

Effect of Diode Laser on Clinical Parameters in Aggressive Periodontitis Patients - A Pilot Study

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ABSTRACT

Introduction: The anti-inflammatory and antibacterial properties of laser are desirable assets which validates its use in the treatment of periodontitis. Hence the present study was planned and conducted to evaluate the efficacy of laser as adjunct to scaling and root planing.

Materials and Methods: Fifteen patients (8 males and 7 females) in the age group of 30-55 years diagnosed with aggressive periodontitis were selected for the study. Two teeth were selected in each patient that readily bleeds on probing on the initial visit. Of the selected 30 sites, 15 were test sites (group A) which was followed with diode laser (980 nm) after scaling and root planning and 15 were control sites (group B) which were only treated with scaling and root planning. Mean values were compared with Chi-square test. P value <0.05 was considered as the level of significance.

Results: In group A reduction in plaque scores was observed from 2.15 ± 0.53 to 0.94 ± 0.61 , gingival index reduction was observed from 2.25 ± 0.19 to 1.19 ± 0.50 , and probing pocket depth, reduction was observed from 4.34 ± 0.91 to 3.31 ± 0.61 after 30 days. In group B plaque scores from 2.08 ± 0.67 to 1.21 ± 0.56 , gingival index 2.89 ± 0.65 to 1.94 ± 0.36 and probing pocket depth from 4.28 ± 0.23 to 3.45 ± 0.55 after 30 days. Significant mean decrease was seen in both groups, however more reduction was seen in test group as compared to control group.

Conclusion: The diode laser used as an adjunct therapy to scaling and root planning helps in reduction of inflammation in the periodontal pockets and improves clinical parameters.

Keywords: Diode laser; Periodontal disease; Scaling and root planning

eration of cementum, periodontal ligament, and supporting alveolar bone, and significant decreases in subgingival pathogenic bacteria.³ Hence the present study was planned and conducted to evaluate the efficacy of laser as adjunct to scaling and root planing.

MATERIALS AND METHODS

Fifteen patients (8 males and 7 females) in the age group of 30-55 years, were selected randomly from the department of Periodontics who visited for the treatment of Aggressive periodontitis for the present randomised controlled study. After ethical approval from institutional ethical committee, a total of 30 sites were selected from fifteen patients. Two teeth were selected in each patient that readily bleeds on probing on the initial visit. Patients who have not undergone any form of periodontal surgical or non surgical periodontal therapy for the previous six months and were willing to take part in the study were selected after receiving informed consent for the study. Patients who were current smokers, had history of alcohol abuse, had systemic diseases such as diabetes, pregnant and nursing mothers were excluded from the study. Of the selected 30 sites, 15 were test sites (group A) which was followed with diode laser (980 nm) after scaling and root planning and 15 were control sites (group B) which were only treated with scaling and root planning. On the first day, patients were selected, target sites were identified and probing depth in target sites were measured. Prior to scaling and root planning at baseline, (day 1) the selected teeth with the site were subjected to assessment of gingival index, plaque index and probing pocket depth which was followed by full mouth scaling and root planning.

The hard tissue side of the pocket was first debrided with ultrasonic scalers and hand instruments. This was followed by laser bacterial reduction and coagulation of the soft tissue side of the pocket. The laser fiber was measured to a distance

INTRODUCTION

Periodontitis is a chronic inflammatory disease instigated by a bacterial infection. Thus, the bactericidal and detoxifying effects of laser treatment are advantageous in periodontal therapy. The effectiveness of this therapy involves suppressing certain bacteria associated with periodontal disease that cannot be treated readily with conventional scaling and root planing (SRP). As the bacteria is present on diseased root surfaces; as a result, it can invade the adjacent soft tissues as well, making removal by mechanical instrumentation difficult.¹ Recent research has proven that though bacteria are essential for periodontitis but most of the damage is done by inflammatory mediators and free radicals.² The anti-inflammatory and antibacterial properties of laser are desirable assets which validates its use in the treatment of periodontitis. The use of a dental laser in the treatment of Aggressive Periodontitis is based on the purported benefits of subgingival curettage, laser-induced new attachment through regen-

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Group	Plaque index		p-value	Gingival index		p-value	probing pocket depth		p-value
	Mean± Standard Deviation			Mean± Standard Deviation			Mean± Standard Deviation		
	Day 1	Day 30		Day 1	Day 30		Day 1	Day 30	
Test group (Group A)	2.15±0.53	0.94±0.61	0.01	2.25±0.19	1.19±0.50	0.04	4.34±0.91	3.31±0.61	0.00
Control group (Group B)	2.08±0.67	1.21±0.56	0.03	2.89±0.65	1.94±0.36	0.05	4.28±0.23	3.45±0.55	0.45

Table-1: Summary of clinical parameters

of one mm short of the depth of the pocket. Methylene blue was used as a photosensitizer. The fiber was used in light contact with a sweeping motion that covers the entire epithelial lining, starting from the base of the pocket and moving upward. Patients were recalled after 1 week again for the second application of laser to the test site. The patients were then appointed to attend the dental clinic on the 30th day and plaque index, gingival index and probing pocket depth were assessed in control and test groups. Mean and standard deviation were estimated from the sample for each study group. Mean values were compared with Chi-square test. P value <0.05 was considered as the level of significance.

