Review Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2018;7:3:47-52.

Laser Assisted New Attachment Procedure: A no cut-no sew, trauma free replacement for periodontal surgeries

Sachin Sinha[1] Ritesh Khosla[2*]

[1]Reader, Department of Periodontology and Oral Implantology, Awadh Dental College, Jamshedpur, India.
[2]Private Consultant, Department of Periodontology and Oral Implantology, Panta, India.

ABSTRACT

Background: Whenever patients are told that they have to go under a surgery first few things no matter how minor thoughts that comes into their minds are it will be pain full, causes bleeding, delayed recovery, will be time consuming and these facts can't even be denied but with LASER ASSISTED NEW ATTACHMENT PROCEDURE all these problems can be overcome as this is another step into the future of periodontal health preservation. This procedure provide all the desired results with no of the drawbacks of the conventional methods of flap surgeries. Thus this paper of mine focuses on the LANAP procedure and its technique which is the all new dimension in the field of periodontal surgeries proving pathological termination without trauma or blood loss.

Keywords: LANAP, Trauma, Laser.

INTRODUCTION

Although extremely difficult to quantify, it is widely accepted that 70% to 80% of Indians have some form of periodontal disease, and as much as 50% of these may be characterized as moderate to severe periodontitis. From the foregoing, it may be inferred that individuals with periodontal disease are not seeking or receiving adequate periodontal care.

The primary goal of periodontal therapy is to control periodontal infection by the removal of supragingival and subgingival biofilms and smear layer, which contains bacteria, bacterial endotoxins and contaminated root cementum. Removal of these pathologic substances ensures biologic compatibility between the diseased periodontal radicular surface and new connective tissue attachment (CTA).

In the context of subgingival curettage, one of the major aims is to achieve the absence of germs or a reduction of the germ count in the subgingival region. The level of periodontopathogenic germs (marker germs: primarily Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, etc.) must be reduced to a level below the critical mass. Based on experience relating to the possibility of reducing germ levels by laser, it particularly lends itself of application as a supportive measure in periodontology.

Traditional approaches like non-surgical and surgical periodontal methods using both hand instruments and ultrasonic scalers have been carried out for several years with great success but still the statistics shows other-wise why? The answer may be attributed to the general perception that periodontal treatment, especially surgical, is invasive, often with unpredictable and undesirable outcomes and onerous, long-term adverse effects. In addition, surgical intervention is thought to be time consuming, costly, and painful.

Additionally, the theory behind conventional pocket elimination was to produce an environment that promoted ongoing disease control by facilitating personal oral hygiene. At its best, raditional pocket

Received: Jan. 3, 2018: **Accepted**: Feb. 19, 2018
*Correspondence Dr. Ritesh Khosla.
Department of Periodontology and Oral Implantology, Panta, India.
Email: drritesh3579@gmail.com

pISSN 2278-0076
eISSN 2321-9270

surgery often falls short of achieving these goals and objectives .

In the 1970s, Dr.D.WalterCohen (paraphrased) prophesized that, "In the future, the management of periodontal disease will focus on plastic and reconstructive procedures, 'additive' rather than resective 'take away' procedures."Laser-assisted new attachment procedure (LANAP) introduced by Dr. Robert Gregg and Delwin McCarthy in 1989 is the tool which makes Dr.Cohen's prophecy become true to its every word, giving reconstructive procedures an upper hand over respective onces.

The indications for LANAP are the same as for standard periodontal therapy that includes periodontal pocket depth (PD) ≥4 mm, radiographic evidence of bone loss, and positive laboratory test for presence of putative periodontal pathogens.

THE POTENTIAL FOR REGENERATION IS FACILITATED BY

1) delivering intense, precise, and selective energy to the affected area (periodontal pocket), without damage to adjacent tissues

2) being bactericidal to pigmented periodontal pathogens

3) sealing the pocket orifice with a "thermal fibrin clot".

