Medical and Research Publications
International Open Access

Case Report **Journal of MAR Dental Sciences (Volume 7 Issue 2)**

A Case Report on Minimally Invasive Laser Fibrotomy in Oral Submucous Fibrosis

Dr Adarsh Desai [1], Dr Ritu Chhatbar [2], Dr Nirav Patel [3], Dr Aditi Singh [4], Dr Harsh Rana *[5], Dr Krishpi Mehta [6]

1. MDS, Professor and Head of Department , Department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

2. MDS, Senior Lecturer in department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

3. MDS, Reader in department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

4. MDS, Reader in department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

5. Post graduate student (Third year MDS), Department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

6. Post graduate student (Second year MDS), Department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

Corresponding Author: Dr Harsh Rana, Post graduate student (Third year MDS), Department of Oral and Maxillofacial Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

Received Date: February 15, 2023

Published Date: March 01, 2023

Abstract

Oral submucous fibrosis is a chronic debilitating disease of the oral cavity characterized by inflammation and progressive fibrosis of the submucosal tissues leading to restricted mouth opening. The most common surgical procedure is excision of the fibrotic bands. Due to limited range of mouth opening bleeding during the procedure increases lack of accessibility and visibility. Diode Laser has proved to overcome these problems than any other conventional procedures. Here is the case report of a 20 year old male presented with oral submucous fibrosis stage-2 of left and right buccal mucosa treated by fibrotomy using diode laser.

Keyword: *Minimally invasive, Laser fibrotomy, OSMF.*

Introduction

Oral submucous fibrosis (OSMF) is defined as "An insidious chronic disease affecting any part of the oral cavity and sometimes the pharynx. It is always associated with juxta-epithelial inflammatory reaction followed by fibroelastic changes of the lamina propria with epithelial atrophy leading to stiffness of the oral mucosa and causing trismus and inability to speak" **[**1**]**

Oral submucous fibrosis (OSMF) is a high-risk premalignant condition of the oral mucosa involving the oropharynx. It is phenomenon characterized by excessive fibrotic changes in the lamina propria and connective tissue of oral mucosa. The rate of malignant transformation of OSF is about 7-30%. OSF results in blanching and stiffness of the oral mucosa, trismus, burning sensation in the mouth and hypomobility of the tongue with loss of taste sensation, leading to compromised quality of life. **[**2**]**

Various treatment modalities like medical, surgical and physical therapy either used individually or in combination. Each technique has its own advantages and limitations. Surgical treatment of trismus includes incising and relieving fibrous bands and reconstruction of defects using local or distant skin or oral mucosal grafts or muscular flaps like temporalis or temporalis fascia transfer or buccal fat pad.**[**1**]**

Lasers are becoming one of the standard care for many oral and maxillofacial procedures, and they are being introduced as an efficient modality for many applications today. Diode lasers which have a wavelength ranging from 805nm-980nm can be used in gated or continuous pulse modes.**[**1**]**

The treatment of patients with oral submucous fibrosis depends on the degree of clinical involvement. Most patients with oral submucous fibrosis present with moderate- to-severe disease. Moderate-to-severe oral submucous fibrosis is irreversible. Surgical treatment is indicated in patients with severe trismus and/or biopsy results revealing dysplastic or neoplastic changes.[3]

The aim of this case report was to review the clinical progress of patient with oral submucous fibrosis who underwent diode laser excision and regular follow up. In this way the progress of the clinical status and the efficacy of intervention by diode laser in the management of oral submucous fibrosis was also assessed.

Case Report

A 20-year-old male patient was referred from department of orthodontics to Department of Oral and Maxillofacial Surgery with a chief complaint of crowding of teeth, limited mouth opening since last two years and burning sensation on consumption of hot and spicy food. Patient started noticing reduced mouth opening and gradually increase in burning sensation since 2 years. Patient had habit of chewing betel nut chewing 3-4 times a day since past 5 years. Patient gave no relevant medical or family history.

On local examination, on inspection extraorally: No gross facial asymmetry was detected. Sunken cheeks with reduced cheek blowing capacity. Restricted mouth opening was noticed. On palpation no lymphnodes were tender or palpable.

Figure 1: Pre-OP

Interincisal mouth opening recorded was 26mm on inspection intraorally: Blanching was seen on right and left buccal mucosa. Marble stone appearance of right and left buccal mucosa extending from retrocommisural area upto retromolar area anteroposteriorly. Supero inferiorly from maxillary vestibule to mandibular vesibule. Blanching was seen on hard palate, soft palate and faucial pillars. Shrunken uvula was observed. Tongue movement was not restricted.

