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CASE STUDY

LASER THERAPY AS AN ADJUNCT TO CONVENTIONAL PERIODONTAL THERAPY

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ABSTRACT

Laser stands for "Light Amplification by Stimulated Emission of Radiation". They are being used for various periodontal therapies. Low level lasers have wavelengths suitable for periodontal healing. Diode laser is an excellent soft tissue laser and it helps in significant bacterial reduction, removal of the inflammatory products while creating excellent hemostasis. A flexible fiber optic delivery system allows the clinician easy and safe access around the periodontal pocket. In this case report the effectiveness of diode laser as an adjunct to scaling and root planing (SRP) in the nonsurgical treatment of chronic periodontitis has been evaluated.

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INTRODUCTION

Periodontitis is an inflammatory disease caused due to mixed microbial flora present in the oral cavity. It is characterized by destruction of the supporting tissues of the tooth and consequent formation of periodontal pockets. (Crispino *et al*., 2015) The pathogenic bacterial plaque in the susceptible host triggers an immune response leading to inflammation and further advancement of the disease. The initial treatment to control periodontal disease includes elimination of bacterial deposits, primarily by thorough scaling, root planing and polishing alongwith dental plaque control performed by the patient. (Cobb *et al*., 2010) Sometimes conventional mechanical debridement leads to incomplete removal of bacterial toxins in certain areas due to tooth morphology. In such cases adjunctive treatment like local drug delivery, host modulation, laser therapy, photodynamic therapy etc are required to overcome the limitations of conventional therapy. (Plessas, 2014; Soliman *et al*., 2014) Laser is a device that converts electrical/chemical energy into light energy. This light energy can be absorbed by a target tissue and produces a thermal reaction in that tissue. (Cobb *et al*., 2010) Low-level lasers have wavelengths such that the absorption leads to photobiological events which are advantageous for periodontal healing. (The *et al*., 2005) Diode lasers have a wavelength of 810nm or 910-980nm which does not interact with dental hard tissues making it an excellent choice for treatment of periodontal soft tissues. It helps in significant bacterial reduction and removal of inflammatory products. (Cobb *et al*., 2010; Soliman *et al*., 2014)

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Case Report

A 40 year old male reported to the Department of Periodontology, Bharati Vidyapeeth Deemed University, Dental college and hospital, Pune with a chief complaint of bleeding and swollen gums since 5-6months. During examination periodontal pockets of more than 5mm were recorded. There was presence of generalized gingival bleeding on probing and suppuration in certain areas. Generalized gingival inflammation and clinical attachment loss was present. The case was diagnosed as generalized chronic periodontitis. Thorough scaling, root planing and polishing was undertaken and patient was given home care instructions for dental plaque control. Patient was recalled two weeks after the completion of Phase I therapy for evaluation. The inflammation had not subsided completely and residual pockets still existed. Therefore low-level laser therapy was planned as an adjunct to scaling and root planing, in the non-surgical periodontal treatment of chronic periodontitis for added benefits.

Procedure

- The low level laser therapy was undertaken during the two week follow up visit of the patient after thorough full mouth mechanical debridement.
- Topical anaesthetic agent was applied and laser bacterial reduction was undertaken using diode laser

[Biolase] after taking appropriate laser safety measures. Fig 3

- Each pocket was probed to reconfirm the depth and the probe was placed next to fibreoptic tip and the length was adjusted.
- The caliberation depth is kept 1mm shorter than the pocket depth. This measurement is important because the laser energy will penetrate through the tissue and the adjustment will minimize any interaction with the epithelial attachment. (Convissar, 2017)
- The laser tip was kept parallel to the long axis of the tooth and introduced in the periodontal pocket.
- The laser setting was arranged at low energy level of 1.5W and was moved with sweeping movement in each pocket for 20seconds.
- After completing the procedure, post operative instructions were given and patient was prescribed to take analgesic if required and asked to report after 1 week for follow up.

Fig.1. Pre-operative

Fig.2. Two weeks after Scaling and root planing

Fig. 3. Laser therapy

Fig. 4. Post-operative

Patient reported to the department after one week with no complaints of any pain or discomfort. Only visual clinical examination was done which revealed gingival and periodontal condition had improved without any visible clinical signs of inflammation. Reduction in pocket depth and gain in clinical attachment level was observed.

DISCUSSION

The aim of low level laser therapy as an adjunct to conventional non-surgical therapy is to reduce bacterial load, reduce inflammation and pocket depth, maintenance of or gain in clinical attachment level. Research and clinical case studies over the last 10 years indicate that this laser therapy improves the effectiveness of periodontal treatment. Low level lasers leads to photobiological events such as proliferation of fibroblasts (Suresh *et al*., 2015), increased cell metabolism, increased collagen synthesis, increased activity of leukocytes and release of growth factors. (Surendranath and Arjunkumar, 2017) These properties result in better treatment outcome. In the present case report we have used a diode laser. This laser does not interact with dental hard tissues therefore it is an excellent soft tissue surgical laser. Kreisler *et al* assessed the periodontal ligament cell attachment to the root surface treated with a 810 nm diode laser and concluded that the diode laser does not have any deleterious effect on the root surface. Diode laser radiation has greater absorption and less penetration especially in blood rich tissues. (Schwarz, 2016) Thus collateral damage with diode laser is less. Diode laser leads to thermo coagulation of blood vessels, which is responsible for its hemostatic effect. (Soliman *et al*., 2014) Laser energy has the potential to breach the protective mechanisms of biofilm. It causes lysis of cell wall of periodontal pathogens thus exhibiting bactericidal effect. (Schwarz, 2016) Diode laser normalizes cell function and promotes tissue healing by increasing the production of adenosine triphosphate and thus providing more energy that powers the cell. (Gupta *et al*., 2016; Goldstep and Freedman, 2011) Diode laser was well tolerated by patient and have provided promising

Conclusion

In the present study, an attempt was made to evaluate the adjunctive role of diode lasers on probing depths and level of clinical attachment. Positive clinical results have been obtained by using diode laser as an adjunct to conventional periodontal therapy in non-surgical treatment of chronic periodontitis. Although, further clinical and microbiological studies with a larger sample size are required to assess the role of lasers in such type of therapy.

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