

Effect of Ozone on biofilms in dental unit waterlines

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Ozone (O₃) has been investigated for the treatment of dental unit water lines (DUWL) contamination due to its strong oxidative ability that enables it to kill microorganisms. Objectives: the aim of this study was to evaluate the efficacy of O₃ to control the problem of DUWL contamination and remove the biofilms from inside these lines. Methods: Two treatment protocols were used. In the first protocol, three dental units with existing biofilms were flushed for 2 minutes daily, for 7 days with water ozonated for 1, 2 and 3 minutes respectively. Water was collected for culture on nutrient agar before and immediately after flushing via the high-speed handpiece. In the second protocol, a dental unit was flushed for 15 min with water ozonated for 15 minutes. The waterline was cut into sections at baseline, and after 5, 10 and 15 minutes flushing for visualisation by immunofluorescence. Multiple sections were made and stained by Propidium Iodide. Results: The baseline bacterial count was 2.9×10^4 , 9×10^4 and 2.7×10^4 CFU/ml in units 1, 2 and 3 respectively. After 7 days the bacterial counts were 2×10^5 , 0 and 0 CFU/ml in the 1st, 2nd and 3rd units. In the fourth unit with 15 min ozonated water, the biofilm was clearly evident by immunofluorescence in the baseline samples and showed marked reduction after 5 minutes of flushing and was absent at 10 and 15 min flushing.

Conclusions: Daily treatment by water ozonated for >2 min is capable of reducing the bacterial count in DUWLs to acceptable levels. Single treatment with higher levels of ozone were also able to reduce and then remove the biofilm from inside the DUWLs.