




Article

Dental Unit Waterlines in Quito and Caracas Contaminated with Nontuberculous Mycobacteria: A Potential Health Risk in Dental Practice

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Abstract: Three cases of severe odontogenic infections due to nontuberculous mycobacteria (NTM) in Venezuela that were directly associated with dental procedures and the finding of dental unit waterlines (DUWLs) in dental offices that were colonized with mycobacteria species was the reason for assessing the water quality of DUWLs in dental offices in two capital cities in South America, namely, Quito and Caracas. The main water supplies and the water from 143 DUWLs in both cities were sampled and especially checked for contamination with NTM. To measure the overall bacteriological quality of the water also the presence of heterotrophic bacteria, coliform bacteria, and *Pseudomonas* was determined. Results showed that respectively 3% and 56% of the DUWLs in Quito and Caracas yielded NTM species (up to 1000 colony-forming units (CFU)/mL). Furthermore, high and unacceptable total viable counts of heterotrophic bacteria and/or coliform bacteria and *Pseudomonas* were detected in 73% of the samples. We conclude that, in both cities, the water in the majority of DUWLs was contaminated with NTM and other potential pathogens, presenting a risk to human health. The detection of NTM in DUWL water with acceptable heterotrophic bacteria counts shows the need to include NTM in water quality testing. Mycobacteria are more resistant to disinfection procedures than other types of vegetative bacteria, and most testing protocols for DUWLs do not assess mycobacteria and thus do not guarantee risk-free water.

Keywords: dental unit waterline (DUWL); biofilm; dental infection control; heterotrophic plate count (HPC); coliform bacteria; *Pseudomonas aeruginosa*; nontuberculous mycobacteria (NTM)

1. Introduction

Dental unit waterlines (DUWL) provide water for irrigation, cooling, and flushing of the patient's oral cavity during dental procedures. Because patients and dental staff are regularly exposed to this water and the aerosols generated from the dental unit, the microbial quality of this water is of importance because contamination with pathogens can pose a health risk, especially for elderly and immunocompromised people [1]. The most discussed infection event due to DUWL water is a fatal case in 2012 of a healthy woman who developed Legionnaire's disease after a dental visit [2]. Since