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Case report: Using 1064 nm Diode Laser as an Adjunct in Nonsurgical Periodontal Therapy

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ABSTRACT

Periodontal diseases encompass a wide scope of chronic inflammation of gums, periodontal ligament and alveolar bone.

The golden standard for treating periodontitis is mechanical removal of supragingival and subgingival plaque and calculus with scaling and root planing (non-surgical therapy).[1]

To enhance treatment outcomes, several adjunctive therapies have been proposed. In this case, 1064 nm diode laser was used (Fotona SkyPulse Multi-4) for periodontal pockets degranulation, disinfection and fibrin clot stabilization.

Results show that adjunctive therapy with 1064 nm diode laser is favorable in periodontal therapy.

Key words: Periodontitis, Periodontal therapy, 1064 nm diode laser.

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I. INTRODUCTION

Sed Periodontal diseases encompass a wide scope of chronic inflammation of gums, periodontal ligament and alveolar bone. Periodontal disease begins with gingivitis. Gingivitis is localized inflammation of gingiva initiated by bacteria in dental plaque. If plaque-induced gingivitis is untreated it can progress to chronic periodontitis. Chronic periodontitis affects gingiva, bone and periodontal ligaments and creates the deep periodontal pockets that are a hallmark of the disease.[1]

The golden standard for treating periodontitis is professional removal of supragingival and subgingival plaque and calculus with scaling and root planning (non-surgical therapy).[1]

To enhance treatment outcomes, several adjunctive therapies have been proposed. One of them involves the use of dental lasers. Their effectiveness in eliminating periodontal pathogens and decreasing pocket depth is widely documented.

In this case, 1064 nm diode laser was used (Fotona SkyPulse Multi-4).

MATERIALS AND METHODS

A 57-year-old medically fit, non-smoking female presented with generalized gingival bleeding. Radiographic and clinical assessment with periodontal pockets probing revealed a stage III periodontitis. 22 of 156 probing sites were measured with depth ≥ 4 mm.

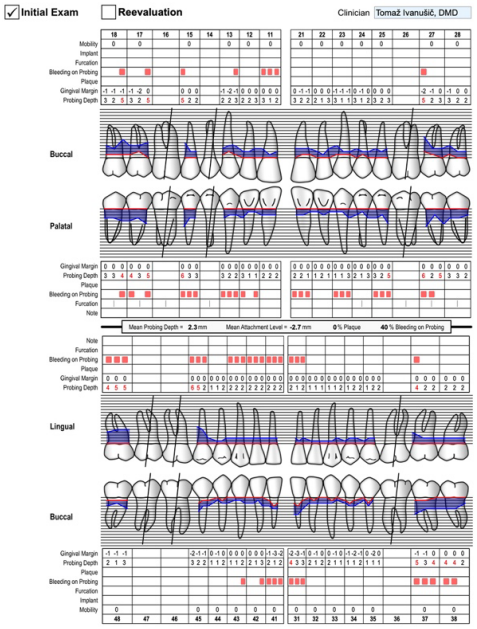

Figure 1: Periodontal chart of initial examination

Figure 2: Panoramic X-ray before treatment

Figure 3: Intraoral view before treatment

All details about the diagnosis and treatment were discussed with the patient and consent was obtained.

After administration of the local anesthetic agent, the ultrasound scaler (EMS, Piezon) was used for removal of supragingival plaque and calculus. Then a diode laser (Fotona SkyPulse Multi-4) with 1064 nm wavelength and 2 W of power in continuous wave mode was used for periodontal pockets sterilization and decontamination for 30 seconds per tooth. The R21-C3 handpiece with 320 µm fiber was used.

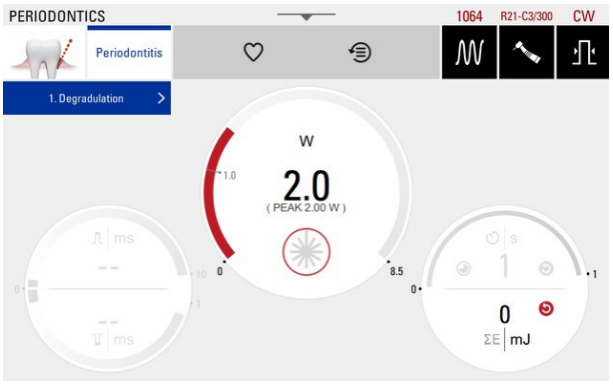

Figure 4: Settings used for periodontal pockets sterilization and decontamination

The next step was removal of subgingival plaque and calculus with ultrasound scaler and curettes (Hu-Friedy Everedge 2.0).

For final decontamination and stabilization of fibrin clot, the diode laser with 1064 nm wavelength, 4 W in continuous wave mode was applied again. The laser fiber tip was introduced into the periodontal pocket to a depth of 1 mm less than the value obtained through the probing procedure. The tip was held parallel to the long axis of the tooth, activated and kept in constant motion, scanning the pocket wall until a stable fibrin clot was achieved.

