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MANAGEMENT OF POST RADIATION MICROSTOMIA - A CASE REPORT

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ABSTRACT
Oral submucous fibrosis is a chronic debilitating condition of the mouth caused by areca nut chewing. It is a precancerous condition with malignant transformation rate of 7-30%. The management of malignant lesion arising from this precancerous condition is debatable as the surgery alone protocol doesnot prevent the occurrence of second primaries or recurrences and the standard surgery followed by radiation protocol results in further fibrosis resulting in trismus and microstomia The causative factors are trauma, infection, drug induced (succinyl choline), neoplasm, Oral submucous fibrosis, Post radiation fibrosis. Microstomia and Trismus are two different term with varied definition. Microstomia is defined as reduced oral aperture due to various etiologies. The causative factors are Physical trauma to masticatory muscles, chemical burns, electric burns, post surgery, post radiotherapy, scleroderma and syndromes like Freeman-Sheldon syndrome, Leopard syndrome, Moebius syndrome. Diagnosis of Microstomia is not defined by specific criteria and the diagnosis depend on functional efficiency and esthetics. Trismus is defined as mouth opening restriction (the maximum interincisal distance is <35mm) due to masticatory muscle spasm. The reason behind all extra articular trismus is fibrotic contracture of soft tissue of check and masticatory muscles. Both Microstomia and trismus drastically affect the quality of life. Treatment of extra articular trismus is by topical or systemic drugs, surgery and physiotherapy. Here we report a case of post radiation fibrosis which caused microstomia, trismus and which was treated by combined medical therapy and surgical correction followed by physiotherapy.

KEYWORDS: Trismus and microstomia.

CASE REPORT
A 64year old male patient reported to department of maxillofacial surgery with the chief complaints of restricted mouth opening for the past four years and burning sensation for the past two years. Patient had history of betel areca nut and tobacco chewing for the past 35 years and history of surgery and radiotherapy for a malignant lesion in right buccal mucosa one year before in cancer centre elsewhere which aggravated the mouth opening restriction. On examination the patient the patient Washington completely edentulous with inter labial mouth opening of 10mm and inter alveolar mouth opening of 15mm(Figure 1).

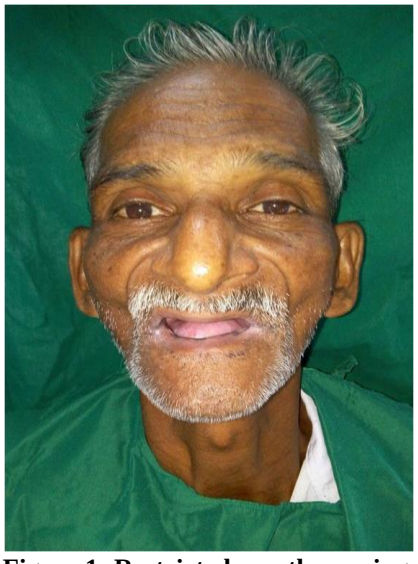

Figure 1: Restricted mouth opening.

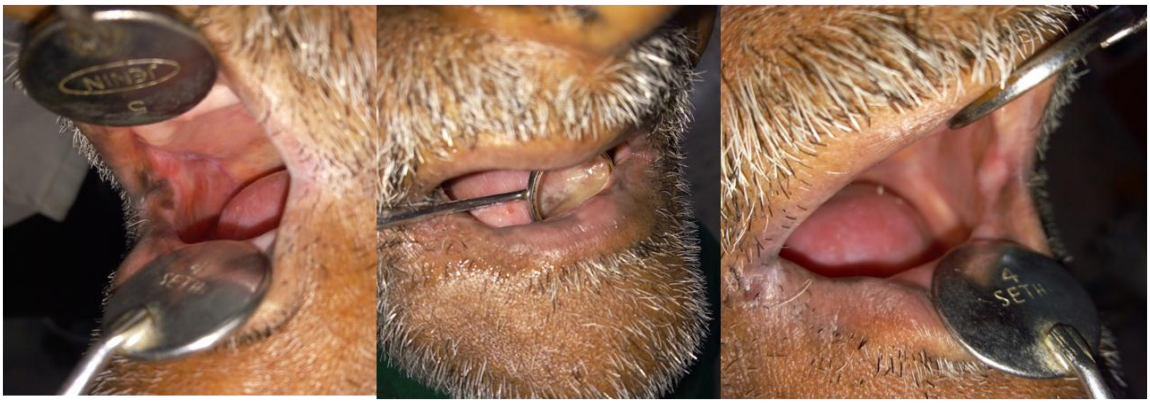

Figure 2: Intra oral picture showing curling of lips.

