



Comparative Evaluation Of Different Graft Materials In Surgical Management Of Oral Submucous Fibrosis

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Abstract

Aim:

The aim of this study was to compare the efficacy of nasolabial flap, split thickness skin graft and collagen sheet in increasing postoperative mouth opening as a reconstructive material in surgical management of Oral Submucous Fibrosis (OSMF).

Materials and Methods:

15 patients were included in this prospective cohort study and were randomly divided into 3 groups of 5 patients, based on type of graft material used for reconstruction.

Group 1 patients received nasolabial flap, Group 2 patients received split thickness skin grafts and Group 3 patients received collagen sheet after resection of fibrous bands. Histologically proven cases of OSMF with mouth opening less than 25 mm were included in the study. Patients were evaluated at regular intervals and mouth opening was documented preoperatively, intraoperatively, and at 1 and 3 months of follow-up.

Results:

In all three groups, mouth opening differed substantially at all periods of follow-up from preoperative values. At 1 month follow up mean mouth opening increased to 28.4 mm in Group 1, 26.2 mm in Group 2 and 25.0 mm in Group 3. At the end of 3 months of follow up mean increase in mouth opening was greater in Group 1 (29.6 mm) in comparison to Group 2 (20.2 mm) and Group 3 (19.2 mm).

Conclusion:

No statistically significant difference in mouth opening was observed in three groups. Nasolabial flaps, split thickness skin grafts and collagen sheet are good options for reconstruction of defects created by resection of fibrous bands in patients with OSMF.

Keywords: Collagen, Oral Submucous Fibrosis, prospective cohort study, Skin graft, treatment protocol

Introduction

Oral submucous fibrosis (OSMF) is a chronic, progressive, scarring precancerous condition of the oral cavity seen predominantly in the Indian subcontinent and South East Asia [1]. In India, the prevalence increased over the past four decades from

0.03% to 6.42% [2], [3]. with an estimate of 5 million OSMF patients [4].

The treatment for this condition requires the release of fibrosis to increase mouth opening. Medicinal therapy is beneficial in the early stages of the disease [5] and includes intralesional injections, antioxidants, vitamins and iron supplements, and placental extracts

[6]–[9]. Surgery is the only option available for advanced stages of OSMF, which involves resection of the fibrotic bands and reconstruction of the defect using various techniques [10], [11].

Various interpositional materials have been used with variable results for coverage of the intraoral raw defect created after fibrosis release. These include local flaps, such as the tongue flap [12], buccal fat pad [13], nasolabial flap [14], and palatal flap [15], and distant flaps, such as the split skin graft [16], bilateral radial artery forearm free flap [17], collagen [18], and amniotic membrane [19].

This study compared the efficacy of locally available pedicled nasolabial flap, distant non vascularised skin graft and allogenic collagen sheet in surgically treated cases of OSMF. Aim of the study was to compare the efficacy of 3 flaps in management of OSMF. Mouth opening, pain, post operative infection and swelling was evaluated for a period of 3 months.

Materials And Methods

This prospective study was carried out at the Department of Oral and Maxillofacial Surgery. The study was approved by the institutional ethics and review board. Histologically proven cases of OSMF with mouth opening less than 25 mm with palpable intraoral fibrotic bands were selected (Fig. 1). Patients not willing to be a part of study and patients with malignant changes were excluded.

15 patients fulfilling the criteria were included in the study and were randomly divided into 3 groups of 5 patients each based on type of graft material used for reconstruction. Group 1 patients received Nasolabial flap, Group 2 patients received skin graft and Group 3 patients received collagen sheet.

Resection of fibrous bands, based on degree of involvement was done under general anaesthesia. Using Fergusson's mouth gag/Heister mouth gag, mouth was gently opened to an acceptable range. Interincisal opening was recorded (Fig. 2). Extraction of third molars was done and haemostasis was achieved.

