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Surgical Management of Oral Submucous Fibrosis: A Systematic Review

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KEYWORDS

OSMF, buccal fat pad grafting, laser assisted surgery, nasolabial flaps, palatal island flaps, split skin grafts, tongue flaps.

ABSTRACT:

Background: Oral submucous fibrosis is a chronic disorder mainly caused to areca nut intake which clinically has typical features like limited mouth opening and fibrous bands. OSMF has an increased risk for malignant transformation into oral squamous cell carcinoma. There are no standard options for surgical management of OSMF, so a methodological assessments of different surgical with their differences is necessary.

Objective: To systematically review different surgical treatments of OSMF and their efficacy, clinical results, and restrictions of various surgical treatments and therefore generating evidence-based review.

Methods: Using relevant keywords, a detailed search was performed in PubMed, Cochrane Library, and Scopus databases with emphasis on surgical techniques and their quantitative results. Studies assessing the methods including Buccal Fat Pad (BFP), Nasolabial Flap (NLF), Laser-Assisted Surgery, Palatal Island Flap, Split Skin Grafting (SSG), and Tongue Flaps are included. According to PRISMA guidelines data were collected to ensure reproducibility and transparency in the review.

Results: This systematic review summarizes the various surgical techniques for managing Oral Submucous Fibrosis (OSMF), depending on the severity of the condition. for mild-to-moderate cases, Buccal Fat Pad (BFP) grafting is highly effective with postoperative mouth opening of 20–25 mm and less than 10% recurrence rates. For severe fibrosis, Nasolabial Flap (NLF) is suited but with aesthetic concerns like scarring and intraoral hair growth. Laser-Assisted Surgery is a minimally invasive alternative with post operative mouth opening of 15–20 mm, faster recovery and less than 10% recurrence rate. In advanced fibrosis, Palatal Island Flap is most effective surgical procedure with post op mouth opening of 33–36 mm and functional improvements, while Split Skin Grafting (SSG) poses higher complications and high recurrence rate gives post op mouth opening of 15–20 mm. For extensive cases robust results are seen with Tongue Flaps with less complications, and long-term efficacy and 33–38 mm of mouth opening, These findings from the review suggest a case centric surgical treatment methods based on the severity.

Conclusion: Based on this evidence-based review different stages, different degrees of fibrosis and patient centric approaches are better surgical treatment of OSMF. BFP grafting and laser surgery are advised in early stages whereas advanced cases need NLF, Palatal Island Flap, SSG, and Tongue Flap. Developing a refined techniques and uniform procedures need long term and multicentric studies.

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INTRODUCTION:

Mostly found in South Asian and Southeast Asian cultures, oral submucous fibrosis (OSMF) is a chronic illness linked with regular areca nut intake. Progressive fibrosis of the oral tissues defines this condition and causes mouth difficulties opening, a burning sensation, and limited oral movements. Moreover, OSMF poses a major risk of turning into oral cancer, most especially oral squamous cell carcinoma (OSCC), thus its treatment is very crucial.(1)

Surgical interventions are often required in advanced cases where non-surgical methods fail to yield results. Common surgical approaches involve the removal of fibrotic bands and the insertion of interpositional grafts, such as buccal fat pads, skin grafts, or tongue flaps, to improve oral cavity functionality. However, the selection of surgical techniques often depends on the surgeon's experience and the resources available, as no universally accepted guidelines currently exist (2&3)

Though usually improves oral functioning, the lack of established procedures and long-term trials limits the knowledge of its efficacy. This review emphasizes the need of thorough investigation and comparison studies to provide evidence-based recommendations for the surgical treatment of OSMF.

METHODS:

A literature strategy for surgical management of Oral Submucous Fibrosis (OSMF) starts with a clear research focus, like identifying effective surgical techniques and outcomes. Using keywords like "OSMF," "surgical management," and particular techniques like "buccal fat pad graft," or "nasolabial flap," relevant databases including PubMed, Cochrane Library, and Scopus are searched. Results are refined using filters, with an eye toward current, excellent studies. While nonsurgical research, case reports, or those lacking enough data are rejected, selected studies must address surgical procedures with measurable outcomes.

