

## Oral Submucous Fibrosis: Delima of a Surgeon- A Literature Review

Dr Sandeep S Arora

BDS, MDS (Oral & Maxillofacial Surgeon)

Fellow- Cleft Lip & Cleft Palate Surgery, Cleft Children International (CCI) Switzerland

Life member of Association of Oral & Maxillofacial Surgeons of India

Associate Professor S. Nijalingappa Institute of dental science and research

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**Abstract:** Oral submucous fibrosis (OSF) is a chronic disease of the oral cavity which is more commonly found in patients in the Asian subcontinent and the Far East. Oral Submucous Fibrosis (OSMF) is an insidious, chronic, complex, crippling, debilitating, irreversible, progressive, scarring, potentially malignant and collagen metabolic disorder, induced by a known carcinogen arecanut; wherein the oral mucosa, and occasionally the pharynx and esophagus is subjected to various pathological changes with significant clinical manifestations at different stages of progression, leading to functional morbidity; and with a risk of malignant transformation in the overlying epithelium. Although the condition is mainly diagnosed based on classic clinical manifestations, the commonly used existing definition for oral submucous fibrosis is primarily based on histological features.

**Objectives:** This review aims for collection and analysis of electronic data available for surgical management of Oral Submucous Fibrosis till date.

**Materials and Methods:** PRISMA protocol was followed for systemic review. Electronic collection of data from Ovid, MEDLINE/ PubMed, Cochrane library was done from out of which a total of 78 articles include review article and original study were included in this study. There were no exclusion criteria as this article aims for inclusion of various treatment options available till date.

**Results:** Author had reviewed around more than 78 articles available on subject. A total of 1019 surgically treated cases were included in the analysis. Most of articles were based on random trails. The choice of rehabilitation depends entirely on treating surgeon.

**Conclusions:** In the entire review of various articles available on internet there is no definitive consensus available for adoption of single treatment modality for OSMF.

**Keywords:** Oral Submucous Fibrosis, Surgical management, Arecanut, Flaps, Grafts, review

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### I. Introduction:

OSMF is a form of pathological fibrosis which is characterized by progressive inability to open the mouth due to loss of elasticity and development of vertical fibrous bands in labial and buccal tissues. The disease is seen in any age group, including children and adolescents, but the prevalence is high in the age group of 18–35 years. The prevalence of OSMF cases have increased from 0.03% to 6.42% in the last four decades, making it a significant public health problem in India. The disease contributes significantly to mortality because of its high malignant transformation rate. (1-4)

Various factors are suggested to trigger the disease process including areca nut chewing, genetic predisposition and immunologic processes. The nutritional deficiency and ingestion of chillies may further contribute to the course of the disease. (2-4)

