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Role of buccal fat pad versus collagen in the surgical management of oral submucous fibrosis: a comparative evaluation

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KEYWORDS Oral submucous fibrosis; Buccal fat pad; Collagen sheet; Surgical management.

ABSTRACT

Aim This study was conducted to assess the efficacy of buccal fat pad and collagen in the surgical management of oral submucous fibrosis.

Materials and methods This camparative study was conducted on 20 patients with reduced mouth opening due to oral submucous fibrosis (Khanna and Andrade Classification Grade 3 and 4 a), randomly divided into 2 groups. In one group, the buccal fat pad was harvested and in another group, only wet bovine collagen sheet was applied as surgical dressing in the intra-oral wound after fiberotomy.

Results Both the dressings resulted in the achievement of nearly normal mouth opening with insignificant differences in the proportion of relapse. Buccal fat pad as an autogenous graft has the advantage of better vascular supply, minimum donor site morbidity, better strength and resilience during the healing phase. Xenogeneic collagen has better availability, no donor site morbidity, ease of application and better coverage of the surgical wound.

Conclusion Considering post-operative healing and surgical convenience, use of collagen sheet is a superior method to the transposition of the buccal fat pad.

INTRODUCTION

Oral submucous fibrosis (OSMF) is an insidious, chronic disease affecting any part of the oral cavity and sometimes the pharynx. Occasionally proceeded by and/or associated with vesicles formation, it is always related to the juxta-epithelial inflammatory reaction followed by the fibro-elastic change in lamina propria with epithelial atrophy leading to stiffness of the oral mucosa and causing trismus and inability to eat (1,2). Patients generally complain of burning sensation while eating spicy food. The fibrosis also leads to difficulty in swallowing, mastication, speech and pain in the throat. In advanced cases, there may be severe trismus, and totally inelastic mucosa forced against the teeth leading to chronic ulceration and subsequent infection. The pathogenesis of the disease is multifactorial including areca nut chewing, ingestion of chillies, genetic and immunologic processes, nutritional deficiencies and other factors.

The treatment of patients with OSMF depends on the degree of clinical involvement. If the disease is detected at a very early stage, cessation of the habit is sufficient along with medicines consisting of multivitamins, B-complex etc. Patients' diet should include proteins, vitamin D, E and B-complex and micro-nutrients. Intralesional injections of dexamethasone in the fibrotic bands along with hyaluronidase weekly for 4-6 weeks followed by aggressive physiotherapy and regular monitoring of mouth opening is also performed. Alfa-lipoic acid and Lycopene are anti-proliferative, anti-inflammatory and antioxidant drugs used as the first line of treatment. Antioxidants restrict the damage caused by reactive free radicals to cells and cellular components (3,4).

The management of OSMF aims at improving mouth opening and relieving associated symptoms. Surgical management comprises the release of fibrosis by excision of fibrous bands with or without grafts. In cases with severe trismus, bilateral coronoidectomy and temporalis myotomy can be done to relieve the trismus and enhance the mouth opening (5). The buccal fat pad is a supple and lobulated mass of a specialized fatty tissue which is distinct from subcutaneous fat, easily accessible and can

be mobilized in the oral cavity. The accelerated wound healing property of the buccal fat pad can be attributed to its rich vascular anastomoses through the small branches of facial, internal maxillary and superficial temporal artery and veins (6). The clinical application of buccal fat pad is strongly grounded on the results of studies on its anatomy and clinical significance by Stuzin et al. (6) and Tideman et al. (7).

A resorbable naturally occurring collagen has been incorporated into various medical devices and is used for multiple purposes. For intra-oral applications homogenized reconstituted collagen mixed with cell culture media has been used for burn treatment and endodontic repair (8). Resorbable collagen wound dressing has been used in oral wounds and closure of grafted areas or extraction sites because they stabilize blood clots, protect surgical sites and accelerate the healing process. Collagen-based membranes have been widely used in periodontal dressing and implant therapy as barriers that prevent the migration of epithelial cells and enhance migration and attachment of fibroblasts through its space-making ability (9,10).

MATERIALS AND METHODS

The study was conducted in the Department of Oral and Maxillofacial Surgery, Sardar Patel Post Graduate Institute of Dental and Medical Sciences Lucknow (India) from February 2016 to December 2017 after approval from the institutional ethical committee. 20 patients with reduced mouth opening due to OSMF (Khanna and Andrade Classification Grade 3 and 4 a), randomly divided into 2 groups. Written consent in patients' regional language was obtained. The patients were operated and were kept under observation for a particular time period in O.P. Chaudhary Hospital and Research Centre Lucknow by the same authors. Fibrotomy, masseter and temporalis myotomy and coronoidectomy were done along with prophylactic extraction of all third molars in all the patients. In one group, the buccal fat pad was harvested and in another group, only wet bovine collagen sheet was applied as surgical dressing in the intra-oral wound. Patency as dressing material was compared. Follow up was performed on day 1 and 3, week 1, 2, 4, and 6, 3 and at 6 and 12 months postoperatively. Parameters of assessment were pain (visual analogue scale), mouth opening, relapse and wound dehiscence. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical analysis software.