In Group 1 patients bilateral inferiorly based nasolabial flaps were raised as described by Kshirsagar [14]. A transbuccal tunnel was created near the region of modiolus, flap was then transposed intraorally and secured (Fig. 3a and 3b). In group 2

patients, split thickness skin grafts were harvested from anterolateral thigh as described by Braza *et al.* [20] and secured into the defect (Fig. 4a and 4b). Donor area was covered with 0.5% Chlorhexidine soaked gauze (Bactigras) dressings. In group 3 patients, collagen sheet was used to cover the raw mucosal surface after excision of fibrous bands. Commercially available collagen sheet (CollDrez) was adapted over a template and was secured over the defect (Fig. 5). In Group 1 and 2 patients intraoral bolster dressing was placed to support the graft material.

All the patients received nasogastric feeding for 1 week. Initial physiotherapy was started within 48 hours post operatively with mouth opening exercises using wooden spatulas as described by Mehrotra *et al.* [21] After tenth postoperative day, intense physiotherapy was started using Heister's mouth gag.

Patients were followed regularly for 3 months to document maximum mouth opening (Fig. 6a and 6b). Healing of the surgical wound was observed for postoperative pain and infection. The results were analyzed statistically for improvement in mouth opening at the end of 1 and 3 months and compared with preoperative values.

Results

Of the 15 patients included in the study, a male predominance was seen (male-to-female ratio, 2:1). The mean age of study group was 29.4 ± 9.1 years. All patients included in study were of Grade IV of clinical classification given by Khanna *et al.* [15].

In group 1, preoperative mouth opening was 0 to 6 mm (mean, 2.6 ± 2.7). At the 1-month follow-up visit, the mean mouth opening was 28.4 ± 5.5 mm. A mean mouth opening of 32.2 ± 2.6 mm was achieved at 3-month follow-up.

Mean preoperative mouth opening in Group 2 was 7.4 ± 2.8 mm. Postoperative mouth opening at the end of 1 month and 3 months period was 26.2 ± 1.1 mm and 27.6 ± 6.1 mm respectively.

Preoperative mouth opening ranged from 6 to 14 mm (mean, 9.8 ± 3.1 mm). Mean intraoperative mouth opening after resection of fibrous bands was 38.0 ± 1.1 mm. After 1 month mean mouth opening was 25.00 ± 2.5 mm and it was 29.00 ± 2.2 mm at the end of 3 months of follow up.

In groups 1,2 and 3 mouth opening was significantly improved ($P < .05$) at all periods of follow-up compared to the preoperative value as analysed by paired t test (Table 1). All three groups had significant increase in mouth opening at follow up periods (Graph 1)

Mean increase in mouth opening at the end of one month was greater in Group 1 (25.8 mm) when compared with Group 2 (18.8 mm) and Group 3 (15.2mm).

At the end of 3 months of follow up mean increase in mouth opening was greater in Group 1 (29.6 mm) in comparison to Group 2 (20.2 mm) and Group 3 (19.2 mm).

No statistically significant difference in mouth opening was observed between the 3 groups at 3-month follow-up. In all 3 groups there was a progressive increase in mouth opening toward the 3-month follow-up period.

During the post operative evaluation, intraoral hair growth was observed in one male patient of Group 1, on post operative day 5. Intraoral hair growth was also seen in one male patient of Group 2 after one month of surgery. Hair growth in both cases was managed by regular trimming. One patient of group 3 complained of cheek bite after 1 month of surgery and was managed by surgical debulking.

Discussion

Surgical treatment of OSMF is beneficial in cases presenting severe trismus and which are not responding to the medicinal treatment [10], [11]. Various interpositional materials have been used with variable results for coverage of the intraoral raw defect created after fibrosis release. These include local flaps, such as the tongue flap [12], buccal fat pad [13], nasolabial flap [14], and palatal flap [15], and distant flaps, such as the split skin graft [16], bilateral radial artery forearm free flap [17], collagen [18], and amniotic membrane [19].

