Saifalarab Mohmmed et al., Dentistry 2017, 7:9(Suppl)
DOI: 10.4172/2161-1122-C1-024

Assessment of passive and active irrigation protocols to remove single or multi-species biofilm from the wall of a simulated root canal model

Saifalarab Mohmmed, Morgana E Vianna and **Jonathan C Knowles**
UCL Eastman Dental Institute, UK

Background: A multitude of studies have identified the resistance of bacterial biofilms to the antimicrobial agents used in the root canal treatment. Although this has been described to the complex anatomy of the root canal system that interferes with an effective irrigant penetration, there is increasing concern that the cooperative behaviour of a multi-species biofilm enables persistence after exposure to an antimicrobial agent.

Aim: The aim of this study was to examine the removal of single and multispecies biofilm from the root canal system by passive or active (manual, sonic and ultrasonic) irrigation protocols.

Methods: A total of 80 root canal models (n=10 per group) were manufactured using 3D printing. The model consisted of two longitudinal halves of an 18 mm length root canal with apical size 30 and taper 0.06. Biofilms of single species (Enterococcus faecalis) or multispecies (Streptococcus mutans, Enterococcus faecalis, Fusobacterium nucleatum, and Prevotella intermedia) were grown on the apical 3 mm of the models for 10 days. Biofilms were stained using crystal violet for visualisation. Each model was attached to an apparatus and observed under a fluorescence microscope. Following 60 seconds of 9 mL of 2.5% NaOCl irrigation using syringe and needle, the irrigant was either left stagnant in the canal or activated using manual, sonic and ultrasonic methods for 30 seconds. Images were then captured every second using an external camera. The residual biofilm percentages were measured using image analysis software. The data were analysed using generalized linear mixed model analysis at a level of significance $p \leq 0.05$.

Results: Results indicated a conclusive evidence of the effect of biofilm type (single, multispecies) on the efficacy of NaOCl irrigation. In all irrigation protocols, there was a statistically significant difference between the single and multiple residual biofilm ($p \leq 0.001$).

Conclusion: Passive and active irrigation protocols (manual, sonic, ultrasonic) using 2.5% NaOCl were less efficient against the multi-species biofilms than single species biofilms.

Biography

Saifalarab Mohmmed is an Assistant Professor in the Department of Conservative Dentistry at the College of Dentistry/University of Baghdad where he has been a faculty member since 1999. He completed his Master's degree at College of Dentistry/University of Baghdad in 2002. His research interest lies in root canal treatment. In recent years, he has focused on better techniques for root canal irrigation and antibacterial action of irrigation solutions. He has collaborated actively with researchers in several other disciplines of Dentistry, particularly Oral Surgery and Periodontal Diseases. He is currently pursuing PhD programme at Eastman Dental Institute/UCL.

saif.mohmmed.12@ucl.ac.uk

Notes: