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Diode Laser-Assisted Flap Surgery Along With Laser Sealing of Cervical Dentinal Tubules - A Case Report

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Abstract

The main intent behind any of the periodontal therapies is to institute periodontal health and to regenerate periodontal apparatus which got destroyed by periodontal disease. Traditionally, conventional open flap surgery in conjunction with mechanical debridement has been shown to effectively achieve the desired goal to restore periodontal health and function. However, recent advancements in laser have set a milestone in the field of periodontal surgery. The objective is to compare and evaluate healing, probing pocket depth and clinical attachment level in conventional open flap debridement (C-OFD) with that of laser-assisted open flap debridement (LA-OFD) diode laser application. One patient with generalized chronic periodontitis was treated with C-OFD with respect to one quadrant in mandible whereas LA-OFD with respect to the contralateral side. The result thus obtained was LA-OFD yielded better clinical results in terms of healing when compared with the C-OFD. The patient also reported no post-operative discomfort on the site operated using the laser.

Keywords: Chronic Periodontitis, Periodontal Flap, Manual Debridement, Diode Laser.

Introduction

Chronic periodontitis is an infectious bacterial disease, characterized by loss of attachment and bone, leading to gingival recession and pocket formation which results in the loss of tooth in vulnerable individuals if left untreated.

The aetiology of the disease is multifactorial, which includes pathogenic plaque microflora to systemic factors and also host immune responses which result in direct or host-mediated tissue injury.[1]

A periodontal flap is defined as a section of gingiva and or mucosa surgically separated from the underlying tissues to provide visibility and access to the bone and root surface. The primary objective of the therapy is to obtain access for root instrumentation to remove bacterial biofilm and calculus accretion on the root surfaces thoroughly.[2]

Mechanical debridement being the "gold standard" of periodontal treatment, still does not eliminate the micro-organisms in the soft tissue wall of the pocket, neither is complete resection of the diseased tissues possible.[3]

In recent years, the use of laser radiation has been expected to serve as an adjunctive treatment to conventional, mechanical periodontal therapy with the following advantages: (a) haemostatic effects (b) absorption of laser energy increases adenosine triphosphate formation, which in turn stimulates cell function which enhances the wound healing (c) minimal postoperative bleeding and reduced dentinal hypersensitivity (d) initiates biostimulation (e) facilitates collagen synthesis. (f) the diode laser exhibits thermal effects using the "hot-tip" effect caused by heat accumulation at the end of the fiber and produces a relatively thick coagulation layer on the treated surface.[4]

The present case report aimed to compare and evaluate healing, probing pocket depth and clinical attachment level in conventional in C-OFD with that of LA-OFD.

Material and Method

A 30-year old female patient reported to the outpatient department of Periodontology, Subharti Dental College and Hospital, Meerut, Uttar Pradesh. She presented with a chief complaint of bleeding while toothbrushing and dentinal hypersensitivity. No attributable medical history was reported. On intraoral examination, generalized gingival inflammation and generalized probing pocket depth of more than 5mm with fair oral hygiene were noticed. After recording the clinical findings, the patient was then diagnosed with chronic periodontitis.

A written consent form was duly signed by the patient. The clinical parameters such as gingival index (Loe and Silness, 1963)[5], plaque index (Silness and Loe, 1964)[6], probing pocket depth (in mm) were measured by UNC-15 periodontal probe. The patient was subjected to phase I therapy comprising of full mouth scaling, root planing, and occlusal correction if required. Mobility and vitality were checked for the teeth. Oral hygiene instructions were given. After the initial phase 1 therapy, the results were found to be satisfactory, and pockets > 5mm present, patient was scheduled for surgery. The quadrant in which C-OFD was done, served as control, whereas the contralateral side served as a test where LA-OFD was done.

Surgical phase

After attaining adequate local anesthesia, C-OFD was done in one set of the mandibular quadrants. The procedure began with crevicular and interdental incisions with the help of scalpel blade no 12 (figure 1,2). A full-thickness mucoperiosteal flap was then reflected (figure 3) using a periosteal elevator and a meticulous manual debridement and root planing were done (figure 4,5,6).

For LA-OFD, crevicular and interdental incisions were given with the help of blade no 12 (figure 8) and a full-thickness mucoperiosteal flap was reflected. Mechanical debridement along with the laser assisted disinfection was done (figure 9), the inner surface of the flap was lased using a diode laser (wavelength 810 nm Sunny gold 6) with a power setting of 1.5 W in a continuous mode (figure 10). A 320-μm-diameter tip was used to lase the inner side of the flap from the free gingival margin to the

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bottom of the apical aspect of the flap (both labial and lingual/palatal).

The treatment was performed from the coronal to the apical aspect in parallel paths, and the laser emission was interrupted for 30 s after irradiation exceeded 10 s. The resultant charred layer was removed with moist gauze (figure 11,12). Measures were taken to avoid any laser contact to the root surface or the alveolar bone and aiming the laser (810 nm) beam at a 45°angulation to the soft-tissue flap. Interrupted figure of eight sutures were placed (figure 13) and no periodontal dressing was given to the patient.

After surgery prophylactic antibiotics were prescribed for 5 days. The patient was also instructed to rinse 3 times a day with 0.12% Chlorhexidine gluconate for the first postoperative month and was asked not to brush at the surgical site for the first 2 weeks, patient was recalled after 15 days for suture removal and then were followed up for three months.

