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# TREATMENT OF ORAL LEIOMYOMA WITH 940NM DIODE LASER: A NEW APPROACH

Dental Science

**Dr. S. Fatima Khan M.D.S** Reader, Department of Oral Medicine, Diagnosis and Radiology Rungta College of Dental Sciences and Research Bhilai,Chhattisgarh, India.

**Dr. Sana Farista M.D.S*** Consultant Periodontists Mumbai, Maharashtra, India. *Corresponding Author

**Dr. Naved Khan** Postgraduate student, Department of Oral and Maxillofacial Surgery Al-Badar Rural Dental College and Hospital Kalaburgi, Karnataka India.

**Dr. ShaninFarista M.D.S** Consultant Endodontist Mumbai, Maharashtra,India

**Dr. Himanshu Ajwani** Reader, Department of Periodontology and Oral Implantology Yashwantrao Chavan Dental College & Hospital, Ahmednagar, Maharashtra, India

**Dr. Dimple Vaswani Ajwani** Post graduate student, Department of Oral Medicine and Radiology, Daswani Dental College, Kota, Rajasthan.

## ABSTRACT

Summary: Leiomyoma is a benign smooth muscle tumor that is rarely seen in the oral cavity. The diagnosis is mainly determined by histological studies due to its unspecific clinical appearance. The common modalities of treatment of these lesions are surgical excision, cryotherapy and electro surgery. However, in the last few decades, use of laser has been recommended for ablation of some oral soft tissue lesions. Laser treatment presents less chance of postoperative complications and is patient friendly. The present case report describes one such rare case of oral leiomyoma successfully treated with a diode laser.

## KEYWORDS

Oral Leiomyoma, smooth muscle, Diode LASER

**Introduction:** Leiomyoma is a benign smooth muscle tumor that can occur at any location. The most common sites are female genital tract, gastrointestinal tract and skin. The occurrence of leiomyoma is rare with incidence of 0.06% due to lack of smooth muscle fibers in the oral cavity.1,2 It is commonly seen in 4th and 5thdecade with slight female predilection. Classically, the lesion is characterized as a solitary nodular mass, usually located on the lips, tongue, palate or buccal mucosa. It is a slow growing lesion with a small size, usually, less than 2mm. The clinical features could be pain, difficulty in chewing and sometimes tooth mobility however; in most of the cases the lesion is asymptomatic.3,13

The WHO has classified leiomyomas as solid,vascular (angiomyoma) and epitheliod leiomyoma (leiomyoblastoma).The common types being the solid and vascular. Histological study remains the key to diagnosis as it is difficult to differentiate it from other mesenchymal tumours, clinically. Surgical excision is the preferred treatment modality as the lesion has rare recurrence. 4, 5

The advent of lasers started in 1917 with the theory of "stimulated emission" put forward by Albert Einstein. Townes and Schawlow worked on this study together which led to the development of Light Amplification by Stimulated Emission of Radiation (LASER). In 1960's Maiman introduced first ruby laser, since then lot of researches in this field and its various applications in dental treatment have been developed.6

The diode laser has become the most commonly utilized laser in dentistry comprising of wavelengths ranging from 800 to 980nm. Diode lasers have various advantages over the traditional surgical and therapeutic technique including less pain and less bleeding during and post-operative procedure. The following case report presents a rare case of oral leiomyoma which was treated successfully using diode laser.6,7

**Case Report**

A 45-year-old female patient reported to the Department of Oral Medicine & Radiology with the chief complaint of swelling since 5 months, in relation to upper left molar teeth. Intraoral examination revealed a solitary well defined swelling, seen on left side of the posterior palate in relation to 27 (maxillary left 2nd molar) measuring 1cm x1cm with an ulcerated overlying mucosa, rolled out margins and normal surrounding mucosa (Figure 1).Patients medical history was non-contributory.

On palpation the swelling was painless, soft in consistency, non-hemorrhagic and not fixed to the underlying structures. The lesion was provisionally diagnosed as pyogenic granuloma. Probing showed interdental and palatal bone loss in between 26, 27, and 28. Intra oral periapical radiograph was obtained of teeth #26 and #27 and radiological examination confirmed there is loss of interdental and palatal bone in between 26, 27, and 28 involving the middle 1/3rd of root (Figure 2), so it was confirmed that soft tissue diode laser can be used to treat the lesion.

Patient was explained about the treatment option and explained about the advantages and disadvantages of both the conventional and laser technique, patient opted for laser, consent was signed, and all the laser safety measure were taken into consideration.

