

Versatility of Buccal Pad Fat Grafts in Surgical Treatment of Oral Submucous Fibrosis

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The buccal fat pad has been widely used for the repair of oral defects including treatment of patients suffering from trismus caused by oral submucous fibrosis is reported. This study has been conducted on 10 patients who underwent incision of the fibrotic bands and coverage of the buccal defect with a buccal fat pad graft. The surgical technique is described below, and the results suggest that this is a satisfactory, convenient, and reliable technique for the treatment of oral submucous fibrosis.

Key words: Buccal pad of fat, Grafts, Oral submucous fibrosis.

In everyday practice maxillofacial surgeons and dentists often encounter a wide range of oral mucosal lesions. These lesions vary from small mucosal alterations that need patient motivation and simple therapeutic remedies to life threatening malignant conditions. Most of these lesions are caused by tobacco and betel nut use. It is estimated that about 47% of Indian population aged 15 years and above use tobacco and betel nut in one form or another (Fali S.M. *et al*).

Oral submucous fibrosis has been established in Indian medical literature since the time of Sushruta- a renowned physician who lived in the era 2500-3000 B.C. (Fali S.M.) This condition was described by Schwartz (1952) as "Atrophii idiopathica mucosae oris" (Schwartz J.). Later Joshi in 1953 described the condition in India and gave the name "Oral Submucous Fibrosis" (Anil S *et al*).

Oral Submucous Fibrosis can be defined as, "An insidious chronic disease effecting any

part of the oral cavity and sometimes the pharynx. Although occasionally preceded by or associated with vesicle formation, it is always associated with a juxta-epithelial inflammatory reaction, followed by a fibroelastic change of the lamina propria, with epithelial atrophy, leading to stiffness of the oral mucosa and causing trismus and inability to eat" (Pindborg J. J. *et al*).

Oral Submucous Fibrosis has a multifactorial etiology, genetic susceptibility may also be associated with it and is shows affinity towards malignant transformation. Paymaster J.C. (1976) was the first to mention the precancerous nature of Submucous Fibrosis.

Various modalities of management include both medical and surgical treatments. Medical modalities include the use of gold (Rao A.B.N.), senotypoid (Egyedi P.), hyaluronidase (Borle R.M. *et al*), steroids (Lai D.R. *et al*), placentrix (Rana Janeyulu *et al*), vitamins (Borle R.M. *et al*), chymotrypsin (Gupta D. *et al*), iron supplements (Borle R.M. *et al*), peripheral vasodilators like buflomedial hydrochloride (Lai D.R. *et al*), and nylidrin hydrochloride (Sharma K. *et al*). Surgical treatments include the excision of fibrotic band (Paissat D.K.), temporalis myotomy and coronoidectomy with skin

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grafts(Canniff J.P. *et al*), tongue flaps(Kavarana N.M. *et al*), fresh amnion grafts(Lai D.R. *et al*), lingual pedicled flaps(Golhar S.U.), palatal island grafts(Khanna J.N.), and buccal fat pad grafts(Yeh C.Y).

The Buccal Fat Pad is a supple, lobulated mass, easily accessible, mobilized and well accepted graft for covering intra-oral defects. It is mainly used to cover defects in posterior maxilla, the buccal region, the hard palate, the soft palate, the retromolar and pterygomandibular regions after tumour resection, oro-antral communications after tooth extraction and also in the surgical management of Oral Submucous Fibrosis. Here, we conducted a study to establish the application of Buccal Fat Pad as a graft to the surgical management of Oral Submucosal Fibrosis in 10 patients.

MATERIALS AND METHODS

A study of 10 cases was carried out in the Department of Oral and maxillofacial Surgery, SreeBalaji Dental College and Hospital, Chennai, over a period of 1 year.

Among the 10 patients included in the study, 8 were males and 2 were females with the age range from 20-50 years. The clinical diagnosis of Oral Submucosal Fibrosis was made on the basis of intolerance to spicy food, blanching of oral mucosa, loss of suppleness or oral mucosa, presence of fibrotic bands and a decreased mouth-opening.

Incisional biopsies were taken in all the subjects for the confirmation of the diagnosis and to exclude the cases with malignant changes. A detailed personal history with special attention to smoking, betel quid chewing habits and alcohol consumption was obtained from each patient.

Patients with temporomandibular joint problems and pericoronitis of the lower third molars were excluded from this study.

Before starting the treatment, cessation of the betel nut chewing habit and a full mouth scaling were the prime requirements for all patients. A thorough clinical examination was done in all cases. Routine blood investigations, urine examination, ECG, chest(P-A view) and a physician's opinion regarding the patient's fitness to undergo surgery under general anesthesia were required.

