ORIGINAL RESEARCH

Excisional New Attachment Procedure Versus Laser-assisted New Attachment Procedure - A Split Mouth Study

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ABSTRACT

Background: About 47% of adult population above 30 years suffers from chronic periodontitis. Scaling and root planning (SRP) is crucial because it is causal, non-surgical therapy to control bacterial infection, and it always represents the first phase of periodontal treatment. Yet, another innovative causal therapy is represented by the irradiation of periodontal pockets with diode laser and excisional new attachment procedure (ENAP) as an adjunct to SRP in the treatment of chronic periodontitis.

Aim: The present study was done to compare and evaluate the clinical efficacy of diode laser as an adjunct to SRP versus ENAP in the treatment of chronic periodontitis.

Materials and Methods: A total of 10 patients with generalized moderate chronic periodontitis were selected. Following phase 1 therapy, pockets in one sextant were subjected randomly to ENAP and another was subjected to irradiation by diode laser. Cheese II medical diode laser was used and was operated at 980 nm wavelength with continuous wave mode at 2-watt setting.

Results: Data were analyzed by Student's *t*-test, with two tails; for all clinical parameters, both groups reported statistically significant differences compared to basal values ($P < 0.0001$). Both procedures were effective in improving GI, PD, and bleeding on probing, but the use of diode laser was associated with more evident results. No significant results were observed for PI between both the tests.

Conclusion: Considered the better clinical outcomes, diode laser can be routinely associated with SRP in the treatment of periodontal pockets of patients with moderate-to-severe periodontitis.

Keywords: Chronic periodontal disease, Diode laser, Excisional new attachment procedure, Root planning, Scaling.

How to cite this article: Gudakuwala A, Ansari W, Badaam H, Hegde R, Muglikar S, Sheikh S. Excisional New Attachment Procedure Versus Laser-assisted New Attachment Procedure - A Split Mouth Study. Int J Prev Clin Dent Res 2018;5(2):S6-10.

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Source of support: Nil

Conflict of interest: None

INTRODUCTION

Knowledge of the transition from health to disease and the progression of the disease through various stages of severity are important in the development of effective strategies for prevention and treatment.[1] The periodontal disease is a chronic inflammatory process, characterized by bacterial etiology and cyclic evolution, which determines a progressive, site-specific destruction of the supporting tissues of the tooth, and proceeds from the superficial periodontium (gum) to the deep periodontium (alveolar bone, periodontal ligament, and cementum), resulting in typical pathological lesions (periodontal pockets, gingival recessions, vertical and/or horizontal bone resorption, and bifurcation lesions) to the loss of the dental element.[2] Several treatment modalities are available to treat periodontal disease which can be broadly classified into either surgical or non-surgical approaches.[3] There is a need among patients and clinicians to treat periodontal ailment adequately with minimally invasive treatments.[4] Recent studies have concentrated on surgical treatment with minimally intrusive flap approaches.[5] Many patients and clinicians decline to utilize these successful regular surgical strategies because of apparent and genuine side effects, for example, as root exposure, gingival recession, and post-operative distress. This frequently prompts the determination of non-surgical treatments for the treatment of advanced periodontal ailments, bringing about deficient determination of the ailments.[6] Laser-assisted new attachment procedure (LANAP) therapy, having been at first presented over 16 years ago, is winding up more generally acknowledged among clinicians as extra research emerges.[7] An underlying histologic report gave confirmation of new connection to LANAP-treated teeth with new cementum and inserting Sharpey's fibers.[8] The present study was done to compare and evaluate the clinical efficacy of diode laser as an adjunct to scaling and root planning (SRP) versus excisional new attachment procedure (ENAP) in the treatment of chronic periodontitis.

MATERIALS AND METHODS

A total of 10 patients with generalized moderate chronic periodontitis were selected. Following phase 1 therapy, pockets in one sextant were subjected randomly to ENAP and another was subjected to irradiation by diode laser. Cheese II medical diode laser was used and was operated at 980 nm wavelength with continuous wave mode at 2-watt setting.

RESULTS

The biggest difference was found relatively to the average gingival index (GI). In the group of patients undergoing ENAP, clinical parameter decreased from the value of 1.9 to the value of 0.7, with a reduction of 44% as average, while in the group of subjects treated with LANAP, the average GI was turned from the value of 1.4–0.2, demonstrating a decrease of 80%; therefore, the addition of the laser therapy allows to reduce the average GI than double the SRP alone. Bleeding on probing and probing depths were reduced by a mean of 58% in the group of patients receiving ENAP, while in the group of patients undergoing laser therapy, BP and PD underwent a mean percentage decrease of 69% and 79%. Ultimately, the results of this study clearly show that both procedures are effective in improving periodontal indices (GI, BP, and PD) compared to basal values, but the association of the diode laser to the initial preparation allows to obtain clinical results more evident than the single procedure of SRP. Plaque index did not result in significant changes between both the procedures [Figures 1-12].