The area was anesthetized using topical anaesthesia and the periphery of the lesion was marked 1mm beyond the lesion (safety margin) using an initiated surgical tip at 0.8Watts power in a continuous mode in slow and controlled fashion using 940nm diode laser (Ezlase, Biolase Technology Inc, USA) (Figure 3). The lesion was excised intact with 1W continuous mode and the area was scaled with ultrasonic scaler followed by laser curettage (Figure4). High speed suction was used throughout the procedure to avoid thermal damage to the tissue and laser tip was continuously cleaned in between the procedure to avoid hot tip effect. The procedure was painless and well tolerated by the patient. Analgesic was prescribed to control post-operative pain if persisted.

The specimen was sent for histopathological examination. The

hematoxylin and eosin stained section under 10x and 40x magnification shows overlying proliferative epithelium and underlying connective tissue stroma. The stratified squamous epithelium shows parakeratinisation and is non-lesional. Juxtaepithelial region shows patchy distribution of chronic inflammatory cell infiltrate comprising chiefly of lymphocytes and plasma cells. Deeper fibrocellular stroma shows streaming of blunt ended spindle cells (cigar shaped) with hyper chromatic nucleus arranged in whorled pattern around blood capillaries (Figure5a and b). Thus, a histological diagnosis of leiomyoma (Solid variant) was given. Patient was reviewed on the 10thday for an initial post-operative re-evaluation (Figure 6) and then after a month. Healing was satisfactory, which suggested a good prognosis. There was no recurrence at 4th, 6th month and at 1year follow-up with complete resolution of the lesion (Figure 7).

**Discussion**

Leiomyoma is a relatively uncommon lesion on the face and the oral cavity because of the scarcity of smooth muscle. In 1884, Blanc reported the first case of leiomyoma in the oral cavity. Since then, very few cases of oral leiomyoma have been described in the literature [Orsini et al., 2001; Benet et al., 2003].1,2 The congenital form of leiomyoma has been reported in literature, most common locations are the lip (48.6%), hard and soft palate (21.1%), tongue (9.2%), and cheek (9.2%). Clinically, they appear as smooth-surfaced submucosal nodule, and the colour of the lesion varies depending upon their vascularization and depth. Fifty-five percent of the cases appear red, blue, or purple in colour.13 Usually, the oral leiomyomas are asymptomatic; but in some cases, they may cause toothache, loose tooth, difficulty in deglutition, shortness of breath, referred pain in temporomandibular joint (TMJ) depending upon their size and location.3,4,5

The diagnosis of leiomyoma is relatively difficult to establish, due to the similarity with other fusiform cell tumors. The differential diagnosis must include other mesenchymaltumors (fibroma, neurofibroma, lipoma, etc.), salivary gland neoplasms (mucocele, pleomorphic adenoma, etc.), vascular tumors(lymphangioma, hemangioma, pyogenic granuloma, etc.), and soft tissue cysts such as dermoid cysts. 7, 8The definitive diagnosis of leiomyoma is therefore based on the histological study of the lesion. Special stains such as Mason's trichrome, Van Geison's stain or Mallory's phosphotungstic acid (PTAH) are specific for muscle cells and collagen fibers. Immunohistochemical studies to make the differential diagnosis with other spindle cell tumors such as myofibroblastoma.9,10

Conventional forms of treatment are the scalpel excision and cryosurgery, but these can cause scarring, bleeding, post-operative pain and discomfort.11So to overcome these disadvantages we have used a soft tissue laser. It is indicated mostly for soft tissue lesions with an approximate size of 3-4 mm to 1cm that are selectively removed by minimal thermal changes to the adjacent tissues resulting in excellent homeostasis, minimal scarring, less need of suture with reduced post-operative pain and oedema. This treatment modality also has an additional advantage of bactericidal properties.11, 12,15

With good control of bleeding, visualization of the surgical field is greatly improved, and many laser procedures can be performed with less injectable anaesthesia. In those situations, additional treatment may be performed in the same appointment. Furthermore, initial postoperative bleeding and swelling are reduced because of the sealing of blood vessels and lymphatics.7,15

The use of lasers in dentistry was introduced in 1964 by Goldman. Several lasers such as Argon laser, Diode laser, Er:YAG, Nd:YAG laser and carbon dioxide ($CO_2$) laser are used in dentistry.15
The diode lasers are semiconductor devices which operate from a standard AC electrical outlet with a relatively high-power output. The external electrical power supply delivers the excitation required to facilitate stimulated emission and thus

Lasing, they are small, lightweight and compact, hence portable.7

**CONCLUSION.** The observations in the present case led us to conclude that laser therapy has proved to be superior to the other treatment modalities. The only disadvantage observed was the non-availability of the tissue sections for histological purposes. A thorough knowledge of the etiological factors, biological behaviour of the lesion, and histological diagnosis and diode lasers in experienced hands is imperative for treatment for oral soft tissue lesions.

