth opening of 40 mm was maintained and was advised for regular follow-up after every month to check signs of improvement in the mouth opening.

Results

All patients results satisfactory mouth opening immediately after the surgery are shown in Tables 1 and 2. In 50 patients, the range of preoperative

mouth opening was 5-23 mm (14 ± 4.90) (Table 1). Intraoperatively, the result of mouth opening range 25-38 mm (33.25 ± 4.17). The mouth opening at the time of discharge at 72 hours was 25-36 mm (30.63 ± 3.82). Without any complications buccal fat pad had satisfactory healing and epithelialized in 3-4 weeks. Patients compliance to carry out regular physiotherapy decrease after the discharge resulting in decrease in mouth opening. Six months follow up results show mouth opening range was 18-35mm (mean 30 mm) (Table 1&2). Students' T-test was applied to compare the preoperative mouth opening with intra- and each postoperative mouth opening and was found to be statistically significant.

Discussion

Dysplastic or any neoplastic pathology diagnosed on biopsy and associated with severe trismus is treated surgically. Uncomplicated incision of the fibrotic bands may produce abnormal shortening of the tissue and exacerbation of the disease. Borle⁵ mentioned that to cover the defect it was repaired with skin graft and lingual flap but the results were unsatisfactory and increasing donor site morbidity. Canniff et al¹⁰ also reported temporalis myotomy and coronoidectomy are preceded by split thickness skin graft^{11,12}. Twelve recurrent reported cases were found in Khanna and Andrade¹⁴ studies which shows shrinkage, contraction, and rejection of split skin graft. After excision of fibrotic bands Mehrotra et al¹³ presented a case series of 100 patients where comparison was done among buccal fat pad graft, tongue flap, nasolabial fold flap, and split skin graft for correction of mucosal defect.

Use of different flaps like nasolabial flap, bilateral tongue flap, palatal island flap, superficial temporal fascia, free radial forearm flap have been used to cover the musculo-mucosal in literature^{14,15,16}. The use of bilateral tongue flap requires double surgical intervention because of need for pedicle division. It may cause dysphasia, disarticulation and risk of aspiration¹⁵. Nasolabial flap is mostly preferred for small defects while extended nasolabial though covering the bigger defects have disadvantage of aesthetic compromising extraoral scar¹⁶. Use of palatal island flap is not possible always in every patient especially where the palatal mucosa is involved by the disease¹⁵. Similarly the

use of bi paddle radial forearm and anterolateral thigh flap requires microvascular expertise¹⁶. Mild grade of setback were observed due to shortening of the graft but overall the appearance and function achieved were satisfactory.

First description of buccal fat pad flap (BFP) was presented by Heister in 1732 and Bichat elucidated on the exact character of the flap¹⁶. Yeh¹⁷ first mentioned the application of pad of buccal fat for covering defect in OSMF. He showed very good results with minimum morbidity. In his study, mean preoperative mouth opening was 12.1mm. After surgery mean postoperative operative mouth opening was 31.2 mm over follow up period of 10 to 38 months¹⁷. Similarly, study by Sharma R et al¹⁵, the mean preoperative mouth opening was 16.5mm preoperative and 33.5 postoperatively. Results concluded that buccal fat pad rotation was at upper level as compared to the other surgical methods.

OSMF patients were repaired with buccal fat pad after excision of the fibrotic bands as it is easily accessible, mobilized and a well-accepted graft. It comprises of a main body and five extensions^{8,9}: buccal, pterygopalatine, pterygomandibular, superficial and deep temporal. Above the parotid duct the body is centrally positioned extending along the anterior border of masseter muscle and overlies on the uppermost fibres of buccinator muscle. Buccal extension give the bulk or fullness. The temporal region is occupied by the superficial and deep temporal extensions. Total weight of buccal fat pad is 55% to 70%. The accelerated wound healing property of the buccal fat pad can be ascribed to its rich vascular supply through the small branches of facial, internal maxillary and superficial temporal artery and veins⁹.

In this study, the range of the mouth opening at time of discharge was found to be 25-36 mm (30.63 ± 3.82). During the admission time in the ward, all the patients maintained the intraoperative achieved mouth opening but after the discharge there was a gradual decrease in mouth opening due to poor patient compliance or their failure to carry out regular physiotherapy. At the postoperative

6 months, mouth opening was found to be in range of 18-35 mm (30 ± 5.37).

In all cases patients had uneventful postoperative healing with no infection, no scarring, and efficient uptake at the recipient site due to its rich vascular network. Symptoms of burning sensation and intolerance to spicy ingredients were also diminished among patients. Marked decrease in mouth opening were seen in some patients after the discharge from hospital due to poor compliance to carry out regular stick exercises. Patients were kept on follow up for 6 months to assess and compare degree of mouth opening.

The advantages of employing specialized buccal fat pad flap in this study concluded the ease of accessibility through the same incision used for creating surgical defect¹⁸, thereby obviating the necessity of an alternative donor site and its ensuing morbidity. The buccal fat pad use can close the excised fibrotic defect up to 4x4x5cm without compromising its blood supply and with restored height of the buccal vestibule. Post-surgically, the suppleness and elasticity of cheek were improved.