4) creating a physical barrier (such as a barrier membrane), preventing down growth of epithelium.

5) promoting healing from the bottom up rather than the top down by stimulating the release of pluripotential cells from the PDL and alveolar bone.

LANAP PROTOCOL

During the 1990s, Dr. Delwin McCarthy and Dr. Robert Gregg began doing research on the use of a laser for the treatment of periodontal disease.

In 1998, they published findings on periodontal bone regeneration. In 2004, the U.S. Food and Drug Administration cleared the LANAP protocol for the treatment of periodontal disease.

Later, in 2007, in conjunction with their work, histological proof of not only bone generation, but new cementum mediated connective tissue attachment was published by Dr. Raymond Yukna, DMD, MS (University of Colorado, formerly at Louisiana State University).

The LANAP protocol is a patient-friendly, laser periodontitis surgery with consistent, reproducible and positive results.

Step A

Patients undergo a full dental examination and treatment plan as with all dentistry. If they have an appropriate diagnosis of Type III or greater periodontal disease, all treatment options are presented to the patient. The initial step of the LANAP protocol, after anesthesia has been administered, is bone sounding around each tooth. The objective is to determine areas of osseous defects that cannot be seen radiographically.

Step B

This is the first time the laser is used. The objective of this step is to remove only diseased epithelium, to selectively affect bacteria associated with periodontal disease, to affect the calculus present, and to affect thermo labile toxins. The bacteria that are associated with periodontal diseases are pigmented and are found in the sulcus, within the root surface and within the epithelial cells. One of the reasons for the predictability of this step is in the selection of a free-running pulsed Nd:YAG laser with a wavelength of 1,064 nm and pulsed in a range of seven different microseconds. The shorter 1,064 nm wavelength was selected for its affinity for melanin or dark pigmentation, unlike the longer wavelengths that are highly absorbed in water and would have a shallow depth of penetration. This ability to increase the depth of penetration of the laser energy with minimal collateral damage is the reason that the diseased epithelium can be selectively removed without damage to the underlying tissue, leaving intact rete pegs. The diode lasers are also known for this selective absorption in pigmented tissues, but the free running pulsed Nd:YAG lasers differ in their. Ability to operate at very high peak powers in very short time-frames, which allows the Nd:YAG to have the greater depth of penetration and the lack of collateral damage.

Due to the bacteria-reducing and concrement-loosening properties of some lasers (e.g. Nd:YAG laser, diode laser), it makes sense to carry out laser therapy of the periodontal pockets before conventional treatment by scaling and root planing. This facilitates conventional curettage and minimises the risk of bacteraemia, especially in risk patients (Pinero-J[i], 2000). This pretreatment is described, for example, in laser-assisted periodontal treatment according to the Aachen Concept (Gutknecht[ii] 1999).

Step C

This step in the LANAP protocol is straight forward; it is just a matter of using the piezo-scalers to remove the calculus present on the root surfaces. The removal of calculus is believed to be easier after the interaction of the laser energy with the calculus. The first interaction of the laser results in the initial formation of a mini-flap, thereby further assisting in the removal of calculus because of increased visibility and access to the calculus.

Step D

The next step again utilizes the laser. This time the parameters are varied to enhance the ability to form a fibrin clot to close the mini-flap and to disinfect the site again. The formation of the stable fibrin clot is significant, as it is stable for approximately 14 days. The role of the fibrin clot is to keep the sulcus sealed against bacterial infiltration

Fig 1: PerioLase MVP-7 Laser used for LANAP. Source:

http://www.meaningfulusenetwork.com/dental-lasers-incorporate-android-based-technology/

and to prevent the growth of epithelium down into the sulcus. Other laser wavelengths not only lack the ability to form this stable fibrin clot, but also require repeated treatments to prevent epithelium growth down into the sulcus. The ability to select the laser–tissue interaction specifically is unique to the PerioLase MVP-7.Through the use of specific fiber sizes, energy, repetition rates, pulse durations and standardization of the energy at the fiber tip, this protocol can be followed in a predictable and reproducible manner.

