

EXCISION OF A CHRONIC INFLAMMATORY MASS USING DIODE LASERS: A CASE REPORT

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ABSTRACT

Photobiomodulation (PBM), also known as low level laser therapy (LLLT) or cold laser therapy uses light energy to elicit biological responses from the cell and help regulate cell function. From a clinical point of view PBM offers dental practitioners a non-invasive treatment modality that can be used as an adjunct to the traditional therapies or as a therapeutic tool on its own. This is a case of surgical excision of a fluctuant mass using a scalpel and diode laser 980nm wavelength.

KEYWORDS: Diode Laser, Photobiomodulation, Surgical Excision, Fluctuant Mass, Bone Augmentation

INTRODUCTION

Photobiomodulation (PBM), also known as low level laser therapy (LLLT) or cold laser therapy uses light energy to elicit biological responses from the cell and help regulate cell function.¹ This treatment procedure that nowadays is called photobiomodulation therapy (PBM) has also had more than 60 other names in scientific literature most common being -low-level laser therapy| (LLLT) The reasons to prefer the term -PBM| over - LLLT| are twofold.² Firstly PBM does not imply that a laser is necessary to achieve the therapeutic benefits and secondly PBM implies that the therapeutic effects could in some instances be due to inhibition effects in combination with usual stimulation effects at cellular level.³ According to the mechanism of action suggested by various studies LLLT affects the mitochondria of the cell, primarily Cytochrome c oxidase in the electron transfer chain(ETC) and porphyrins on the cell membrane.^{4,5} Light photons absorbed by these receptors have been proposed to do three things : stimulation of ATP synthesis by activating ETC; transient stimulation of reactive oxygen species, increasing the conversion of ADP to ATP; and a temporary release of nitric oxide(NO) from cytochrome c oxidase, resulting in an increase in cellular respiration.⁶ PBM utilizes nonionizing forms of

light sources, such as light emitting diodes (LEDs), lasers, and broadband light to produce desired reactions in various tissues.⁷ The results that need to be achieved by PBM depend upon the type of laser as well as the wavelength used.⁸ The term LASER is an acronym for - light amplification by simulated emission of radiation.⁹ It pumps electrons of a - laser gain medium| E1 to an excited state E2 using light, electricity or a chemical reaction as a source of energy.¹⁰ Once majority of the electrons are in an excited state (population inversion) an incoming photon E photon will lead to stimulated outburst of new photons.¹⁰ Hence, the light will be amplified. Mirrors placed at either end of the laser cavity allow the light to bounce back and forth, leading to significant amplification.¹⁰ One of these mirrors is only partially reflective to allow the laser beam to escape from the cavity.¹⁰

CASE

A 60-year old woman presented to the clinic with complaint of pain in the upper right 6 and 7 along with mobility and bleeding. Medical history revealed her to be have controlled Diabetes. The patient had undergone dental procedures before including multiple root canal treatments, crowns and scaling. Clinical

examination revealed a fluctuant mass covering the upper right 6 and partially 7 as shown in figure 1.

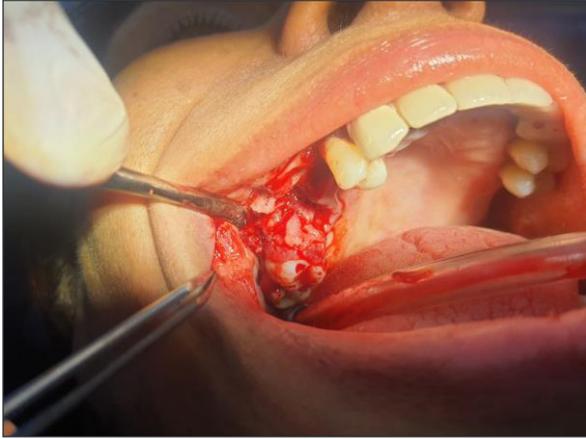


Figure 1: Fluctuant Mass Covering the Upper Right 6 And 7

The Right upper 6 was extracted. Curettage was done and soft tissue and fluctuant mass was removed using a scalpel and diode laser 980nm wavelength as shown in figure 2.

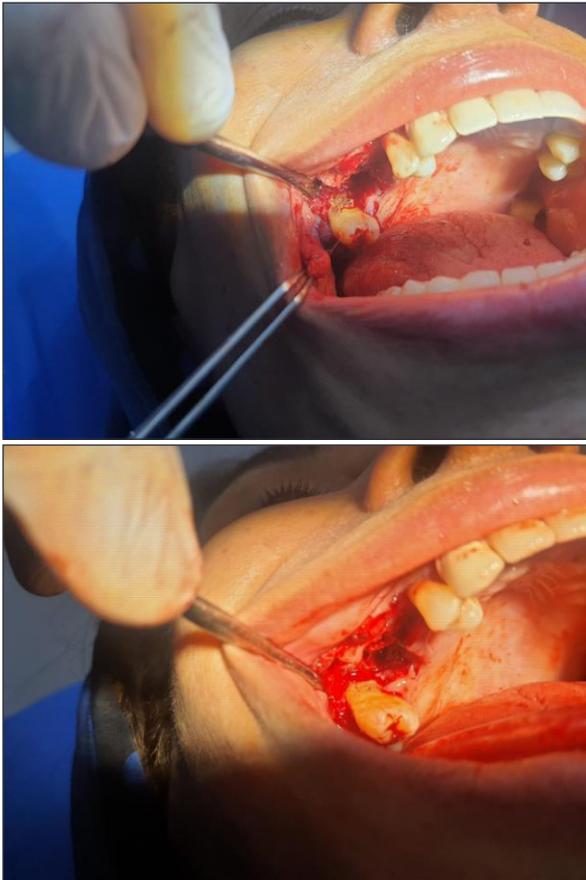


Figure 2: Removal of the Fluctuant Mass and Associated Tooth

Excavation was done using surgical curettes and 4.0x 10mm Oostem implant tissue level was placed at 50N as shown in figure 3.

