Lasers in Periodontal Therapy

Lasers commonly used in dentistry consist of a variety of wavelengths delivered as either a continuous, pulsed (gated), or running pulse wave-form, e.g., CO2, Nd:YAG, Ho:YAG, Er:YAG, Er,Cr:YSGG, Nd:YAP, GaAs (diode), and argon.

The energy emitted by a laser is essentially a light of one color (i.e., monochromatic) and, therefore, of one wavelength. In the case of biologic tissues, the laser energy is absorbed by the target surface tissues and is converted to heat resulting in simple warming, coagulation, or excision and incision through tissue vaporization.

CO2 lasers have a high absorption coefficient in water and are therefore well suited for soft tissue surgery but currently have no scientifically well-supported clinical application to mineralized tissues. The Nd:YAG and diode lasers have lower absorption coefficients in water than CO2 lasers but are preferentially absorbed in pigmented tissues, and the Er,Cr:YSGG and Er:YAG wavelengths are highly absorbed in both water and hydroxyapatite.

Advantages of the laser:

Tissue: Coagulation leading to better visualization of the surgical field and increased patient acceptance.

Root Surface: Possible greater gains in connective tissue attachment and regeneration of root surface cementum and dentin.

VersaWave (Er:YAG) Laser

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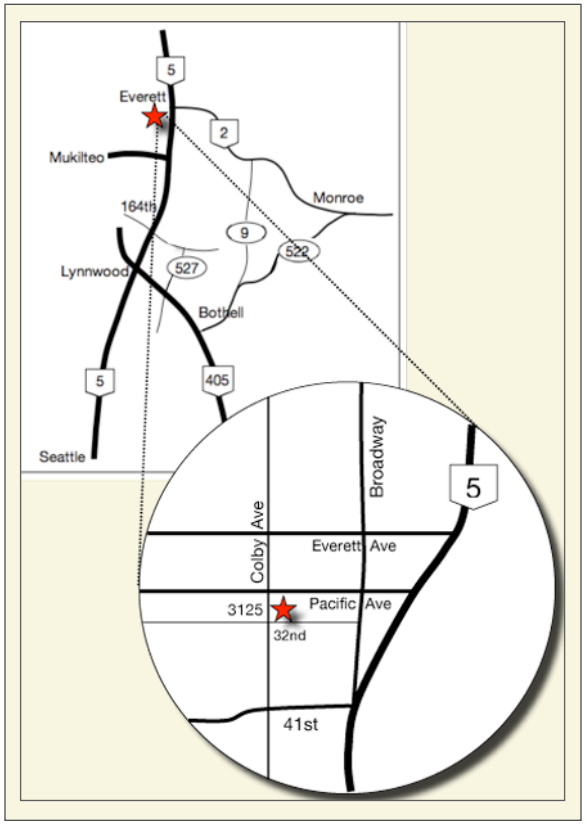

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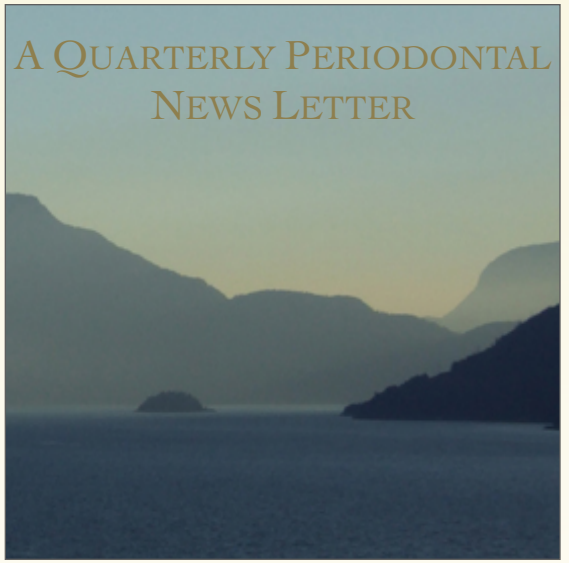
Probe Tips



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Have a topic you'd like to see addressed in the next ProbeTips?

Email us with your thoughts and suggestions!

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Lasers in Periodontal Therapy

Misconceptions:

Soft Tissue: Surprisingly, there are little data to support faster healing response or decreased scarring.

Root Surface: Achievement of adequate water cooling important in suppressing heat-induced surface alterations and protection of the pulp against elevations in temperatures during root surface irradiation is likely to be inconsistent.in deeper periodontal pockets.

Clinical Crown Lengthening: Currently, there are no controlled longitudinal or cohort studies supporting use of lasers for clinical crown lengthening using the closed-flap technique.

Bacteria and calculus: There is limited evidence suggesting that lasers effect greater reductions in subgingival bacteria than that achieved by traditional therapy like scaling and root planing.

One laser: No one laser can treat both soft and hard tissues effectively.

Other: Possible health risk of inhalation of laser smoke plume, and high cost of equipment.

Conclusion

Simply put, there is insufficient evidence to suggest that any laser is superior to the traditional modalities of periodontal therapy like scaling and root planing (SRP) or surgery. Current evidence does suggest that use of the Nd:YAG or Er:YAG wavelengths for treatment of chronic periodontitis may be equivalent to SRP with respect to reduction in probing depth (PD) and subgingival bacterial populations. However, if gain in clinical attachment level (CAL) is considered the gold standard for non-surgical periodontal therapy, then the evidence supporting laser-mediated periodontal treatment over traditional therapy is minimal at best. Lastly, there is limited evidence suggesting that lasers used in an adjunctive capacity to SRP may provide some additional benefit.

Information taken from:

The American Academy of Periodontology Commissioned Review.
Cobb, CM: J Perio, April 2006; 77: 545-564
and
CDC Guidelines for Infection Control in Dental Health-Care Settings

WaterLase (Er, Cr:YSGG) Laser

PerioLase (Nd:YAG) Laser