



Effect of low level laser therapy in bone regeneration as an adjunctive for treatment of periimplantitis: A case report

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ABSTRACT

Introduction: Peri-implantitis involves inflammatory changes affecting the soft tissues surrounding the implant resulting in loss of the supporting bone surrounding the implant.

Thus the present case report aimed to describe the surgical treatment of peri-implantitis, with a regenerative approach along with low level laser therapy (LLLT) as an adjunctive.

Case Presentation: A 24 years female patient reported with falling off crown from implant placed in 16 region. Radiographic assessment revealed there was vertical bone loss around the implant. So, bone graft with membrane along with LLLT was done to sustain the implant. After 3 months there was uneventful healing and adequate bone fill was seen radiographically. **Conclusion:** It was concluded that after treatment it showed good clinical result for the long-term sustainability of the implant.

KEY WORDS: Peri-implantitis, inflammatory conditions, regenerative approach, implants, low level laser therapy

INTRODUCTION

The use of dental implants to provide support for missing tooth has broadened the treatment options for patients and clinicians equally. According to the research, 69 % of adults between the ages of 25 and 44 have lost at least one permanent tooth due to various reasons. As a result, the use of dental implants reveals that approximately 100,000-300,000 dental implants are placed each year.¹ The criteria for determining the success of dental implants includes the absence of mobility at the start of the prosthetic phase, the absence of radiolucency around the implant, the absence of peri-implantitis with suppuration, and

subjective patient complaints.² Although, peri-implant disease is not an uncommon condition in which plaque and its byproducts are the primary aetiology, as it has been in the past. Furthermore, certain risk factors/indicators like smoking or a history of periodontal disease have been strongly linked to the prevalence of periimplantitis.³

According to Esposito et al implant failure is linked to an immunological inflammatory host response, an intensive inflammatory process that inhibits osseointegration. Maxillary implant failures are three times higher than mandible implant failures, with early failure rates ranging from 15 to 21 %.⁴

Peri- implantitis, a pathological condition occurring in tissues around dental implants, characterized by inflammation in the peri- implant mucosa and progressive loss of supporting bone.⁵ The optimal treatment for dental implant failure should include the regeneration of the lost peri-implant tissues. In recent years the use of barrier membranes in guided bone regeneration (GBR) was introduced as a treatment method aimed at achieving bone regeneration. The Guided Tissue Regeneration (GTR) theory was proposed in the mid-1980s, according to which tissue regeneration is achieved when cells with the ability to repair the specific type of lost tissue are permitted to populate the defect during healing. On the basis of the GTR principle, the GBR therapy idea was created.⁶

Laser technology is progressing at a breakneck pace, and new lasers with a wide range of capabilities are now accessible for application in a variety of dental fields. Low level laser therapy (LLLT) or photobiomodulation (PBM) has become a common treatment option in many dentistry clinics, and it has been shown to help with wound healing and tissue regeneration.⁷ The use of low-level lasers is based on the direct application of light energy with biomodulatory properties to body cells. Photoacceptors (cytochrome C oxidase) absorb low-level laser irradiation and transport it into mitochondria to supply cell energy in the form of adenosine triphosphate (ATP). Increased cell activity occurs when ATP production is stimulated. Macrophages, fibroblasts, endothelial cells, mast cells, bradykinin, and nerve conduction speed are all affected by these alterations.⁸

Thus the aim of this case report is to restore the failing implant with bone graft and membrane along with LLLT as an adjunct in the treatment.

