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Treating a diabetic patient with periodontal disease using the LANAP protocol: A case study

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Introduction
This report describes the advantage of the LANAP protocol (laser-assisted new attachment procedure) with the PerioLase MVP-7 digitally pulsed Nd:YAG dental laser (1) in treating diabetic patients with Type IV periodontitis.

Diabetes mellitus (DM) affects an estimated 29.1 million of the US population, with 8.1 million of them undiagnosed. (2) Type 1 diabetes affects 5%–10% of the population, and is classified by the autoimmune destruction of beta cells in the pancreas. This leads to total loss of insulin secretion, and type 1 diabetics must take insulin to remain alive. Type 2 diabetes affects 85%–90% of the population who become insulin-resistant without destruction of pancreatic beta cells, and patients retain some capacity for insulin production. Their hyperglycemia can gradually increase without symptoms. (3)

ADDITIONAL READING | Salivary diagnostics: The future of health care

Diabetes and periodontitis
Long-established evidence suggests diabetes predisposes to periodontal disease, (4) and periodontal disease adversely affects diabetes outcomes. (5) A study by Chapple and associates (6) found consistent evidence that severe periodontitis adversely affects glycemic control in diabetic patients and causes glycemia in nondiabetic patients. The study concluded that diabetes and periodontitis are complex chronic diseases with established bidirectional relationships.

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Nd:YAG laser in periodontal treatment
Aemaimanan et al. (7) reported a significant prevalence of red complex bacteria in subgingival biofilm of patients with poor glycemic control. These pathogens

associated with periodontitis were significantly higher in DM patients compared to control groups with good glycemic control. Recent studies have shown the bactericidal efficacy of the Nd:YAG laser. De Andrade and colleagues (8) noted the Nd:YAG laser combined with conventional treatment significantly reduced bacteria in Class II furcations. McCawley and associates (9) reported immediate suppression of bacterial pathogens following LANAP treatment.

LANAP procedure

The LANAP surgical procedure for periodontal therapy has been shown to provide new bone growth and stability in patients with Type IV chronic periodontitis, reestablish new cementum-mediated periodontal ligament attachment, and induce periodontal regeneration. (10–12)

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Case study

A 62-year-old male was referred due to gingival swelling and bleeding. The patient reported tender gums. He indicated he was a Type 2 diabetic with glycated hemoglobin (HbA1c) levels "out of control" at 11.7% (normal is 4.5%–6.0%). He was taking medications to control cholesterol, hypertension, and diabetes.

Dental examination revealed gingival swelling and bleeding on probing. Periodontal probing showed moderate-to-deep pocket depths in all posterior teeth (figures 1–3). Generalized bone loss was observed on radiographs (figures 4–6). Tooth vitality and percussion tests were negative. Teeth 2, 3, 31, 14, and 15 had Class III mobility. The patient was diagnosed with Type IV chronic adult periodontitis. Treatment options were discussed, and, after explanation, the patient agreed to the LANAP procedure.

The LANAP protocol was performed in September 2014 with use of nitrous oxide analgesia and local anesthetic. A first laser pass was performed with the fiber inserted into the pocket and moved circumferentially around each tooth. The fiber was angled parallel to the root surface to remove long junctional epithelium and ablate bacteria. Tooth roots were then thoroughly scaled using a piezo-electric scaler with 0.12% chlorhexidine gluconate irrigation. The fiber was used for a second laser pass to obtain a hemostatic seal. Occlusal adjustment was performed to eliminate premature contacts and balancing interferences.

The patient tolerated the procedure well, and was prescribed medications for pain control and chlorhexidine rinses twice daily. No oral antibiotics were prescribed. At the one-week postoperative checkup, the patient reported only mild discomfort following surgery. His tissues appeared less inflamed, and gingival swelling was greatly improved. Two weeks later, the patient was continuing to heal well, his gingival swelling was decreasing, and he reported no discomfort. An occlusal guard was fabricated to help alleviate bruxing trauma.

At the three-month periodontal maintenance appointment, the patient's gingival color was pink with no sign of inflammation (figures 7–9).

The patient also reported his HbA1c level had dropped from 11.7 to 8.2. He reported feeling better generally and more energetic. He was then rescheduled for regular periodontal maintenance at three-month intervals.

At nine months, the patient's tissues appeared pink with no inflammation. Radiographs revealed new bone growth, especially around teeth Nos. 3, 15, and 31 (figures 10–12). The patient reported his HbA1c level stable at 8.2.

Conclusion

This clinical case demonstrates the efficacy of the LANAP protocol in treating adult periodontitis in a patient with diabetes mellitus. It also demonstrates the correlation of uncontrolled DM and its effect on chronic adult periodontitis. The patient's HbA1c levels and periodontal health exhibited marked improvement after

LANAP treatment.

Patient presentation before LANAP treatment (figures 1–6)

Clinical presentation three months after LANAP treatment (figures 7–9)

Figure 1: *Gingival bleeding and swelling at teeth Nos. 28–30.*

Figure 7: *No inflammation or bleeding was present at teeth Nos. 29–31.*

Figure 2: *Exudate, bleeding, and swelling at teeth Nos. 2–4.*

Figure 8: *Swelling and inflammation were absent at teeth Nos. 2 and 3, and mobility had improved from Class III to Class I.*

Figure 3: *Gingival bleeding and swelling at teeth Nos. 12 and 13.*

Figure 9: *No inflammation was present at teeth Nos. 12–14.*

Radiographs nine months after LANAP treatment (figures 10–12)

Figure 10: *Bone regeneration apparent on distal aspect of tooth No. 3. Mobility*