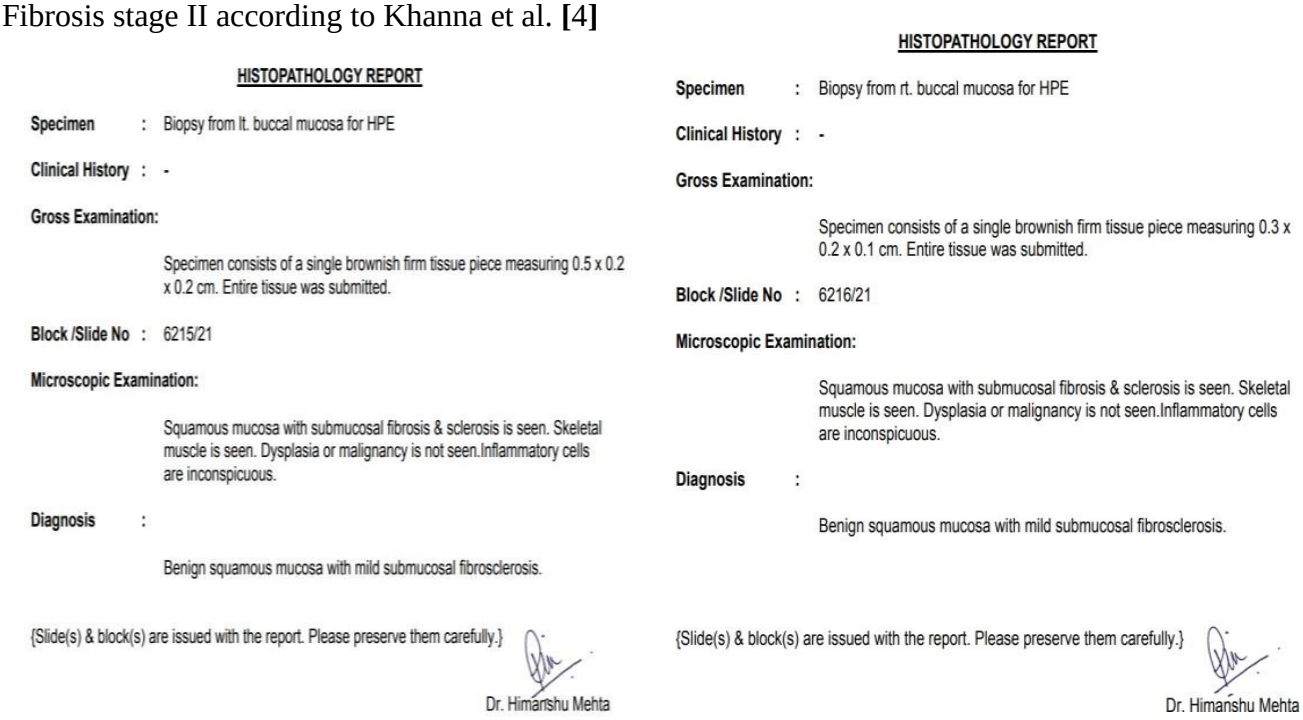
Figure 2: Pre-OP mouth opening- 26mm

Figure 3: Blanching on right and left buccal mucosa

On palpation: Interincisal distance was limited to 26mm. Vertical bands were palpated on right and left buccal mucosa extending from second molar region till pterygomandibular raphe anteroposteriory and from maxillary vestibular region till mandibular vestibular region supero-inferiorly.

From the history of patient and clinical examination provisional diagnosis of Oral Submucous Fibrosis was given. Incisional biopsy was taken from right and left buccal mucosa which revealed that squamous mucosa with submucosal fibrosis and sclerosis. There was no dysplasia or malignancy. Inflammatory cells were inconspicuous suggestive of benign squamous mucosa with mild submucosal fibrosclerosis.

So after the clinical presentation and investigation final diagnosis was given of Oral Submucous Fibrosis stage II according to Khanna et al. **[**4**]**



HISTOPATHOLOGY REPORT

Specimen : Biopsy from lt. buccal mucosa for HPE

Clinical History : -

Gross Examination:

Specimen consists of a single brownish firm tissue piece measuring 0.5 x 0.2 x 0.2 cm. Entire tissue was submitted.

Block /Slide No : 6215/21

Microscopic Examination:

Squamous mucosa with submucosal fibrosis & sclerosis is seen. Skeletal muscle is seen. Dysplasia or malignancy is not seen.Inflammatory cells are inconspicuous.