RESULTS

Pain postoperatively was evaluated using Visual Analogue Scale (VAS) and the median pain score between both the groups was not found statistically significant on day 1,3 and 7. A significant difference in pain score was seen on week-2 postoperatively (p=0.012), Group II reported with a median score of 1.0 and group I reported with 1.5. At week 4, the median pain score of patients of both groups was 0 and none of the patient-reported pain 6 weeks onwards. Mean pain score of patients of group I was more than that of group II (Fig. 1).

Pre-operative mouth opening was not statistically significant in both groups (p=0.403). Intra-operative mouth opening and mouth opening at consecutive follow-ups were found to be higher in group II (collagen group). A significant difference was found on day-1 (p=0.046) and day-3 (p<0.001). In both the groups, at all follow-up periods, mouth opening was found to be higher than baseline and changes were found to be statistically significant at all the periods of observation in both groups (Fig. 2).

Wound dehiscence was observed only at week-1 and 2 of follow-up. Partial wound dehiscence was observed in patients of group II at week 1 (p=0.531) and 2 (p=0.606) of follow-up which was not statistically significant when compared with group II. At week 4, complete healing of intra-oral wounds was observed in both groups. At week-1, no incidence of relapse was found in any of the groups. The proportion of relapse was higher in group II as compared to group I at all the consecutive follow-up periods, at week 2(30.0% vs 0.0%); at 1 year (20.0% vs

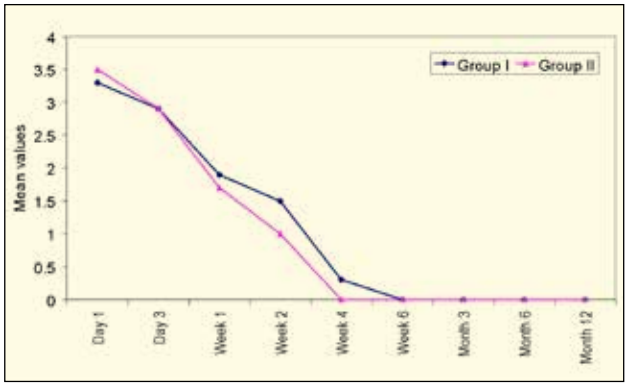

FIG. 1 Mean pain scores.

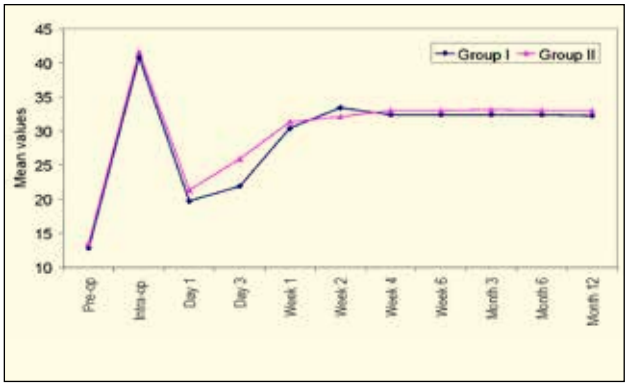

FIG. 2 Changes in mouth opening.

10.0%). The difference in the incidence of partial relapse among patients of group I and II was not found to be statistically significant at any of the follow-ups.

DISCUSSION

The management of OSMF aims to improve mouth opening and relieve the associated symptoms. Various surgical modalities have evolved mainstay is release of fibrosis by excision of fibrous bands along with temporalis and masseter myotomy and coronoidectomy to achieve better mouth-opening post-surgically. Various authors have proposed different grafts/dressing materials for intraoral wound coverage after fibrotomy. Reconstruction of the defect is done by variety of options such as skin grafts (11), island palatal mucoperiosteal flap (12), bilateral tongue flap (13), superficial temporal fascia flap with split-thickness skin graft (14), radial forearm flap (15), flaps from anterolateral thigh (16), artificial dermis (17), buccal fat pad graft (18) and nasolabial flaps (19). Authors evaluated two reconstruction modalities, buccal fat pad and collagen because they believed that these are relatively convenient and carry less postoperative morbidity.

