

Use of Buccal Fat Pad for Treatment of Oral Submucous Fibrosis

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Purpose: The aim of this study was to clinically evaluate the application of pedicled buccal fat pad (BFP) in the surgical management of stage III and IV oral submucous fibrosis (OSMF).

Materials and Methods: Twenty-eight cases of clinically and histologically diagnosed cases of OSMF were divided into 2 groups: group I (n = 15) and group II (n = 13), corresponding to clinical stage III and stage IV, respectively. All the patients underwent incision of fibrotic bands and coverage of the buccal defect with a pedicled BFP flap. Both groups were analyzed separately for mouth opening (interincisal distance in millimeters) preoperatively and 1 year postoperatively, time taken for epithelialization of BFP, time taken for establishment of normal contour, and changes in symptoms (painful ulcerations, burning sensation, and intolerance to spices) 1 year after grafting.

Results: The mean preoperative mouth opening was 19.6 mm (SD, 2.43) in group I and 12.92 mm (SD, 1.21) in group II. The mean postoperative mouth opening after 1 year was 35 mm in group I (SD, 1.96) and 31.76 mm in group II (SD, 1.97). The time taken for epithelialization of BFP was 4 weeks in group I and 5 weeks in group II. The mean time taken for establishment of normal contour after grafting was 12.25 weeks (SD, 1.42) in group I and 15.07 weeks (SD, 1.26) in group II. In 2 cases in group II, there was remission of painful ulcerations, burning sensation, and intolerance to spices.

Conclusion: BFP is reliable for the treatment of OSMF.

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The buccal fat pad (BFP) is a supple and lobulated mass, easily accessible and mobilized. It is a well-accepted graft for defects after incision of fibrotic bands in the surgical management of oral submucous fibrosis (OSMF). OSMF is a chronic progressive disease of the oral cavity and has been defined as an insidious, chronic, fibrotic change in the oral mucosa.¹ In the late stages, mouth opening is limited by

severe scarring, which causes trismus. This condition can be treated surgically or nonsurgically, depending on the stage of presentation. Surgical management is the treatment of choice in cases with marked limitation of mouth opening, usually stages III and IV.²

The bulk of the BFP occupies the buccal space and rests on the periosteum that covers the posterior buccal aspect of the maxilla. The BFP has a rich blood supply through the small branches of the facial artery, the internal maxillary artery, and the superficial temporal artery and vein by an abundant network of vascular anastomosis.³ On average, the volume of BFP is 9.6 mL (range, 8.3-11.9 mL). Defects measuring up to 3 × 5 cm can be covered with BFP without compromising the blood supply.^{4,5} The buccal extension and the main body of the fat pad are in close proximity to the buccal defect and may be approached through the same incision. The BFP also improves the physiologic functions of the cheek after surgery.

Numerous treatment modalities have evolved over time. These include simple release of fibrosis and skin grafting,⁶ use of a bilateral tongue flap, the nasolabial flaps,^{7,8} the island palatal mucoperiosteal

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flap,⁹ bilateral radio artery forearm free flap,¹⁰ the superficial temporal fascia flap with split skin graft,¹¹ and the use of BFP.¹² Though no technique is exclusively recommended, BFP has promising results with minimal morbidity.

This study involves clinical evaluation of patients from the mixed Indian population with stage III or IV OSMF treated with BFP and comparison of the results with other studies.

Materials and Methods

All patients who presented to the department of oral and maxillofacial surgery at our institute to seek treatment for chief complaints of reduced mouth opening, painful ulcerations, burning sensation, intolerance to spices, and a habit of betel nut or tobacco chewing were screened for clinical diagnosis of OSMF. On the basis of clinical findings, the patients were grouped into 4 categories¹: stage I, interincisal mouth opening of more than 35 mm; stage II, interincisal mouth opening from 26 to 35 mm; stage III, interincisal mouth opening from 16 to 25 mm; and stage IV, interincisal mouth opening of less than 16 mm.

Approval of the institutional ethical committee was obtained before proceeding with further study. The patients in stages III and IV underwent histopathologic examination to confirm OSMF and to rule out any evidence of malignancy. The other selection criteria were a high level of motivation to give up deleterious habits and no history or clinical/radiologic presentation of any other cause of trismus.

We selected 28 cases (7 women and 21 men), aged 18 to 53 years, for this study, after obtaining informed consent forms. These cases were further subdivided into group I (n = 15) and group II (n = 13) for stage III OSMF and stage IV OSMF, respectively.

Routine investigations for the pre-anesthetic check-up were done.