Palatal island flaps to cover the defects of oral submucous fibrosis has been employed by Khanna and Andrade [15]. The technique is simple but has limitations such as its involvement with fibrosis and need of second molar tooth extraction. It also leaves a large raw area on the palatal bones. Sometimes the

defect created may be large and local flaps may not be able to cover the entire defect.

Disadvantages of tongue flaps include postoperative dysphagia, disarticulation, the risk of postoperative aspiration and need for additional surgery for detachment of the pedicle. Moreover, involvement of tongue in oral submucous fibrosis often precludes its use in treating OSMF [12].

Bilateral radial artery forearm free flaps [17] and the bipaddled radial forearm flap [22] from single donor site can also be used but require micro vascular expertise and is time consuming. Donor site morbidity and formation of an unsightly scar are other disadvantages. These flaps are hairy and 40% of the patients require secondary de-bulking procedures [23].

The nasolabial flaps have advantages such as, local availability, reliable and rich vascularity and ease of flap elevation. Intraorally placed nasolabial flap provides 15 cm² of durable lining and a mobile pedicle with sufficient blood supply [24].

There have been conflicting views about use of skin grafts in the treatment of OSMF, some clinicians favouring its use while others outright rejecting skin grafts. Use of split skin grafts have certain advantages like ease of harvest with minimal additional operating time and post-operative hospital stay, an acceptable functional and cosmetic result [16].

The advantages of collagen sheet as a wound dressing material in surgery of OSMF include convenience of application, the ease of availability of collagen sheet, no adverse effects, good tolerance of oral tissue, there is no morbidity associated with the use of grafts, and there are no problems associated with healing of donor site [25].

Mehrotra et. al. [21] compared buccal fat pad, tongue flap, nasolabial flap and split skin graft, for correction of mucosal defect created after incising the fibrous bands. They found that nasolabial flap provides excellent function and postoperative results when compared to other flaps. Agrawal et. al. [23] also compared nasolabial flap and buccal fat pad as graft materials in OSMF and found out that nasolabial flaps show better results and are a better option for the coverage of surgically treated defects in OSMF compared with the buccal fat pad.

Sikkerimath et. al. [26] compared the efficiency of nasolabial flap, collagen membrane graft, split thickness skin graft, buccal fat pad, platysmal mucocutaneous flap, and temporoparietal fascia in OSMF. They found out that split thickness skin grafts had similar post operative values of mouth opening when compared with other graft materials. Pradhan et. al. [21] compared split thickness skin graft with tongue flap and buccal fat pad in surgical management of patients with OSMF. They found that split skin grafts provided adequate wound coverage and excellent function without deteriorating the esthetics and are associated with better postoperative mouth opening and less postoperative complications when compared to tongue flaps in management of OSMF.

Gupta H et. al.[27] and Nataraj et. al.[28] compared transposition of buccal pad fat graft with collagen sheet in OSMF. They found that Collagen sheet was superior when compared to transposition of the buccal pad of fat as a graft to cover the surgical wound in the treatment of OSMF.

Present study was conducted with an aim of achieving results in terms of mouth opening and reduction of symptoms by resection of fibrous bands and reconstruction using nasolabial flap, skin graft or collagen sheet and comparing the results of both techniques in achieving the same.

In groups 1,2 and 3 mouth opening was significantly improved ($P < .05$) at all periods of follow-up compared to the preoperative value as analysed by paired t test (Table 2). No statistically significant difference in mouth opening was observed between locally available pedicled nasolabial flap, distant non vascularised skin graft and allogenic collagen sheet. Findings of our study suggest that in surgically treated cases of OSMF, proper resection of fibrous bands and aggressive physiotherapy are essential for maintaining postoperative mouth opening. Pedicled nasolabial flap, non vascularised skin grafts and allogenic collagen sheet are equally beneficial in maintaining the post operative mouth opening as also described in other studies.[21], [26], [29], [30]

Conclusion

In conclusion, this study highlights the importance of surgical correction for improved mouth opening in advanced cases of OSMF. Proper resection of fibrous

bands followed by reconstruction and aggressive physiotherapy are important to maintain postoperative mouth opening.

