3371 **Comparison of methods for reducing dental unit waterline bacteria and biofilm.** J.Kettering*, C. Munoz, J. Stephens, D. Swift, & J. Dawson (Loma Linda University School of Dentistry, Loma Linda, CA and Micrylium Laboratories, Toronto, Canada).

A major concern for dentistry is the fact that dental equipment lends itself to provide an ideal atmosphere for contaminated water accumulation. The most common cause for dental unit water contamination is the production of microbial biofilm along the walls of the tubing furnishing water to the highspeed handpiece and air/water syringe tip. Loma Linda Dental School replaced 120 dental chair units with new Adec self-contained water system units. These new dental water lines were ideal to investigate biofilm reduction and water contamination. Ninety dental units were divided into six equal groups of 15. Each group used a separate protocol as follows: Gp.1) distilled water through the self-contained water system; Gp.2) chlorhexidine solution (***Bio2000***); Gp.3) tap water and rinsed the water lines nightly with ***Bio2000***; Gp.4) tap water and purged the lines with sodium hypochlorite; Gp. 5) distilled water and rinsed the lines nightly with ***Bio2000***; and Gp. 6) tap water only for the positive control. Groups # 1 & 4 had the lines purged weekly with sodium hypochlorite. Sections of waterline tubing were randomly chosen from one unit in each group at the study start for a baseline of biofilm layering. A second section from these same chairs was taken at the end of the two month study for comparison of biofilm layering. Every two weeks water samples were taken and labeled from each unit's highspeed handpiece line and air/water syringe line and analyzed. Total heterotrophic plate counts were measured using R2A agar (Difco). No *Pseudomonas aeruginosa* was found in any of the systems. Twice, random samples were additionally analyzed by the University's Department of Microbiology using the same protocol for evaluation. The dental units with the Chlorhexidine solution demonstrated no bacterial growth for the duration of the study while the units containing tap water, regardless of additional methods for purging and disinfecting, continuously had CFU's in the range 500,000 to 5,000,000. Examination of the tubing using SEM supported the findings as related to biofilm layer development. The use of an antimicrobial agent such as **chlorhexidine is necessary** for a reduction in biofilm accumulation and bacterial counts in dental unit waterlines.

3373 **Quantitation of Mesophilic, Heterotrophic Bacteria and Elemental Ions in Dental Unit Waterline**. D. Swift*, K. Ganeshan, I.A. Buivids and J.R. Dawson. (Micrylium Laboratories, Toronto, Canada).

The contamination of dental unit waterline (DUWL) is becoming an increasingly important issue in light of the fact that more elderly and immunocompromised patients are seeking dental care. Previous studies have shown that a vast array of microorganisms including known pathogens can be isolated from these lines. To determine the extent of the problem in Canada, samples from across the country were analyzed to ascertain their bacterial levels and ion content . Six hundred samples from handpieces, air water syringes and scalers were filtered through 0.22μm membranes and plated on R2A and MPAC agar. Air samples were also collected from compressed air lines and plated on R2A. Representative samples from each region of the country were also analyzed by ion exchange chromatography for chloride, fluoride, phosphate, sulfate, calcium and magnesium levels. The bacterial levels in more than 85% of the samples exceeded the 500 CFU/mL limit set by Health Canada for potable water. The counts ranged from 0 to 2.7 x10^7 cfu/mL. with handpieces generally having the highest counts. *Pseudomonas aeruginosa* was found in more than 5% of samples. The ion content range for chloride was 1-35 ppm: fluoride 0-1ppm, phosphate 0-8ppm, sulfate 1-155 ppm, calcium 1-40 ppm and magnesium 0-11 ppm. In regions where there was low chlorination, if the source of water was municipal, the *Pseudomonas* levels were most elevated; regions with chloramination had the lowest bacterial levels 0-4.5x10^3cfu/mL. Dental clinics with self-contained water systems had bacterial levels from 2 to 10 times greater than clinics that used municipal water. This preliminary study showed that the DUWL in Canada are heavily contaminated and require a concerted effort to find ways to reduce biofilm formation and eliminate or reduce levels to within acceptable limits.