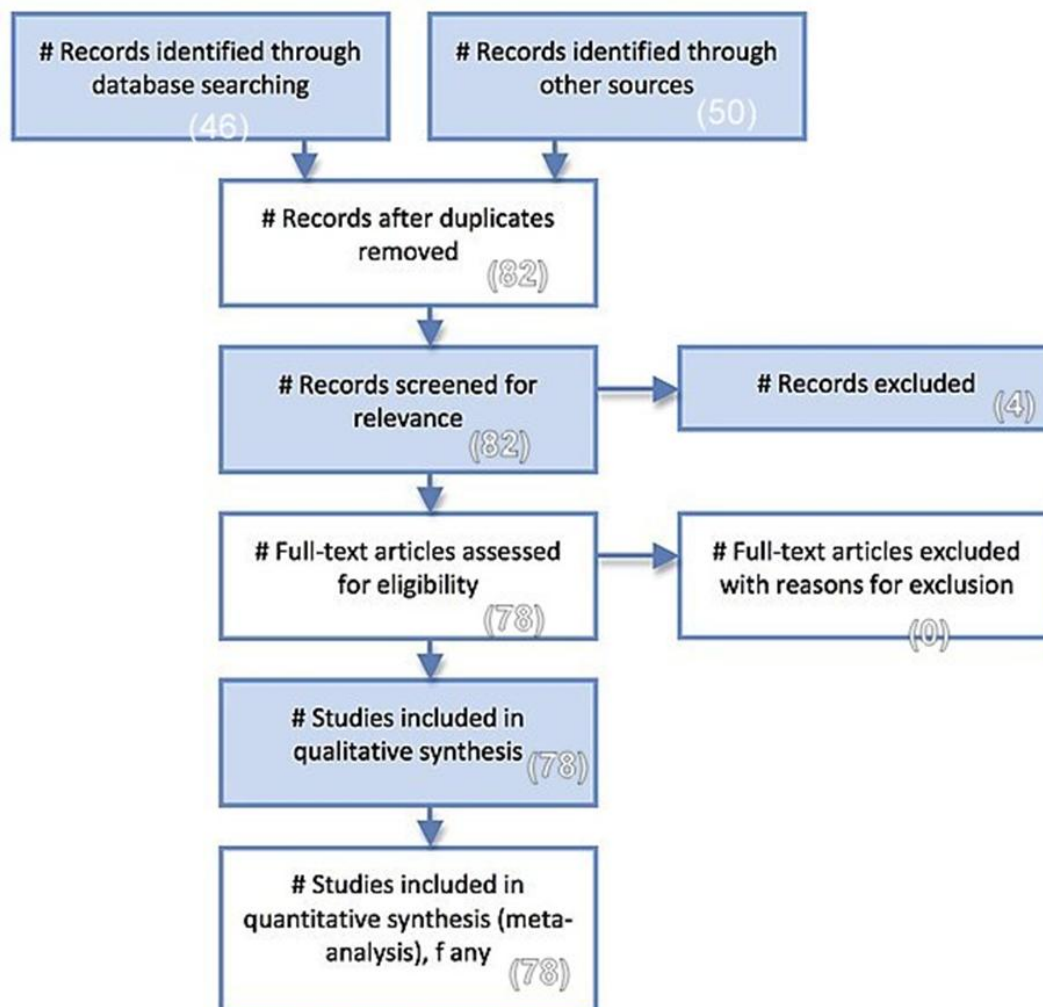
Surgical management of OSMF has involved excision of the fibrotic bands either by the scalpel or using a laser, with or without the use of interpositional grafts to maintain the mouth opening.

The present review aims at analysing information available regarding surgical options and rehabilitation for the treatment of OSMF. Author emphasis was on criteria for “successfully managed” cases based on accepted criteria.

### II. Methodology:

The PRISMA protocol was followed for the systematic review (5). The keywords included “surgical treatment of OSMF”, “OSMF”, oral premalignant conditions”. Author’s initial search was based on indexed journals and review articles. The search engines Medline/Pubmet, Cochrane library, Ovid, Researchgate, non-medical search portals like Google etc. As per the guidelines established in the protocol, following identification of articles, duplicates were removed. Studies that incorporated surgical and medical treatment concomitantly

were excluded. Anti-inflammatory drugs used intra- and immediate post-operatively were not considered as medical treatment.



**Fig. 1** The PRISMA flow diagram used in the systematic analysis with the observed results (adapted from Prisma 2009 flow diagram, Moher et al. (5))

### III. Results:

This review resulted in total of 78 articles on the desired subject obtained from sources mentioned above (Fig 1). 16 articles were from non-indexed journals and the rest were from indexed journals. Most of the case studies originated from the Indian subcontinent and the Chinese mainland.

A total of 1265 cases that were surgically operated were included in the systematic review. Only in the cases were following excision of fibrous bands, SSG were utilized as primary coverage was included under the category of grafts.

The predictable treatment for OSMF was with use of scalpel and lasers were used with small numbers. Post-excision of fibrotic bands, the treatment varied. Majority of studies included use of inter-positional grafts to maintain the increased mouth opening, graft choice, site and technique depends on the surgeon's expertise and choice.

A few studies include use of masticatory muscle myotomies and coronoidectomies as adjuncts.

