

COMPARISON BETWEEN BUCCAL PAD OF FAT GRAFT AND COLLAGEN MEMBRANE
IN SURGICAL MANAGEMENT OF ORAL SUBMUCOUS FIBROSIS

¹ Sudhakar Gudipalli	¹ Associate professor
² Surekha.K	² Professor and Head
³ Manthru Naik R	³ Senior Resident
⁴ Leela Rani	⁴ Post graduate student
⁵ Rangu mounica	⁵ Senior resident
⁶ Praveen Perumalla	⁶ senior lecturer

¹⁻⁶Department of oral and maxillofacial surgery, ^{1,2} Government Dental College and Hospital,Vijayawada, Andhra Pradesh.
³Government Dental College and Hospital, Hyderabad, Telengana. ⁶Kamineni institute of Dental science, Narketpally, Nalgonda, Telengana.
^{4,5} Department of oral medicine and radiology, Government Dental College and Hospital, Hyderabad, Telengana

ABSTRACT: Aims and objectives: To evaluate and compare the effectiveness of the buccal pad of Fat (BPF) and collagen membrane for the reconstruction of the defects secondary to the resection of the Fibrotic bands in oral submucous fibrosis (OSMF). **Materials and methods:** 20 patients of OSMF diagnosed clinically with mouth opening less than 25 mm were selected. Patients were divided into group I (BPF) and II (collagen membrane) of 10 patients each. After excision of the fibrotic bands, mouth opening was checked and if it was found to be < 35 mm, then bilateral coronoidectomy was carried out along with extraction of third molars. Results were compared within the parameters of maximal mouth opening (MMO), postoperative pain and duration taken for epithelialization. **Result:** Study showed statistically insignificant difference in the postoperative mouth opening and pain, significant difference in time taken for epithelisation. **Conclusion:** Present study indicates both BPF and Collagen membrane are versatile materials for the treatment of OSMF. Collagen membrane is superior to BPF in terms of time taken for epithelisation.

KEYWORDS: Buccal pad of fat, Collagen membrane, Oral submucous fibrosis, Mouth opening.

INTRODUCTION

Oral submucous fibrosis is defined¹ as “an insidious chronic disease affecting any part of the oral cavity and sometimes the pharynx. It is always associated with a juxta epithelial inflammatory reaction followed by a fibro elastic change of the lamina propria, with epithelial atrophy leading to stiffness of the oral mucosa and causing trismus”.It is regarded as a precancerous and potentially malignant condition. In this study, the effectiveness of BPF and collagen membrane are taken up for the reconstruction of the buccal defect created after excision of buccal fibrotic bands was evaluated and compared.

Methodology

The study comprised 20 clinically proven OSMF cases with mouth opening less than 25 mm who reported to the department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Vijayawada. The patients were randomly divided into group I and group II of 10 patients each. Group I (BPF group): After resection of buccal fibrous bands, the mucosal defects were reconstructed with group I (BPF) and Group II (Collagen membrane group). Inclusion criteria of the study is Grade III and Grade IVA cases of OSMF (Khanna and Andrade classification)² requiring surgical management and

reconstruction and who are medically fit patient . Exclusion criteria: Grade I, II and IVB cases of OSMF, medically compromised patients for surgical procedure under general anesthesia and patients with previous surgical treatment for oral submucous fibrosis.

Surgical procedure

The patients were operated under general anaesthesia. Along the planned incision line 2% xylocaine with adrenaline (1: 2,00,000) was infiltrated into the buccal mucosa bilaterally. A longitudinal incision using an electrosurgical knife is placed in the buccal mucosa along the occlusal plane from the pterygomandibular raphe or anterior faucial pillar posteriorly, to as far as the corner of the mouth depending on the extent of the fibrotic bands and away from the Stenson's orifice. The incision was carried out to the depth of the sub mucosal layer, and the wound created was further freed by manipulation using fingers until no restriction was felt (Fig,1 and Fig.2). The mouth was then forcefully opened using Heister's mouth gag as wide as possible. Then the mouth opening was measured from incisal edges intra-operatively. A mouth opening of >35 mm was considered to be the minimal acceptable opening(Fig.3)..All third molars along with



