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Control of Microbial Biofilms in Dental Unit Waterlines.

B.A. SANFORD*[3], D.P. KRIEG[1], H.R. RAWLS[2], V.L. THOMAS[3], E.K. ESKEW[1], G. SIEGEL[1], P.B. SIEGEL[1] and W.D. WARREN[1] (Biomedical Development Corp.[1], University of Texas Health Science Center School of Dentistry[2] and Dept. of Microbiology[3], San Antonio, TX).

A unique disinfectant, Dentacide™, was tested for the capacity to prevent/eliminate biofilm in dental unit waterlines (DUWL). Ten lines were treated every weekend with Dentacide™; lines in 6 of the units were also treated nightly. After treatment, lines were flushed to remove residual Dentacide™; tap water was used for routine operation. Five untreated DUWL were used as controls. Samples (~3 ml) were collected weekly for 10 weeks and quantified for total mean colony forming units (CFUs)/ml of water by culture on R2A agar at 25°C for 3 weeks. Results (expressed as the mean CFUs/ml [±S.E.M.]) at 4 weeks were 8.33 (±6.5) for nightly-treated DUWL, 209.25 (±119.8) for weekly-treated, and 1.86×10^5 (±0.45) for untreated; results at 8 weeks were 105.83 (±64.2) for nightly-treated, 1.06×10^4 (±0.68) for weekly-treated, and 1.2×10^6 (±0.45) for untreated. Mean CFUs/ml were significantly lower in samples from daily-treated DUWL vs. weekly-treated (P=0.06) and untreated (P=0.001). DUWL clippings, processed for scanning electron microscopy, demonstrated that mature biofilm was comprised of multi-layered microcolonies including: curved rods, cocci, hyphae, spirochetes and matrix material. Dentacide™ treatment successfully removed the biofilm, leaving behind the remnants of dead cells and cellular debris but little to no matrix material. In conclusion, Dentacide™ appears to be an effective disinfectant for use in preventing the development of microbial biofilm in DUWL, as well as, removing preexistent biofilm from waterlines. Funding was provided to Biomedical Development Corporation by the National Institute of Dental Research (2R44 DE11221-02).