Dentist PRACTICE MANAGEMENT Bulletin
JANUARY 25, 2017 ISSUE NUMBER 10

Dental Unit Waterlines and Biofilm

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Infections from organisms transferred from dental treatment unit waterlines via dental handpieces, air/water syringes, and ultrasonic scalers have made headlines. Patients who underwent routine dental treatment in offices using water of "uncertain quality" in their dental treatment units were stricken with various infections, required hospitalization, and subsequent invasive procedures.

Using water of "uncertain quality" in a dental treatment unit is inconsistent with acceptable infection control and prevention principles. Water supply to the dental unit—even if considered safe to drink (potable)—cannot reliably produce water that meets accepted quality standards to prevent infection transmission. Potable water hosts a diverse microflora of bacteria, fungi, viruses, and other potential disease-forming organisms. The CDC defines "acceptable" water quality as water exiting the unit containing less than or equal to 500 CFU/ml of heterotrophic water bacteria.

The bacterial concentrations found in drinking water are generally harmless to most populations. However, dental units have narrow-bore tubing which delivers water to dental devices with inconsistent flow rates; and oral fluids can retract into the system. This leads to rapid development of biofilm—an assemblage of microbial cells irreversibly associated (not removed by gentle rinsing) with a surface and enclosed in a matrix of primarily polysaccharide material. Biofilm creates ideal conditions for amplifying bacterial growth within the tubing system, creating unsafe water which exits the dental unit into the patient's oral cavity. This puts all patients at risk, especially children and medically compromised individuals.

Dentists are advised to employ Dental Unit Water Line (DUWL) Technology to ensure water they use for patient treatment is of acceptable quality. Such technologies may include point-of-use filters and self-contained water systems that treat source water. However, biofilm formation must still be controlled.

Dental units, depending on their manufacturer, require different protocols to consistently eliminate biofilm in the internal tubing. Adhere to manufacturer recommendations for appropriate methods and procedures. Put biofilm prevention protocols in writing, and include them in all staff training sessions. Use only sterile water solutions for coolant or irrigant during surgical procedures.

The only way to know your protocols are effective is to routinely check them with in-office testing products or outside testing labs. Keep detailed records of your testing procedures and results. See the current CDC guidelines for a summary of infection prevention in dental practices.