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MANAGEMENT OF INTRAORAL FIBROMA WITH LASERS: A CASE REPORT

Dentistry

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ABSTRACT

Intraoral fibroma is a common lesion that arises due to trauma or tissue injury. The conventional treatment of oral fibromas is surgical excision using scalpel; but this has disadvantages like bleeding and post operative pain. With advancements in laser dentistry and their use in excision and healing promotion, the problems of surgical treatment can be overcome. This case report presents the excision of an intra oral fibroma using diode laser followed by low level laser application for improving healing. Diode laser proved to be effective with minimal bleeding and uneventful healing in the treatment of intraoral fibroma.

KEYWORDS

Fibroma, Diode laser, Low level laser therapy, Photobiomodulation

INTRODUCTION:

Intra oral fibroma is commonly seen as an overgrowth caused due to chronic trauma or irritation. The common etiological factors include calculus, overhanging restorations, habits such as lip biting, injury from sharp cusp tips or broken teeth.[1,2] They occur more frequently in third and fourth decade with twice the frequency in women than men.[2,3] The most prevalent site of occurrence is buccal mucosa along the plane of occlusion followed by mandibular labial mucosa, gingiva, and tongue.[1, 4, 5] Clinically, fibromas appear as a sessile or pedunculated mass. The lesion may appear pale or similar to the surrounding mucosa. The outer surface may appear smooth and whitish due to hyperkeratosis or may be ulcerated due to repetitive trauma. The lesion is usually asymptomatic and does not have any risk of malignancy.[6, 7] The recurrence is less likely and occurs due to incomplete removal of the etiological factors.[7]

The conventional treatment for the excision of fibromas is surgical excision using scalpel blades. However, this method has limitations such as bleeding, need of sutures, scarring in the excised region, post-surgical pain, swelling and delayed wound healing.[5, 8, 9] Lasers are widely being used in the fields of medicine and surgery since the development of the Ruby laser by Maiman in 1960.[10] The characteristics of a laser depend on its wavelength. Harnessing this property, various lasers have been designed for different clinical applications.[11] The wavelength of lasers used in medicine and dentistry ranges from 193 nanometres (nm) to 10,600 nm representing a broad spectrum from the ultraviolet to the far infrared range. The diode laser is delivered through a flexible quartz fiber optic handpiece and is available in different wavelengths ranging from 810 – 980 nm.[12]

It is used in contact mode for soft tissue removal.[13,14] The mechanism of action of these lasers is the absorption of laser energy into the target tissue releasing heat by photothermal process which further causes intra and extracellular vaporization of cells with resultant cellular explosion and tissue ablation. This occurs in concentric serial circles around the homogeneous target tissue. Lasers also cause sealing of vessels resulting in haemostasis during laser surgery.[15] Low level lasers have been used for photobiomodulation therapy. Upon absorption of light energy at appropriate wavelength, a photo sensitizer undergoes a transition from a low energy singlet ground state to a higher energy triplet state. Photon absorption causes a shift in molecular configuration of the photoacceptor, accompanied by an associated alteration in the molecular signal of the cell. The alterations in photoacceptor function are the primary reactions and subsequent alterations in cellular signalling, and cellular functions are secondary reactions. Laser-enhanced biostimulation promotes intracellular metabolic changes that speed up matrix production, fibroblast migration, and cell division. The amount of light energy that is absorbed impacts the laser's ability to stimulate biological processes. The depth of energy penetration is dependent on several factors, including wavelength, temperature, strength, energy values, exposure time, waveform optical properties of tissue absorption, and scattering coefficient.[16, 17] In Periodontics, lasers are used for various surgical procedures like gingivectomy, frenectomy, gingival depigmentation, soft tissue excision, etc., as well as photobiomodulation therapy and photodynamic therapy.[18,19] This case report, describes the treatment of an intraoral fibroma using diode laser for excision and photobiomodulation.

CASE REPORT:

A 56-year-old female patient reported to the Department of Periodontology with the chief complaint of an overgrowth on the cheek mucosa of right side since 2-3 years. Her medical and personal history was not relevant. Extraoral examination didn't reveal any abnormalities and lymph nodes were non-palpable. On intra oral examination, a round, pinkish, pedunculated mass with regular margins and firm consistency, measuring 10x9 mm in diameter on the cheek mucosa of right side along the occlusal plane was observed. The mass was painless and had same surface texture as of the surrounding buccal mucosa. The patient gave history of cheek biting and on examination it was observed that the mandibular first molar had sharp mesio-buccal cusp. Considering the history and clinical examination a provisional diagnosis of irritation fibroma was arrived at. As the ideal treatment of irritation fibroma is removal of the etiologic factors and excision, our treatment plan included, laser excision followed by photobiomodulation therapy.

The patient was informed of the treatment plan and written consent was taken. Blood investigations were carried out followed by full mouth disinfection. Local anaesthesia (2% lidocaine with 1/100,00 adrenaline) was administered. Removal of etiological factor was done i.e. smoothening of the sharp mesio-buccal cusp of the mandibular first molar. Then, the mass was engaged with a silk suture to facilitate its retraction, visualize its margin and ease excision. A diode laser of 940 nm wavelength (Biolase Epic X Dental Laser) with 0.4 mm diameter surgical tip was applied in contact mode and moved around the base of

the lesion. The lesion along with some connective tissue at the base of the lesion and 2 mm of surrounding healthy tissue was excised in toto. The power of laser was set at 2.5W, and used in continuous wave contact mode. Immediately after the excision low level laser therapy with power of 0.5W, continuous wave in non-contact mode was applied on the excision site. 3 applications of 1 minute each of LLLT at intervals of 2 minutes was administered.