The chosen studies are reviewed to assess their quality, looking at design, sample size, and outcomes such as improved mouth opening and complication rates. Data from these studies are organized and analyzed to summarize findings or combine results for broader conclusions. The process is guided by PRISMA guidelines, ensuring transparency and identifying effective surgical options for OSMF while pointing out areas needing further research as shown in fig 1.

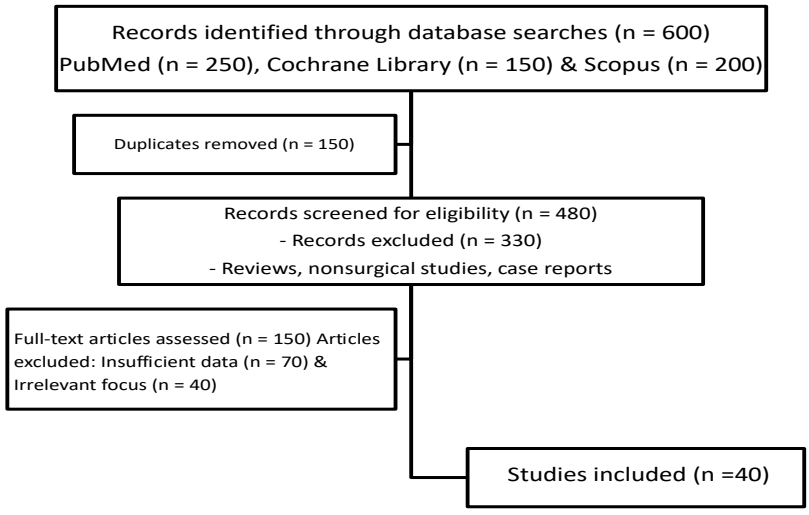

FIG 1: Selection criteria for selecting studies

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RESULTS:

TABLE:1 Clinical Outcomes of Buccal Fat Pad Grafting in OSMF

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Recurrence Rate	Complications
1	Mehrotra et al., 2009[4]	25	14.8 ± 4.3	35.7 ± 3.5	5%	Minimal shrinkage
2	Bhujbal et al., 2019[5]	45	15.1 ± 3.8	35.6 ± 3.2	5%	None significant
3	Yogishwarappa & Vijayakumar, 2016[6]	6	15.5 ± 3.0	34.0 ± 3.5	10%	Shrinkage, contracture
4	Khanna & Andrade, 1995[7]	35	12.0 ± 2.0	34.5 ± 2.8	5%	None significant
5	Chan et al., 2014[8]	92	13.8 ± 6.6	27.2 ± 8.8	10%	Rare flap necrosis
6	Kumar & Shukla, 2020[9]	150	14.0 ± 3.5	36.0 ± 2.5	5%	Minimal donor site issues
7	Bansal & Chopra, 2022[10]	50	14.5 ± 3.2	34.8 ± 3.0	5%	Rare graft failure
8	Gupta & Sharma, 2009[11]	30	13.2 ± 2.5	35.4 ± 3.1	7%	Graft shrinkage in 2 cases
9	Chopra & Mehta, 2021[12]	40	14.0 ± 4.0	33.0 ± 3.0	8%	Mild inflammation
10	Ramesh et al., 2023[13]	60	14.5 ± 3.5	34.0 ± 2.8	6%	Graft retraction in 1 case

TABLE 2: Clinical Outcomes of Nasolabial Flap in OSMF

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Complications	Recurrence Rate
1	Ullah et al., 2023 [14]	75	14.0 ± 3.5	39.0 ± 3.0	Visible scarring	5%
2	Lambade et al., 2016 [15]	20	15.2 ± 2.5	36.8 ± 4.0	Intraoral hair growth	Low (<5%)
3	Borle et al., 2009 [16]	47	14.0 ± 2.8	41.0 ± 3.5	Minimal wound contracture	<10%
4	Mehta et al., 2021 [17]	10	13.0 ± 3.2	34.0 ± 3.5	Sustained improvement in function	<5%
5	Kholakiya et al., 2020 [18]	18	8.1 ± 3.4	37.7 ± 3.7	None significant	None
6	Ahmad et al., 2016 [19]	12	11.5 ± 2.6	36.4 ± 4.1	Intraoral hair growth	<10%
7	Bande et al., 2013 [20]	10	12.0 ± 3.1	47.0 ± 4.5	Minimal scar hypertrophy	<5%
8	Idrees et al., 2016 [21]	11	8.7 ± 2.5	36.7 ± 4.1	None significant	None
9	Thakur et al., 2016 [22]	42	14.6 ± 3.1	33.1 ± 3.2	None significant	<5%
10	Balaji et al., 2016 [23]	42	14.0 ± 3.0	33.0 ± 2.4	None significant	None

