Laser Assisted Periodontal Therapy: A Case Series

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Periodontitis is one of the commonly occurring disease. Various therapies have been used and suggested for its treatment which includes nonsurgical, antimicrobial, and surgical therapy. In the recent years, lasers have been used frequently for periodontal therapy. Lasers have been applied for debridement, reshaping as well as the reduction of bacterial load in the pocket. This case series represent the use of lasers for exposure of impacted teeth, second stage surgery for dental implant, and vestibuloplasty. The surgical procedure with a 810 nm diode laser has been described. The laser-assisted procedures provided excellent results without complications as well as high patient and clinician satisfaction.

Keywords: Laser, Periodontal Surgical Therapy, Second Stage Implant Surgery, Vestibuloplasty

INTRODUCTION

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. The physical principle of laser was developed from Einstein’s theories in the early 1900s, and the first device was introduced in 1960 by Maiman.¹ Since then, lasers have been used in many different areas in medicine and surgery. The concept of using dental lasers for periodontal therapy elicits very strong reactions from all aspects of the spectrum. Everyone has a varied opinion. Although numerous studies have been published in regard to lasers, the ambiguity still remains. In this regard, the only certainty is confusion. There is a definite lack of clear direction in the concept of Laser Assisted Periodontal Therapy (LAPT).²

The use of lasers has two main points to be pondered on, i.e. is it a hard tissue or soft tissue laser and secondly the procedure it is being utilized for. Certain lasers are used specifically for soft tissue treatment. These are the CO2, Nd: YAG, and diode lasers. Others can be used for both soft and hard tissue applications. These are the Er: YAG and Er, Cr: YSGG lasers. In the preview of periodontal therapy, soft tissue lasers have a greater use. Many of the soft tissue lasers have been shown to provide periodontal treatment benefits.³

In order to achieve clarity and simplicity on this complex topic, this article presents the case reports for its various uses in periodontal therapy including exposure of impacted teeth, second stage implant surgery and vestibuloplasty.⁴ Based on its various characteristics, such as ablation or vaporization, hemostasis, and sterilization effect, laser treatment may serve as an adjunct or alternative to mechanical, conventional, and surgical periodontal therapy.⁵

CASE REPORTS

The laser used for the procedures under mentioned a diode laser (Zolar photon plus laser) with a wavelength of 810-980 nm and maximum wattage of 10 watts.

Case 1

A male patient of age 20 years reported with the chief complaint of bleeding from gums in the lower front region of the mouth since past 8 months. On clinical examination, it was noted that the patient had inadequate vestibular depth in the mandibular anterior region of the mouth (Figure 1). Further ahead a treatment plan of phase one therapy followed by laser assisted vestibular deepening was decided. The surgical site was anesthetized using 2% Lignocaine. The laser settings of 1 watt and pulsed mode with interval of 50 ms were made. The laser was used in the contact mode till the desired vestibular depth was attained (Figure 2). Periodontal dressing was placed and post-operative instructions were given. The patient was re-evaluated postoperatively for 1 week and 1 month (Figure 3).

Case 2

A 50-year-old male patient was referred from Department of Prosthodontics for the second stage dental implant surgery.
The patient was evaluated clinically and radiographically. The site of dental implants was determined (Figure 4). The surgical site was adequately anesthetized using 2% Lignocaine. The laser settings of 1 watt and pulsed mode with interval of 50 ms were made. The laser was used in contact mode (Figure 5). The implant exposure was done until adequate diameter for the placement of gingival formers was available (Figure 6). The gingival formers were placed immediately.

Case 3
A 24-year-old female patient was referred from Department of Orthodontics for the exposure of impacted maxillary right canine (13). The patient was evaluated clinically and radiographically. After the evaluation of the CBCT for the tooth position, it was decided to expose the impacted tooth using lasers since it was a soft tissue impaction. The surgical site was adequately anesthetized using 2% Lignocaine. Transgingival probing was done to demarcate...
the tooth location (Figure 7). The laser settings of 1 watt and pulsed mode with interval of 50 ms were made. The laser was used in contact mode (Figure 8). The impacted tooth was exposed and the orthodontic tooth bracket was placed immediately (Figure 9). The post-operative instructions were given to the patient. The patient was re-evaluated after 1 week and 1 month.

DISCUSSION

This article presented the different uses of lasers in periodontal therapy. In the first presented case, a diode laser was used to deepen the vestibule. The post-operative healing was found to be better as compared to cases of vestibular deepening done with a scalpel. Furthermore, the level of patient comfort was much more intra-operatively and post-operatively. Therefore, where indicated, it is strongly recommended that the laser assisted vestibuloplasty should be carried out to assure the patients a better postoperative outcome. Various case reports presented like that by Amid et al.\(^6\) and Moghtader\(^7\) support the use of laser for vestibuloplasty and showed better post-operative healing.

The lasers have recently began to hold ground in the implant therapy. It is increasingly becoming popular as a mode for the second stage implant surgery and treatment of peri-implant mucositis. The second case described presented the second stage implant surgery carried out with diode laser. It was followed with immediate placement of gingival formers. It was therefore more time efficient procedure along with increased patient comfort postoperatively. Magid et al.\(^8\) and El-holey\(^9\) have supported the use of lasers for second stage implant surgery.

The third case described was the exposure of impacted tooth. The benefit of carrying out this procedure was the immediate placement of orthodontic tooth bracket, since a clean field with hemorrhage control could be achieved immediately. Furthermore, the increased postoperative comfort was an additional benefit. The lasers can definitely be used for exposure of impacted teeth, especially in cases of soft tissue impaction. This procedure also negates the extensive surgical procedure usually required for exposure of impacted teeth. Supporting the use of lasers in exposure of impacted teeth many workers like Frank\(^10\) and Meeran\(^11\) have stressed on the advantages of this procedure. Orthodontic patients treated with the diode laser required less infiltration anesthesia, had rapid postoperative hemostasis, reduced bleeding during and after surgery, elimination of suture placement and an improved postoperative comfort, and healing.

The better healing and increased post-operative comfort is similar to the findings in other studies\(^12\text{-}15\) where the laser was used for ablation of lesions, frenectomy, incisional and excisional biopsy, gingivoplasty, gingivectomy, coagulation of graft donor sites, operculectomy, and certain crown lengthening procedures. Studies by Antenucci\(^16\) concluded that the use of the laser in soft tissue management maximized the oral tissues health in a minimally invasive manner.
A treatment modality should be strictly evaluated in regard to the scientific evidence and critical review of the existing literature. Although the use of lasers for varied periodontal surgical procedures have been increasing among practitioners, the scientific standardized studies indicating positive clinical results of lasers are still lacking.

Further basic and clinical studies are necessary to elucidate the actual effects and effectiveness of lasers in comparison with conventional treatment, as well as negative side effects.

For safe use of lasers in a clinic, the practitioner should first have precise knowledge of the characteristics and effects of the various laser systems and their applications along with full understanding of the conventional treatment procedures. Furthermore, the clinician should exercise appropriate caution during their use. A reliable procedure for laser application in periodontal surgical therapy should be established by further studies, and clinicians should follow the results of scientific investigations to obtain successful outcomes. As understanding of the nature of laser light evolves, lasers will be used more effectively in the treatment of periodontal diseases.

CONCLUSION

Traditional surgery has the characteristics of a common need for incisions with scalpels, mechanical excision of the muscle attachment, placement of sutures, significant postoperative discomfort, and delayed healing. With the benefits and risks of alternative treatment modalities taken into account, minimally invasive LAPT seems to be very attractive technique.

REFERENCES