DISCUSSION

The remarkable difference between the two procedures in improving periodontal variables is attributable to the benefits from the use of LANAP in addition to the traditional procedures of SRP in the compared to ENAP for the treatment of chronic periodontitis. They are:

- Bactericidal effect;
- Curettage effect;
- Biostimulating effect.

Combining LANAP with conventional procedures is, in fact, achieved a more effective decontamination of the pocket, with also a recolonization slower than sites treated only mechanically;[9-12] some authors attribute this phenomenon to clot formation in the pocket that would act as a seal to it. According to Kreisler *et al.*,[13] the greatest reduction in the degree of tooth mobility and probing depth in the group of patients who underwent SRP + laser therapy can be mainly attributed not to the killing of bacteria in periodontal pockets, but rather to the complete removal of infected sulcular epithelium, which leads to greater attack of the connective tissue. Furthermore, the removal of granulation tissue infected promotes the healing of connective tissue with a decrease in probing depth, GI, and tooth mobility and a recovery of clinical attacks significantly higher compared to the initial preparation only;[13-16] these results, in addition

Figure 1: Pre-operative image (excisional new attachment procedure)

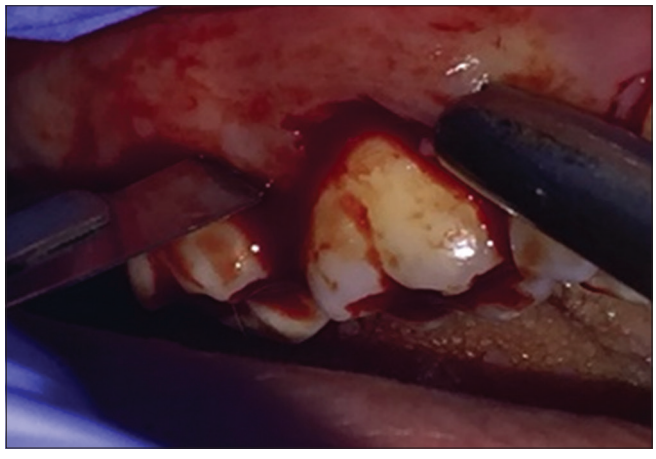

Figure 2: Excisional new attachment procedure performed with 15 no . Blade

Figure 3: Immediate postoperative photo after excisional new attachment procedure