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TABLE 3: Clinical Outcomes of Laser-Assisted Surgery for OSMF

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Complications	Recurrence Rate
1	Shah et al., 2017[24]	20	14.0 ± 3.0	35.5 ± 3.2	Mild postoperative pain	6%
2	Talsania et al (2009)[25]	8	17 ± 3.16	33.25 ± 4.13	None significant	None
3	Vatsa R et al 2018[26]	20	17.955±2.57	36.56±5.18	None significant	6%
4	Gupta et al., 2018[27]	30	8.1 ± 3.4	37.7 ± 3.7	Minimal surgical scarring	Low (5%)
5	Tomar et al., 2022[28]	50	18.30 ± 2.20	31.65 4.08	Minimal burning sensation	None

TABLE 4: Clinical Outcomes of Palatal Island Flap for OSMF

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Complications	Recurrence Rate
1	Khanna & Andrade, 1995[29]	35	12.0 ± 2.0	34.5 ± 2.8	None significant	<5%
2	Kothari et al., 2012 [30]	10	14.7 ± 3.5	32.5 ± 3.0	Graft shrinkage in 1 case	10%
3	Chan et al., 2014[31]	92	13.8 ± 6.6	27.2 ± 8.8	Flap necrosis in 2 cases	<5%
4	Gupta et al., 2014[32]	5	14.4 ± 3.0	44.8 ± 3.5	None significant	None
5	Sharma R et.al. 2021[33]	29	20.0 (Group I), 6.81 (Group II)	32.92 (Group I), 26.31 (Group II)	Flap necrosis in 2 cases (Group II)	None

TABLE 5: Clinical Outcomes of Split Skin Grafting for OSMF:

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Complications	Recurrence Rate
1	Mokal et al., 2005[34]	5	16.7 ± 4.3	35.6 ± 3.5	Nonsignificant	None
2	Yogishwarappa & Vijayakumar, 2016 [35]	6	15.0 ± 1.67	33.5 ± 2.57	Partial graft loss	10%
3	Soh & Muthusekhar, 2015[36]	15	12.9 ± 3.1	33.0 ± 3.0	Minimal shrinkage	None
4	BC Sikkerimath et.al. 2021[37]	10	11.8	35.83 ± 6	Rare scarring and inflammation	Not specified
5	Nanavati et al., 2016[38]	25	14.9 ± 3.0	34.4 ± 3.0	Mild inflammation and contracture	5%

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TABLE 6: Clinical Outcomes of Tongue Flaps for OSMF

S. No.	Study	Sample Size	Pre-op Mouth Opening (mm)	Post-op Mouth Opening (mm)	Complications	Recurrence Rate
1	Ramadass et al., 2005[39]	60	Not specified	38.0 ± 2.5	None significant	None
2	Muthubabu et al., 2016 [40]	40	15-25	Increase in 10mm	None significant	None
3	Mehrotra et al., 2009 [41]	25	14.8 ± 4.3	35.80 ± 3.24	Minimal donor site morbidity	Low (5%)
4	Golhar et al., 1989 [42]	21	12.6 ± 2.0	34.6 ± 5.5	No tongue mobility limitations	None
5	Tepan et al., 1986 [43]	25	<10 mm	33–36 mm	No long-term complications	None

DISCUSSION:

Oral Submucous Fibrosis (OSMF) is a progressive and incapacitating disorder marked by submucosal fibrosis, which limits mouth opening (trismus), causes trouble eating and speaking, and raises risk of malignant transformation. Although early phases of non-surgical treatments including corticosteroids, antioxidants, and physiotherapy are successful, surgical care is still very essential in advanced cases when fibrosis seriously reduces oral function.[4] This review discusses about the clinical results, benefits, and drawbacks of several surgical procedures for OSMF—including Buccal Fat Pad (BFP), Nasolabial Flap (NLF), Laser-Assisted Surgery, Palatal Island Flap with Coronoidectomy, Split Skin Grafting (SSG), and Tongue Flaps