CASE PRESENTATION

A 24 years old female patient with good general health and no systemic conditions visited the Department of Periodontology, Manav Rachna Dental College with a complain of falling off crown 1 week back in relation to implant already placed in maxillary right first molar tooth region 4 years back. (FIG-1)

On examination, there was no clinical sign on soft tissue. A radiographic assessment was done to evaluate the periodontal condition and for the placement of implant. It was observed that there was vertical bone loss around the implant (FIG 2) and was diagnosed as peri-implant soft and hard tissue deficiencies (according to 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions), so it was decided to sustain the implant by using Bone Graft with Guided Tissue Regeneration (GTR)

membrane along with LLLT. To carry out the procedure a signed consent form was submitted by the patient and complete hemogram investigation was assessed. A full-thickness flap was raised under LA. On exposure it was observed that there was bone resorption present around the implant (3 threads were exposed) from buccal surface (FIG 3) but there was no sign of mobility. Using the plastic curettes, curettage was done to remove the granulation inflammatory tissue around the implant. After complete debridement, the defect was irrigated using a combination of normal saline and 10% povidone iodine.

PerioGlas® bone graft (FIG 4) (NovaBone Products, LLC, Florida, USA) was placed along with collagen GTR membrane (FIG 5) (Healiguide®, Advanced Biotech Products Pvt. Ltd., Chennai, India) to stabilize the graft that is being placed. To allow primary healing, non-resorbable silk sutures 3-0 (Mersilk®, Ethicon, Johnson and Johnson, India) were given for 7 days. Later on biomodulation was done using LLLT at 940 nm (Biolase Epic X), at 0.5 watt in non contact mode for 90 seconds on occlusal and buccal surfaces. The post operative instructions were given and antibiotic therapy consisting amoxicillin 500 mg thrice daily was administered for 5 days, along with chlorhexidine 0.2% mouth rinses, in order to prevent postsurgical secondary infections and was instructed not to brush in the operated area. After 7 days, sutures were removed and again LLLT was performed. Oral hygiene instructions were again reinforced. Postoperatively patient did not complain any kind of pain or swelling.

Recall was done after 3 month, where there was uneventful healing and adequate bone fill was seen in the intraoral periapical radiograph (FIG 6). Now, the patient was recalled for abutment placement followed by prosthetic placement of missing edentulous area.

DISCUSSION

The success of implant therapy has been reported with a favourable high survival rates ranging between 95% and 99%. However, implant failure and its consequences have also been reported.⁴

Meffert, classified unhealthy implant into ailing, failing and failed implants. The ailing implants were those without inflammatory signs or any kind of mobility and showing radiographic bone loss. On the other hand failing were those which showed progressive bone loss, inflammatory signs but no mobility while failed were considered to be the implants with progressive bone loss with clinical mobility and loss of function as well.⁴

According to a study conducted it stated that just after implants installation within two weeks there is presence of submucosal microbiota. This early colonization can contribute and be the reason to the development of peri-implant lesions.⁹ So some of the treatment options includes the mechanical debridement, antimicrobial therapy and GBR along the use of photobiomodulation as an adjunct for peri-implantitis.¹⁰

In a study by Dörtbudak and Haas, they concluded that irradiation with a pulsed diode soft laser has a biostimulating effect on osteoblasts *in vitro*, which might be used in osseointegration of dental implants. Also, Markovic *et al.* showed that the use of low-power laser can have a significant influence on the speed of healing bone defects.

Thus, this case concluded with a successful treatment of failing implant that was achieved by the surgical access of full-thickness flap, followed by degranulation and disinfecting around the implant surfaces using LLLT as an adjunct and stabilization of the defect with the help of bone grafting and membrane. Apart from every surgical modalities, routine monitoring of dental implants acts as the necessary part of this kind of treatment. Thus, making maintenance and evaluation of the periodontium mandatory. However, patient's oral hygiene and their motivation towards maintaining it may overcome all the peri implant complications after placement of the implants.

CONFLICTS OF INTEREST: NONE

SOURCE OF FUNDING: SELF FUNDING

FIGURES



FIG 1 PRE OPERATIVE



FIG 2 IOPA SHOWING BONE LOSS



FIG 3 AFTER EXPOSURE IMPLANT
THREAD VISIBLE



FIG 4 AFTER BONE GRAFT PLACEMENT



FIG 5 AFTER GTR MEMBRANE PLACEMENT



FIG 6 IOPA AFTER 3 MONTHS

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