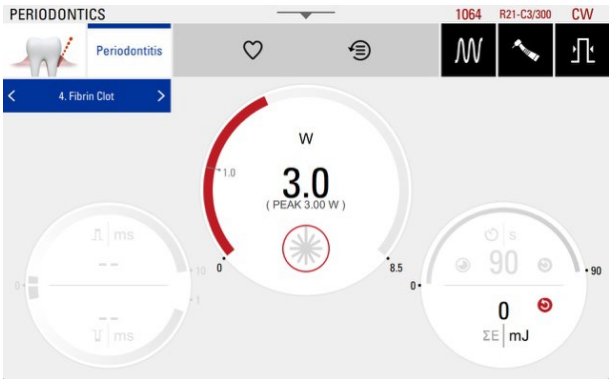

Figure 5: Settings used for final decontamination and stabilization of the fibrin clot

Tooth 47 was extracted due to deep caries.

At the end of the appointment, the patient was instructed on how to perform home hygiene.

After 3 months, periodontal probing was performed again.

II. RESULTS

The number of probing sites with depth ≥ 4 mm was reduced from 22 to 3. Bleeding on probing was reduced from 40% to 7%.

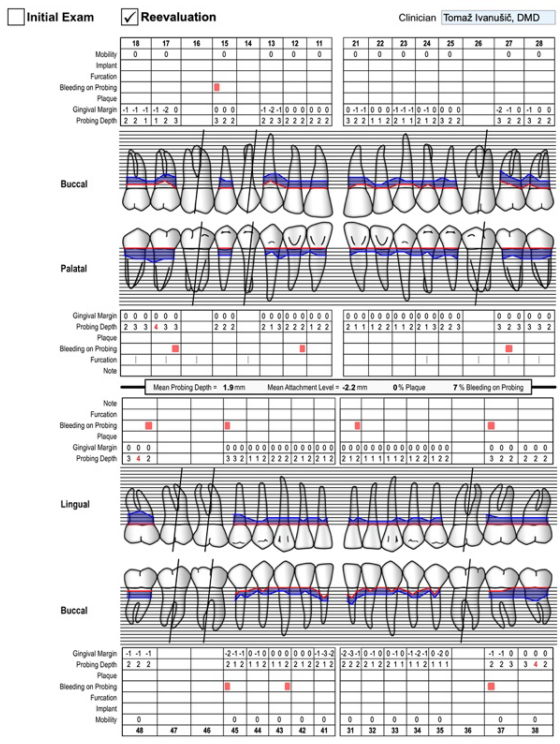

Figure 6: Reevaluation of the periodontal chart

Figure 7: Intraoral view 3 months after treatment

No adverse effects related to the laser irradiation were reported. Healing was uneventful and without complications.

III. DISCUSSION

All forms of plaque-induced gingivitis and periodontitis are treated with debridement, removal of risk factors, daily home care and professional prophylaxis at follow-ups.

The golden standard for treating periodontitis is professional removal of supragingival and subgingival plaque and calculus with scaling and root planing (non-surgical therapy).[1]

Many adjunctive therapies have been proposed and the use of lasers is one of them. Different lasers with different settings are used in the literature.

Soft-tissue lasers may be used for sulcular debridement, hemostasis and sterilization[2]. When used for various soft-tissue procedures, lasers can provide distinct advantages over traditional methods, such as easy ablation of small volumes of tissue, hemostasis (which, in turn, offers better visualization of the surgical field), sterilization of the incision or target surface area and less post-treatment tissue edema and swelling[2]. For many procedures, use of the laser can be considered a minimally invasive technique, resulting in less discomfort than traditional approaches[2]. Furthermore, lasers may have biostimulatory effects (i.e. photo-biomodulation), that are reported to result in better wound healing compared to traditional approaches, and in periodontal tissue regeneration[2]. Lastly, there is a developing body of evidence indicating that laser periodontal therapy may have the beneficial side-effect of reducing inflammatory mediators, such as interleukin-1b, interleukin-6, tumor necrosis factor-a and matrix metalloproteinase-8[2].

In this case, 1064 nm diode laser was used as an adjunct therapy and showed good results in improving periodontal indicators (reduction of pocket depths and bleeding from probing). The results were comparable to the results for Nd:YAG laser reported in the literature (probing pocket depth improvement by 0.34 - 1.27 mm).[3] Nd:YAG laser was used for comparison because it emits the same laser wavelength (1064 nm).[4]

IV. CONCLUSIONS

Adjunctive therapy with 1064 nm diode laser can enhance the success of periodontal therapy.

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REFERENCES

1. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. Nat Rev Dis Prim. 2017;3:1-14. doi:10.1038/nrdp.2017.38
2. Cobb CM. Lasers and the treatment of periodontitis: the essence and the noise. Periodontol 2000. 2017;75(1):205-295. doi:10.1111/prd.12137
3. Gómez C, Domínguez A, García-Kass AI, García-Nuñez JA. Adjunctive Nd:YAG laser application in chronic periodontitis: Clinical, immunological, and microbiological aspects. Lasers Med Sci. 2011;26(4):453-463. doi:10.1007/s10103-010-0795-8
4. Midda M. Lasers in periodontics. Periodontal Clin Investig. 1992;14(1):14-20. doi:10.4103/0975-7406.100245