Fig. 1: Mouth opening of 24 mm



Fig. 2: Excision of fibrous bands

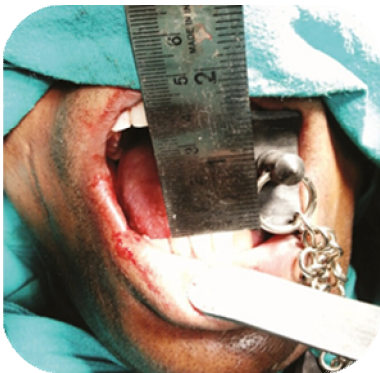


Fig. 3: Mouth opening of 37 mm. achieved intraoperatively



Fig. 4: Wound area sutured with buccal pad of fat

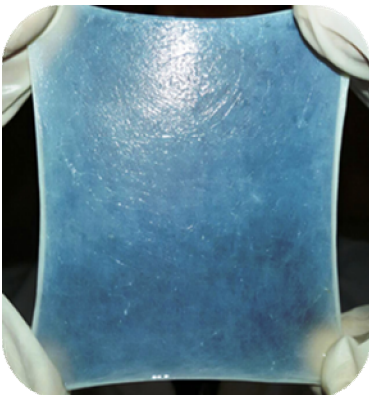


Fig. 5: 0.6mm x 5cm x 5cm collagen membrane ("KOLLAGEN"™ of Eucare Pharmaceuticals pvt.Ltd.)



Fig. 6: Mouth opening of 36 mm achieved intraoperatively



Fig. 7: Wound area sutured with collagen membrane



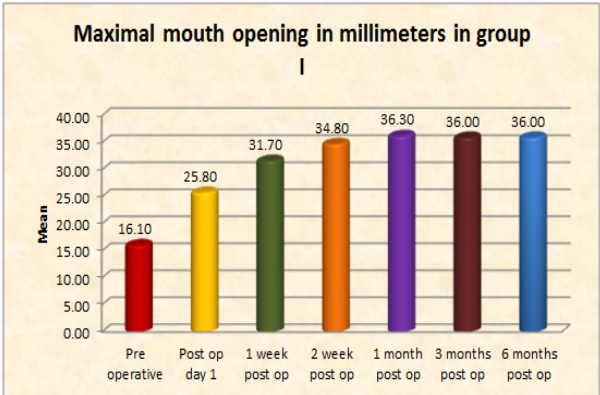
Fig. 8: 6 months postoperative - Mouth opening of 36 mm

Table:1 Maximum Mouth Opening – Group 1

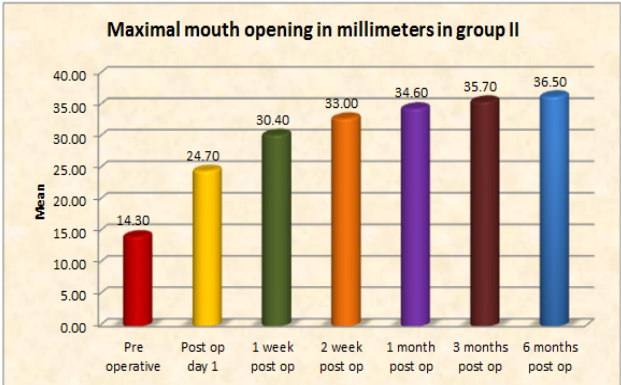
S.No	Age	Sex	Maximal Mouth Opening (MMO) in millimetres						
			Pre operative	Post op. day 1	1 week post op.	2 week post op.	1 month post op.	3 months post op.	6 months post op.
1	27	Male	24	26	27	31	32	32	33
2	34	Male	13	23	31	34	36	36	38
3	46	Female	12	25	32	36	37	37	37
4	31	Female	16	29	34	38	38	38	38
5	42	Male	16	26	31	37	31	24	20
6	49	Female	11	28	33	35	38	38	38
7	35	Male	19	23	35	36	40	40	41
8	37	Male	17	22	28	31	34	37	37
9	33	Male	9	29	31	33	34	34	34
10	26	Male	24	27	35	37	43	44	44
MEAN			16.10	25.80	31.70	34.80	36.30	36.00	36.00
SD			5.13	2.53	2.71	2.49	3.68	5.31	6.43