Step E

The fifth step in LANAP is the compression of the fibrin clot to enhance the healing process. Because laser wounds heal by secondary intention, closer approximation enhances the healing time.

Step F

Following the compression and stabilization of the clot, the last step of LANAP is refining the occlusion. Occlusion has been considered a greater cofactor in the progression of periodontal disease than smoking.

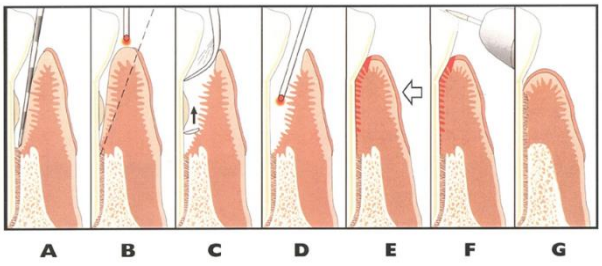

Fig 2: THE LANAP PROCEDURE. Source.

Due to the optical fibre and the action spectrum, the Nd:YAG laser and the diode laser are prime candidates for use as adjuvant lasers in closed curettage. Several studies recommend a setting of 1.25 W to 3 W, in order to avoid the risk of irreversible damage resulting from the blind guidance of the beam in the gingival pockets (Tsuda und Matsumoto[ii], 1992; White et al.[iii] 1991). Under these conditions, there are also reports of the possibility of the routine use of a pulsed Nd:YAG laser in pocket therapy without any disadvantages

(Myers[iv], 1989; Myers[v], 1991; White et al.28, 1991; Antenucci [vi], 2000), as neither destructive effects on adjacent tissue (Gold und Vilardi [vii], 1992) and dental pulp (White et al.[viii], 1992) nor gingival traumata (Midda[ix], 1990) can be demonstrated. Luomanen et al.4 (1992) and Luomanen et al.[x] (1994) examined the proliferative activity of the epithelial cells and the fibroblasts in laser wounds and found that it was not reduced.

PATIENT ACCEPTANCE OF LANAP PROCEDURE:

• Minimal discomfort post operatively, shrinkage of swollen puffy gums and reduction in bleeding.

• After procedure patient notices healthier tissue.

• No Cut No Sew: no trauma or no injury to the tissue

• No post operative recession

• No sensitivity and longer appearing teeth.

Fig 3: Ideal setting for LANAP with FRP Nd:YAG Laser: 2W(20Hz,100mJ), 90-150microsec pulse duration, 300-400micrometer fiber diameter, 3-4times with a gap of 5-7days, 25-50sec in each pocket.

Results Obtained Using Lasers Of Different Wavelengths

Fig 4: Dr. Murray Rabalais using a Nd:YAG Lase of wavelength 1060nm treated osseous defect distal to 18: measuring 8mm on the disto-facial aspect and 5 mm on the disto-lingual aspect. LANAP was chosen as a mode of treatment for the paticular condition and a 15 month post-operative radiograph shows excellent result with reduction in probing depth to normal limits.

Fig 5: A recovery of all the lost bone can be observed here on the distal aspect of 18 after the procedure.

Fig 6: Bone loss on the labial and interdental aspect of mandibular molar tooth.

Fig 7: A recovery of the lost bone can be observed here on the labial and interdental aspect after 18 months after the procedure.

CONCLUSION

LANAP is a well-defined treatment protocol, with human histologic validation and evidence of initial and long-term success. Properly applying the laser has been shown to produce less bleeding, swelling, and discomfort. The Nd:YAG laser appears to address the cause of periodontal disease rather than the effects by specifically targeting identifiable by which dentists measure treatment effectiveness which have been historically associated periodontal pathogens.