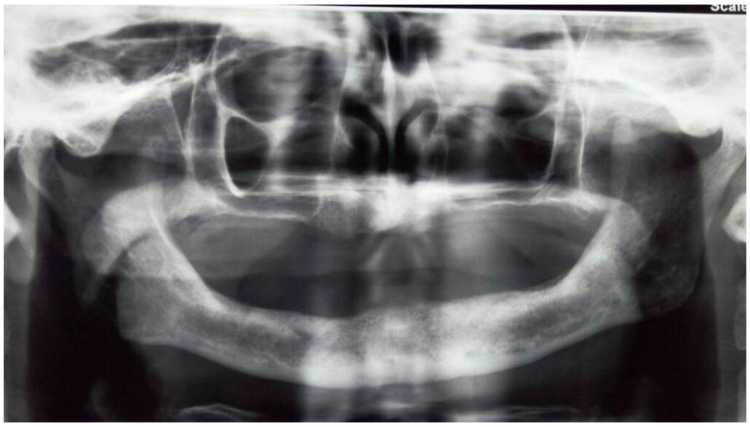

Figure 3: Orthopantamogram of the patient.

Figure 4: Gradual increase in mouth opening during medical therapy.

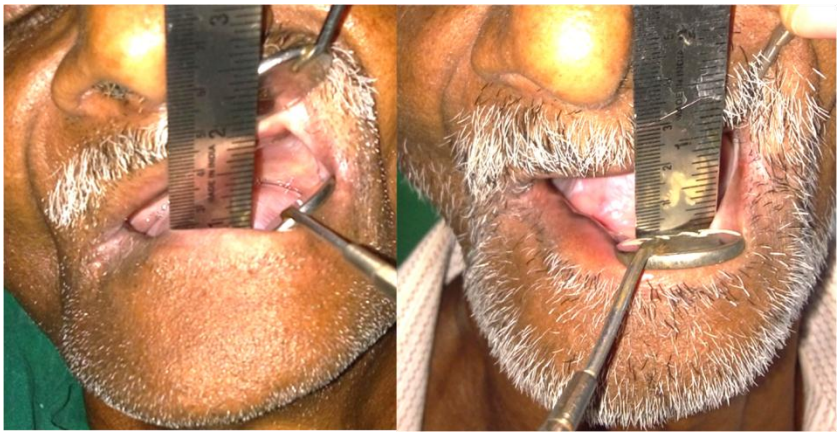

Figure 5: Post medical therapy.

Upper and lower lip were blanched, non resilient and not retractable with the lower lip curled inwards (figure 2) to form deep labio alveolar fold on palpation the lips revealed the presence of fibrotic bands around the commisure.

The right buccal mucosa showed scar tissue in relation to the commisure, and on palpation the fibrotic bands of thuickness 0.5cm was palpated. The left buccal mucosa was blanched and on palpation revealed fibrous bands. Tongue showed blanching and scrapable white lesion suggestive of peusdomembranous candidiasis and movements of tongue were restricted. No clicking, crepitus and tenderness over temperomandibular joint and no lymphnodes palpable in head and neck. The orthopantamogram (Figure 3) revealed normal position of condyle in the fossa and no bony erosion in right side of mandible, the region of previous surgery and radiotherapy.

From patient history, it was clear that patient had Oral submucous fibrosis which developed a malignant lesion in right buccal mucosa which was treated by surgery and radiotherapy. This aggravated the fibrosis leading to microstomia. The treatment plan of intralesional injection of mixture of inj Hyaluranidase 1500IU, inj placentrix 150mg, inj dexamethasone 8mg was given intralesionally biweekly for six weeks. The site of buccal mucosa was divided into three quadrants. The mixture of these injections was injected intralesionally to one quadrant bilaterally during the day of injection. Figure 4,5 shows the maximum mouth opening of the patient, which shows gradual improvement in both interalveolar and interlabial distance during the six weeks of medical therapy. Figure 5 shows after medical therapy though the interlabial distance improved to 20mm and interalveolar distance improved to 35mm but the lip and commisure remained fibrotic with reduced rima oris.