A single surgeon (R.S.) performed all operations with the patient under general anesthesia (endotracheal tube intubation or nasal) using either blind nasal, retrograde, or fiberoptic intubation, keeping the restricted mouth opening in view. The patients underwent infiltration along the planned incision line parallel to the occlusal plane with a 1:200,000 epinephrine-lac concentration. A No. 15 Bard Parker blade (Kehr Surgical Pvt Ltd, Kanpur, India) was used for incising fibrotic bands on each side of the buccal mucosa at the level of the occlusal plane away from the Stensen orifice. The incision line extended from the pterygomandibular raphe and/or anterior faucial pillars to as far as the premolar region and/or corner of the mouth depend-

ing on the extent of the fibrotic bands detected by palpation. The incised fibrotic bands were further disentangled manually until no restrictions were felt. The mouth was then forced open with a Heister mouth gag to an acceptable range in excess of 35 mm. After hemostasis was achieved, the BFP (main body and buccal extension) was approached through the posterior-superior margin of the created buccal defect and then dissected with an index finger. The BFP was teased out gently until a sufficient amount was obtained to cover the defect without tension. The interrupted and mattress sutures were placed by use of No. 3-0 Vicryl (Ethicon, Somerville, NJ) to secure the graft (Fig 1). The BFP covered the entire defect, eliminating the possibility of secondary epithelialization.

Postoperatively, all patients received prophylactic antibiotics and nasogastric feeding for 1 week. Mouth opening exercises were started within 36 hours. This intensive exercise was carried out daily for at least 3 months and with reduced frequency for as long as 1 year. The patients were analyzed regarding postoperative mouth opening (interincisal distance in millimeters), time taken for epithelialization of BFP, time taken for establishment of normal contour, and changes in symptoms (painful ulcerations, burning sensation, and intolerance to spices) at 4, 12, 24, and 52 weeks.



FIGURE 1. BFP sutured over defect.

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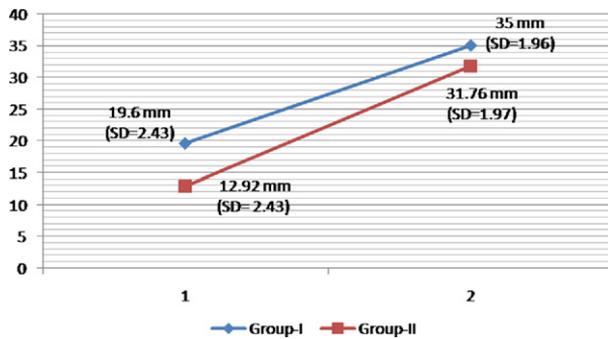


FIGURE 2. Graph of preoperative and postoperative mouth opening.

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Results

In our study 28 patients were divided into 2 groups: group I (stage III) consisted of 15 patients and group II (stage IV) consisted of 13 patients with a mean preoperative mouth opening of 19.6 mm (SD, 2.43) and 12.92 mm (SD, 1.21), respectively. The mean postoperative mouth opening after 1 year was 35 mm in group I (SD, 1.96) and 31.76 mm in group II (SD,



FIGURE 3. Epithelialized graft.

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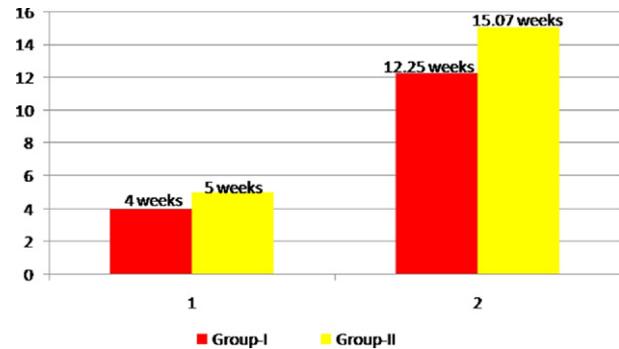


FIGURE 4. Histogram depicting time taken for epithelialization and establishment of normal contour of BFP.

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1.97) (Fig 2). There was no evidence of graft failure, but recurrence of trismus and no remission of painful ulceration, burning sensation, and intolerance to spices were found in 2 of 28 cases in group II. Both patients were in the fifth decade of life. Improvement in the physiologic function of the buccal mucosa, such as suppleness and elasticity, was noted in all other cases. Compared with group I, the time taken for epithelialization of BFP (Fig 3) was greater in group II (4 weeks vs 5 weeks). The mean time taken for establishment of normal contour after grafting was 12.25 weeks (SD, 1.42) in group I and 15.07 weeks (SD, 1.26) in group II (Fig 4).