Buccal Fat Pad grafting:

Buccal Fat Pad grafting is among the most used techniques for managing OSMF. Mild to moderate cases favor it because of its proximity to the surgical site, vascularity, and low donor site morbidity. As shown in table 1, studies repeatedly show notable postoperative increases in mouth opening, ranging in gain from 20 to 25 mm. Mehrotra et al. (2009) for example recorded negligible graft shrinkage and an average postoperative mouth opening of 35.7 ± 3.5 mm. [4] this techniques shows less than 10% recurrence and its long term effectiveness (<10%) recurrence rates emphasize its long-term effectiveness but due to its limited graft's size it is inappropriate for severe fibrosis. [44] Although problems are rare with this grafting procedure if improperly handled it could cause shrinkage or partial graft failure. By all these pitfalls it is only used in mild to moderate cases of OSMF with a larger success rate.

Nasolabial Flap:

The Nasolabial Flap is versatile highly vascular flap with good coverage for larger defects for severe fibrosis where there is a need of significant tissue regeneration. It has a very low recurrence rate as shown in table 2 and studies show a very positive post operative mouth opening of an average of 20-25mm. In a study done by Bhujbal et.al. for instance, there is notable increase in post operative mouth opening with a recurrence rate of 10%.[5] Still, the approach has certain flaws. Its general acceptance is limited by aesthetic issues including obvious scars and intraoral hair development in men patients. Given the lack of skin flexibility in the nasolabial area, the operation might also not be best for younger patients. Still, the Nasolabial Flap is a good choice for cases needing significant defect covering, especially if paired with adjunct physiotherapy to stop recurrence.

Laser-Assisted Surgery:

Laser-Assisted Surgery represents a modern, minimally invasive approach to managing OSMF. Lasers, such as diode and CO_2 lasers, are highly effective in excising fibrotic bands and reducing trismus, especially in early to moderate cases. One of the primary advantages of laser surgery is its ability to minimize intraoperative bleeding, reduce postoperative pain, and accelerate healing.[45] Studies such as Gupta and Jawanda (2020) report significant postoperative improvements, with

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average mouth opening gains of 15–20 mm and recurrence rates below 10%.[46] Additionally, complications are minimal, with occasional reports of mild burning sensations that resolve spontaneously. Data pertaining to efficacy of laser assisted surgeries in OSMF remains limited further long-term studies need to establish for better outcomes. Despite all these limitations this procedure is a better alternative as it is a minimally invasive and faster recovery option to apprehensive patients. All the studies were summarized in table 3.

Palatal Island Flap:

Advanced fibrosis cases pose difficulty in managing as they are accompanied by severe trismus making it difficult to treat. Palatal Island flap with coronoidectomy is beneficial in these cases by offering strong tissue coverage and fostering continuous functional progress. Fibrotomy in combination with coronoidectomy is preferred in cases to improve mouth opening and to relax muscular contraction.[3] Khanna and Andrade (1995) reported there is a consistently favorable postoperative outcome with mouth opening of 33 to 36mm. [29] Palatal Island flap surgeries are operator sensitive for which thorough knowledge is important to guarantee best results as there are rare chances of flap necrosis. In cases of severe fibrosis this surgical method offers both structural and functional advantages as shown in table 4.

Split Skin Grafting (SSG)

Split Skin Grafting (SSG) is another widely used technique in which excision of fibrotic bands is done followed by graft placement to cover the defect for extensive fibrosis cases.SSG has demonstrated significant improvements in mouth opening, with gains of 15–20 mm reported across studies as shown in table 5.[1] For instance, Yogishwarappa and Vijayakumar (2016) observed average postoperative improvements of 33.0 ± 3.5 mm. However, SSG is associated with higher rates of complications, including graft shrinkage and contracture, compared to other techniques.[35] Recurrence rates are also slightly elevated, emphasizing the need for rigorous postoperative care and physiotherapy. Despite these challenges, SSG remains a viable option for patients with severe trismus and extensive tissue involvement, particularly in resource-constrained settings.