All the procedures were done under general anesthesia with naso-endotracheal intubation. The incision was made with an electrosurgical knife along each side of the buccal mucosa at the level of the occlusal plane away from the Stenson's duct orifice. Incision was carried posteriorly to the pterygomandibular raphe and anteriorly towards the corner of the mouth, depending upon the location of the fibrotic bands. The bands were further freed by finger manipulation until no restrictions were felt. The mouth was opened forcefully with the help of mouth gag to an acceptable range of 35mm. In case of difficulty in achieving a mouth opening of a minimum of 35mm, coronoid process was resected.

The buccal fat pad was approached via the posterior superior margin of the created buccal defect. A dissecting scissor was used to widen it. If necessary, the submucosal tunnel was widened again until the buccal fat pad appeared in the mouth. The buccal fat pad was taken out until a sufficient amount was obtained to cover the defect without tension. The margins of the defect were sutured to the buccal pad of fat with 4-0 vicryl sutures. Ryle's tube was given to the patient for a period of 10 days.

All patients received taxim 1gm twice daily by intravenous route for 3 days along with doses of intravenous dexamethasone 8mg given 8th hourly for the first 24 hours and tapered gradually. A liquid diet with Ryle's tube was given for 10 days. Mouth opening exercises were started 48 hours post operatively and were continued daily for 3 months.

Post-operative follow up was done weekly once for the first month, once in two weeks for the next 2 months and once a month for the next 9 months.

The patients were evaluated for intra-operative and post-operative complications, epithelisation of the fat pad and improvement in the mouth-opening.

RESULTS

Pre-operative inter-incisal opening was less than 17mm in all the cases except for one case where the incisal opening was 21mm. Intraoperative inter-incisal opening of 35mm or more was achieved after forcing the mouth open. Bilateral coronoidectomy was carried on in two cases where forced mouth opening was less than

35mm, and after that a final opening of 35mm was achieved.

None of the 10 cases had any intra-operative complications. Routine bleeding was seen in all the cases, that was controlled by pressure packs and surgical defect was adequately covered with buccal fat pad without any tension.

All patients were advised to exercise daily and the results obtained were satisfactory. One patient failed to exercise and finally had a relapse. The immediate post-operative mouth-opening range was 19-30mm that increased to 25-35mm after 7 days and that was maintained for a follow up period of 40-48 weeks. All patients showed an improvement in mouth opening and the symptoms of blanching and burning sensation was found to reduce gradually. None of the patients had any complications like excessive granulation of the buccal fat pad or partial necrosis of the buccal fat pad.

DISCUSSION

In our study we included subjects aged between 20-50 years, since most of the young adults are habituated to chewing betel nut in various forms. Our study group has male to female ratio of 4:1 because of the male predominance to habit of chewing betel nut than females. Amongst the ten subjects in the study group, seven used only pan para which contained betel nut, tobacco, catechu, lime permitted spices and flavours. One chewed pan para and smoked cigarettes, one used paan, tobacco, lime, areca nut while one patient consumed alcohol and chewed pan para. So, all the patients used betel nut in one or the other form, and it may be considered as an etiologic factor for OSF. This finding is in accordance with that of Canniff J.P. *et al.*, and Anil S. and Beena V.T..

In our study 4 patients complained of burning sensation of oral mucosa on eating spicy food and six patients came to us with the complaint of difficulty to open the mouth. This is in accordance with the researches of George A. T., Rao A.B.N., Pindborg J.J. *et al.*, Canniff J.P. *et al.* In our study the pre-operative mouth opening was 2-20mm. In two patients a bilateral temporalis myotomy and coronoideotomy was done as the forced intra-operative mouth opening was less than 35mm. Bilateral buccal defects ranging from 4.0X2.5 to 5.0X3.5 were covered with buccal fat pad without

any tension. Coverage of approximately similar size defects was reported by Lai D.R. *et al.*, Yeh Y.C. The range of mouth opening after 7 days was 25-35mm. Yeh Y. C. also observed a range of 28-36mm in his study after same time-period.

Ryle's tube feeding was continued for a period of 10 days post-operatively. A similar period of nasogastric feeding was done by Khanna J.N. *et al.* and Malik N. A. *et al.* In our study routine post-operative physiotherapy was started after 48 hours and lasted till the last follow up. Uncovered buccal fat pad started epithelizing by 7th post-operative day and completed by end of 1 month. Similar time span was reported for epithelisation by Malik N.A. *et al.*

Oral submucous fibrosis (OSMF) is a complex, debilitating, and precancerous condition of insidious onset (Gururaj Arakeri *et al.*). It is featured by the deposition of fibrous tissue in the submucosal layer of the pharynx, palate, fauces, cheeks, lips, larynx and oesophagus. About 2.5 million people are affected worldwide, with most cases being in southern India (D. Mehrotra). It has a multifactorial etiology including capsaicin, betel nut alkaloids, hypersensitivity, autoimmunity, genetic predisposition (HLA-A110, HLA-DR3, HLA-DR7 and haplotypes A10/DR3, B8/DR3, and A10/B8) and malnutrition, but chewing quid and tobacco is the most promising etiological factor. There have been several excellent reports on the risks of chewing tobacco (Tilakaratne W.M., Jacob B.J., Ahmad M.S., Oakley E., Ranganathan K., Lee CH *et al.*). This disease is characterized by blanching, stiffness of oral mucosa, trismus, burning sensation in the mouth, hypomobility of the soft palate and tongue, loss of gustatory sensation, and occasionally mild hearing impairment due to blockage of Eustachian tube (Borle R. M.). This disease can be classified in two phases: an eruptive phase and the fibrosis induction phase.

