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keep it clean

QUESTION: How do I ensure dental unit water quality?

The quality of water delivered from dental units has been a topic of discussion and research for many years. Research has demonstrated that dental unit water has levels of contamination beyond the accepted standard for potable (safe) drinking water.

Although there are no documented cases of patients or dental team members suffering adverse health effects from exposure to the aerosol from this contaminated water, we know that certain microorganisms, such as *Legionella* bacteria can be isolated from dental unit water.

Because of the lack of specific cases of illness caused by exposure to dental unit water, it is not surprising that some dental practices are skeptical about the need to modify their dental units, or perform flushing and/or cleaning procedures on the water lines. Some dental practices (and patients) are aware of the issue, however, and many practices have modified their procedures in response to patient questions, media reports and guidelines from various sources.

The U.S. Centers for Disease Control and Prevention (CDC) issued guidelines for infection control in dentistry in 2003 that addressed the dental unit water quality issue. These guidelines are recognized throughout the U.S. and Canada as the standards of care for infection control. In addition, the Canadian Dental Association's (CDA) Committee on Clinical & Scientific Affairs published similar guidelines in 2006 in its "Infection Prevention and Control in the Dental Office: An opportunity to improve safety and compliance." Other provincial associations and dental schools across Canada have either adopted the CDA and CDC recommendations, or established their own infection control manuals and procedures based on these two documents.

A standard of care has been established for dental unit water quality. Dental professionals have an ethical obligation to meet that standard of care within their practice settings. Following this standard of care is relatively simple for the dental team. The recommendations from the CDA state that the following protocols should be followed:

Research has demonstrated that dental unit water has levels of contamination beyond the accepted standard for drinking water

- "Waterline heaters should not be used in a dental unit or dental equipment, as these heaters encourage waterline microorganism growth."
- "All waterlines should be purged at the beginning of each workday by flushing the lines thoroughly with water for at least 2 – 3 minutes. This purging should be done with handpieces, air/water syringe tips and ultrasonic tips not attached to the waterlines."
- "Handpieces utilizing water coolant should be run for 20 – 30 seconds after patient care, in order to purge potentially contaminated air and water. A sterilized handpiece can then be attached, following regular clinical

contact surface management (see IPC-05-03)."

> "Sterile water or sterile saline should be used when irrigating open vascular sites and whenever bone is cut during invasive surgical procedures. Sterile water or sterile saline may be administered. Conventional dental units do not reliably deliver sterile solutions, even when equipped with independent water reservoirs, due to the formation of biofilm along the water pathway. Delivery systems, such as bulb syringe or sterile, single-use disposable products along the entire system should be used to deliver sterile irrigation solutions."

> "When closed water systems are used, DHPC (dental health care professionals) should be careful not to touch the tubing with the fingers or gloved hand when changing the water coolant bottle, as this easily contaminates the entire system."

> "Manufacturers' instructions of the dental units and dental equipment should be followed for daily and weekly maintenance whenever closed water systems or other special water delivery systems are utilized."

One of the most commonly utilized systems for water delivery on dental units now is a closed or self-contained water system. This means that the dental unit is not directly connected to the municipal water supply, and a separate water bottle on each unit is filled with tap or distilled water for delivery during dental procedures.

Both tap and distilled water contain some levels of microbial contamination—typically at the recommended levels for potable water: <500 colony forming units (cfu's)/ml. Over time, however, the cfu's can increase to levels higher than 500 cfu's, because the microorganisms begin to colonize in the tubing and the water bottle and multiply. Using distilled water can actually increase cfu's in dental units, if the facility uses a distiller that is not properly maintained. The distillation process does not produce sterile water, and the chlorine ions that are present in tap water are removed, which increases the potential for growth of microorganisms.

Self-contained water delivery systems must be cleaned and maintained on a regular basis to ensure that the water delivered to the handpieces, air/water syringes and ultrasonic handpieces meets the water quality standard. One of the most efficient means to accomplish this task is to utilize a complete waterline treatment system including a daily maintenance product and an antimicrobial cleaner for periodic use.

Providing safe water from dental units is an ethical and professional responsibility

These products should be waterline cleaners that have been cleared by a regulatory agency, such as the U.S. Food and Drug Administration (FDA) and/or U.S. EPA, which has a cooperative relationship with the Canadian Department of Health and Welfare. The products include tablets and liquids which are added to the water each time the bottle is filled. This procedure must be followed by a periodic "cleaning," which is designed to clean the system and remove microbial contaminants that may be accumulating in the lines. Some dental teams are not aware of the need for this additional cleaning step.

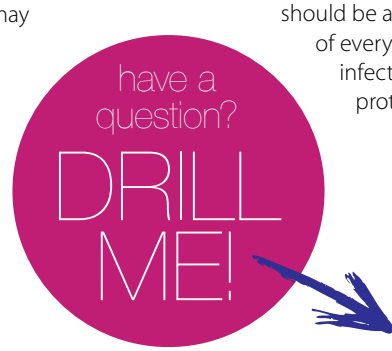
To help make this simpler for dental teams to properly maintain their water delivery systems, some manufacturers have introduced products that are designed to provide both the maintenance and cleaning functions.

One example of this type of product is Team Vista™ from Hu-Friedy (hu-friedy.com), a kit that contains a liquid concentrate, VistaClean™ that is added each time the water bottle is filled. It is an organic, citrus-based solution that is safe for patients and the environment, non-corrosive to dental units (unlike hypochlorite or bleach), does not affect bond strength of dental materials and helps keep dental waterline tubing clean. The kit also contains VistaTab™, an effective antimicrobial cleaner that contains chlorine dioxide and is non-corrosive to dental units.

While the continuous-use products like VistaClean™ are effective in controlling waterline contamination, they do not eliminate it altogether. Over time, microbial and other contaminants can build up in the waterlines, thus affecting the water quality and potentially clogging the tubing. Using an antimicrobial cleaner like VistaTab™ on a regular basis is a critical step in maintaining the quality of the dental unit water delivery system.

The CDC recommends periodic testing of dental unit water as a quality control measure. It is important to evaluate the effectiveness of the maintenance of the water delivery system protocol. There are test kits available through several companies that can assist the dental team in evaluating the quality of the water from the dental units. Three companies that provide these test kits include: Proedgedental (Proedgedental.com), Millipore Corporation (millipore.com), and Nelson Analytical (nelsonanalytical.com). Easy to use, these kits test for quantities of cfu's—not for specific microorganisms—but are very useful in evaluating the effectiveness of the maintenance protocol for the waterlines.

Providing safe water from dental units is the ethical and professional responsibility we have to our patients and dental team members. Water quality protocols should be an integral part of every dental facility's infection prevention protocol. ●



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