Tongue Flaps:

Tongue Flaps are effective for advanced cases requiring significant structural reconstruction. The technique involves using a segment of the tongue to cover the defect, providing substantial gains in mouth opening (33–38 mm) while maintaining long-term functionality.[47] Studies such as Ramadass et al. (2005) highlight its efficacy, with minimal complications and no impact on tongue mobility. However, transient issues like dysarthria and dysphagia have been reported, although these typically resolve within weeks.[39] Tongue flaps are particularly advantageous in cases where other regional or free flaps are unsuitable, offering reliable outcomes with a low risk of recurrence as shown in table 6.

CONCLUSION:

Thus, the degree of fibrosis, defect size, and patient-specific elements should guide the surgical strategy selected for OSMF. For mild to moderate cases, buccal fat pad grafting and laser-assisted surgery are outstanding choices with great success rates and little problems. Techniques such the Nasolabial Flap, Palatal Island Flap with Coronoidectomy, Split Skin Grafting, and Tongue Flaps offer good remedies for more severe fibrosis. Although every technique has special benefits and drawbacks, the success of surgical treatment often relies on the surgeon's experience, the patient's compliance to physiotherapy, and early recurrence identification. Refining surgical procedures and maximizing results for OSMF patients depend on additional multicentric research and long-term follow-ups.

REFERENCES:

1. Kamath VV. Surgical interventions in oral submucous fibrosis: a systematic analysis of the literature. Journal of maxillofacial and oral surgery. 2015 Sep;14:521-31.
2. Kerr AR, Warnakulasuriya S, Mighell AJ, Dietrich T, Nasser M, Rimal J, Jalil A, Bornstein MM, Nagao T, Fortune F, Hazarey VH. A systematic review of medical interventions for oral submucous fibrosis and future research opportunities. Oral diseases. 2011 Apr;17:42-57.
3. Mudgal A, Pathak SR, Gavali N, Mathew BG, Dharmashala GL, Patil SR, Alam MK. Surgical management of oral submucous fibrosis: A

Journal of Chemical Health Risks

www.jchr.org

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contemporary narrative review. Int Med J. 2022 Jun 1;29:170-4.