In this review article author had included

1. Excision of fibrotic bands with scalpel or using lasers.
2. Coverage of the mucosal defect using flaps, grafts and collagen membrane
3. Adjunctive procedures intraoperatively included coronoidectomies and masticatory muscle myotomies
4. Post operative oral physiotherapy, dietary supplementation and other medications

**IV. Discussion:**

**Primary Excision**

It is well established fact that vertical bands are more common in the buccal mucosa; diffuse fibrosis without delineated bands are common in the tongue and circumferential bands following the outline more common on the soft palate.

Primary excision using lasers were reported in six studies (6-8). The most common lasers used were the ErYCCG laser (6) KTP 532 and the diode lasers. The choice of lasers seems to have been determined by their availability in the surgical unit rather than scientific selection. Use of lasers is most successful in buccal mucosa in other areas the results are not fruitful. The efficacy of laser excision was rated as good, excellent, with follow-ups extending to a minimum of 6 months only.

**Table 1** gives an overview of the surgical modalities used in the management of OSMF.

Treatment Modalities	No. of articles in review	Indexed/non indexed	Total no of cases (% of total cases)	Average follow up period
LASERS	14	10/4	70 (4.82 %)	3-36 Months
Local Flaps Intraoral				
Tongue	6	6/0	140 (14.70 %)	1-84 Months
Palatal	2	2/0	33 (3.32 %)	48 Months
Buccal Fat Pad	14	8/6	139 (13.97 %)	2 weeks- 36 months
Extraoral Nasolabial	12	8/4	227 (22.81%)	6-66 months
Temporalis Fascua	1	1/0	5 (0.5 %)	
Distant Flaps Radial Forearm free falp	5	4/1	65 (6.53 %)	3-48 months
Thigh Flaps	1	1/0	9 (0.90 %)	Mean 16.2 months (10-33 months)
Grafts Split skin grafts	4	4/0	96 (9.65%)	10 weeks-48 months
Collagen membrane	6	3/3	107 (10.75 %)	3-24 months
Artificial dermis	3	3/0	61 (6.13 %)	3-6 months
Human placenta/amnion grafts	2	2/0	39 (3.92 %)	NA
Other adjunctive modalities Coronidectomies/muscle myotomies	2	2/0	22 (2.21 %)	6 months
Oral stents	6	4/2	6 (0.5 %)	3-36 months
Total	78	58/20	1019	2 weeks minimum to 86 months maximum

1. Only those cases primarily covered by split skin grafts included
2. More than one study attempted different treatment options

**Adjunctive surgical procedures:**

It is the detachment of coronoid process from its temporalis muscle attachment or intentional sectioning of the coronoid process with or without detachment of the muscle (coronoidectomy) was the most common procedure described in adjunct to primary excision of the bands (9).

In a parallel study, Chang et.al. (10) carried out coronoidectomy in 18 head and neck cancer patients having trismus secondary to maximal radiation. The coronoidectomy was carried out after standard physical therapy for 3 months failed to increase oral opening. The results were quite encouraging and the authors reported a substantial increase in mouth opening (postoperative mouth opening was maintained at 35 mm) at the 6- and 12 months follow up period.

**Interpositional Grafts (Flaps)**

**Local Flaps**

Local flaps were further subdivided into intraoral and extraoral flaps.

1. Intraoral Flaps
  - a) Tongue Flaps
  - b) Palatal island flaps
2. Extraoral flaps
  - a) Buccal fat Pad
  - b) Nasiolabial flap

c) Temporalis fascia flap

**Table 2** Analysis of buccal fat pad used for treatment of oral submucous fibrosis in literature

S. No	Author's	No. cases	Follow up	Remarks
1.	Gupta Et al. (11)	1	6 months	IOO increased from 8 mm to 32 mm
2.	Nataraj et al. (12)	15	6 months	IOO increased from 11 to 32 mm One replase reported
3.	Pandya et al (13)	1	6 months	IOO increased from 7 mm to 28 mm
4.	Sharma et al (14)	28	12 months	Gr I IOO increased from 19.6 mm to 35 mm Gr II IOO increased from 12.92 to 31.76 mm
5.	Surej Kumar et al (15)	1	2 Weeks	IOO increased from 14 to 35 mm
6.	Krishna Prasad et al (16)	3	36 months	IOO increased from 17-22 to 34-37 mm
7.	Saravanan and Vinod Narayan (17)	8	6 months	IOO increased from 18 to 30 months
Total		57	2 weeks- 36 months	

