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C.E. article

Laser-assisted new attachment procedure

trends

Lasers in endodontics

case report

Diode laser applications in clinical orthodontics

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Summer is upon us, and while many will be taking some well deserved vacation time, it's also an excellent time to reassess where you are with your practice. Do you need to make changes to improve your bottom line, such as purchase new equipment or hire a new staff member?

If you are looking to expand your armamentarium, then adding a laser to your practice should be your first consideration. If you already have a laser, have you thought about adding another one? The versatility of dental lasers coupled with their ease of use are just two of the most basic reasons to own one. From uses in general practice, implantology, endodontology and orthodontics, lasers have a place in every clinician's hand. Having been first introduced into dentistry in 1976, lasers have come a long way, and we hope this publication helps to keep you up to date with the latest research and trends. We've gathered experts from within the borders of the United States but also from around the globe to round out this publication and make the most of your reading time.

There is a nice variety of subjects in our C.E. articles within this edition, starting with the LANAP procedure and moving through to frenectomy and, finally, enamel alterations. After you read the articles, visit www.DTStudyClub.com to take the short quiz and earn one unit of ADA CERP-certified C.E. credit. Because this is a quarterly magazine, you'll have the opportunity to earn at least three more C.E. credits this year. Annual subscribers to the magazine (\$50) need only register at the Dental Tribune Study Club website to access these C.E. materials free of charge. Non-subscribers may take the C.E. quiz after registering on the Dental Tribune Study Club website and paying a nominal fee.

In this edition, a large international team brings you the word on research in regard to the effect of low-level laser therapy during rapid maxillary expansion. Similarly, the application of lasers in endodontics and orthodontics are also represented here.

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If there is a topic you'd like to see covered in this publication, please don't hesitate to let us know by contacting us at feedback@dental-tribune.com. If you have questions, concerns, praise or a critique about some of the materials presented, we want to hear those comments too, so don't hold back.

Our goal with this publication is to make it a valuable return on your reading time, so if we can help improve that, we certainly want to know!

Sincerely,

Torsten Oemus
Publisher



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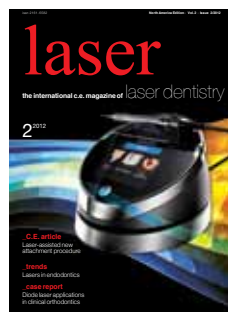
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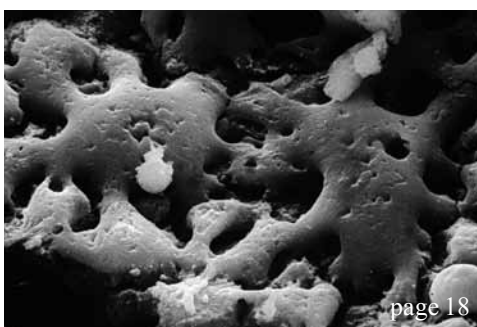
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Laser-assisted **new** **attachment procedure** (LANAP)

Author_David Kimmel, DDS

_c.e. credit part I

This article qualifies for C.E. credit. To take the C.E. quiz, log on to www.dtstudyclub.com.

A historical perspective of the development of the laser-assisted new attachment procedure (LANAP) is presented in this article. The simplicity of the protocol is discussed, as well as its nuances. The concept of LANAP was born back in 1989 with Drs. Robert Gregg II and Del McCarthy. As with most general dentists battling with the day-to-day realities of periodontal disease, they were looking for an answer on how to better care for their patients. The reality at the time was that periodontal disease was difficult to treat and maintain. It was primarily based on older concepts of wound debridement and amputation. Once treated, relapse was common.

We know periodontal disease is a multifactorial disease process and patient behavioural routines can play a significant role. It is a wonder that the conventional treatments worked as well as they did. Even when they did work, there often were significant secondary repercussions clinically as well as psychologically.

Clinically, many of these traditionally treated cases were difficult to restore whenever dental prosthetic treatment was needed and patients were often left with the compromised aesthetic result of a long tooth appearance.

Post-surgically, there was significant root surface exposure and with patients' increased life span and the



Fig. 1_Selective thermal ablation of epithelium. (Photos/Provided by Dr. David Kimmel)

Fig. 2 Formation of the stable fibrin clot.

Fig. 3_Periodontal charting.

[illegible]



Fig. 5



Fig. 4 Pre-op CBT scan.

Fig. 5 Postop periodontal probing at 15 months.

Table I The LANAP protocol.

This is then followed up by two more separate days of treating patients to refine techniques and add other treatment modalities utilising the Nd:YAG. Because of the simplicity, predictability and standardisation of LANAP, it has become a very safe and effective way to treat periodontal disease. The simplicity of the LANAP protocol can be seen in Table I.