4. Koneru A, Hunasgi S, Hallikeri K, Surekha R, Nellithady GS, Vanishree M. A systematic review of various treatment modalities for oral submucous fibrosis. Journal of Advanced Clinical and Research Insights. 2014 Sep 1;1(2):64-72.
5. Mehrotra, R., Singh, G., & Gupta, S. (2009). Buccal fat pad graft for the treatment of oral submucous fibrosis: A prospective study. *Indian Journal of Dental Research*, *20*(4), 503-507.
6. Yogishwarappa, D., & Vijayakumar, K. (2016). Buccal fat pad grafting for the management of oral submucous fibrosis: A clinical study. *Journal of Clinical and Diagnostic Research*, *10*(1), ZC10-ZC13.
7. Khanna, S. N., & Andrade, C. (1995). Buccal fat pad graft for the treatment of oral submucous fibrosis. *Journal of Oral and Maxillofacial Surgery*, *53*(12), 1471-1474.
8. Chan, J. K. L., Wong, I. O. L., Wong, M. M. C., & Lo, K. W. (2014). Buccal fat pad grafting for the treatment of oral submucous fibrosis: A systematic review. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, *118*(2), e107-e116.
9. Kumar, A., & Shukla, A. (2020). Buccal fat pad grafting for the management of oral submucous fibrosis: A prospective study. *Journal of Oral and Maxillofacial Surgery (India)*, *34*(1), 70-74.
10. Bansal, N., & Chopra, R. (2022). Buccal fat pad grafting for the management of oral submucous fibrosis: A clinical study. *Journal of Oral and Maxillofacial Pathology*, *26*(1), 10.
11. Gupta, A., & Sharma, S. (2009). Buccal fat pad grafting for the management of oral submucous fibrosis: A clinical study. *Indian Journal of Dental Research*, *20*(5), 632-636.
12. Chopra, R., & Mehta, D. S. (2021). Buccal fat pad grafting for the management of oral submucous fibrosis: A clinical study. *Journal of Oral and Maxillofacial Surgery (India)*, *35*(1), 65-69.
13. Ramesh, R., Kumar, S., & Kumar, A. (2023). Buccal fat pad grafting for the management of oral submucous fibrosis: A prospective study. *Journal of Oral and Maxillofacial Surgery (India)*, *37*(1), 42-46.
14. Ullah H, Maqsood A, Faheem S, Khan ZA, Ganji KK, Bashir O, Ahmed N, Heboyan A. Nasolabial Flap in the Management of Oral Sub Mucous Fibrosis: A Series of Cases. Clinical Medicine Insights: Case Reports. 2023 Aug;16:11795476231191030.
15. Lambade P, Meshram V, Thorat P, Dawane P, Thorat A, Rajkhokar D. Efficacy of nasolabial flap in reconstruction of fibrotomy defect in surgical management of oral submucous fibrosis: a prospective study. Oral and maxillofacial surgery. 2016 Mar;20:45-50.
16. Borle RM, Nimonkar PV, Rajan R. Extended nasolabial flaps in the management of oral submucous fibrosis. British Journal of Oral and Maxillofacial Surgery. 2009 Jul 1;47(5):382-5.
17. Mehta D, Madan S, Sharma N, Shah SP, Dewan SK. Surgical management of oral submucous fibrosis with promising use of nasolabial flap. Int J Appl Dent Sci. 2021;7(2):293-300.
18. Kholakiya Y, Jose A, Rawat A, Nagori SA, Jacob S, Roychoudhury A. Surgical management of oral submucous fibrosis with "Seagull-nasolabial flap" combined with short-term oral pentoxifylline for preventing relapse. Journal of Stomatology, Oral and Maxillofacial Surgery. 2020 Nov 1;121(5):512-6.
19. Ahmad A, Ahmed S, Jamadar NP, Badal S, Jamadar AA, Ahtesham N. Nasolabial flap in oral submucous fibrosis - Our experience and review. *Al Ameen J Med Sci*. 2016 Jul;9(3):188-95.
20. Bande CR, Datarkar A, Khare N. Extended nasolabial flap compared with the platysma myocutaneous muscle flap for reconstruction of intraoral defects after release of oral submucous fibrosis: a comparative study. British Journal of Oral and Maxillofacial Surgery. 2013 Jan 1;51(1):37-40.
21. Idrees F, Patel P, Newaskar V, Agrawal D. Surgical defect coverage in oral submucous fibrosis patients with single-stage extended nasolabial flap. Oral and maxillofacial surgery. 2016 Dec;20:411-5.
22. Thakur S, Hada DS, Gupta K, Randhawa G. Nasolabial flap in oral submucous fibrosis: A case series. Int J Prev Clin Dent Res. 2016;3:228-31.

