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UVB irradiation has a greater efficacy than photodynamic therapy on *Enterococcus Faecalis*

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Aim

Within endodontics photodynamic therapy (PDT) has been suggested as a disinfectant procedure during root canal treatment (RTC). A photoactive dye (photosensitizer), methylene blue or toluidine blue, are activated by a light source, usually lasers or light emitting diodes (LEDs), thereby forming free oxygen radicals supposing to kill the bacteria. New ultraviolet (UV) LEDs may be used without a photosensitizer. The aim of the present study was to compare the efficacy of UVB irradiation with an existing PDT on *Enterococcus faecalis* biofilm.

Methodology

UV irradiation was provided using an LED in the UVB region (296nm), with a fixed dose J/m². The PDT was applied using the commercial product Fotosan®. The biofilms were grown on AB-trace glucose medium and incubated for 24 hours (h) at 37°C. Three biological replicas were irradiated together with 2 or 3 technical replica. Controls were taken every h. Serial dilutions were made and plated onto lysogenic broth medium and the treatment effect was registered using total number of colony forming units (CFUs) after overnight incubation at 37°C. Statistical analyses were carried out using Two Way Anova with a significant level P=0.05.

Results

No significant variation among the technical replica was noticed (P=0.082), but both the biological replica and the treatments had significant variation (P<0.0001). Both the UVB treatment and the PDT significantly reduced the growth of the *E. faecalis* biofilm (P<0.0001), and in addition, the UVB treatment was significantly more effective than PDT (P= 0.0017).

Conclusions

UVB irradiation and the PDT significantly reduced the growth of the *E. faecalis* biofilm; however the UVB treatment was more efficient than PDT to reduce the total number of viable cells. UV LEDs may improve disinfection procedures during root canal treatments.

Acknowledgements etc

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