Thus the treatment plan of bilateral fibrotomy of the buccal and commissural fibrous bandsand collagen membrane (SURGICOL) grafting was proposed. Under aseptic precaution, under local anesthesia the fibrotomy incision was placed in the centre of the buccal mucosa and the mucosa was dissected to expose the fibrous bands. The bilateral incision was connected to each other by incision through the lower lip releasing the commissural bands. Submucosal dissection was done to expose the fibrous bands (Figure 6). Part of fibrous band along with epithelium was excised for histopathological examination.

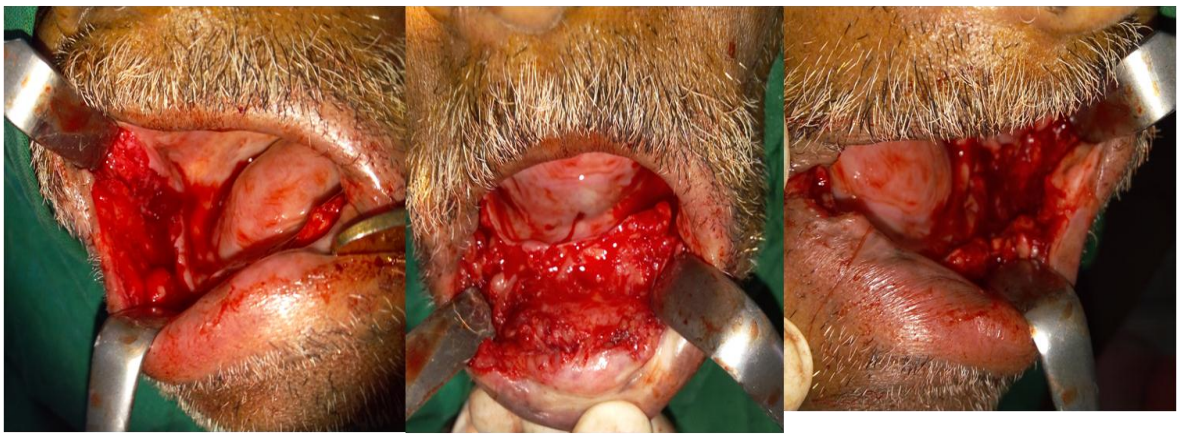

Figure 6: Post fibrotomy defect.

The defect was undermined and SURGICOL a collagen membrane was sutured to the defect (Figure 7) with a bolster. Patient was maintained ryles tube for a week until the bolster dressing was removed.

The patient was advised mouthopening exercises and placement of cheek retractor (Figure 8) and gunning splint to maintain the mouth opening. The immediate mouth opening after surgery and removal of bolster pack was interlabially 40mm and interalveolar 35mm (Figure 9).

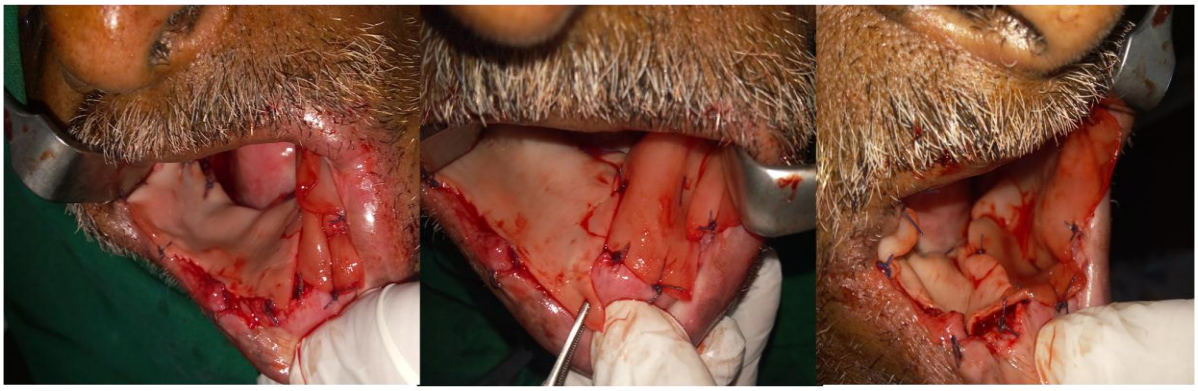

Figure 7: Collagen grafted over the defect before placing bolster dressing.