Results and Discussion

The wound healing was assessed by evaluating clinical parameters at baseline, 1 month, and after 3 months were post probing depth, Clinical Attachment Level. A visual analogue scale was used to evaluate the pain perception by the patient in the test and control sites during the surgical procedure and 7 days postoperatively.

Good soft tissue was observed, and patient did not report any discomfort. Healing was found to be satisfactory in the test site.

Clinical findings	Laser assisted surgery (LA-OFD)	Conventional flap surgery (C-OFD)
Probing Pocket Depth		
Baseline	6	6
1 month	3	2
3 months	2	2
Clinical Attachment Level		
Baseline	7	6
1 month	7	5
3 months	6	5
Postoperative Pain	Nil	Mild
Healing	Fast	Slow

Periodontal therapy is directed at disease prevention, slowing or arresting disease progression, regeneration of lost periodontal tissues, and maintaining the achieved therapeutic objectives. Successful periodontal therapy mainly depends on anti-infective procedures aimed at suppressing pathogenic organisms found in dental plaque associated with the tooth surface. Nonsurgical mechanical therapy alone may not effectively eliminate the periodontal disease, particularly in deep pockets. Hence, surgical therapy is performed, which provides improved visualization of the root surface and defects.

In recent years, the use of laser therapy has been investigated as an adjunctive tool to conventional, mechanical procedures commonly employed in the treatment of periodontal disease.[7]

In recent times, the diode laser has gained a lot of popularity for the surgical treatment of periodontal disease and is considered to be an excellent soft tissue laser with the following advantages:(a) The radiation of a diode laser

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shows a greater absorption and a smaller penetration depth, especially in blood-rich tissues. (b) The wavelength of the diode laser is considerably more absorbed due to haemoglobin when compared with the Nd: YAG laser. This causes not only a better incision performance but also excellent coagulation of tissue.[8]

Fig. 1: Pre-operative View

Fig.2: Crevicular incision Given

Fig. 3: Mucoperiosteal flap elevated

Fig.4: Debridement done

Fig.5: Sutures Given

Fig. 6 : 3 month postoperative

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Fig. 7: Probing pocket depth by using UNC- 15 probe #36

Fig. 8: Crevicular Incision given

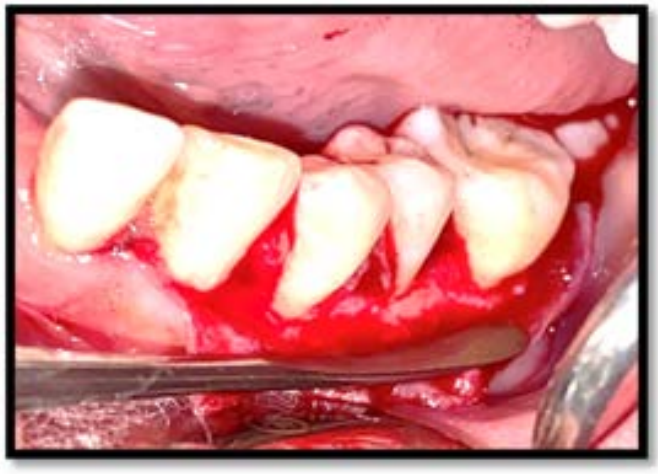

Fig. 9: Mucoperiosteal flap elevated

Fig.10: Diode Laser

Fig. 11: Debridement done along with laser assisted disinfection.

Fig.12: Formation of charred layer

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Fig.13: Sutures Given

Fig.14: 3 Months follow up

Conclusion

The present case report evaluated the use of diode laser in open flap debridement as compared to conventional surgery.

1. It was concluded that Laser-assisted flap surgery yields better clinical results in terms of healing and patient's pain perception when compared with the conventional flap. The diode laser treated sites also had significantly less postoperative tissue oedema as compared to the control sites thus demonstrating a better wound healing following the use of laser.

References

1. Caton JG, Armitage G, Berglundh T, Chapple IL, Jepsen S, Kornman KS, et al. A new classification scheme for periodontal and peri-implant diseases and conditions–Introduction and key changes from the 1999 classification. J Clin Periodontol 2018;45:1-8.
2. Newman MG, Takei H, Klokkevold PR, Carranza FA. Newman and Carranza's Clinical Periodontology E-Book. Elsevier Health Sciences; 2018.
3. Cobb CM. Non-surgical pocket therapy:Mechanical. Annals of Periodontology 1996;1:443-490.
4. Sharma H, Kaushik M, Tomar N, Wadhawan A, Dureja D. Treatment of gingival melanin hyperpigmentation with diode laser: A report of two cases. International Journal of Orofacial Research 2018;3:14.
5. Loe H, Silness J. Periodontal disease in pregnancy. I. Prevalence and severity. Acta Odontol Scand 1963;21:533-551.
6. Silness J, Loe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand 1964;22:121-135.
7. Jonnalagadda BD, Gottumukkala SN, Dwarakanath CD, Koneru S. Effect of diode laser-assisted flap surgery on postoperative healing and clinical parameters: a randomized controlled clinical trial. Contemporary clinical dentistry 2018;9:202-205.
8. Umana M, Heysselaer D, Tielemans M, Compere P, Zeinoun T, Nammour S. Dentinal tubules sealing by means of diode lasers (810 and 980 nm): a preliminary in vitro study. Photomedicine and laser surgery 2013;31:307-314.

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