_The LANAP protocol

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 de-

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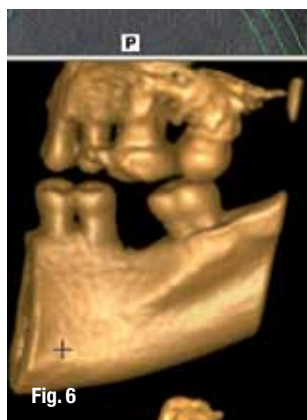


Fig. 6_CBT scan 15 months post-op LANAP.



Fig. 7_Preop photograph.

termine 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 affect selectively bacteria associated with periodontal disease, to affect the calculus present, and to affect thermolabile 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 (Fig. 1).

Step C

This step in the LANAP protocol is straightforward; 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 utilises 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 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 (Millennium Dental Technologies).

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. The high standard of training that each LANAP doctor receives also contributes to the predictability of this protocol and to its safety.

Patients often present with different tissue types along with different degrees of disease. One of the purposes of the hands-on training is learning to recognize these differences and how to change the laser parameters accordingly so that the desired laser-tissue interactions are achieved (Fig. 2).

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 stabilisation of the clot, the last step of LANAP is refining the occlusion. Occlusion has been considered a greater co-factor in the progression of periodontal disease than smoking. In order to minimize this role, extensive adjustments are made to the dentition.

The patients are then followed for nine to 12 months with routine supra-gingival cleanings and occlusal refinements. No sub-gingival restorative or periodontal probing is done during this time. Only during the final post-operative visit is a periodontal probing done.

The results that are seen from LANAP treatment are very similar to the following cases, where new bone fill can be seen in vertical osseous defects. The bone fill ranges from simple proximal defects to the more complex furcation defects. The hallmark of



Fig. 8



Fig. 9

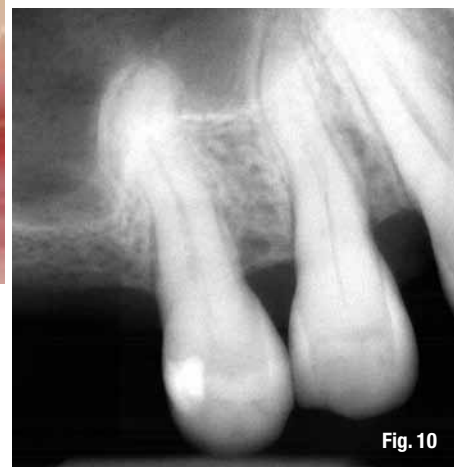


Fig. 10

LANAP is pocket reduction, new tissue attachment and a lack of tissue recession.

_LANAP case No. 1

The patient in this case was a 40-year-old female patient with a history of lupus, rheumatoid arthritis and Sjögren's syndrome. She was also a smoker. There was generalised deep pocketing as seen in her periodontal charting (Fig. 3).

The extent of the osseous defect is shown on the lingual view of the right quadrant preoperative CBT scan (Fig. 4). The initial post-LANAP evaluation was done at 15 months. Post-operative probing is shown in Figure 5.

The CBT from the lingual view of the right quadrant at 15 months post-operatively is shown in Figure 6. The change in the osseous defects is apparent. Minimal to no recession is shown in the preoperative clinical photograph in Figure 7 and the post-operative in Figure 8.

_LANAP case No. 2

The patient in this case was a 59-year-old male patient, with Type 1 diabetes and a smoker. His periodontal pocketing was 7 mm on the mesial second premolar. The preoperative X-ray is shown in Figure 9 and the 36-month post-LANAP X-ray in Figure 10. The 7 mm pocket had been stable and maintained at 3 mm for the last 36 months.

The LANAP protocol will be 22 years old this year. It is coming of age. It has stood the test of time. There are over 1,000 trained clinicians applying LANAP. They have all been standardized. The uniqueness of the protocol is that whether the doctor is new to LANAP or a veteran "LANAP'er," his results are similar.

During its early stages, early adopters accepted LANAP with anecdotal evidence alone, which was reinforced by the individual successes seen clinically. It was further validated by Dr. Ray Yukna's histological studies in 2003.

As the LANAP multicentre clinical studies move to completion, 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, one in which the patient has no to minimal discomfort and treatment acceptance is high.

Fig. 8_Post-op photograph.

Fig. 9_Preop X-ray.

Fig. 10_Post-LANAP X-ray at 36 months.

_about the author

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David Kimmel is a general dentist with a private practice that specializes in laser dentistry and facial enhancements. He holds a mastership from the World Clinical Laser Institute and is a certified instructor for the Institute for Advanced Laser Dentistry that teaches the LANAP protocol. He is also a faculty member for the American Academy of Facial Esthetics and is a

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Editorial note: This article first appeared in the international magazine of laser dentistry, Vol. 3, No. 3, 2011.