Table :2 Maximum Mouth Opening – Group 2

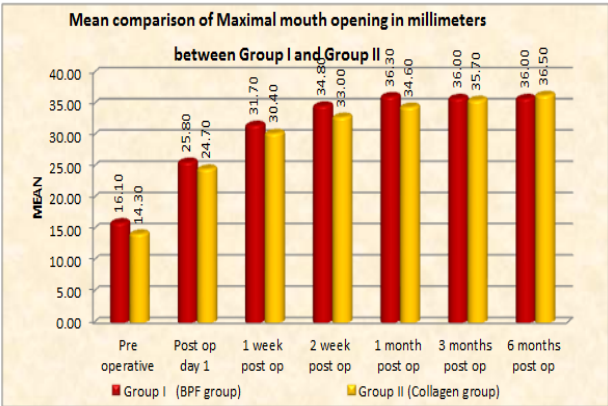
S.No	Age	Sex	Maximal Mouth Opening (MMO) in millimetres.						
			Pre operative	Post op. day 1	1 week post op.	2 week post op.	1 month post op.	3 months post op.	6 month s post op.
1	30	Male	19	25	31	36	30	26	26
2	31	Male	21	29	35	37	45	46	46
3	30	Female	16	27	31	34	35	35	37
4	30	Male	20	27	31	33	33	36	36
5	28	Male	4	24	31	28	31	34	36
6	27	Male	5	22	29	34	35	37	37
7	31	Male	17	26	33	35	36	38	39
8	36	Female	9	20	27	30	33	35	36
9	29	Male	10	23	29	31	34	34	35
10	34	Male	22	24	27	32	34	36	37
MEAN			14.30	24.70	30.40	33.00	34.60	35.70	36.50
SD			6.73	2.67	2.50	2.79	4.09	4.88	



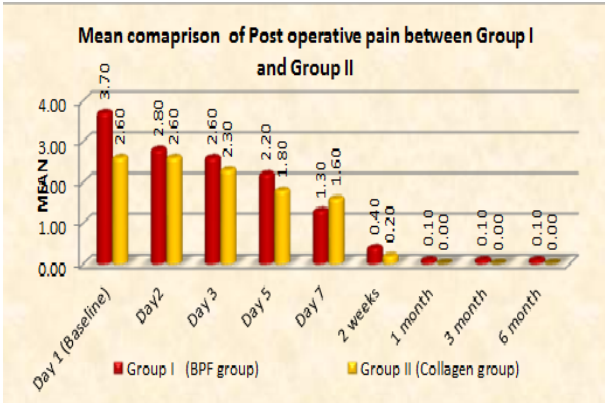
Graph 1: Maximum Mouth Opening – Group 1



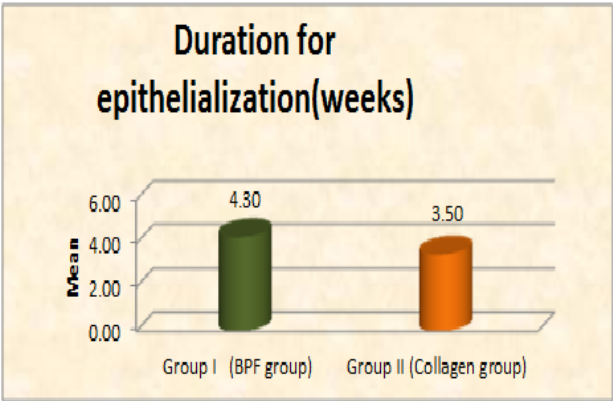
Graph 2: Maximum Mouth Opening – Group 2



