1999 OSAP Annual Symposium
Infection Control Integration
June 24-27, 1999
Cincinnati, Ohio

Comparison of Dentacide™ and Bleach in Treated Dental Unit Waterlines.

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Purpose: The American Dental Association's goal for the year 2000 is to improve the microbiologic quality of water in dental unit waterlines (DUWL) to ≤200 colony forming units (CFU)/mL of aerobic mesophilic heterotrophic bacteria. To meet this standard, we have developed a unique disinfectant, Dentacide™, for the chemical disinfection of DUWL. The objective of this study is to compare Dentacide™ to bleach which is currently recommended by A-dec™ for chemical disinfection of waterlines in their Self-contained Water System.

Methods: Two independent studies were performed to compare the efficacy of Dentacide™ and bleach disinfection of DUWL:

1) *UTHSCSA Dental School Clinic Study*: Waterlines from ten dental units were evaluated for 24 weeks. Waterlines in 5 dental units equipped with Dentacide™ Delivery Systems were treated with Dentacide™ overnight on a daily basis. After treatment, lines were flushed with tap water for two minutes to remove residual Dentacide™ from the lines. Dentacide™ did not come into contact with patients and was used at the end of the day after all patients were seen. Tap water was used for routine use of these units. The remaining 5 units were equipped with A-dec's™ Self-contained Water Systems and treated weekly with 1:10 diluted household bleach (~5000 ppm free chlorine). Additionally, a solution of tap water containing ~3 ppm free chlorine was continuously used during patient treatments. Water samples (~5 mL) were collected weekly for 24 weeks from the handpiece and syringe of each DUWL and plated on R2A agar to determine total aerobic CFU/mL.

2) *Navy Dental Clinic Study*: Six dental units equipped with free-standing water reservoirs were evaluated for 16 weeks. All units had previously been treated weekly with a 1:10 solution of bleach. At the beginning of this study, baseline water samples were collected, and units were assigned for either Dentacide™ (5 units) or bleach (1 unit) treatment. As above, Dentacide™ units were treated overnight on a daily basis. After treatment, lines were flushed with tap water for two minutes to remove residual Dentacide™. Also in this study, Dentacide™ did not come into contact with patients and tap water was used for routine use. The bleach unit continued to receive weekly treatments with 1:10 diluted bleach. All treatments and sample collections were performed by the Navy dental professionals. Water samples (also ~5 mL) were collected on a regular basis for 16 weeks from the handpiece and syringe of each DUWL and plated on R2A agar to determine total aerobic CFU/mL.

Results: Over the entire 24 weeks of the *UTHSCSA Dental School Clinic Study*, 91% of samples from units treated with Dentacide™ were ≤200 CFU/mL while only 62% from bleach-treated units were ≤200 CFU/mL. In the last 12 weeks of this study, 97% of samples from units treated with Dentacide™ were ≤200 CFU/mL compared to only 43% of the bleach treated units. During the 16 weeks of the *Navy Dental Clinic Study*, 92% of handpiece and 88% of syringe samples from Dentacide™-treated units were ≤200 CFU/mL compared to only 20% of handpiece and 0% of syringe samples from bleach treated units.

Conclusions: Dentacide™ appears to be more effective than bleach at maintaining ≤200 CFU/mL of aerobic mesophilic heterotrophic bacteria in DUWL.

Funding was provided to Biomedical Development Corp. by the National Institute of Dental and Craniofacial Research (SBIR #5R44 DE 11221-03)