BFP transplantation has been known since 1892 when Neder (20) first described it. The first report of use of buccal pad of fat as a pedicled graft for defects up to 4 cm diameter covering it with a free split-thickness skin graft was made in 1977. It was found in various studies that harvesting of BFP did not produce any marked defect on the cheek. In reference to the oral cavity, BFP is technically easy to harvest and graft as both donor and recipient sites are contiguous in the oral cavity, there is no visible scar in the donor area, anatomic proximity permits rapid grafting, and the graft can be directly rotated onto the defect, it is not necessary to sever the graft pedicle. The uncovered pedicle graft provided a bed of tissue for subsequent epithelialization, thereby obviating the need for split-thickness skin cover. The authors chose pedicled buccal fat pad and decided not to cover their graft.

The advantages of collagen sheet as a wound dressing material in OSMF include easy availability of collagen sheet, the convenience of application, good tolerance to oral tissue, no incidence of allergic reaction in the patients, obviation of a second surgery to obtain graft or detachment of the pedicle and there is no morbidity associated with donor site healing. Postoperative pain was controlled in all the patients using the same analgesic of the same dosage, frequency and was prescribed for the same length of time. Postoperative pain was assessed on the VAS scale of 0-10. By two weeks time, there was a declined pattern of pain score observed in both groups, suggestive of proper healing. Samman et al. had shown histological evidence of wound healing in 2-3 weeks (21). Mouth opening in both groups, on postoperative day 1, showed a significant reduction as compared with recorded intra-operative mouth opening (42 mm avg.). Authors attributed this reduction to post-operative pain and swelling due to which patients were not able to open their mouth fully. However, there was a significant increase in mouth opening in both the groups at the end of follow-up. Post-operative day-2 onwards mouth opening increased steadily. This outcome suggested a successful outcome in both groups, and this result found the support of the various workers who recommend surgical resection of fibrous bands such as Kothari et al. (22), Gupta et al. (23), Kamnath (24) and Chang et al. (25). The proportion of relapse was higher in group II as compared to group I at 3, 6 and 12 months. This can be attributed to the fact that collagen is fragile and does not act as a strong interpositional graft so as to prevent repositioning of muscles leading to relapse as reported by Rastogi et al. (26), Tideman (7) and many other researchers.

Wound dehiscence was observed only at 1st and 2nd week of follow up. At week 1 and 2, partial wound dehiscence was observed in higher proportion in patients of group-II when compared with group I, but the difference was not statistically significant. None of the patients of either group had complete wound dehiscence. This can be attributed to the fact that collagen has a high tendency to accumulate debris and has least flushing property due to more fragility when compared with a buccal fat pad. This led to secondary infection and subsequent wound dehiscence occurred. Patients were advised to maintain oral hygiene and no further complications occurred. Same findings regarding collagen application were reported by Rehman et al. (27), Shivpriya et al. (28), Kamnath (24), and Sowjanya et al. (29).

The authors, in a different study, compared collagen membrane as a covering material over buccal fat pad versus buccal fat pad in management of OSMF, concluded that though surgical time increases on the application of collagen membrane over the grafted buccal fat pad, it is acceptable as pain score, physical trauma, food lodgement and subsequent infection at the surgical site are reduced. Collagen when placed over the buccal fat pad graft as a covering material, provides sufficient protection and helps in maintaining the structural integrity of BFP during the healing phase (30).

CONCLUSION

In this study, the authors compared two graft materials, one being autogenous buccal fat pad and the other being collagen sheet which is of animal origin for the reconstruction of the intraoral wound created by fibrotomy. Buccal fat pad had advantages such as rich vascular supply, minimal donor site morbidity, ease of surgery as well as no impairment in physiologic functions of cheek after surgery, good patient acceptance and minimal postoperative morbidity, while disadvantages being

anterior reach of the graft being limited and restricted use for larger defects because excessive stretching of BFP invariably impairs the vascularity so the closure of larger defects cannot be guaranteed without producing flap necrosis or creating a new fistula. Collagen sheet that was grafted in the other group, the authors found that despite its weakening by collagenolysis, contributing factor for a higher proportion of relapse in this study, collagen membrane was robust enough to withstand strong masticatory forces for a sufficient duration of time to allow granulation tissue to form, which appeared uniformly and clinically healthy. Clinically, collagen is well tolerated with no adverse effects. Uneventful wound healing was observed without incidence of an allergic reaction despite being xenogenic with minimal morbidity to the patient.

Hence, in this study, the authors conclude that the use of a collagen sheet as a wound dressing material as a surgical dressing was more convenient than the buccal fat pad. Both the dressings resulted in the achievement of nearly normal mouth opening with the insignificant difference in the proportion of relapse, considering post-operative healing and surgical convenience, use of collagen sheet is a superior method to the transposition of the buccal fat pad. However, more studies with large sample size are required to further support the following study.

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Conflicts of interests

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