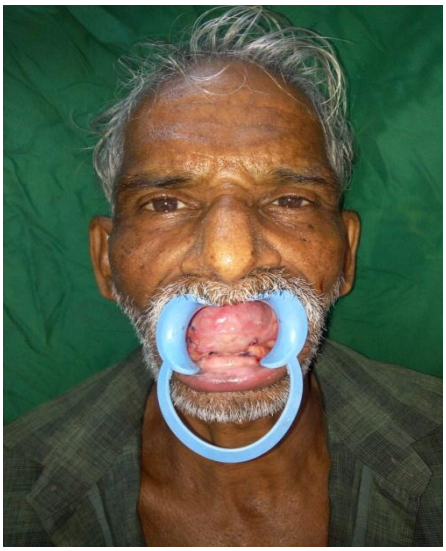

Figure 8: Post operative physiotherapy with mouth prop and cheek retractor.

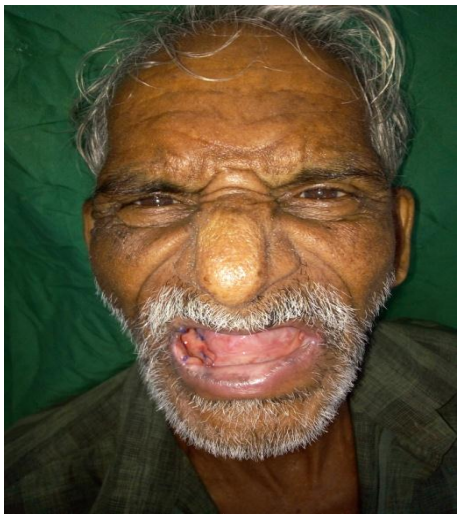

Figure 9: Post operative mouth opening.

DISCUSSION

Oral submucous fibrosis is a chronic inflammatory disease which causes juxta epithelial fibrosis resulting in trismus. The disease has a multifactorial etiology like vitamin deficiencies, iron and zinc deficiencies, cupper intolerance and mainly the betel quid areca nut chewing. It is common is asian countries especially in India where 0.5% of the population is affected by Oral submucous fibrosis.[1] The most important diagnostic clinical features of oral submucous fibrosis are blanched mucosa and fibrotic bands palpable in oral mucosa. The presentation begins by appearance of vesicular eruption and mucosal erosions in the oral mucosa followed by development of fibrotic bands from all the regions from the pterygomandibular raphe to the commisures.[2] As it is a pre cancerous condition with malignant transformation rate of 7-30% not only the epithelium of the affected region but also the adjacent normal epithelium has malignant potential according to field cancerisation phenomenon.[3] The malignancy arising from oral submucous fibrosis is treated according to the standard surgery followed by radiotherapy protocol.[4] The surgery alone protocol is not advised for the risk of locoregional recurrence. Though the radiation further increases the fibrosis, trismus and may result in microstomia, the risk of loco regional recurrence outweighs the morbidity due to trismus.

In 1952, Schwartz introduced the term “atrophia idiopathies (tropica) mucosae oris” later Joshi coined the term Oral subucous fibrosis.[5] In 1996 Khanna JN, Andrade NN introduced a classification system.[6]

Group I Very early	vesicles and ulceration no mouth opening restriction	fine fibrillar collagen with marked edema
Group II Early	Blanching and fibrous sheets in buccal mucosa mouth opening 26-35mm	Juxta epithelial hyalinisation, PMNL
Group III Moderately advanced	Fibrous bands till anterior pillar of fauces, mouth opening 25-16mm	Juxta epithelial hyalinisation, collagen bundle with young fibrobalsts
Group IVA Advanced	Fribeous bands till soft palate and deviating uvula, restriction of tongue protusion, mouth opening <15mm	Juxta epithelial hyalinisation, collagen bundle with young fibrobalsts, lymphocytes
Group IV B	Blanching, fibrous bands with leukoplakia or squamous cell carcinoma	Juxta epithelial hyalinisation, collagen bundle with young fibroblasts, lymphocytes with dysplastic features

