Photodynamic Therapy for Endodontic Disinfection

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Abstract

The aims of this study were to investigate the effects of photodynamic therapy (PDT) on endodontic pathogens in planktonic phase as well as on *Enterococcus faecalis* biofilms in experimentally infected root canals of extracted teeth. Strains of microorganisms were sensitized with methylene blue (25 μg/ml) for 5 minutes followed by exposure to red light of 665 nm with an energy fluence of 30 J/cm^2. Methylene blue fully eliminated all bacterial species with the exception of *E. faecalis* (53% killing). The same concentration of methylene blue in combination with red light (222 J/cm^2) was able to eliminate 97% of *E. faecalis* biofilm bacteria in root canals using an optical fiber with multiple cylindrical diffusers that uniformly distributed light at 360 degrees. We conclude that PDT may be developed as an adjunctive procedure to kill residual bacteria in the root canal system after standard endodontic treatment. *(J Endod 2006;32:979–984)*

Key Words

Biofilms, endodontic bacteria, *Enterococcus faecalis*, methylene blue, photodynamic therapy, root canals