



What's in your water?

Solutions control contamination, but how can you be sure?

by Mary Govoni, CDA, RDA, RDH, MBA

Over ten years ago, the news media sensationalized the issue of dental unit water contamination, going as far as to compare dental unit water with toilet water. They called it “dentistry’s dirty little secret.” You know the story — the toilet water was less contaminated than the dental unit water. This revelation didn’t make dentistry look good. However, at the time, we didn’t have effective and efficient solutions for reducing the bacterial contamination in dental unit water lines. Ten plus years later, the problem still exists, but the solutions are many. Which begs the question, “What’s in your water?”

The problem

Contamination in dental unit water lines results from the formation of biofilm, a sticky, slimy layer of bacterial colonies. These colonies form from the bacteria that normally live in water supplies, and they attach on the sides of pipes and other containers, grow and colonize, and produce endotoxins. A great everyday example of biofilm is in your pet’s water dish. If it isn’t cleaned regularly, a slimy layer will appear on the sides of the bowl. This is the bacterial contamination that forms from the water used to fill the dish.

When water flows through a pipe or tube, some of the bacteria and endotoxin that form on the sides are carried out of the pipe or tube with the water. In a dental unit, the tubing is very narrow, causing more bacteria and endotoxin to be sloughed off and carried out, since the water has maximum contact with the sides of the very narrow tubing.

The bacterial contamination is measured in colony forming units (CFUs), and the Centers for Disease Control and Prevention (CDC) established the standard for water quality for dental unit water in its 2003 *Guidelines for Infection Control in Dental Health Care Settings*.

The CDC states that there should be no more than 500 CFUs/ml in dental unit

water. This is the same quality required for public drinking water, also known as potable water. According to the extensive research done in numerous dental settings, untreated dental unit water typically contains in excess of 100,000 CFUs/ml. Although there is no evidence that the dental unit water is making patients sick, both the CDC and the American Dental Association (ADA) agree that exposing patients to this water is not in keeping with “generally accepted infection control principles.”

The solutions

Several solutions to the water quality issue in dental units are available. If the dental unit is connected to the municipal water supply, a filter can be placed between the triplex syringe or hand-piece and the tubing, or at the point where the water enters into the junction box or to the building. Individual filters on tubing (point-of-use filters) require frequent replacements and some users report leakage from the filters. Point-of-entry filters placed at the junction box or at the source where the water supply enters the facility require much less maintenance.

Although the point-of-entry filters will produce purified water, if that water passes through dental unit water lines that already contain biofilm, the water will become contaminated. Thus, the lines must be treated or replaced prior to using these types of filters.

None of these filter systems will protect the facility, however, if there is a “boil water alert” caused by power outages, water main breaks, or other events that render municipal water unsafe to drink. Dental facilities should not treat patients during boil water alerts if they utilize municipal water in their units.

Another solution is to purchase equipment with independent water reservoirs (bottles) that can utilize chemical cleaners in the bottles and water lines to control the bacterial contamination. Existing equipment can be economically retrofitted to utilize these water bottles. When this option was first introduced, equipment manufacturers recommended the use of diluted chlorine bleach (sodium hypochlorite) to disinfect the lines; however, this is no longer recommended due to potential problems with corrosion of metals in the dental units.

There are two steps in waterline treatment to achieve potable water quality — cleaning and maintenance. Unfortunately, many offices are only doing the maintenance step.

Many types of new waterline cleaners have been developed to control the growth of bacterial contamination in dental units. These include chlorhexidine, alkaline peroxide, and chlorine dioxide solutions that can be placed in the dental unit water bottles and drawn into the waterlines. These cleaners are used typically on a

weekly or monthly basis, depending on the manufacturer, and are necessary to remove the microbial contaminants that build up over time.

Some of solutions can be flushed immediately while others sit in the lines overnight or over a weekend and are flushed out prior to treating patients. Cleaning products can be liquid, powder, or tablets that must be dissolved prior to use. In some cases, if the powder is not completely dissolved, blockages can form in the water lines.

Although “shock treating” or periodically cleaning your lines with an antimicrobial cleaner removes microbial contamination that may have built up on the tubing, a daily maintenance product should also be used to help slow bacteria growth in the lines. Maintenance products such as daily irrigant drops, cartridges, or tablets should be placed in the water bottles.

Some of these products are iodine-, silver- or citric-acid based products that are effective, but perhaps not as eco-friendly as some of the newer products which contain citrus botanicals. These products are typically added in the water bottle each time it is filled, making them more efficient and less time consuming than having to flush the lines after a product has been sitting overnight.

To prevent possible chemical reactions, it is important to make sure that the continual daily maintenance with a product and the antimicrobial product are compatible — perhaps part of a “system” from a manufacturer. Always follow the manufacturer’s instructions for utilizing the products and for frequency of use.

Monitoring effectiveness

Whatever the delivery method of water to the dental unit, it is important to monitor the quality of the water that is used in patient treatment. Several dental schools or local labs can provide water-quality testing services for dental units.

Additionally, you can purchase in-office water testing kits. Although the CDC recommends testing water quality, they do not have a guideline on frequency. A good rule of thumb might be to do a baseline test — especially if the units are connected to the municipal water supply and the water is not treated. After the baseline, testing is recommended a month after implementing a new water delivery system or utilizing a new product.

The answer to the “What’s in your water?” question is up to you. Find out by testing, decide which product or system works best in your facility, and let your patients know the additional protocols that you follow to ensure their safety.

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