Post radiation trismus occurs in 28.3% of the patients undergoing radiotherapy in head and neck region and in 86% of the patients undergoing radiotherapy in relation to TMJ and maticatory muscles.[7] Trismus is common in multimodality treatment then single modality.[8] The changes resulting in post radiation trismus is fibrosis of submucousa and also the muscles of mastication and increase in extracellular collagen matrix.[9] The treatment of post radiation subfibrosis is similar to oral submucous fibrosis with medical, surgical and physiotherapy.[10] The treatment of Oral submucous fibrosis involves medical managements.[11]

- Corticosteroids
- Placental extracts
- Recombinant Human Interferon Gamma (γ-IFN)
- Enzymes
- Antioxidents,
- Immunised milk,
- Turmeric
- Peripheral Vasodilators

Corticosteroids are the first medication used intralesionally for management of Oral submucous fibrosis as it is anti-inflammatory, inhibits proliferation of fibroblast and collagen upregulation. Short action steroids like inj.triampicolone acetonide 0.1% and inj. Hydrocortisone are used in very early and very early cases as weekly injection for 12 weeks. The longer acting dexamethasone and betamethasone are found effective in biweekly dosages for 6 weeks in moderately advanced cases also.[12]

Placental extracts are divided into four groups aqueous extracts, lipoidal extracts, immune gmma globulins and tissue coagualnts. Only the aqueous extract of plasma is beneficial it contains enzymes, nuclic acids, amino acids, fatty acids, Vitamins, steroids and trace elements. The placental extracts are superior to corticone and can be combine with hyaluranidae and steroids for better results. The resistant case are treated by surgical excision of bands followed by the placental interpositional grafting.[13]

Recombinant interferon gamma is an anti fibrotic cytokine with epithelial regulatory effect. This anti fibrosis factor cause down regulation of fibroblast proliferation and collagen synthesis. It is available at 0.1-1 IU/ml injection thrice a day for 6 months. The above dosage increases the mouth opening by 42%.[14]

Levimasole is an antihelmintic drug used for the immuomodultory effects. It down regulates the Ig G, Ig A, Ig M and it is used at a dosage of 150mg TID for three consecutive days in a weeks for three alternative weeks.[15]

Chymotrypsin is a ensopeptidase which hydrolysis the peptide bonds and esters. It is used in 5000U as biweekly injection for 10 weeks. Hyaluranidse breaks downconnective tissue intercellular substance. It causes potential loss of viscosity in inter cellular substance and it can be injected along with steroids and palcentrix as it disperses the medication all round the affected tissue.Collagenase is a lysosomal enzyme which degrades phosphate esters, sulphate esters, proteins, polysaccharides and glycosides. Dosage is 2mg /ml injection biweekly for 6 weeks.[16]

Antioxidants like Lycopene, Alphalipoic acid, beta carotene prevents dysplastic changes, regulates epithelial proliferation, scavenges the free radicals.[17] The doses are lycopene 8mg bd, Beta carotene 50mg, Vitamin E 10IU thrice a day for 2 months. Immunised milk is a form of skim milk from cows immunised with intestinal bacteria, it contains 20-305 of higher Ig G antibodies causing immunomodualtory effect. Increase in mouth opening is brought about by immunised milk when used in a form of powder at a dose of 45mg twice daily for 3 months.[18]

Tumeric is used for Oral Submucous fibrosis treatment as it contains Curcumin, demethyocycurcumin, bisdemethoxycurcumin. The curcumin has antiinflamatory and antioxidant and anticollagen property ehen used in dosage of 3g TID for 3months. Curcumin oil and cucumin resin have synergestic effect

of preventing the occurance of dysplastic feature and DNA damage.[19]

Aloevera, Oxitard (Magnifera indica) and Spirulina are herbal medication used for their anti oxidant and anti inflammatory properties.[20]