The excised tissue was preserved in 10% formalin and was sent for histopathological examination to the Department of Oral Pathology. On histopathological examination, the H & E studied section revealed epithelial and connective tissue. Epithelium was para-keratinized stratified squamous in nature. It was stretched at places and underlying connective tissue comprised of dense collagen fiber bundles interspersed with few fibroblasts. This confirmed the diagnosis of intraoral irritational fibroma, and hence warranted no further treatment.

The patient was recalled after 24 hours and 3 days for LLLT. Three applications of LLLT for 1 minute each at equal interval of 2 minutes was administered. The patient was put up on follow-up. Healing was assessed using index given by Landry *et al* (1988) at 24 hours, 1st day, 3rd day and 14th day. At 24 hours, whitish halo was seen surrounding greyish slough in circumferential manner, depicting uneventful healing. At 3 days, the healing area was shrinked with whitish halo surrounding very small greyish matter. At 14 days, the operated area was completely healed. The mucosa appeared pale pink in colour and was indistinguishable with that of the surrounding mucosa. Assessment of pain was done using the Visual Analog Scale at 24 hours, 1st day, 3rd day and 14th day. The VAS score was 0 which denotes that the patient did not have any post operative pain. And also reported that there was no need to consume analgesic post excision.

DISCUSSION:

Fibro-epithelial hyperplasia, also known as irritation fibroma or traumatic fibroma is a common benign nodular mass which constitutes a group of hyperplastic lesions that occurs in response to local trauma or tissue injury.[2,6,20,21] It occurs mainly due to chronic irritation of cheek bite, trauma from sharp tooth, denture or other prosthesis.[22] Clinically they are solid, well demarcated, rounded, sessile or pedunculated growths covered by normal mucosa having strong female predilection.[6] Conventionally, fibromas are treated by excision using surgical blades. Alternative treatment modalities include electrosurgery and cryosurgery. However, these methods have limitations such as intraoperative bleeding, pain, delayed wound healing, and post-surgical discomfort to the patient. With the advent of lasers, the scenario of surgical treatment has changed. Diode laser being a soft tissue laser is effectively used for the excision of intraoral lesions with minimal intraoperative and postoperative problems.[8,9]

Surgical excision with diode laser is bloodless due to its efficiency in the coagulation of superficial lesions, thus providing a dry surgical field. The mechanism of diode laser that leads to ablation or decomposition of biological material is photochemical, thermal, or plasma mediated. The diode laser is absorbed by pigmented tissue and haemoglobin without penetrating surrounding tissues and transmits energy to the cells through warming, coagulating, welding, drying, carbonization, vaporization, and protein denaturation. Due to its absorption in haemoglobin within blood vessels, sealing of capillaries by protein denaturation and stimulation of clotting factor VII production throughout the procedure, better control of bleeding site and visibility is achieved. The thermal effect of the laser also seals the capillaries and lymphatics, which reduces postoperative oedema and bleeding.[23, 24] In addition, post-operative oedema and discomfort are minimal with laser therapy as lasers have been shown to modulate pain through several biochemical mechanisms. One of the primary ways LLLT achieves this is by influencing the production and release of endorphins and enkephalins, which are natural pain-relieving chemicals in the body. These biochemicals bind to opioid receptors in the nervous system, reducing the perception of pain.[25, 26] LLLT exposure causes fibroblasts to reproduce and mature more frequently, change from fibroblasts to myofibroblasts, this causes reduced prostaglandin E2 production. This decreases the levels of pro-inflammatory cytokines, such as TNF-alpha and IL-1β.[27] It is also been seen that fibroblast growth factors (FGF), platelet-derived growth factor (PDGF) and transforming growth factor beta (TGF-β) are stimulated.[27, 28] Hence, lasers also cause reduction in the inflammation which is also seen when using low level laser therapy.[29, 30] Histologically, laser wounds have been found to contain a significantly lower number of myofibroblasts. This results in less wound contraction and scarring and ultimately improved healing.[23] Various studies have reported that the use of lasers may result in sterile conditions in both pulsed and continuous modes through significant reduction of viable bacteria.[24, 31] Furthermore, this indicate that in addition to its bactericidal effect, laser irradiation can also inhibit lipopolysaccharide (LPS) induced macrophage activation and therefore blunt the inflammatory response.[32]

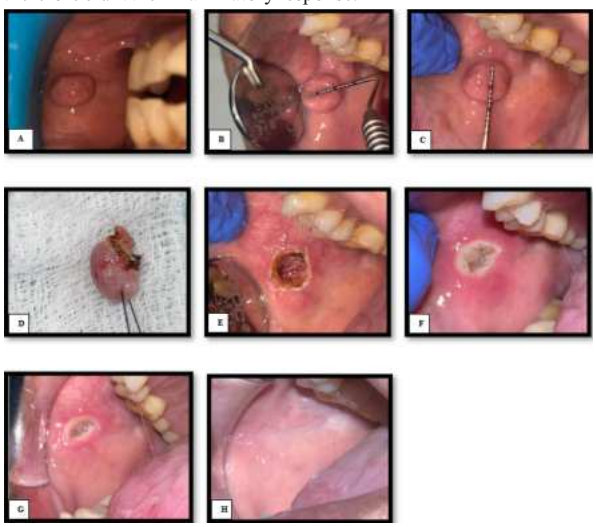

Fig. A: Pre-operative, Fig. B & C: Dimensions of the mass, Fig. D: Excision of mass with the help of suture, Fig. E: Wound immediately after excision, Fig. F: 24 hours follow-up, Fig. G: 3rd day follow-up, Fig. H: 15th day follow-up.

CONCLUSION:

Diode laser proved to be an effective tool for the excision of intraoral fibroma. The low-level laser therapy following excision resulted in uneventful wound healing of the lesion site. In addition, the patient was comfortable during the procedure and post operative phase as well.

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