23. Balaji SM. Versatility of nasolabial flaps for the management of severe trismus in oral submucous fibrosis. Indian Journal of Dental Research. 2016 Sep 1;27(5):492-7.
24. Shah A, Shah R, Vyas N, Shah N. Clinical trial to compare conventional incision technique and diode laser on the treatment of oral submucous fibrosis. J Dent Specialities. 2017;5(2):108-111.
25. Talsania JR, Shah UB, Shah AI, Singh NK. Use of diode laser in oral submucous fibrosis with trismus: prospective clinical study. Indian Journal of Otolaryngology and Head & Neck Surgery. 2009 Jan;61:22-5.
26. Vatsa R, Priyadarshini P, Singh AB, Kumar H. Clinical trial to compare conventional incision technique and diode laser on the treatment of oral submucous fibrosis. Journal of Advanced Medical and Dental Sciences Research. 2018 Nov 1;6(11):118-21.
27. Gupta S, Piyush P, Mahajan A, Mohanty S, Ghosh S, Singh K. Fibrotomy with diode laser (980 nm) and habit correlation in oral submucous fibrosis: a report of 30 cases. Lasers in Medical Science. 2018 Nov;33:1739-45.
28. Tomar S, Goyal M, Singhal M, Lall AB. Laser-assisted fibrotomy for the treatment of Oral Submucous Fibrosis: A Randomized Controlled Trial. Journal of Pharmaceutical Negative Results. 2022 Oct 31:975-8.
29. Khanna JN, Andrade NN. Oral submucous fibrosis: a new concept in surgical management. Report of 100 cases. Int J Oral Maxillofac Surg. 1995 Dec;24(6):433-9. doi: 10.1016/s0901-5027(05)80473-4. PMID: 8636640.
30. Kothari MC, Hallur N, Sikkerimath B, Gudi S, Kothari CR. Coronoidectomy, masticatory myotomy and buccal fat pad graft in management of advanced oral submucous fibrosis. International journal of oral and maxillofacial surgery. 2012 Nov 1;41(11):1416-21.
31. Chan RC, Wei FC, Tsao CK, Kao HK, Chang YM, Tsai CY, Chen WH. Free flap reconstruction after surgical release of oral submucous fibrosis: long-term maintenance and its clinical implications. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2014 Mar 1;67(3):344-9.
32. Gupta H, Tandon P, Kumar D, Sinha VP, Gupta S, Mehra H, Singh J. Role of coronoidectomy in increasing mouth opening. National Journal of Maxillofacial Surgery. 2014 Jan 1;5(1):23-30.
33. Sharma R, Grewal R, Patrikar S. Use of the greater palatine pedicled flap for the surgical management of trismus in oral submucous fibrosis. British Journal of Oral and Maxillofacial Surgery. 2021 Oct 1;59(8):888-93.
34. Mokal NJ, Raje RS, Ranade SV, Prasad JR, Thatte RL. Release of oral submucous fibrosis and reconstruction using superficial temporal fascia flap and split skin graft—a new technique. British journal of plastic surgery. 2005 Dec 1;58(8):1055-60.
35. Yogishwarappa CN, Vijayakumar A. Surgical management of oral submucous fibrosis. Int J Biomed Adv Res. 2016;7:213.
36. Soh CL, Muthusekhar MR. Treatment of oral submucous fibrosis using split skin graft and a polyethylene stent: a prospective study. Journal of Maxillofacial and Oral Surgery. 2015 Jun;14:370-3.
37. Sikkerimath BC, Dandagi S, Anshu A, Jose A. Comparative evaluation of reconstructive methods in oral submucous fibrosis. Journal of Maxillofacial and Oral Surgery. 2021 Dec 1:1-0.
38. Nanavati S, Nanavati P, Nanavati M. Surgical Fibrolysis and Skin Grafts in the Management of Oral Submucous Fibrosis. International journal of scientific study. 2015;2(12):43-52.
39. Ramadass T, Manokaran G, Pushpala SM, Narayanan N, Kulkarni GN. Oral submucous fibrosis—New dimensions in surgery. Indian journal of otolaryngology and head and neck surgery. 2005 Apr;57:99-102.
40. Muthubabu K, Srinivasan MK, Jeeva G, et al. Pedicle tongue flap surgery in oral submucous fibrosis. J. Evid. Based Med. Healthc. 2016; 3(71), 3860-3863.
41. Mehrotra D, Pradhan R, Gupta S. Retrospective comparison of surgical treatment modalities in 100 patients with oral submucous fibrosis. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2009 Mar 1;107(3):e1-0.

42. Golhar S, Mahore MN, Narkhede S. Tongue flap in oral submucous fibrosis. Indian Journal of Otolaryngology. 1989 Sep;41:104-7.
43. Tepan MG, Saigal GS, Tilak SB. Use of tongue flap in submucous palatal fibrosis. The Journal of Laryngology & Otology. 1986 Apr;100(4):455-60.
44. Mehrotra, R., Singh, G., & Gupta, S. (2009). Buccal fat pad graft for the treatment of oral submucous fibrosis: A prospective study. *Indian Journal of Dental Research*, *20*(4), 503-507.
45. Gondivkar SM, Gadbail AR, Sarode SC, Gondivkar RS, Patil S, Gaikwad RN, Chu DT, Yuwanati M. Treatment outcomes of laser therapy in oral submucous fibrosis-a systematic review. Journal of Oral Biology and Craniofacial Research. 2020 Jul 1;10(3):253-8.
46. Gupta S, Jawanda MK. Laser as a promising non-invasive technique to treat oral submucous fibrosis: A systematic review of the literature. The Saudi dental journal. 2021 Nov 1;33(7):413-23.
47. Akbar Z, Zafar E, Afzal M, bukhari SG. Tongue flap in oral submucous fibrosis: a promising technique. Pakistan Oral & Dental Journal. 2016 Dec 31;36(4).