Figure 4: Excisional new attachment procedure post-operative 30-day image

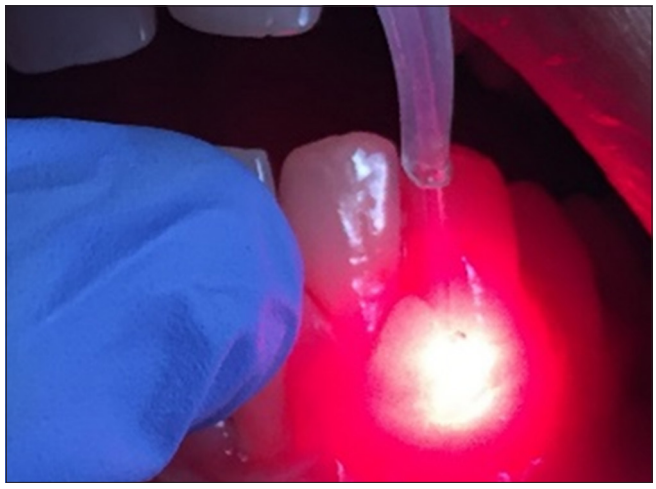

Figure 7: Diode laser tip while performing the procedure

Figure 5: Pre-operative laser-assisted new attachment procedure image

Figure 8: Laser-assisted new attachment procedure post-operative 30-day image

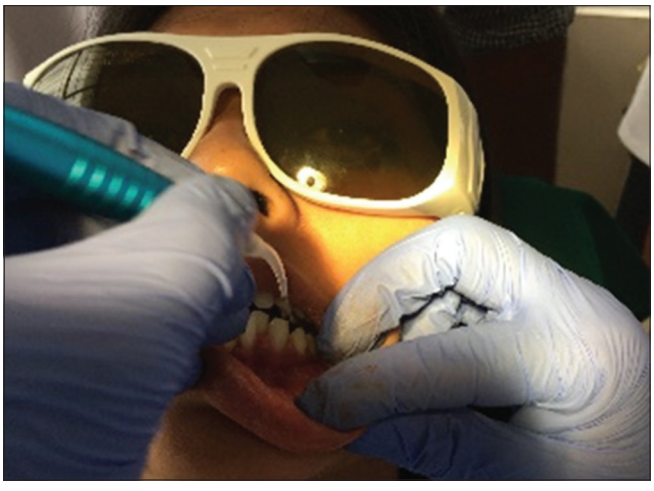

Figure 6: laser assisted new attachment procedure performed with diode laser

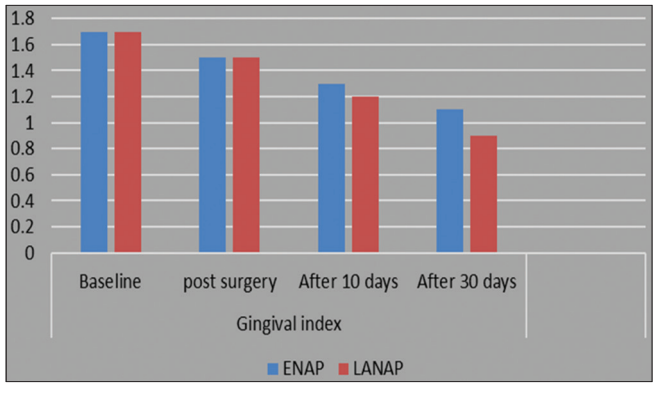

Figure 9: Gingival index

to being the best, are longer lasting and more stable over time.[17] Finally, due to the biostimulant effect,[18-21] laser therapy induces the acceleration of mitotic processes within the irradiated tissues, without causing structural and/or functional alterations. According to the studies of Benedicenti, the laser would stimulate mitochondrial activity, with a production of intracellular ATP >22% in irradiated cells compared to those not exposed to radiant energy, resulting in a halving of the times of cell duplication.[22] Conlan found an increase of about 50% of the proliferation and differentiation of fibroblasts and collagen synthesis within the periodontal ligament,[23] which process, according to Choi begins to manifest between the next 24 and 48 h to laser treatment,

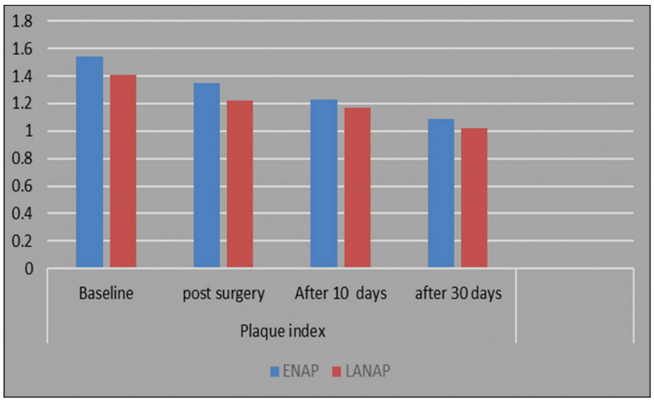

Figure 10: Plaque index

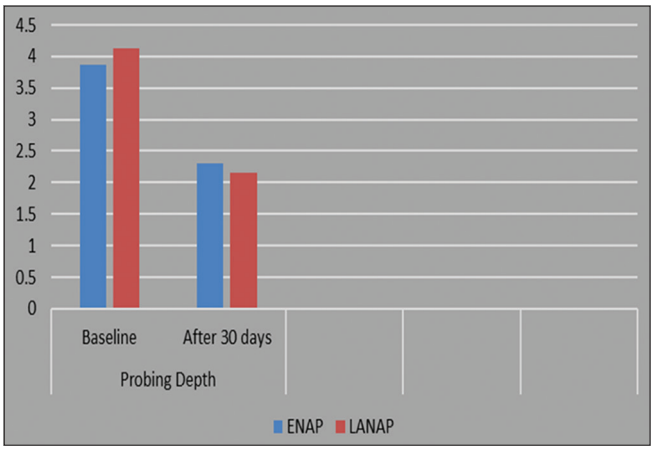

Figure 11: Probing depth

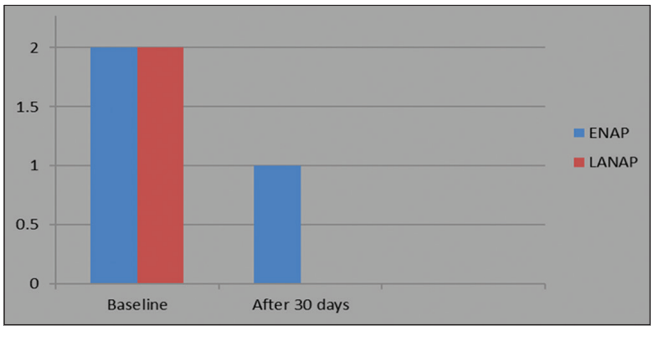

Figure 12: Bleeding on probing

and intensifies especially after the 72 h;[24] all these reactions accelerate the healing process and encourage a speedy recovery in clinical attachment. Regarding the tolerance and compliance of the patient, the laser therapy of periodontal pockets does not involve discomfort or intraoperative pain, nor requires, as a rule, the execution of locoregional anesthesia since the power values provided are relatively low (3W), and the energy is supplied in pulsed mode.[20]

CONCLUSION

LANAP was statistically better as compared to ENAP for reducing bleeding on probing, GI, and probing depth. However, there was no significant difference seen in plaque index in either case.

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