Graph :3. Mean comparison of Maximal mouth opening in millimeters between Group I and Group II



Graph 4: Mean comparison of Post operative pain between Group I and Group II



Graph 5: Duration for epithelialization(weeks)

diseased and decayed teeth were extracted. In cases with maximal mouth opening (MMO) less than 35mm, coronoidectomy was done. The periosteum of the anterior border of the mandibular ramus was elevated and subperiosteal dissection was continued up to the sigmoid notch with the help of curved periosteal elevators. Coronoid retractors were placed on each side of the coronoid process to protect vital structures, including the lingual and inferior alveolar nerves, the maxillary artery. After isolation of the coronoid process, temporalis myotomy and coronoidectomy were carried out.

Then, in case of group-I, BPF was approached via postero-superior margin of the created buccal defect i.e. posterior to the zygomatic buttress. The BPF was teased out gently until significant amount was obtained to cover the defect without tension. The BFP was then secured in place with peripheral suturing (**Fig,4**) and with some quilting sutures using vicryl 3- 0, as standard in all patients. The same procedure was carried out on the opposite side.

In cases of Group – II (Collagen membrane group), prior to use the collagen membrane was washed in saline to remove the preservative isopropyl alcohol. The size used in present study was 0.6mm x 5cm x 5cm (**Fig,5 and Fig.6**). The material was reconstituted by immersion in normal saline for 5 minutes, and then cut with scissors to required shape, leaving a small overlap on the remaining mucous membrane. The graft was sutured all along the periphery and if required some quilting sutures may be taken to attain close approximation to the underlying tissues (**Fig,7**)

All the patients received prophylactic antibiotic coverage and liquid diet for one week through Ryle's feeding tube. Mouth opening exercises with Heister's mouth gag were started after 36 hrs post operatively. Gentle irrigation with betadine was carried out in all our cases from the 3rd post-operative day .Patients were discharged after one week with strict instructions regarding continuance of intense mouth opening exercises for atleast 6 months. The inter-incisal distance (ID) between the incisal edges of the maxillary and mandibular central incisors were measured using a metal scale and expressed in millimetres. The inter-incisal distance was measured pre-operatively and on post op day 1, 1st week , 2nd week, 1st month, 3rd month and 6th month post operatively. Duration of epithelialization was recorded in weeks. Palpability of fibrous bands pre-operatively and post-operatively was recorded as palpable or not palpable.

The postoperative pain was assessed using an 11 point horizontal VAS scale at day 1(baseline), day 2, day 3, day 5, day 7, 2 weeks, 1st month, 3rd month and 6th month. (**Fig,8**). The pre and Post operative radiographs were taken (**Fig,9 and Fig.10**)

Interpretation

No pain – 0, Mild pain – 1 to 3, Moderate pain – 4 to 6, Severe pain – 7 to 10

Results

The post operative mean mouth opening in group – I was 36.00 mm and in group – II was 36.50 mm, with no significant difference noted. There was no significant difference in pain experienced by the patients between the groups except on postoperative day 1. By postoperative 1 month, no patient had even mild pain in both the groups except one in group - I. The mean time taken for epithelialization was 4.30 weeks in group – I and 3.50 weeks in group – II, with statistically significant difference. Palpability of fibrous bands pre-operatively was seen in all patients in both the groups. Postoperatively, no patient had palpable buccal fibrous bands except one in each group. Out of 20 patients included in the study, 10 patients were operated for BPF reconstruction with ages ranging from 26 - 49 years (mean – 36, S.D – 7.64) under group I, 10 were operated for collagen membrane reconstruction with ages ranging from 27 - 36 years (mean – 30.60, S.D – 2.67) under group II. (**Table.1, Table.2 and Graphs 1-5**)