The surgical management of submucous fibrosis includes primary excision or fibrotomy of the fibrous bands followed by interpositional graft based on local pedicled or distant flaps or by skin grafting.[21] The additional procedures like masticator muscle myotomy and coronoidectomy is used when the masticaotry muscles are fibrosed and when intraoperative mouth opening is >35mm.[22] The interpostional materials and flaps used in treatment after fibrotomy are

- Intra oral flaps
  - Tongue flaps
  - Palatal island flaps
  - Buccal pad of fat flap
- Extra oral flaps
  - Nasolabial flap
  - Temporalis fascia flap
  - Platysmal flap
  - Sternocleidomastoid flap
  - Submental flap
- Skin graft and its substitutes

Tongue flaps were first developed by Lexer in 1908, later underwent several modification by Candeses et al. and De sande et al. (anterior pedicled), Bhrany et al. used tongue flap after buccal fibrotomy in management of submucous fibrosis, but requires second procedure for detachment. It is contraindicated when submucous fibrisi fibrosis involed in the tongue usually in 38% of OSMF patients.[23]

Palatal flap was introduced by khanne et al and later was utilised in oral submucous patients by Golhar et al., with disadvantages of limited reach and requires extraction of molar teeth and second procedure for detachment.[24,25]

Buccal fat pad grafting is the second most successful local flap procedures used in submucous fibrosis was introduced by Egpedi et al and utilised in submucous fibrosis by Singh et al., this can support an additional collagen graft or skin graft over the fat pad to increase the reach of the flap. the obtianalbe quantity is 10grams and it epithelialise in 4 weeks.[25,26,27]

Nasolabial flap was introduced by Sushruta, popularised by Walace and Rose made it to be a single stage procedure. A modification of it was by Bhorle et al as extended nasolabial flap which extended from medial canthus to the inferior border of mandible which was centrally based, randon pattern flap tunnel intraoraaly as a single stage procedure. The mouth opening increase was highest as 35mm even after 36 months post operatively.[28,29]

Temporalis fascia flap was introduced by Gillies in 1983, is used as axialpatern flap based on middle temporal vessels. The disadvantage include limited anterior reach, extraoral scar, may require second procedure.[30,31]

Cervical flaps like submental[32], sternomastoid[33], Platysmal flap[34] can be used in the defect. Among which platsmal flap was introduced by Baur et al. it is a myocutaneous flap based on branches of submental arteries[35], superiorly based flap can be used in reconstruction of buccal defect reaching over the mandible showing results better than buccal fat pad grafting.

The Skin graft play vital role in reepithelialisation of the defect, lei et al. in 25 months follow up the Split thickness skingraft cases showed 35-50mm mouth opening.[36] The alternative of skin graft are dermal grafts, collagen graft, aminotic memebrane grafts.[37]

Collagen membrane has following advantages[38]

- Excellent biocompatability
- Biodegradable
- weak antigenicity (ability to react with an antibody)
- Mechanical strength
- Act as a thermal, chemical and biological barrier
- Recruits additional fibroblast
- Fastens epithelisation

Natraj S et al. showed that collagen membrane grafting produced lesser relapse than buccal fat pad in treating oral submucous fibrosis.[39]

Secondary surgeries after radiation are often complicated due to the decrease in wound healing potential of the irradiated tissue, as synthesis of cytokines decreases in all stages of wound healing after radiation.[40] In Preradiated patients local flaps and full thickness graft are to be avoided, the Split thickness graft and their substitutes are preferred.Wound healing accecelerators like copper, Silver, bioflavanoids, histone deacetylase inhibitor – phenyl butyrate are to be used.[41] If the fibrosis is severe in port radaiation scenario resulting in microstomia commisurotomy is done to improve mouth opening. The commisurotomy can be performed by widening and replacing the commisure mucosa by advancing the buccal mucosa as a fish tail flap.[42] Maintenance of mouth opening is done by a dynamic retainer like cheek retractor used thrice a day for restoring the resiliency of the healing tissue.[43]

REFERENCES

1. Rajalalitha P, Vali S. Molecular pathogenesis of oral submu-cous fibrosis—a collagen metabolic disorder. J Oral Pathol Med, 2005; 34: 321–8.2.
2. Angadi PV, Rao SS. Areca nut in pathogenesis of oral submucous fibrosis:revisited. Oral Maxillofac Surg, 2011; 15: 1–9.11.

