Preventing Biofilm Formation in Dental Unit Waterlines (8/04)


The authors used a simulated-use dental unit waterline system to evaluate the ability of a test product, A-dec ICX™ (A-dec, Newburg, Ore), to prevent biofilm formation. They evaluated buffered distilled water and hard water models versus mixed-challenge suspensions of Staphylococcus aureus, Klebsiella pneumoniae and Pseudomonas aeruginosa. The authors documented development of significant biofilm in untreated test units, while treated test units showed no indication of biofilm formation throughout the 16-week study. Student t tests and 95% confidence intervals performed on the plate count data confirmed that untreated test units had significantly greater bacterial populations than did treated test units (P < 0.05). Qualitative images by scanning electron microscopy verified these findings. In this simulated clinical-use study, the test product effectively reduced bacterial counts in incoming water and produced water quality exceeding stated recommendations of the American Dental Association. The test product provides an approach to dental unit waterline maintenance that is simple to use and that, by continuously preventing biofilm formation, reduces concerns about bacterial contamination in dental unit water.

DIS Comment: A-dec’s ICX™ waterline treatment product, an effervescent tablet, is added each time the bottle is refilled and takes 60 seconds to dissolve prior to use. The active ingredients are sodium percarbonate, silver nitrate and cationic surfactants that reportedly provide both immediate and sustained residual protection against biofilm formation. This is the first waterline treatment product in tablet form as compared with other available products that are primarily antimicrobial liquid solutions or cartridges impregnated with an antimicrobial agent. Advantages of a tablet-form product include: elimination of dilution procedures; saves storage space; less time involved in the treatment process; and a potential for increased compliance. The study evaluated several clinically relevant situations and potential problems when maintaining water quality: the effects of periods of inactivity and water hardness. Acceptable water quality was achieved under all conditions evaluated in the study. This study was supported by the manufacturer of the ICX™ waterline tablet (A-dec) and the authors did acknowledge that more studies are warranted to continue evaluation of the product’s efficacy in a variety of situations. Nevertheless, the study does provide evidence that A-dec ICX™ offers clinicians another choice in maintaining dental unit water quality.