Different surgical treatment modalities using buccal fat pad, tongue flap, nasolabial flap, and split thickness graft concluded that buccal fat pad graft is superior to all the other surgical procedures and it can also be performed as a day care procedure.

We studied the surgical approach prospectively and measured outcomes and compared the results with each other to determine the versatility of buccal fat pad flap. The frailty of BFP itself is the fibrotic bands if present anterior to canine region requires additional graft coverage. Its use is contraindicated in the patients with prior local radiotherapy, malar hypoplasia, thin cheeks or Down's syndrome. BFP should be handled gently with extra care as the overstretching can lead to ischemic necrosis¹⁸.

The limitation in this study is the possibility of partial dehiscence of the flap due to the impaired vascularity due to overstretched ends of BFP and a

year follow up were not recorded. For the future recommendation the BFP should be compared with the other flap and grafts used for repair of fibrotic defect in terms of post-operative pain and discomfort, duration of healing and recurrence rate.

Conclusion

Buccal fat pad flap resilience encourages immediate commencement of mouth opening exercises resulting in improved mouth opening. Spontaneous epithelialization makes the buccal fat pad more rational, reliable and convenient surgical technique.

Acknowledgments

The authors would like to appreciate whole team of Department of Oral and Maxillofacial Surgery, Ziauddin University.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study.

References

1. J. Schwartz. "Atrophialdiopathica mucosa oris," in Proceedings of the 11th International Dental Congress. London;1952.
2. Joshi SG. Sub mucous fibrosis of the palate and pillars. *Ind J Otolaryngology* 1953;4:1-4.
3. Ariyawardana A, Athukorala AD, Arulanandam A. Effect of betel chewing, tobacco smoking and alcohol consumption on oral submucous fibrosis: a case-control study in Sri Lanka. *J Oral Pathol Med* 2006;35:197-201.
4. Ariyawardana A, Sitheequa MA, Ranasinghe AW, Perera I, Tilakaratne WM, Amaratunga EA, et al. Prevalence of oral cancer and pre-cancer and associated risk factors among tea estate workers in the central Sri Lanka. *J Oral Pathol Med* 2007;36:581-7.
5. Borle RM, Borle SR. Management of oral submucous fibrosis: a conservative approach. *J Oral Maxillofacial Surg* 1991;49:789-91.
6. Kerr AR, Warnakulasuriya S, MighellAJ, Dietrich T, Nasser M, Rimal J. A systematic review of medical interventions for oral submucous fibrosis and future research opportunities. *Oral Dis* 2011;17:42-57.
7. Lai DR, Chen HR, Lin LM, Huang YL, Tsai CC. Clinical evaluation of different treatment methods for oral submucous fibrosis. A 10-year experience with 150 cases. *J Oral Pathol Med* 1995;24:402-6.
8. Amin MA, Bailey BM, Swinson B, Witherow H. Use of the buccal fat pad in the reconstruction and prosthetic rehabilitation of oncological maxillary defects. *Br J Oral Maxillofac Surg* 2005;43:148-54.
9. Baumann A, Ewers R. Application of the buccalfatpad in oral reconstruction. *J Oral Maxillofac Surgery* 2000;58:389-92.
10. Canniff JP, Harvey W, Harris M. Oral submucous fibrosis: its pathogenesis and management. *Br Dent J* 1986;160:429-34.
11. Mokal NJ, Raje RS, Ranade SV, PrasadJS, Thatte RL. Release of oral submucous fibrosis and reconstruction using superficial temporal fascia flap and split skin graft-a new technique. *Br J Plastic Surg* 2005;58:1055-60.
12. Khanna JN, Andrade NN. Oral submucous fibrosis: a new concept in surgical management. Report of 100 cases. *Int J Oral Maxillofac Surg* 1995;24:433-9.
13. 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 Endodontol* 2009;107:1-10.
14. Lee JT, Cheng LF, ChenPR, Wang CH, Hsu H, Chien SH, et al. Bipaddled radial forearm flap for the reconstruction of bilateral buccal defects in oral submucous fibrosis. *Int J Oral Maxillofac Surg* 2007;36:615-9.
15. Sharma R, Thapliyal GK, Sinha R, Menon PS. Use of buccal fat pad for treatment of oral submucous fibrosis. *J Oral Maxillofac Surg* 2012;70:228-32.
16. Rapidis AD, Alexandridis CA, Eleftheriadis E, Angelopoulos AP. The use of the buccal fat pad for reconstruction of oral defects. Review of the literature and report of 15 cases. *J Oral Maxillofac Surg* 2000;28:158.
17. Yeh CJ. Application of the buccal fat pad to the surgical treatment of Oral SubmucousFibrosis. *Int J Oral Maxillofac Surg* 1996;25:130-3.
18. Durrani Z. Buccal fat pad flap in reconstruction of oral cavity defects: a case series of five patients. *JKCD* 2012;2.