However, long term studies with larger sample size are required to validate the findings of the present study.

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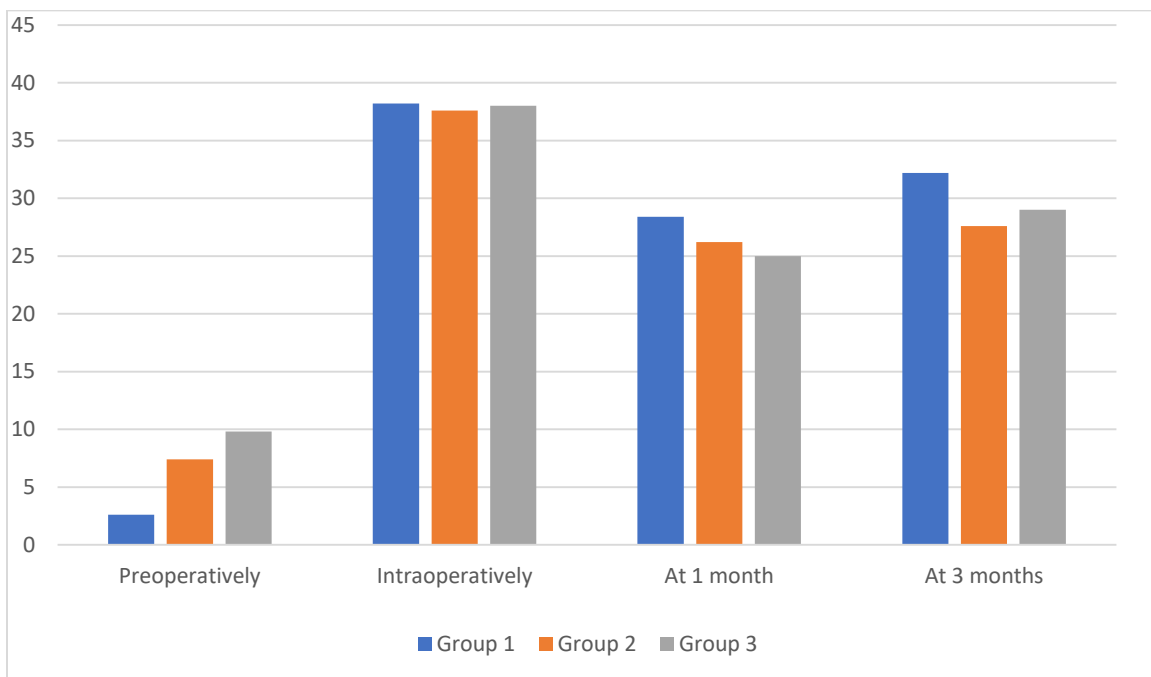
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Graphs

Graph 1: Shows intergroup comparison of mean mouth opening at different intervals



Figures:

Fig. 1: Preoperative mouth opening



Fig 2: Achieving optimal mouth opening after resection of fibrous bands



Fig. 3: a: Raising of inferiorly based nasolabial flap



Fig: 3b: Nasolabial flap sutured into defect created by resection of fibrous bands



Fig. 4a: Harvesting split thickness skin graft from anterolateral thigh with Humby knife and dermatome blade



Fig. 4b: Split thickness skin graft sutured over the defect created by resection of fibrous bands



Fig. 5: Collagen sheet sutured over the defect created by resection of fibrous bands



Fig. 6a: Post operative mouth opening at the end of 3 months



Fig. 6b: Post operative mouth opening at the end of 3 months