3. Aziz SR. Oral submucous fibrosis: case report and review of diagnosisand treatment. J Oral Maxillofac Surg, 2008; 66: 2386–9.
4. James SJ, Muthusekhar MR, Baig MF, Abdul WP. Oral submucous fibrosis turning malignant. A case report and review of literature. J Dent Med Sci., 2013; 11: 10-5.
5. Pindborg JJ, Sirsat SM. Oral submucous fibrosis. Oral Surg Oral Med Oral Pathol, 1966; 22: 764–79.4.
6. 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.
7. Scott B, Butterworth C, Lowe D, Rogers S. Factors associated with restricted mouth opening and its relationship to health-related quality of life in patients attending a maxil-lofacial oncology clinic. Oral Oncol, 2008; 44: 430–8.
8. Bensadoun R, Riesenback D, Lockhart P, Elting L, Spijkervet F, Brennan M. A sys-tematic review of trismus induced by cancer therapies in head and neck cancer patients. Supp Care Cancer, 2010; 18: 1033–8.
9. Teguh DN, Levendag PC, Voet P, van der Est H, Noever I, de Kruijf W, et al. Trismus in patients with oropharyngeal cancer: relation- ship with dose in structures of mastication apparatus. Head Neck, 2008; 30: 622–30.
10. Kent M, Brennan M, Noll J, Fox P, Burri S, Hunter J, et al. Radiation-induced trismus in head and neck cancer patients. Supp Care Cancer, 2008; 16: 305–9.
11. Dayanarayana U, Doggalli N, Patil K, Shankar J, Mahesh KP, Sanjay. Non surgical approaches in treatment of OSF. Journal of Dental and Medical Sciences, Nov. 2014; 14(11): 63-69.
12. Chole RH, Gondivkar SM, Gadbail AR, Balsaraf S, Chaudhary S, Dhore SV, Ghonmode S, Balwani S, Mankar M, Tiwari M, Parikh RV. Review of drug treatment of oral submucous fibrosis. Oral Oncol, 2012; 48(5): 393-8.
13. Shetty DN, Shenai P, Chatra L. Oral Submucous Fibrosis: Review of Modalities of Management. Indian Dentist Research and Review, 2010; 66-70.
14. Vijayavel. T, Ponni V. mAnAgement for orAl submucous fibrosis – A comprehensive review. Indian Journal of Multidisciplinary Dentistry, 2014; 4(1): 869-874.
15. Kakar P.K., Puri R.K. and Venkatachalam V.P. Oral submucous fbrosis-treatment with hyalase J Laryngol Otol, 1985; 99: 57-59.
16. Gupta D, Sharma SC. Oral submucous fibrosis- A new treatment regimen. Oral Maxillofac Surg., 1988; 46: 830-833.
17. Abhinav kumar et al, Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2007; 103: 207-213.
18. Tai YS, Liu BY, Wang JT, Sun A, Kwan HW, Chiang CP. Oral administration of milk from cows immunized with human intestinal bacteria leads to significant improvements of symptoms and signs in patients with oral submucous fibrosis. J Oral Pathol Med., 2001; 30: 618-625.
19. Hastak K, Lubri N, Jakhi S.D. Effect of turmeric oil and turmeric oleoresin on cytogenic damage in patients suffering from oral submucous fbrosis. Cancer Letters, 1997; 116: 265-9.
20. Mulk BS, Deshpande P, Velpula N, Chappidi V, Chintamaneni RL, Goyal S. Spirulina and pentoxyfilline - a novel approach for treatment of oral submucous fibrosis. J Clin Diagn Res., 2013 Dec; 7(12): 3048-50.
21. Kamath VV. Surgical Interventions in Oral Submucous Fibrosis: A Systematic Analysis of the Literature, J. Maxillofac. Oral Surg, (July–Sept 2015); 14(3): 521–531.
22. Chang Y-M, Tsai C-Y, Kildal M, Wei F-C (2004) Importance of oronoidectomy and masticatory muscle myotomy in surgical release of trismus caused by submucous fibrosis. Plast Reconstr Surg, 2004; 113: 1949–1954.
23. Bhrany AD, Izzard M, Wood AJ, Futran ND (2007) Coronoidectomy for the treatment of patients in head and neck cancer. Laryngoscope, 2007; 117: 1952–1956.
24. Khanna JN, Andrade NN (1995) Oral submucous fibrosis: a new concept in surgical management. Report of 100 cases. Int J Oral Maxillofac Surg, 1995; 24: 433–439.
25. Golhar S, Mahore MN, Narkhede S (1989) Tongue flap in oral submucous fibrosis. Indian J Otolaryngol Head Neck Surg, 1989; 41: 104–107.
26. Kothari MC, Hallur N, Sikkerimath B, Gudi S, Kothari CR (2012) Coronoidectomy, masticatory myotomy and buccal fat pad graft in the treatment of advanced oral submucous fibrosis. Int J Oral Maxillofac Surg, 2012; 41: 1416–1421.
27. Surej Kumar LK, Kurein NM, Sakkir N (2010) Buccal fat pad reconstruction for oral submucous fibrosis. Nat J Maxillofac Surg, 1: 164–167 Borle RM, Nimonkar PV, Rajan R (2009).
28. Extended nasolabial flaps in the management of oral submucous fibrosis. Br J Oral Maxillofac Surg, 47: 382–385.
29. Maria A, Sharma Y, Kaur P (2011) Use of nasolabial flap in the management of oral submucous fibrosis—a clinical study. People's J Sci Res., 2011; 4: 28–30.
30. Cesteleyn L. The temporoparietal galea flap. Oral Maxillofac Surg Clin North Am, 2003 Nov; 15(4): 537-50.
31. Janjua OS, Bukhari SGA, Ibrahim MW, Mehmood S, Sarfraz T (2011) Oral submucous fibrosis—reconstruction with nasolabial flap. Pak Armed Forces Med J., 2011; 2: 1–3.
32. Abouchadi A, Capon-Degardin N, Patenotre P, Martinot-Duguennoy V, Pellerin P. The submental flap in facial reconstruction: advantages and limitations. J Oral Maxillofac Surg., 2007 May; 65(5): 863–9.