Discussion

Treatment for oral submucous fibrosis is a challenge; as the pathogenesis of this disease is obscure.³ Management aims to reverse or alleviate these signs and symptoms, stop the disease progression, and minimise the risk of malignant transformation.⁴ The current protocol for the management of OSMF can be divided into 2 broad groups: conservative (physical and medical) and surgical treatment. In present study, 20 patients with OSMF were selected. Patients were grouped into two categories based on the treatment they received. Patients in group I (n=10) were operated for BPF reconstruction following excision of the fibrotic bands and in group II (n=10) were operated for collagen membrane reconstruction. In the present study, in group I (BPF group), the preoperative mouth opening was 9 – 24 mm with mean value of 16.10 mm (SD-5.13)

The post operative mouth opening at 6 months after surgery was 20 mm to 44 mm with mean value of 36.00mm. Our study did very well correlated with the mean values of studies conducted by Yeh⁵(31.2mm), Mehrotra et al.⁶ (36.36 mm), Postoperative pain was controlled in all patients using the same analgesic of same dosage, frequency, and prescribed for the same length of time .By postoperative 1 month, with the exception of one patient, no patient in group I had even mild pain.

Where as study conducted by Harsha Pradhan ET al.⁷ showed no patient had even mild pain by postoperative day 14. Time taken for epithelialization of BPF in our study was 3 – 6 weeks with a mean value of 4.30 weeks (SD –



Fig. 9 : Pre – operative Orthopantamogram



Fig. 10 : Post – operative. Orthopantamogram

0.82).. Palpability of fibrous bands pre-operatively was seen in all patients in group I. Since these bands were sectioned during surgery, no patient with the exception of one patient had palpable buccal fibrous bands in postoperative follow-up period. The patient who had palpable fibrous bands postoperatively was uncooperative, did not follow post-operative instructions.⁷ BPF has many advantages: Simple and quick flap to use, has rich blood supply, complete epithelialization within 6 weeks, no visible scars, low morbidity and failure rate, well accepted by the patient and it can be associated with other pedicled flaps^{8,9} Major hurdles included the limited reach of the flap for coverage of the anterior regions of the oral cavity, the chances of damage to the parotid papilla and duct during harvesting and secondary infection. Collagen membrane used in this study is a purified bovine serosa collagen ("KOLLAGEN" of EUCA RE Pharmaceuticals private limited). Purified refers to collagen free from other components normally associated with it in its normal state. Reconstituted collagen refers to collagen that has been reassembled into individual molecules without telopeptide extensions. This collagen is cross linked with tanning

agents (glutaraldehyde , chromium sulphate) to increase the tensile strength.¹⁰ Collagen membrane of dimensions 5 x 5 cms and of thickness 0.6 mm is used in this study. This membrane is sterilized by gamma radiation and preserved in Isopropyl alcohol. The membrane is removed from the pouch and washed in normal saline before application. In the present study, in group II (Collagen membrane group), the preoperative mouth opening was 4 – 22 mm with mean value of 14.30mm (SD-6.73). The post operative mouth opening at 6 months after surgery was 26 mm to 46 mm with mean value of 36.50mm. This result was in accordance with the studies conducted by Harsha Pradhan et al,⁷ ShobhaNataraj et al^{11,12} who reported mean postoperative values of 36.53 mm and 35.7 mm respectively. By postoperative 1 month, no patient in group II had even mild pain. This was in accordance with the study conducted by Harsha Pradhan et al.⁷ Collagen when used to cover the raw area provides the coverage for sensitive nerve endings thereby diminishing degree of pain.⁴⁵ Time taken for epithelialization of collagen membrane in our study was 3 – 5 weeks with a mean value of 3.50 weeks (SD – 0.71).¹³ Fibrous bands were palpable preoperatively in all patients in group II. Since these bands were sectioned during surgery, no patient with the exception of one patient had palpable buccal fibrous bands in postoperative follow-up period.⁷ Collagen membrane has an inherent property of haemostatic effect as it is a specific activator of platelets and helps in their release, aggregation and adhesion to collagen fiber.¹⁴ In the present study, collagen membrane showed good haemostatic effect in almost all the cases of application.¹⁵ The collagen did not cause any adverse reaction and may have been responsible for the clinical impression of slightly more rapid healing. In our study no one showed any adverse reaction to the collagen proving its safety as a biological dressing material, this was in accordance with the study of Shobhanataraj et al.¹¹ Where as C.H. Lee et al.¹⁶ reported adverse reactions to exogenous Collagen due to cell response that starts shortly after the material is kept in contact with tissues, evoking a local and fast Inflammatory response. The adherence of collagen membrane is initially due to fibrin collagen interaction and later due to fibrovascular ingrowth into the collagen membrane. All collagen membranes, with time, slowly underwent collagenolysis and were eventually sloughed off. However, despite it's weakening by collagenolysis, collagen membranes were robust enough to resist masticatory forces for a sufficient time, to allow granulation tissue to form, which appeared uniform and clinically healthy.¹¹ Maximal mouth opening in both groups, on postoperative day 1 showed a significant reduction as compared with the recorded intraoperative mouth opening. The reason may be the postoperative pain and swelling due to which patients were not able to open their mouths fully. However, from postoperative day 2 onwards mouth opening increased steadily from the pre-operative mouth opening to a mean of 36.00mm in group I and 36.50mm in group II at the end of follow-up. There was no statistically significant difference between both the groups in terms of

