Abstract

iMedPub Journals
http://www.imedpub.com

Journal of Oral Hygiene & Vector Biology

2022
Vol .3 No.3

Waterline Disinfectants Reduce Dental Bioaerosols: A Multitracer Validation

J.R. Allison
School of Dental Sciences, UK

Abstract

Oral microbes are dispersed during dental treatment and reduction methods have been proposed, but dental unit waterline (DUWL) disinfectants have received little attention; specifically, the effect on viruses has not been studied. This study aims to 1) investigate the effect of DUWL disinfectants on viral dispersion in dental bioaerosols and 2) establish a dual-tracer system using live bacteriophage and fluorescein supported by optical particle measurement. Bacteriophage MS2 was used as a viral tracer and fluorescein as a fluorescent tracer. Validation experiments were conducted to exclude interference of one tracer with the other or of DUWL disinfectants on detection methods. Simulated "saliva" containing the tracers was infused into the mouth of a dental mannequin during 10-min dental procedures with an air turbine handpiece (n = 3 replicates). Aerosols and droplets were sampled in an enclosed dental operatory using air samplers and settlement onto sterile filter papers. Bacteriophage was quantified using plaque assays and reverse transcription quantitative polymerase chain reaction (RT-qPCR). Fluorescein was quantified fluorometrically. The effect of DUWL disinfectants on total aerosol concentration was assessed in separate experiments using an optical particle counter. DUWL disinfectants reduced bacteriophage viability, and interference between tracers was not observed. In simulated clinical procedures, the disinfectant ICX reduced bacteriophage detection substantially ($P < 0.001$; 2-way analysis of variance). MS2 RNA was detected in all experimental samples but not negative controls. Samples positive on RT-qPCR but not plaque assays may indicate that virions at distant sites are nonviable. Fluorescein tracer showed good agreement with the bacteriophage tracer. DUWL disinfectants designed for continuous presence in irrigants reduce the dispersion of viable virus in dental bioaerosols during simulated procedures. Their use may therefore be important for routine infection control and as a mitigation factor during infectious disease outbreaks. Future studies should explore this using a range of viruses and other microbes.

Received: March 04, 2022; **Accepted:** March 27, 2022; **Published:** April 20, 2022

Biography

James R Allison career researcher and dental educator at the School of Dental Sciences, Newcastle University, with a clinical background in Oral Surgery. His interests include bioaerosols in healthcare, orofacial pain, and three-dimensional imaging in dentistry and Oral and Maxillofacial surgery.