**Figure 1:** Solitary well defined swelling on the posterior palatal region in relation to 27 measuring 1x1cms with ulcerated overlying mucosa and rolled out margins

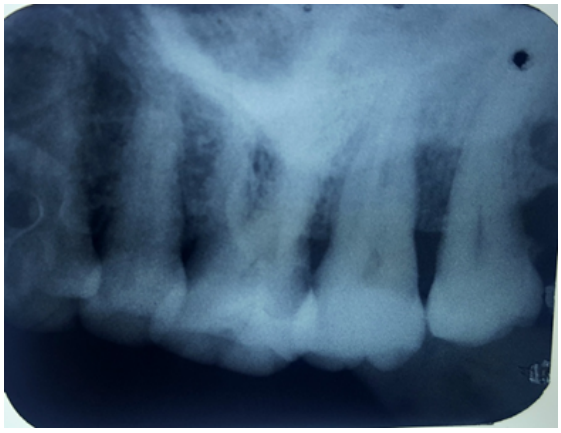

**Figure 2:** IOPA shows interdental& palatal bone loss in relation to 26, 27&28

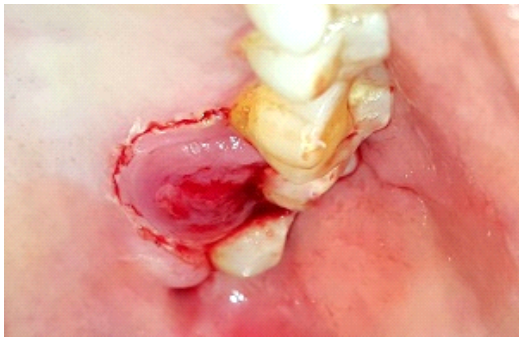

**Figure 3:** Marked outline of the lesion 1mm beyond the periphery with diode laser at 0.8W (CW)

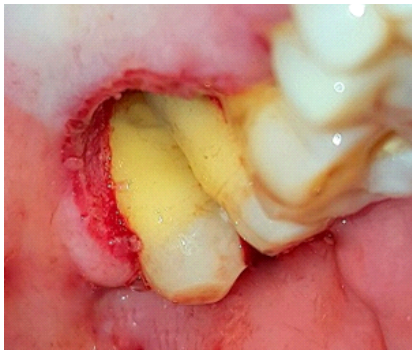

**Figure 4:** Total excision of the lesion followed by laser curettage.

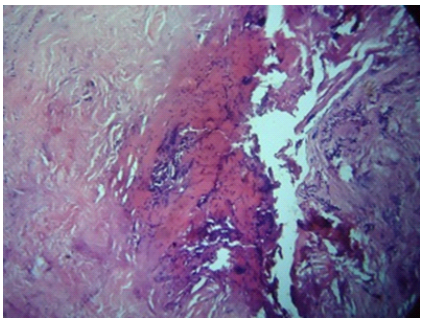

**Figure 5a:** Tissue specimen showing non encapsulated well circumscribed lesion with overlying parakeratinized proliferative stratified squamous epithelium. The cells are arranged in whorls & fascicles.Juxtaepithelial region shows patchy distribution of chronic inflammatory cell infiltrate comprising chiefly of lymphocytes & plasma cells. (H&E stained section under 10x)

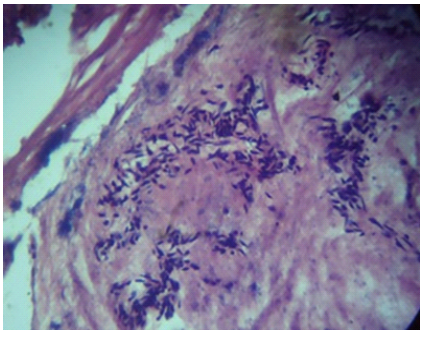

**Figure 5b:** The cells are spindle shaped with eosinophilic cytoplasm & centrally located basophilic cigar shaped (blunt-ended) nucleus arranged in whorled pattern around blood capillaries. No evidence of nuclear atypia/necrosis/hemorrahage between smooth muscle bands. (H&E stained section under 40x)

**Figure 6:** Clinical follow up after 10days shows signs of healing and slough in the centre of the lesion with no pain or complications.

**Figure 7:** Clinical follow up after 1year showed complete healing and resolution of the lesion.

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