Discussion

OSMF is an insidious, chronic disease that may affect any part of the oral cavity and sometimes the pharynx, leading to stiffness of the oral mucosa and causing trismus.^{1,3} This disease is most frequently found in India and is not uncommon in Southeast Asia. It has also been reported in other countries because immigration has resulted in a worldwide distribution. Betel nut chewing appears to be the main factor correlating with this disease.¹²

Most patients complain of an irritable oral mucosa during the early stage of the disease, especially when spicy food is consumed. Clinically, there are erosions and ulcerations; subsequently, the oral mucosa becomes blanched and loses its elasticity. Vertical bands appear in the buccal mucosa, the retromolar area, the soft palate, and the pterygomandibular raphe, and a fibrotic ring forms around the entire rima oris. Some patients have difficulty whistling and with tongue movement.

Numerous treatment modalities have evolved over time, with inherent advantages and drawbacks. The simple release of fibrosis and skin grafting showed recurrence because of scarring and graft contraction.⁶

The use of a bilateral tongue flap is a morbid procedure and requires double surgical intervention in the form of flap division at the second stage. The nasolabial flaps are small compared with the defect,⁷ and the main disadvantage of an extended nasolabial flap is an esthetically compromising extraoral scar.⁸ Use of the island palatal mucoperiosteal flap, based on the greater palatine artery, is possible only in a few cases, where the palatal mucosa is not involved by the OSMF.⁹ Moreover, second molar tooth extraction is required to place the flap without tension. Bilateral palatal flaps leave a large raw area on the palatal bone. Bilateral radial artery forearm free flaps,¹⁰ the bi-paddled radial forearm flap,¹³ and the use of 2 radial forearm flaps from a single donor site¹⁴ require microvascular expertise; in addition, the flaps are hairy and require debulking procedures. Extraction of the third molar is required to avoid flap inclination between teeth. The use of superficial temporal fascia flap along with split skin graft has also been reported in 5 cases with good results in the literature.⁸ In another study, 2 independent flaps from the same thigh based on the descending branch of the lateral circumflex femoral artery were used to reconstruct bilateral buccal defects after release of submucous fibrosis.¹⁵ A drawback of the procedure was the need for another surgery for debulking in about 20% of cases.

Yeh¹² first reported the use of BFP with promising results and minimal morbidity. In his study of 9 patients, the range of preoperative mouth opening was 8 to 16 mm (mean, 12.1 mm). Postoperative mouth opening was in the range of 16 to 38 mm (mean, 31.2 mm) over a follow-up period of 10 to 38 months (mean, 21.3 months), with a mean increase of 19.1 mm. Mean mouth opening in our study was 16.5 mm preoperatively and 33.5 mm postoperatively. This study had a large sample size of 28 patients grouped into stages III and IV for better distinction between 2 categories of the clinical stages of OSMF. The follow-up period and graft epithelialization results in the 2 studies were comparable.

Mehrotra et al¹⁶ conducted a study on 100 patients with OSMF in the Indian population, randomly allocated to different surgical groups, with 25 patients per group. After incision of fibrotic bands, group I was treated with BFP graft, group II with tongue flap, group III with nasolabial fold flap, and group IV with split skin graft. The mean preoperative mouth opening was 14.82 mm (SD, 4.38), and preoperative mouth opening ranged between 4.00 and 25.00 mm. Statistically, there was no significant difference among the 4 groups ($P = .996$). The mean postoperative mouth opening at 1 week was 35.79 mm (SD, 3.53), ranging between 24.00 and 42.00 mm. The mean postoperative mouth opening at 1 month was 36.36 mm (SD, 2.64) in group I, 35.36 mm (SD, 2.9) in

group II, 35.64 mm (SD, 2.94) in group III, and 35.80 mm (SD, 3.24) in group IV. In our study only BFP graft was used, and the mean postoperative mouth opening at 1 month was 38 mm in group I and 34 mm in group II, which is higher than that achieved in the study of Mehrotra et al. Moreover, they grouped clinical stages III and IV of OSMF together. The follow-up of their study is confined to 1 month, whereas our study has a long follow-up of 1 year. The total score for pain, esthetics, and function at 1 month after surgery was highest (11.29) in group I, indicating better results; no such result was evaluated in our study. Mehrotra et al concluded that the BFP flap was superior to other procedures because of the ease of surgery, which can be performed with the patient under local anesthesia on an outpatient basis, whereas the operation in our study was performed with the patient under general anesthesia. The procedure had little postoperative morbidity and good patient acceptance.

From the results, one can conclude that BFP functions well as a pedicled graft in the surgical management of OSMF. The healing was uneventful with the uptake of graft, but vigorous postoperative physiotherapy was necessary to maintain the postoperative mouth opening achieved intraoperatively. Noncompliant patients in stage IV and with an advanced age have a poor prognosis, as was found in 2 cases in our study. As of now, there is no definitive treatment modality for OSMF, but this technique is worthy of consideration.

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