Within the limits of the present study, the results indicate that LANAP protocol allows clinicians to achieve predictable, positive results – including the three-dimensional regeneration of bone. It would be reasonable to expect to see LANAP become the conventional manner or the standard for the treatment of periodontal disease. It is a very simple but eloquent protocol.

Following his steps and protocols, used a Diode laser of wavelength 980nm in a defect of 46 & obtained the following results:

The tooth showed pockets of 6mm on distal aspect and 4mm on the mesial aspect and around 10mm pocket on the buccal aspect along with furcation involvement.

After the treatment the crater like defect seen around the tooth was transformed to defect confined to furcation area and showed remarkable growth of bone on the mesial and distal aspect of the tooth. Pocket depth were reduced to 2mm and 3mm on mesial n distal aspect respectively were as the buccal pocket came down to 6mm which can now be restored using different regenerative techniques.

REFERENCES

1. Cobb CM, Low SB, Coluzzi DJ. Laser and the treatment of chronic periodontics. Dent Clin North Am 2010;54:35-53.

2. Schwartz F, Aoki A,Sculen A,Becker J. The impact of laser application on periodontal and peri implant wound healing. Periodontology 2000 2009;51:79-108.

3. Rader M, MacFarlane TW,MacKenzie, D,Whitters CJ,Payne AP,Kinane DF. An evaluation of the Nd:YAG laser in periodontal pocket therapy .Br Dent J 1996;180:57-62.

4. Gold SI, Vilardi MA. Pulsed laser beam effect on gingiva. J Clin Periodontal 1994; 21: 391-6.

5. Niemz, Markoff H. Laser-Tissue Interaction, Fundamentals and Application, 3ed.New York.Springer, 2007:65.

6. Miazaki A, Yamaguchi T, Nishikata J, et al. Effects of Nd.YAG and CO2 laser treatment and ultrasonic scaling on periodontal pockets of chronic periodontitis patients. J Periodontol 2003; 74: 175-80.

7. Gregg RH, McCarthy DK. Laser ENAP for periodontal ligament regeneration. Dent Today 1998; 17(11):86-9.

8. Gregg RH, McCarthy DK. Laser ENAP for periodontal bone regeneration. Dent today 1998; 17(5):88-91.

9. Yukna RA, Mellonig JT. Histologic 270 Vol- I, Issue - 3, Sep - Dec 2014

10. The LANAP Protocol (laser-assisted new attachment procedure) - A Minimally Invasive Bladeless Procedure.evaluation of periodontal healing in humansFollowing regenerative therapy with enamelmatrix derivative .A 10 series. J Periodontol200;71:752-9.

10. Mellonig JT, Valderrama P, Gregory HJ, Cocharan DL. Clinical and histologic evaluation of non–surgical periodontal therapy with enamel matrix derivative. A report of four cases.J Periodontol 2009; 80:1534-40.

11. Gregg RH 2nd, McCarthy D. Laser periodontal therapy: Case reports. Dent Today 2001; 20: 74-81.

12. Gregg RH 2nd, McCarthy D. Laser periodontal therapy for bone regeneration.Dent Today 2002; 21: 54-9.

13. US Food and Drug Administration. 510(k)s. Final Decisions Rendered for July 2004 (PerioLase M V P-7, 510(k) number K030290). Accessed: August 16, 2012.

14. Dr. I. Stephen Brown. LANAP for clinical management of periodontal pocket. Vol3, no.2, may 2013.

15. Dr. Yogesh Khadtare, Dr. Amit Chaudhari, Dr. Pramod Whagmare, Dr. Shekhar Prashant. The LANAP Protocol- A minimally invasive Bladeless Procedure.vol-1,issue-3,sep-dec 2014.

16. Yukna RA, Carr RL, Evans GH. Histologic evaluation of an Nd:YAG laser-assisted new attachment procedure in humans. Int J Periodontics Restorative Dent 2007; 27:577-87.