Diagnosis :

Benign squamous mucosa with mild submucosal fibrosclerosis.

{Slide(s) & block(s) are issued with the report. Please preserve them carefully.}

Dr. Himanshu Mehta

HISTOPATHOLOGY REPORT

Specimen : Biopsy from rt. buccal mucosa for HPE

Clinical History : -

Gross Examination:

Specimen consists of a single brownish firm tissue piece measuring 0.3 x 0.2 x 0.1 cm. Entire tissue was submitted.

Block /Slide No : 6216/21

Microscopic Examination:

Squamous mucosa with submucosal fibrosis & sclerosis is seen. Skeletal muscle is seen. Dysplasia or malignancy is not seen.Inflammatory cells are inconspicuous.

Diagnosis :

Benign squamous mucosa with mild submucosal fibrosclerosis.

{Slide(s) & block(s) are issued with the report. Please preserve them carefully.}

Dr. Himanshu Mehta

Figure 4: Biopsy report of right and left buccal mucosa

Based on diagnosis the surgical plan was made to perform fibrotomy using diode laser Painting was done using 5% Povidone Iodine solution and draping was done. Fibrotomy of left and right buccal mucosa was performed under local anaesthesia(2% Lignocaine with 1:80,000epinephrine) by using diode laser with 810 -980 nm range, 1.5 watt and on contact- pulsating mode with eye protection for surgeon, assistant, and patient by protective eyewear. Fibrotomy was done on right and left buccal mucosa from Pterygomandibular Raphe to second molar region at mandibular occlusal level. The depth of the fibrotomy is at submucosal layer.

Figure 5: Intra OP mouth opening Active-36mm Passive- 35mm

The raw mucosa on the left and right buccal mucosal after fibrotomy were not grafted and left for secondary healing.

Intraoperatively 36 mm of mouth opening was achieved using Heisters jaw opener which preoperatively was 26mm.

Patient was prescribed oral antibiotics (DROXYL), combination of muscle relaxants and analgesics (MYOSPAZ) for 5 days and tablet DEXONA 0.5mg for 3 days and MUCOPAIN GEL and postoperative physiotherapy exercise with Heisters was started after 48 hours, at least for 7–8 times in a day at the interval of one hour.

POSTOPERATIVE: Postoperative 1week follow up

Figure 6: Follow up 1 week

ACTIVE MOUTH opening was gained using Hister jaw opener 38 mm mouth opening was obtained intraorally

PASSIVE MOUTH opening was gained without Hister jaw opener patient gained 36 mm of mouth opening