mean postoperative mouth opening at the end of follow-up period. This observation suggests a successful outcome in both groups. In the present study, all the patients with the exception of 2 (case no.5 in group I and case no.1 in group II) maintained adequate mouth opening throughout the follow up. This could be attributable to the meticulous physiotherapy regimen which was followed by patients in the present study. The physiotherapy started as early as 3rd post operative day and continued till 6 months of post operative period. The patients were explained and made to understand the value and importance of their cooperation to carry out active physiotherapy for ultimate good result. The patients who followed physiotherapy regimen strictly gave good results. I-Yueh Huang et al¹⁷ found that the patient's cooperation is the primary requirement for success in the treatment of OSMF. However, 2 patients in our study who were uncooperative, did not carry out the postoperative physiotherapy ultimately landed in relapse with significant amount of decrease in mouth opening. Mean postoperative pain on day 1, in group – I (BPF group) was significantly higher than in group – II (Collagen group) with P value <0.05. This may be explained based on the fact that the collagen membrane does not need deep dissection as mobilization of the BPF for transposition resulting in less pain.⁷ There was no significant difference in pain experienced by the patients between the groups in further follow up visits. This pattern of decline of pain along with the progression of time is indicative of proper healing in both the groups. By postoperative 1 month, no patient had even mild pain in both the groups except one in group - I. The mean time taken for epithelialization was 4.30 weeks in group – I and 3.50 weeks in group – II with statistically significant difference. Collagen membrane stabilizes the coagulum resulting in early epithelial proliferation from the surrounding tissues... Palpability of fibrous bands pre-operatively was seen in all patients in both the groups. Postoperatively, no patient had palpable buccal fibrous bands except one in each group. In group – I, a patient had bulkiness of the flap on the right side, which was continuously impinging between the teeth while the patient was chewing, that was managed by a transbuccal suture of the flap. Overall, the present study indicates that both BPF and Collagen membrane were versatile materials in covering the oral defects. We found insignificant difference in the postoperative mouth opening and pain, significant difference in time taken for epithelialization.

CONCLUSION

Overall, the present study indicates that both BPF and Collagen membrane were versatile materials in covering the oral defects. We found insignificant difference in the postoperative mouth opening and pain, significant difference in time taken for epithelialization. However, due to the limited sample size and follow-up period of this study, it is difficult to conclude which material is superior over the

other. Hence, studies with large sample sizes and longer follow up periods are required.

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Nil

Conflicts of interest:

Nil

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Corresponding Author

Dr.Surekha.K
Professor and Head
Department of oral and maxillofacial
surgery
Government Dental College and Hospital,
Vijayawada- 520004
Phone no : 8008372713
E-mail:gsletterbox@gmail.com