**Table 3** The advantages and disadvantages of flaps used in the treatment of oral submucous fibrosis

S. No	Types of flaps	Advantages	Disadvantages
1.	Buccal fad pad	Accessible Unaffected by disease process in mouth Adequate material available for coverage of posterior areas Limited morbidity to patient in terms of esthetics Chairside procedure cane be done under local anesthesia	Anterior reach inadequate and regions anterior to canine have to be left uncovered Inadequate harvesting of BFD due to atrophy in chronic and severe cases of OSMF Excessive fear of breakdown and loss due to lack of protection of tissue
2.	Nasolabial Flap	Accessible Unaffected by disease process in mouth	Limited reach even when extended NF's are used Esthetic morbidity in terms of postoperative scar, loss of nasolabial crease Limited width of flap material for coverage Requires second procedure for detachment
3.	Tongue Flap	Accessible Good muscular bulk available Adequate pedicle vascular supply based on lingual vessels	Dysphagia Disarticulation Risk of Postoperative aspiration Limited amount of donor tissue due to inadequate reach Lack of stability and dehiscence due to uncontrolled tongue movements (38% of patients with OSMF have tongue involvements) Requires second procedure for detachment
4.	Palatal pedicle flap	Accessible Adequate vascular supply of pedicle based on greater palatine vessels	Limited reach and coverage; 2 <sup>nd</sup> molar extraction required at times to extend reach Fibrotic involvement of the site Coverage and healing of donor site a problem and increases morbidity Requires second procedure for detachment
5.	Radial Forearm flaps	Accessible Unaffected by disease process in mouth	Flaps are hairy Procedures requires high expertise, not cost effective Limitations of flap survival due to dependence on microvascular anastomoses Requires second procedures to debulk and in cases of failure of anastomoses Extraction of 3 <sup>rd</sup> Molar required to avoid flap inclination between teeth
6.	Temporalis Fascia Flap	Accessible Unaffected by disease process in mouth	Limited reach Coverage of posterior of mouth only possible Hollowing of temporal region of face can sometimes occur

			<p>Esthetic morbidity in terms of post operative scar</p> <p>Requires second procedure for detachment</p>
7.	Anterolateral thigh flap	<p>Adequate tissue bulk</p> <p>Can be used for coverage of large defects</p> <p>Unaffected by disease process in the mouth</p>	<p>Procedure requires high expertise, not cost effective</p> <p>Limitations of flap survival due to dependence on microvascular anastomoses</p> <p>Second procedures to debulk and in cases of failure of anastomoses sometimes required</p>
8.	Coverage with membranes and split skin grafts	<p>Commercially available</p> <p>Least morbidity to donor site</p> <p>Adequate protection of host site during healing</p>	<p>Increased incidence of postoperative contractures</p> <p>Common failure of SSG's due to lack of vascular supply</p> <p>Best used as immediate coverages</p>

In addition to the mainstream use of grafts and flaps following tissue excision, studies have reported on use of prosthetic devices in the maintenance of the postoperative mouth opening (18-20). Three studies using oral stents as intermediary prosthetic rehabilitation devices were available in the review (13, 21, 22). These stents serve as valuable adjuncts in guiding the postoperative functionality of healing tissue following excision of the bands.

Table 3 presents an overview of the advantages and disadvantages of the surgical procedures employed in the treatment of OSMF

### V. Conclusion:

The mainstay of treatment for oral submucous fibrosis is surgery to release fibrotic bands and increase of mouth opening. In this review author has found there is concrete lack of evidence for adoption of particular surgical procedure for successful outcome of OSMF, as most of the procedure which were adopted not on scientific basis but on the expertise and ease of doing certain procedure in there centres. It's very difficult to rule out single technique/ procedure for surgical treatment of OSMF.

Considering the prevalence of this disease in our subcontinent it is imperative that standardised protocols based on experiences of large centres be evolved to guide the maxillofacial surgeons.

Conflict of Interest: None as this is review article

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