Patient was motivated for physiotherapy

Figure 7: Post OP 3 interincisal distance – 46mm

Figure 8: Healing after 3 months

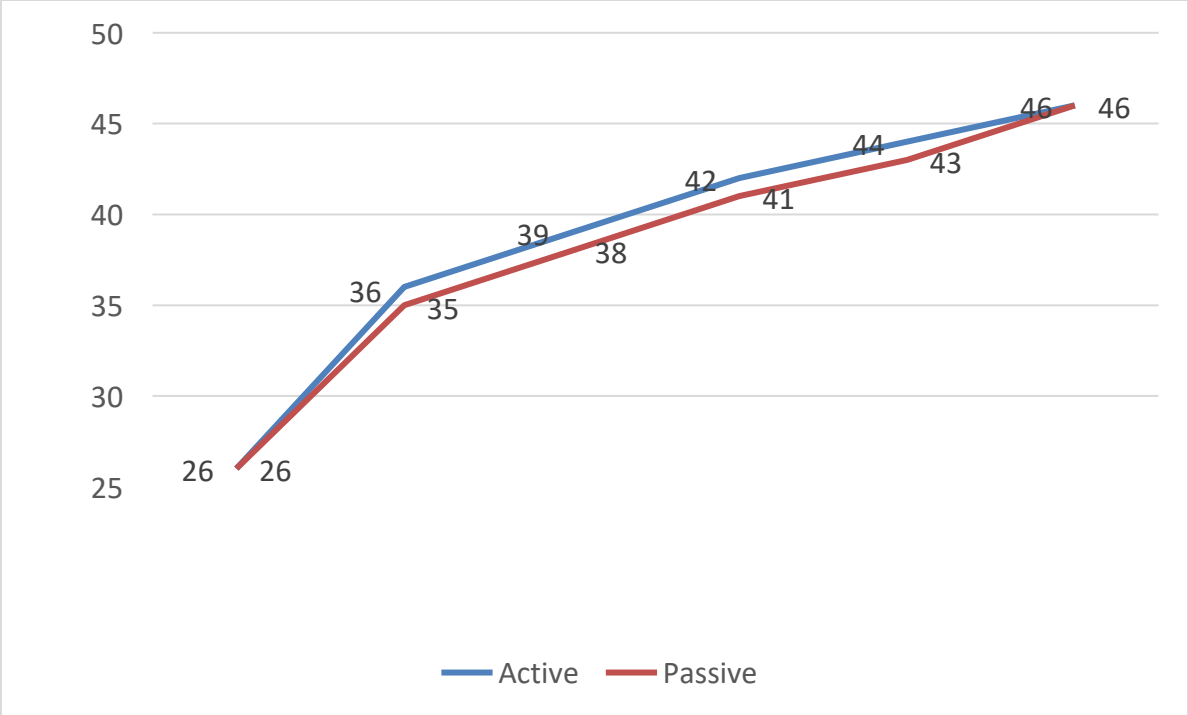


Table 1: Inter-incisal distance in followup

Discussion

Oral submucous fibrosis is a potentially malignant disorder that affects people of South-east Asian origin. The condition was prevalent in the days of Sushruta (2500-3000 BC) and was first described by Schwartz in 1953 while examining five Indian women from Kenya, which they termed as 'Atrophica idiopathica mucosaeoris' **[**5**]**

All the patients had habit history of chewing some form of betel nut and tobacco. Maximum number of patients 73.3% 6 had habit of chewing gutka. 13.3% 7 used tobacco, 3.3% 8 had a paan chewing habit, and 10% 9 used a combination of tobacco and betel nut. 6.7% 10 patients practiced Various studies have suggested a multifactorial origin with a high incidence of the disease in association with consumption of the areca nut.

Areca nut (the fruit of the Areca catechu palm) commonly known as betel nut or supari, plays a crucial dual role in the etiology of OSE Arecoline, an alkaloid component of areca nut, stimulates fibroblastic proliferation and collagen synthesis. The flavonoid (+) - catechin and tannins are also components of the areca nut and stabilize the collagen fibrils, rendering them resistant to degradation by collagenase. The attendant trismus is a result of juxtaepithelial hyalinization and secondary muscle involvement (i.e., muscular degeneration and fibrosis). One of the earliest reports on muscle involvement. **[**11**]**

GOLLNICK et al. state that glycogen consumption is physiologically related to cellular activity. Overactivity of the muscle results in excessive glycogen consumption, leading to glycogen depletion. The increased muscle activity and diminished blood supply following connective tissue changes owing to extensive OSF lead to muscle degeneration and fibrosis.**[**12**]**

The mainstay of treatment for initial stage of OSMF is conservative like cessation of habit, physiotherapy, and medical, which includes anti-oxidant therapy, nutritional, vitamin, and iron supplements along with topical corticosteroids. In the moderate subgroup along with the medical therapy adjuncts like intralesional injections of corticosteroids, hyaluronidase, or placentrex, systemic corticosteroids, immunomodulators, and pentoxifylline are given. Surgical management is usually implemented in advanced stage of the disease where sufficient mouth opening can only be achieved by complete release of fibrotic bands and reconstruction of resultant defect with split thickness skin graft, buccal fat pad, micro-vascular free radial forearm flap, tongue flap, or nasolabial flap. **[**13**]**

Introduction of laser for relieving trismus in OSMF provides a minimally invasive, cost- and time-effective alternative to conventional surgical techniques which has associated risk of general anesthesia and donor site morbidity and is a time-consuming procedure. Lasers can be used as an alternative for surgical fibrotomy as they have the advantage of providing a bloodless field, are minimally invasive, and have less fibrosis and minimal scarring after complete healing. Recently, uses of diode 810– 980nm, KTP—532 nm, and Er,Cr:YSGG— 2780 nm have been undertaken for the management of reduced mouth opening..**[**13**]**

Diode Laser with follow-up physiotherapy is effective to reduce trismus in OSMF; is less expensive, less hospital stays and less follow up as compared to other surgical methods. ErCr: YSGG (Erbium Chromium Yttrium Scandium Gallium Garnet) laser surgery is effective and safe in the treatment of OSMF. Diode laser is a portable hand piece delivers rays through a fiber-optic cable that can reach to relatively inaccessible area. Its cutting depth of laser is less than 0.01 mm, thus controlled cutting is possible without damaging underlying structures. It coagulates smaller blood and lymphatic vessels, allowing excellent visibility and minimizes the chances of intra and post-operative bleeding and edema. **[**13**]**

Advantages of Laser Fibrotomy over Conventional Technique: **[**14**]**

- A single incision is deficient to cut all the fiber bands and may cause re-occurrence of trismus whereas in this technique we palpate the band and where ever it is required we perform the fibrotomy so as to make sure that we cut the bands in all possible direction followed by use of Heister mouth gag which leads to dissection of any remaining bands.