33. Avery CM. The sternocleidomastoid perforator flap: short communication. Br J Oral Maxillofac Surg, 2011; 49: 573–575.
34. Su T, Zhao YF, Liu B, Hu YP, Zhang WF. Clinical review of three types of platysma myocutaneous flap. Int J Oral Maxillofac Surg, 2006; 35: 1011-5.
35. Baur DA. The platysma myocutaneous flap. Oral Maxillofac Clin North Am, 2003; 15: 559–64.
36. Huang I-Y, Wu C-F, Shen Y-S, Yang C-F, Shieh T-Y, Hsu H-J, Chen C-H (2008) Importance of patient's co-operation in surgical treatment of oral submusous fibrosis. J Oral Maxillofac Surg, 2008; 66: 699–703.
37. Chen C-M, Yang C-F, Shen Y-S, Huang I-Y, Wu C-F (2008) The use of artificial dermis for surgical defects in the treatment of oral premalignant lesions. J Surg Oncol, 2008; 97: 291–293.
38. Raghavendra Reddy Y, Srinath N, Nandakumar H, Rajini Kanth M. Role of collagen impregnated with dexamethasone and placentrix in patients with oral submucous fibrosis. J Maxillofac Oral Surg., 2012; 11(2): 166-70.
39. Nataraj S, Guruprasad Y, Shetty JN (2011) A comparative clinical evaluation of buccal fat pad and collagen in surgical management of oral submucous fibrosis. Arch Dent Sci., 2011; 2: 15–22.
40. Dormand EL, Banwell PE, Goodacre TE: Radiotherapy and wound healing. Int Wound J., 2005; 2: 112–127.
41. Chung YL, Wang AJ, Yao LF: Antitumor histone deacetylase inhibitors suppress cutaneous radiation syndrome: Implications for increasing therapeutic gain in cancer radiotherapy. Mol Cancer Ther., 2004; 3: 317–325.
42. Mehra P, Caiazzo A, Bestgen S, et al. Bilateral oral commissurotomy using buccal mucosa flaps for management of microstomia: report of a, case. J Oral Maxillofac Surg, 1998; 56: 1200Y1203.
43. Wust KJ. A modified dynamic mouth splint for burn patients. J Burn Care Res., 2006; 27: 86-92.