First Phase Nonsurgical Laser Periodontal Treatment: A Case Study

By Nora Raffetto, RDH

Introduction

Periodontal disease can have periods of intense activity and periods of dormancy. Today, it is widely accepted that periodontal disease triggers a host-inflammatory response that contributes to the changes in the metabolism of the connective tissue and supporting bone.\(^1,2\) It becomes increasingly important to manage this destructive disease by addressing the microbes responsible while protecting the patient’s health.\(^3\) Thorough treatment of periodontitis must be performed in a way that minimizes the risk of side effects for the patient.

Soft tissue lasers are a good choice for the reduction of the microbial population while providing coagulation of the treatment area. The laser energy is transmitted through the fluid in the sulcus and is most attracted to and reactive with the inflamed tissue and pigmented bacteria. The laser is used adjunctively in periodontal therapy after the hard accretions have been removed on the tooth and root surfaces.\(^4,5\) The dental hygienist generally is the provider of this initial nonsurgical treatment.

Case Presentation

The patient, a 44-year-old Caucasian male, presented with generalized bleeding and inflammation. His health history indicated that he had good general health and was taking an over-the-counter multivitamin. He reported that it had been two years since his last periodontal evaluation and prophylaxis.

The periodontal examination included a full-mouth X-ray, complete periodontal probing, hard tissue examination, oral cancer screening, and evaluation of the occlusion. The results of this exam showed generalized inflammation, supragingival calculus, recession of 1 mm to 2 mm on #6 and #11 due to occlusal trauma, and horizontal bone loss in the molar and premolar areas of 2 mm to 5 mm (figures 1 and 2). No hard tissue lesions were found. The complete exam led to a diagnosis of moderate generalized periodontitis.\(^6\)

Short-Term Goals

1. Initiate good plaque control with an oral hygiene program tailored to the patient’s needs.
2. Adjust the occlusal interferences for more balanced contacts on tooth #6 and #11.
3. Debride all hard tissues followed by laser treatment of the soft tissues.

Long-Term Goals

• Improve periodontal condition with a gain in clinical attachment levels.
• Help patient maintain a high level of oral hygiene.

Treatment Plan

The diagnosis of moderate generalized chronic periodontitis was discussed with the patient and the doctor. The hygienist presented the treatment plan.

1. Complete debridement of the hard tissues using ultrasonics and hand scaling.
2. Perform laser bacterial reduction followed by laser coagulation of the infected sites.
   • The treatment laser is an 810-830 nm diode laser (DioDent, Hoya ConBio, Fremont, Calif.).
   • The fiber for this treatment is a 400-micron fiber.
   • Bacterial reduction settings are 500mW CW for 10-15 seconds per site.
   • Coagulation settings are 700mW CW for 10 seconds per site.\(^7\)
3. Conduct oral hygiene instruction tailored for the patient’s needs.

Treatment Sequence

The patient was treated in four one-hour appointments with seven days between appointments. Treatment...
started in the lower right quadrant, the area with the deepest pocket depths (figures 3 and 4).

Anesthesia used for treatment was a topical anesthesia rinse of 1% dyclonine hydrochloride. After ultrasonic and scaling was completed, the laser was used with the laser fiber calibrated to the depth of the sulcus being treated minus 1 mm. The target tissue was the inflamed epithelial lining of the pocket. The fiber was placed on the tissue at the top of the sulcus and moved both horizontally and vertically "painting" the tissue on the wall of the sulcus with laser energy down to the calibrated depth. The fiber was inspected often during laser use and any accumulated debris was wiped off with dry gauze to avoid any inefficiency (figure 5).

As the treatment sequence progressed the previously treated sites were retreated with the laser using only the bacterial reduction setting and time. The fiber during re-treatment was calibrated to the pocket depth minus 2 mm to avoid disturbing the healing that had started at the bottom of the sulcus.

**Treatment Assessment**

The patient returned one month after his laser treatment was completed so that tissue healing could be checked and home care skills evaluated. No probing was done at this appointment. The patient reported that he had no postoperative discomfort. Home care evaluation showed the patient was compliant with his recommended home care routine, and his tissue showed improvement with no inflammation present.

The author recommends that light probing start at three months posttreatment and a definitive six-point probing be done at six months following laser therapy (figure 6). The rational for the probing schedule of laser-treated areas is suggested because the tissue at the bottom of the sulcus is healing. The fibers are fragile as they reattach to the root surface and could be damaged by introducing a probe too early, delaying healing.7-9

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**Prognosis**

The long-term prognosis for this patient is good. Regular recare appointments are necessary to debride any calculus and biofilm accumulation, to evaluate the pocket depths including tissue tone and inflammation and to continue to monitor patient home care skills.

**Conclusion**

Laser-assisted first phase periodontal therapy often delivered by the dental hygienist is a successful treatment option that can effectively help the patient achieve and maintain optimum levels of health.10,11 Studies of laser soft-tissue therapy and clinical observations of patients treated with the soft-tissue lasers are showing good results. With education and experience, the entire dental team can use the laser as a powerful tool in the treatment of periodontal disease.

**References**

2. Kornman KS, Page RC, Tonetti MS. The host response to microbial challenge in periodontitis: lasers continued on page 14

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**Figure 3. Prior to laser treatment the laser fiber is easily calibrated using a probe to adjust the fiber length.**

**Figure 4. The laser fiber after calibration is placed on the tissue at the top of the sulcus to start treatment.**

**Figure 5. Accumulated debris on the laser fiber is wiped off with dry gauze to ensure laser efficiency.**

**Figure 6. Six-point probing resumes at the 6-month post-treatment appointment.**

**Figure 7. The 12-month post laser therapy probe chart indicates pocket depths have been reduced.**
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Nora Raffetto, RDH, is a 1971 graduate of Cabrillo College with an AAS degree in Dental Hygiene. She recently retired after 38 years working in a general practice setting in Redwood City, Calif. She has been using lasers since 1992 and attained her Nd:YAG Advanced Proficiency in 1994 and Diode Advanced Proficiency in 2001 from the Academy of Laser Dentistry. Raffetto has served on the Academy Board as the Auxiliary Representative and has been a member of the Certification and Scientific Sessions committees. She has published several articles on lasers and contributed a chapter for the October 2004 issue of Dental Clinics of North America. She has trained dentists and hygienists in both Standard Proficiency courses and Laser Soft Tissue Management courses. Raffetto holds a Dental Laser Educator certificate from the University of California at San Francisco and is the 2001 recipient of the Leon Goldman Award for Clinical Excellence. Raffetto has been a member of ADHA since 1970 and is currently a member of the editorial advisory board of Access. Disclosure: Nora Raffetto has no financial affiliations with any laser company. She has taught laser courses for laser companies and received an honorarium.