- 2-3mm deep dissection can be done in multiple areas in the mucosa where the fibrous bands are present.
- Low laser power setting causes minimal damage to the tissue resulting in no delay in wound healing.

In our experience, diode laser fibrotomy under local anesthesia can be a sustainable option in group II OSMF. It is easy to use and gives precise line of cutting without the risk of damaging the adjacent structure or underlying muscle. As it is a bloodless procedure and a coagulum of protein deposits on the surface, spontaneous epithelization takes place and the affected area is visible to inspection in contrast to conditions where bulky flaps might hide developing malignancy. Diode laser can be easily performed in a dental setup or minor operating room under local anesthesia, making it cost-effective. As majority of the patients suffering from this disease are from lower socioeconomic strata, diode laser fibrotomy can offer affordable treatment adjunct.

Conclusion

The surgical treatment of OSMF is primarily aimed at releasing the trismus caused by the fibrotic bands and maintenance of oral opening in the postoperative period. Introducing minimally invasive technique for treatment of OSMF moderate stages laser fibrotomy is a choice of treatment. Laser technology has made rapid progress over few past decades, and lasers have found a niche in many surgical specialities. Lasers can provide as an alternative and better means for surgical fibrotomy and relieving trismus in moderate OSMF cases as they are minimally invasive, cause less hemorrhage, and have short operating time, faster healing, less morbidity, and minimal surgical site scaring and relapse.

References

1. Jamdade V, Jamdade A, Agarwal A, Pardhe N. Diode Laser in the management of Oral Sub-mucous Fibrosis: A Case Report. International Journal of Applied Biology and Pharmaceutical Technology. 2021;12(04).

2. Gondivkar D, Gadbail D, Sarode D, Gondivkar D, Patil S, Gaikwad D et al. Treatment outcomes of laser therapy in oral submucous fibrosis-a systematic review. Journal of Oral Biology and Craniofacial Research. 2020;10(3):253-258.

3. Chaudhry Z, Gupta S, Oberoi S. The Efficacy of ErCr:YSGG Laser Fibrotomy in Management of Moderate Oral Submucous Fibrosis: A Preliminary Study. Journal of Maxillofacial and Oral Surgery. 2013;13(3):286-294.

4. J. N. Khanna, N. N. Andrade: Oral submucous fibrosis." a new concept in surgical management. Report of 100 cases. Int. J. Oral Maxillofac. Surg. 1995; 24." 433- 439.

5. Shah A,Shah R ,Vyas N , Nitu Shah4 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

6. Macfarlane GJ, Zheng T, Marshall JR, Boffetta P, Niu S, Brasure J (1995) Alcohol, tobacco, diet and the risk of oral cancer: a pooled analysis of three case-control studies. Eur J Cancer 31B(3):181–187

7. Murti PR, Bhonsle RB, Pindborg JJ, Daftary DK, Gupta PC, Mehta FS (1985) Malignant transformation rate in oral submucous fibrosis over a 17-year period. Community Dent Oral Epidemiol 13(6): 340–341

8. Pindborg JJ, Barmes D, Roed-Peterson B (1968) Epidemiology and histology of oral leukoplakia and leukoedema among Papuans and New Guineans. Cancer 22(2):379– 384

9. Angadi PV, Rao SS (2011) Areca nut in pathogenesis of oral submucous fibrosis: revisited. Oral Maxillofac Surg 15(1):1–9

10. (1984) A WHO meeting report. Control of oral cancer in developing countries. Bull World Health Organ;62(6):817–

11. LNU A, Soni A, Agarwal P. The Use of Diode Laser in Treatment of Oral Submucous Fibrosis. Journal of Mahatma Gandhi University of Medical Sciences and Technology. 2016;1(2):79-81.

12. GOLLNICK PA, KARLSSON J, PIEHL K, SALTIN B. Selective glycogen depletion in skeletal muscle fibres of man following sustained contractions. J Physiol 1974: 246:59

13. 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;33(8):1739-1745.

14. Farista S, Kalakonda B, Farista S, Iyer V. Diode Laser-Assisted Fibrotomy in the Management of Oral Sub-Mucous Fibrosis: A New Technique in Surgical Management. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2018.