



Case Series

Comparative analysis of laser assisted periodontal pocket therapy with periodontal flap surgery in chronic periodontitis – A case series

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ABSTRACT

Periodontitis is the result of complicated interrelationships between infectious agents such as bacterium and host factors. The objective of periodontal surgery is to restore periodontal health and to prevent further relapse. Traditionally scalpels were used in periodontal surgery. Recent advancements in optical devices have set a milestone within the field of periodontal surgery. Two chronic periodontitis patients with generalized probing pocket depth of ≥ 5 mm and ≤ 7 mm after phase I therapy were selected. The selected segments were randomly divided into open flap debridement and diode laser assisted pocket therapy. Post-operative results based on clinical parameters and patient perspective were recorded. Clinically significant improvement in probing pocket depth and clinical attachment levels were determined in each treated sites. Patient acceptance and comfort were additional in laser treated sites compared to traditional surgical sites.

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1. Introduction

Periodontitis is a chronic inflammatory process that affects the protective and supportive tissues around the tooth characterised by bacterial plaque accumulation.¹ Pathogenic plaque micro-flora, host immune responses, and environmental factors play a major etiologic role and cause both direct as well as host-mediated tissue injury.² There's conjointly a considerable body of evidence indicating a significant relationship between periodontal disease and other diseases such as diabetes mellitus, cardiovascular diseases, osteoporosis and preterm low birth. Therefore, patients diagnosed with periodontitis may be at higher risk because of a compromised immune system, creating it necessary to diagnose and treat periodontal disease at the earliest.³

The ultimate goal of periodontal therapy is elimination or modification of the etiological factors and to enhance attachment gain.¹ A variety of treatment modalities have been used for periodontal therapy, e.g. scaling and root

planing, curettage surgical techniques like gingivectomy, flap procedures, bone grafting, materials and membranes have been clinically used with different success rates as presented in different papers.²

Conventional periodontal surgery, leads to reduced pocket depth, because of apical repositioning of gingival margin, also healing takes place by formation of a long junctional epithelium.² For periodontal new attachment, the presence of junctional and pocket epithelial tissue has been perceived as a barrier to successful therapy as its presence interferes with the direct apposition of connective tissue and cementum, thus limiting the peak to which periodontal fibers can insert to the cementum.³ In contrast to conventional procedures, ablating the periodontal pocket lining with laser retards the epithelial migration and promotes periodontal regeneration, referred as "laser assisted guided tissue regeneration".⁴

Various lasers, e.g., soft tissue lasers such as diode (810nm-980nm), Nd:YAG (1064nm), and hard and soft tissue laser such as CO₂ (9600-10600nm), Er:YAG (2940nm) and Er, Cr:YSGG (2780nm) have been proposed and are expected to serve as an alternative or an adjunctive

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treatment to conventional, mechanical periodontal therapy.⁵ Use of Nd:YAG laser for “laser assisted new attachment procedure” (LANAP) is highly popularised and has been recently approved by FDA in March 2016. However, Nd:YAG laser is an expensive laser and similar outcomes have also been reported in a study by Romanos G (2004) in which complete removal of periodontal pocket epithelium with diode laser (980nm) at a low power setting of 2-4W was achieved,⁶ also a study by Moritz A et al(1998) with diode laser revealed its bactericidal affect and reduction in pocket depth.⁷

Till date, diode laser has been used as an adjunctive therapy to scaling and root planing and open flap debridement procedure. Thus, the case series presented below illustrates the clinical effectiveness of diode laser assisted periodontal pocket therapy versus open flap debridement procedure.

2. Case Series

One male and one female patient of age around 35years who were diagnosed to have chronic periodontics were selected from the out-patient department of Periodontics and Oral Implantology, Santosh Dental College, Ghaziabad. The oral hygiene status of the patients were poor. There was generalized pocket probing depth of more than 8mm.

The patient’s family and medical history were found to be non-significant. Extra-oral examination revealed symmetrical face and convex profile.

After a brief case sheet recording, scaling and root planning (SRP) was carried out. Oral hygiene instructions were given. Post phase I therapy, she was advised mouth rinses with 0.12 chlorhexidine gluconate to reduce bacterial plaque and gingival inflammation. On re-evaluating the patient two weeks after SRP showed a drastic improvement in the clinical results. The probing pocket depth came down to 5-7mm.

The intensity of pain was measured using Visual Analogue Scale.⁸ The score was from 0-10 with 0 representing no pain and 10 representing extreme pain.

Routine hematological and radiological investigations were done. Conventional periodontal flap surgery was performed in the third quadrant under local infiltration of 2% lignocaine [Figure 2]. Interrupted silk sutures were placed. Fourth quadrant was treated with diode laser (980nm) without raising the flap as shown in [Figure 5]. No local anesthesia was given. Score 1 for the flap surgery site and score 0 for laser site was recorded according to visual analogue scale. Laser treated site presented minimal or no bleeding. 2 months and 4 months posttherapy, clinical parameters were evaluated. Four months post - operative probing pocket was around 3-4mm in both the treated sites.



Fig. 1: Preoperative pocket probing depth (3rd quadrant)



Fig. 2: Open flap debridement (3rd quadrant)



Fig. 3: Post-operative pocket probing depth (3rd quadrant)



Fig. 4: Preoperative pocket probing depth (4th quadrant)



Fig. 5: Diode laser assisted periodontal pocket therapy



Fig. 6: Post-operative pocket probing depth (4th quadrant)

3. Discussion

Recently, advancements in LASER, have shown a beneficial effect in the surgical field of periodontology. Romanos and Nentwig in their study suggested that laser assisted pocket therapy results in diminished or no postoperative swelling, bleeding, scar tissue formation or pain (lasers have a welding effect on nerve fibres), less time consuming, no need for sutures thus offering several advantages over conventional procedures.⁹ Similar findings were also noted in our case series. In addition, laser beam transmission through flexible optical fibers in the oral cavity provides ease of maneuverability.

In this case series we found a better operative and post-operative clinical finding in the laser assisted surgical site.

Adjunctive therapy with diode laser has shown a beneficial effect by eliminating the sulcular epithelium as well as reducing the bacterial load and imposes no interaction with dental hard tissues, as described by several authors.^{6,7} It also leads to thermocoagulation of blood vessels, which is accountable for its hemostatic effect.⁹ Also, 80% of the pockets were restored to a healthy pocket of 3 mm in a five year retrospective study by Kusek et al.¹⁰ Castro et al.¹¹ reported that 980-nm DL irradiation at 2 W and a pulse repetition rate of 100msec used adjunctively with SRP induced no detectable root surface alterations in a histological study. Contrary no significant benefits have been reported by use of diode laser in a study by Lobo and Pol et al.¹ Other clinical implications of diode lasers include bacterial elimination, pulpotomy, root canal disinfection, sulcular debridement, caries removal, aphthous ulcer treatment, analgesia, melanin pigment removal and treatment of dentine hypersensitivity.¹²

All the above discussed findings may suggest that the use of 980nm diode laser assisted periodontal pocket therapy significantly enhanced the treatment outcome. Also, more patient abidance was reported in laser treated sites.

4. Conclusion

Though we found appreciable patient comfort while using lasers, the post-operative results were almost same in both the surgical sites. However, further research is recommended with the larger sample size and longer follow up periods to analyse the maximum potential of lasers in non-surgical as well as surgical periodontal therapy.

5. Source of Funding

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6. Conflicts of Interest

None declared.

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