The eruptive phase is characterized by formation of vesicles, erythema and burning sensation. The fibrosis induction phase is characterized by disappearance of the vesicles, healing of the ulcers, decreased burning sensation, blanching and stiffness of the oral and oropharyngeal mucosa owing to healing by fibrosis. These two phases appear in a cyclic manner.

Medical treatment is satisfactory in cases of mild impairment, but gives only symptomatic relief in the long run. In cases of severe limitation, surgical therapy leads to improvement of trismus. In the past excision of the fibrous bands was done with or without grafts. Materials used for grafting includes skin, placental grafts(Gupta D.), tongue flaps(Tepan M.G), temporalis tendon, coronoid process with skin grafts(Canniff J.P.), lingual pedicle flaps(Golhar S.U), nasolabial flaps (Kavarana N.M. *et al*), palatal island flaps(Khanna J. N), and buccal fat pad flaps(Lai D.R, Yeh D.J.C, Malik N.A. *et al*).

D.K. Paissat concluded that excision without grafting resulted in further fibrosis. Use of split thickness graft in covering the buccal defect was first reported by D.J.C. Yen. Tepan M.G *et al* reported the use of tongue flaps in retromolar region. Changes in the temporal tendon secondary to oral submucous fibrosis resuting in trismus have to be corrected by temporal myotomy or coronoidectomy and skin grafting as proposed by Canniff J.P. *et al*.Golhar *et al* proposed lingual pedicle grafting in the retromolar region.Bilateral nasolabial flaps were used successfully byKavarana N.M. and Bhathena H.M. Gupta D. and S.C. Sharma did surgical excision of fibrotic bands and yielded good results by submucosal placement of human placental grafts. J.N. Khanna and N.N. Andrade reported a new surgical technique by covering the buccal defects with apalatal island flap in combination with temporalis myotomy and bilateral coronoidectomy.

Pedicles buccal pad fat as a graft for the buccal defect was described by Lai D.R. *et al* Yeh C.Y and Malik N.A. *et al*.Egyedi P. was the first to report the use of buccal fat pad as a pedicled graft. The buccal pad fat in adult body rests on the periosteum that covers the posterior aspect of the maxilla, and is bounded by the pterygopalatine fossa and the buccinators and masseter muscles. From the anterior portion of the parotid gland, Stenson's duct courses anteriorly across the masseter muscle. At the anterior border of this muscle, the duct turns medially, piercing first the buccal fat pad and then the buccinators muscle, before opening into the oral cavity.

The buccal extension of the fat pad rests on the buccopharyngeal fascia, which lines the external surface of the buccinators muscle. The fat

pad also extends superomedially through the pterygomaxillary fissure into the pterygopalatine fossa, where it envelopes the neurovascular structures contained within the fossa. A thin extension from the upper pole of this process courses along the maxillary division of the trigeminal nerve to enter the cranial vault through the foramen rotundum(Tideman H. *et al*).

The largest, or "temporal", extension passes superiorly under the zygomatic arch to the temporal plane. It splits into two portions, with the larger, superficial portion passing upward and backward between the temporal fascia and the surface of the temporalis muscle. The deep portion is a narrow tongue that passes superiorly between the superficial and deep fibres of the temporalis muscle, to rest on the greater wing of the sphenoid bone. This temporal extension is the only process of fat pad that cannot be easily separated from the surrounding tissues.

Deep to the tendons of the temporalis muscle, the pterygomandibular extension of the fat pad reaches backward into a space bounded laterally by the medial surface of the mandibular ramus, medially by the medial pterygoid muscle, and superiorly by the lateral pterygoid muscle. This process of the buccal fat pad surrounds the lingual and the inferior alveolar nerves and the inferior alveolar blood vessels, and reaches backward to the anterior surface of the deep portion of the parotid gland.

The blood supply to the buccal fat pad is derived specifically from the buccal and deep temporal branches of the maxillary artery, the transverse facial branch of the superficial temporal artery and from the small branches of the facial artery(Tideman H.).

Summary

Surgical treatment is the method of choice in patients with marked limitation of mouth opening. The buccal fat pad grafting is technically easy procedure, with no visible scar or defect in the donor area. The anatomic proximity of the donor site to the recipient site permits rapid grafting which contributes to the "take" of the graft. Symptoms like burning sensation and intolerance to spicy food are relieved by the surgical procedure and improvement in mouth-opening is seen. But, prevention is best line of cure for this precancerous condition.

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