

Photodisinfection: A Case Report

By Catherine Fairfield, RDH

Periowave™ is a locally delivered antimicrobial which utilizes the technology of Photodynamic Disinfection or Photodisinfection. Photodisinfection is a simple two-step clinical procedure which causes cell destruction of targeted Gram-negative anaerobic microorganisms in a selected periodontal defect within 60 seconds.⁽¹⁾ The first step involves irrigation of the affected periodontal site with a photosensitizing solution which selectively binds to the periodontal pathogens, while avoiding human tissue cells.⁽¹⁾ The second step is illumination of this site with the light diffusing tip from a non-thermal diode laser of appropriate wavelength (670 nm) for a period of 60 seconds. Periowave™ photodisinfection has been shown to be effective against a wide range of perio-pathogens, including *Porphyromonas gingivalis*, *Prevotella intermedia*, *Tannerella forsythia*, *Fusobacterium nucleatum*, and *Actinobacillus actinomycetemcomitans*.^(1,2) Virulence factors associated with Gram-negative bacteria are also inactivated.⁽²⁾

The following is a case report utilizing photodisinfection with Periowave™ for treatment of chronic periodontitis in an isolated periodontal defect.

Case Report

A 56-year-old male was referred to the periodontist for a generalized periodontal assessment and treatment as required. He was in good general physical health with no known allergies and reported long-term smoking in moderate amounts. Prior dental hygiene care at his general dental office had shown no improvement in his periodontal condition.

Clinical evaluation consisted of a full periodontal and radiographic examination that revealed generalized chronic periodontitis. Probing depths (PD) ranged from 2 – 9 mm. The gingival tissue presented with generalized edema and isolated cyanosis and the appearance of a 'thickened' soft tissue biotype consistent with smoking. Bleeding on probing was noted generalized throughout the dentition. Radiographic examination revealed both vertical and horizontal osseous defects. Initial treatment was recommended to consist of four visits of SRP with local anesthesia in addition to local photodisinfection using Periowave™ in isolated sites.

On August 3, 2006, the patient presented for OHI and initial SRP, with local anesthesia for the upper right quadrant. (Figure 1.1) The maxillary right cuspid probing depths were 7 mm with BOP from the disto-buccal and 9 mm with BOP from the disto-palatal. Ultrasonic and hand scaling were performed followed by photodisinfection with Periowave™.

On August 21, 2006, the patient underwent SRP and photodisinfection with

Periowave™ on the lower left quadrant. At this time, it was noted that PD for the maxillary right cuspid had reduced to 5 mm on the disto-buccal and 6 mm on the disto-palatal with elimination of BOP for both sites. (Figure 1.2) Re-treatment with Periowave™ for the distal aspects of the maxillary right cuspid was also provided. (Figures 1.3 and 1.4) Periodontal treatment was not completed due to employment changes for the patient.

Discussion

Upon initial examination, it appeared that the periodontal status of this patient had shown no improvement despite previous regularly scheduled hygiene maintenance therapy. The clinical findings were consistent with long term smoking and lack of proper home care. The simultaneous treatment of SRP and photodisinfection with Periowave™ was suggested as a means to reduce or eliminate residual periodontal pathogens in the affected sites with the intention of providing optimal clinical results. It was recommended to retreat this maxillary cuspid to aid with continued healing as the PD remained > than 3 mm. Although the precise etiology of this periodontal lesion remains unknown, the adjunctive use of photodisinfection appears to have been instrumental in reducing the PD from 9 mm to 6 mm and 7 mm to 5 mm with elimination of BOP in a smoker within only eighteen days.

References

1. Wilson M: Bactericidal effect of laser light and its potential use in the treatment of plaque-related diseases. *Int Dent J* 44(2):181-189, 1994.
2. Komerik N, Wilson M, Poole S: The effect of photodynamic action on two virulence factors of gram-negative bacteria. *Photochem Photobiol* 72(5):767-680, 2000.

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FIG. 1.1: Tooth #13 at first initial therapy appointment prior to PW tx (Aug. 3, 2006)



FIG. 1.2: Tooth #13 at 18 days post SRP and first PW tx (Aug. 21, 2006)



FIG. 1.3: Tooth #13 retreatment PW irrigation (Aug. 21, 2006)



FIG. 1.4: Tooth #13 retreatment PW illumination (Aug. 21, 2006)

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