Application of LASER in Periodontology - A Case Series

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Abstract

Laser is one of the most captivating technologies in dental practice since its invention. Today, laser technology is influencing our life in many ways. Its advancements in the field of medicine and dentistry are playing a major role in patient care & wellbeing. Laser technology is at the core of wider area of photonics, essentially because laser light has many special properties. Lasers have various periodontal applications including calculus removal, soft tissue excision, incision and ablation, decontamination of root and implant surfaces, bio stimulation, bacteria reduction, and osseous surgery. They have the advantages of bactericidal and detoxification effects. Use of laser proved to be an effective tool to increase efficiency, specificity, ease, cost and comfort of the dental treatment.These case series presents a conservative and effective treatment approach by using diode laser. The following case of gingival cleft and bacterial decontamination performed using diode laser showed good healing after re-evaluation.

Keywords: *Diode Laser, Gingival Cleft, Gingivoplasty , Bacterial Decontamination*

1. INTRODUCTION

The term Gingival cleft refers to a fissure in the gingival tissues and is usually caused by traumatic oral hygiene,abnormal frenula, trauma from occlusion, orthodontic, or pierce related trauma which leads to gingival cleft formation. Gingival clefts are classified depending on the extent of gingival thickness into red and white. The “red” clefts are characterized with a partial gingival fissure and they may heal spontaneously after the change of the oral hygiene habits. Whereas, the “white” clefts affect the whole gingival thickness with a complete epithelization of the edges of the lesion and are considered as irreversible. The white lesions are divided into complete when entire keratinized mucosa is engaged and incomplete when an unaffected gingiva is observed apical to the cleft.[1]Analysis of gingival clefts indicate an apically-directed spread of an inflammatory exudate through the gingival connective tissues with concurrent epithelial resorptive and proliferative reactions with collagen resorption being mediated by an hydrolytic enzymatic activity.The recommended treatment approach for the incomplete clefts is the gingivectomy of the affected keratinized tissue.

A number of risk factors can influence the start, progression, and prognosis of periodontitis (age, sex, cigarette smoking, hormonal changes, immune system disorders, systemic diseases, diabetes, andstress). The main etiological factor is represented by dental plaque and in particular by anaerobic gram-negative bacilli. For that reason, the first phase of periodontal treatment is always represented by the initial preparation,which is a type of etiological and non-surgical therapy which recognizes the elimination or reduction of bacterial infection and the control of periodontal plaque-associated inflammation. We chose to use laser therapy to clinically verify its actual efficiency, According to literature it has been a better option for a long time in the treatment of periodontally compromised patients and to evaluate their satisfaction.[2]

2. CASE SERIES

Case 1- A 25 year young female patient reported to the department with asmall teeth in upper right front region and alsocomplains of cleft formation in previously extracted teeth for orthodontic treatment in upper right and left front tooth region.On intra-oral examination:- Blunt

interdental papilla was noticed in between 13,15 and 23,25.Patient was diagnosed as chronic generalized gingivitis. Treatment was planned as Scaling and root planning followed by use of 940nm diode laser for gingivoplasty wrt 13 and 15,23 and 25, and esthetic crown lengthening wrt 12 under local anesthesia.(fig 1a to 1h)

Fig. 1a Pre op

Fig. 1b Gingival margin is coronal

Fig. 1c Gingival cleft b/w 23&25

Fig. 1d Gingivoplasty using laser

Fig. 1e Immediate post-op after crown lengthening wrt 12

Fig. 1f Immediate post op aftergingivoplasty between 23

Fig. 1g Immediate post op

Fig. 1h Post op after 2months

Case 2-A 22 year youngmale patient reported to the department with chief complaint of food lodgement in upper right back tooth region since 2 months.On intraoral examination**:-**Periodontal pocket of about 5mm was noticed wrt 16,17. Patient was diagnosed as chronic generalized gingivitis with localized periodontitis wrt 16 and 17. Treatment was planned as scaling and root planing followed byuse of 940nm diode laser for bacterial decontamination wrt 16,17 under local anesthesia.(fig 2a to 2d)

Fig. 2a Pre op pocket depth of 5mm wrt 17

Fig. 2b IOPAR wrt 17

Fig. 2c Bacterial decontamination performed using laser wrt 17

Fig. 2d Post op pocket depth of 4mm wrt 17

3. DISCUSSION

The diode laser is a solid-state semiconductor laser that uses a combination of Gallium (Ga), Arsenide (Ar), Aluminium (Al) and Indium (In). It has a wavelength ranging from 810 to 980 nm. This energy level is absorbed by pigmentation in the soft tissues and makes the diode laser as an excellent hemostatic agent.[3]

Laser assisted crown lengthening has a major advantage over traditional scalpel method that is hemostasis. Clinical results for gingival resection using lasers match but do not exceed those for conventional techniques. The value of laser therapy rests in its appeal to patients who consider it asnovel a treatment. It remains to be seen whether novelty will shift to practicality.Diode lasers may offer an advantageous compromise between surgical efficacy and practicality. Additionally, coronal gingival re-growth is often an undesired sequela of traditional crown lengthening procedures as stated by Ernesto.[4]But, in present case series case 1 patient did not experience any postoperative discomfort and healing was better in both cases after undergoing laser therapy. Recession was not seen after 1 and 2 months respectively.The present study was in accordance to a study which clinically evaluated the effects of Aluminum Gallium Arsenate laser – 670nm in wound healing after gingivoplasty in 11 patients after post-surgical periods of 7, 15, 21,30, and 60 days follow-up have shown better healing.[5]The present study, after 2 months follow-up showed better healing without any pain/swelling after gingivoplasty between 13, 15 and 23, 25 which was in accordance to a study done by Carla damate analyzed the effects of diode laser irradiation on the healing of human oral mucosa after gingivoplasty with a diode laser when patients were followed for 7, 14, 21, and 60 days after surgery to check healing.[6]

In the present study, case 2 showed pocket depth of 5mm pre-operatively, which was reduced to 4mm after diode laser treatment. This was in accordance to a study done by Mehmet Saglam, where PD mean at baseline was 3.6±0.3 in the laser group and 3.5±0.5 in the control group. After SRP and laser treatment, these values

became 1.8±0.2 and 2.8±0.2 at 1 month, 1.7±0.2 and 2.7±0.2 at 3 months, and 1.7±0.2 and 2.7±0.2 at 6 months respectively.[7] The present case was also in accordance to Kamma, who showed that combining SRP with diode laser therapy produces better results than the laser therapy alone both in clinical (probing depth and clinical attachment level) and bacteriological terms (total bacterial count of periodontal pathogens).[8]This present study was also in agreement to a study which stated that diode laser can be routinely used with SRP in the treatment of periodontal pockets of patients with moderate-to-severe periodontitis.[9]

4. CONCLUSION

Gingival clefts were more commonly seen on the maxillary teeth and in the posterior region. Interferences in laterotrusion, mediotrusion or protrusion and also occlusal wear were observed in the teeth showing gingival clefts.From the present case series, it was concluded that esthetic crown lengthening, gingival clefts,and bacterial decontamination treated using diode laser has shown better clinical and esthetic outcomes when compared to conventional techniques.Further research is recommended to clarify the adjunctive benefits of the freegingival grafts in patients with gingival clefts.

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