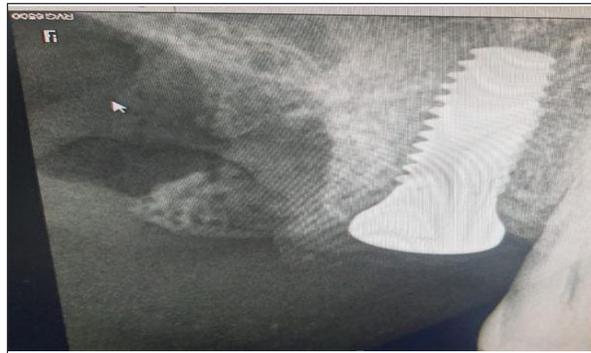


Figure 3: Implant Placement

Curettage of upper right 7 and 8 was done using Gracey curettes and ultrasonic scaler. Periodontal therapy pocket treatment was done using diode laser to initiate bio stimulation and reduce mobility. Bone augmentation was done using sure Oss biosynthetic bone and membrane was placed as scaffold. Allograft Bone SureOss (FDBA) FDBA (freeze-dried bone allograft) 100% allograft cortical bone was done as shown in figure 4

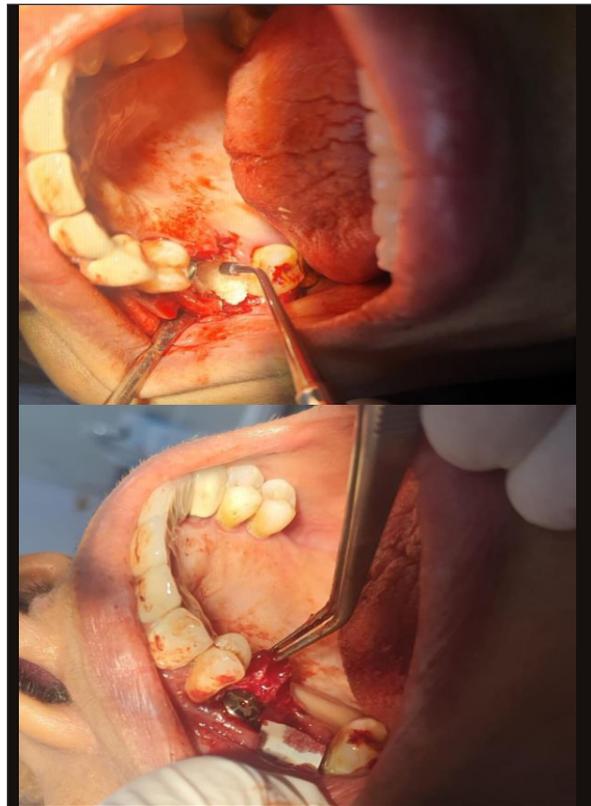


Figure 4: Bone Augmentation

Silk 02 stitches were placed and removed after 7 days as shown in figure 5.



Figure 5: Placement of Stitches

The patient was called for follow-up after 10 days and radiographic evaluation was done as shown in figure 6.



Figure 6: Post-Operative Radiograph

DISCUSSION

PBM works on the principles of Arndt Schultz law, which is the basic principle of Neurosomatic therapy. It states that weak stimulus excites physiological activity, a moderate stimulus favours it, and a strong stimulus arrests it.^{11,12} In order to achieve desired results a threshold for moderate to heavy stimuli should be calculated beyond which tissue damage may occur.¹³ Although the therapeutic window of these lasers is broad, it is essential to calculate the amount of dose (i.e., the energy density) required to achieve desired results before any therapeutic application.¹⁴ From a clinical point of view PBM offers dental practitioners a non-invasive treatment modality that can be used as an adjunct to the traditional therapies or as a therapeutic tool on its own.¹⁵ Scope of this technology includes dental analgesia, treatment of dentine hypersensitivity, healing of soft tissue lesions, reduction of pain and swelling after surgical procedures, better integration of

implants into bone and faster movement of teeth during orthodontic procedures.¹⁶

CONCLUSION

Photobiomodulation although an evolving technology has provided health practitioners with an opportunity to aid in patients wound healing, modulate the inflammatory response and regenerate nerves. It can be used effectively in dental specialties to better manage treatments that are often deemed painful by patients, without prescribing pharmaceuticals that often have a number of side effects. Apart from the health benefits that can be achieved by lasers. It is also highly acceptable among the patients, promising patient compliance required for the success of any treatment. In this the chronic inflammatory mass was excised with minimal invasion.

CONFLICT OF INTEREST: None

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