RESULTS

Analyzing the clinical parameters of aggressive Periodontitis patients, plaque index showed significant reduction in plaque scores ($p < 0.05$). In group A reduction in plaque scores was observed from 2.15 ± 0.53 at baseline to 0.94 ± 0.61 at 30 days, and group B from 2.08 ± 0.67 at baseline to 1.21 ± 0.56 at 30 days. Gingival index in group A reduction was observed from 2.25 ± 0.19 at baseline to 1.19 ± 0.50 at 30 days, and group B from 2.89 ± 0.65 at baseline to 1.94 ± 0.36 at 30 days. Analyzing the probing pocket depth, in group A reduction was observed from 4.34 ± 0.91 at baseline to 3.31 ± 0.61 at 30 days and group B from 4.28 ± 0.23 at baseline to 3.45 ± 0.55 at 30 days. Significant mean decrease was seen in both groups, however more reduction was seen in test group as compare to control group (table 1).

DISCUSSION

The practice of periodontology involves a variety of treatment approaches of which scaling and root planing remain the gold standard. However the use of local adjunctive therapeutic agents along with scaling and root planing has shown positive results as compared to scaling and root planing alone.⁴

This study was carried out to assess the efficacy of diode laser 810 nm as an adjunct to scaling and root planing. All the 15 subjects with 30 test sites were followed for 30 days. The clinical parameters for assessing changes in periodontal tissue were evaluated and more significant improvement was seen in the test group as compare to control group from baseline to 30th day. Kamma JJ et al⁵ compared the effect of scaling and root planing alone, diode laser treatment alone and SRP combined with LAS in aggressive Periodontitis patients to evaluate clinical and microbial parameters and demonstrated that, diode laser-assisted treatment with SRP showed a superior effect over SRP or LAS alone for certain

microbial and clinical parameters in patients with aggressive periodontitis over the 6month monitoring period. Kusek ER et al¹ carried out a five-year retrospective study involving a diode dental laser used on periodontally infected teeth and reported that use of a diode laser 80% of the pockets treated using the diode laser were restored to a healthy pocket depth of 3 mm. Zare D et al⁶ evaluated diode laser (980 nm) effect on gingival inflammation and found more reduction in tooth mobility and probing depth which could be attributed to the removal of lining epithelium of periodontal pocket and improvement of connective tissue attachment.

Castro GL et al⁷ evaluated in vivo effects of scaling and root planing associated with 980-nm diode laser irradiation on periodontally diseased root surfaces and reported that associated therapy was suitable for non-surgical periodontal treatment and suggested that the diode laser may be routinely used as an adjunct to scaling and root planing without damage to the cementum tissue. Borrajo JL et al⁸ evaluated clinical efficacy of diode laser as adjunct to traditional scaling and root planning and found moderate clinical improvement over traditional treatment method.

Lasers in periodontal therapy have been demonstrated to be beneficial for control of bacteremia, better removal of the pocket epithelium in the pockets, bacteria reduction, efficient subgingival calculus and improvement of periodontal regeneration in animals and humans without damaging the surrounding bone and pulp.⁹

Laser biostimulation normalizes cell function and promotes healing and repair. Secondary effects include increased lymphatic flow, increased microcirculation, production of endorphins, increased collagen formation and stimulation of fibroblasts, osteoblasts and odontoblasts. This stimulates the immune response, pain relief and wound healing.¹⁰

CONCLUSION

The diode laser used as an adjunct therapy to scaling and root planing helps in reduction of inflammation in the periodontal pockets and improves clinical parameters. Pocket depths found to be reduced more in the laser group than in the control group. Thus, the diode laser therapy, in combination with scaling, supports healing of the periodontal pockets through eliminating bacteria.

REFERENCES

1. Kusek ER, Kusek AJ, Kusek AE. Five-year retrospective study of laser-assisted periodontal therapy. *General Dentistry*. 2012; e291-4.
2. Nayyar N, Dodwad, Arora K. Comparative evaluation of 1% Curcumin solution and 0.2% Chlorhexidine ir-

- rigation as an adjunct to scaling and root planing in management of chronic periodontitis: A clinico-microbiological study. *Journal of Pharmaceutical and Biomedical Sciences* 14:1-7.
3. Cobb CM. Lasers in Periodontics: A Review of the Literature. *J Periodontol.* 2006;77:545-64.
 4. Bonito AJ. Impact of local adjuncts to scaling and root planing in periodontal diseases therapy: a systemic review. *J Periodontol.* 2005;76:1227-36.
 5. Kamma JJ, Vasdekis VG, Romanos GE. The effect of diode laser (980 nm) treatment on aggressive periodontitis: Evaluation of microbial and clinical parameters. *Photomed Laser Surg.* 2009;27:11-9.
 6. Zare D, Haerian A, Molla R, Vaziri F. Evaluation of the Effects of Diode (980 Nm) Laser on Gingival Inflammation after Nonsurgical Periodontal Therapy. *Journal of Lasers in Medical Sciences.* 2014;5:27-31.
 7. Castro GL, Gallas M, Nunez IR, Borrajo JL, Varela LG. Histological evaluation of the use of diode laser as an adjunct to traditional periodontal treatment. *Photomed Laser Surg* 2006;24:64-8.
 8. Borrajo JL, Varela LG, Castro GL, Rodriguez-Nunez I, Torreira MG. Diode laser (980 nm) as adjunct to scaling and root planing. *Photomed Laser Surg.* 2004;22:509-12.
 9. Georgios R. Current concepts in the use of lasers in periodontal and implant dentistry. *Journal of Indian society of Periodontology.* 2015;19:90-4.
 10. Chung H, Dai T, Sharma SK, Huang Y-Y, Carroll JD, Hamblin MR. The Nuts and Bolts of Low-level Laser (Light) Therapy. *Annals of Biomedical Engineering.* 2012;40:516-533.

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