Dental Unit Water Management
Water in and Water out: What's the Difference?

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The management of and specific protocols for dental unit waterlines (DUWLs) have risen to the surface, and a new buzz phrase has come into vogue: "water in, water out." But what does this all mean? It's great to have a new saying to assist with in-office protocols if dental team members have a clear understanding of the meaning. And why does this topic continue to be so important? Let's take a look.

On Oct. 31, 2022, the Centers for Disease Control and Prevention (CDC) issued a health advisory emphasizing the importance of following existing recommendations for maintaining and monitoring DUWLs due to multiple outbreaks of nontuberculous Mycobacteria (NTM) infections that occurred in children who received pulpotomies in pediatric dental clinics where the dental treatment water contained high levels of bacteria.[1]

Although dental unit water has never been a public health hazard, this is not the first time these infections from untreated dental unit water have occurred. On Sept. 13, 2015, the Georgia Department of Public Health was notified of a cluster of pediatric Mycobacterium abscessus odontogenic infections in children who had had a pulpotomy at a pediatric dentistry practice.[2] Then on Oct. 17, 2016, 37 children were hospitalized for dental infections after having pulpotomies at a Southern California dental clinic. Health officials traced the infections to the clinic's water lines, which all contained Mycobacterium.[3]

What is "water in," and what does it mean?

Think of "water in" as source water, patient care water, water for dental treatment, and water going INTO the dental unit. The water used for patient care must be treated, maintained, and tested to ensure safe use for patients.

What are the necessary protocols for "water in" dental unit water?

With the recent CDC advisory, it's more critical now than ever to ensure that practices have safe dental unit water. Many practices state they use sterile or already-treated water for dental unit water; however, that is not enough. An Environmental Protection Agency (EPA) registered daily disinfectant must be utilized, and the CDC has very specific guidance on maintaining and monitoring DUWLs. It may be a surprise to know that the U.S. Food and Drug Administration (FDA) also has information on the importance of infection control protocols for DUWLs.[4]

Here are the CDC's key recommendations for dental unit water quality:

- Use water that meets EPA regulatory standards for drinking water (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water.
- Use a daily waterline treatment.
- Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the quality of dental water.
- Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product.
- Use sterile saline or sterile water as a coolant/irrigant when performing surgical procedures.[5]

Also, practices should follow the current Organization for Safety Asepsis and Prevention (OSAP), American Dental Association (ADA), and CDC recommendations to flush lines for several minutes each morning and flush any handpieces with air/water for 20 to 30 seconds between patient appointments.[6]

The OSAP, in conjunction with the CDC, has excellent protocols to ensure safe dental unit water:

- Test within one month of implementing a treatment protocol.
- Once you have all passing lines two months in a row, test quarterly — log results!
- Shock waterlines before beginning a treatment protocol, when changing treatment products, if water reveals contamination ≥200CFU/ml, and then quarterly.[5,6]

What is "water out," and how does it differ from "water in"?

Think of "water out" as evacuation water, wastewater, and water that has already been used via saliva ejectors and high-volume evacuation systems; in other words, water going OUT of the dental unit. Dental chair unit evacuation lines remove fluids (e.g., saliva, blood, irrigation water) and debris (e.g., tooth particles, dental calculus, dental amalgam) from the oral cavity during dental procedures.[7]

What are the necessary protocols for "water out" dental unit water?

It is recommended that evacuation line systems be flushed at least daily. Little research has been performed to suggest when during the day it is best to flush the lines, but most practices complete this task at the end of each workday.[8,9] How often flushing the evacuation lines is needed is highly related to patient volume. For example, in a dental school setting, where students see two patients per day, there may not be a need to flush evacuation systems each day. In contrast, a very busy established dental practice with a high volume of patients may need to flush and clean evacuation lines twice a day.

The evacuation system usually consists of a saliva ejector line and a high-volume evacuation line. These two lines have some unique characteristics. For the saliva ejector, "backflow" can occur in the system when previously suctioned fluids present in the suction tubing flow back into the patient's mouth.[10] According to the CDC, this can happen in three ways:

1. When a patient closes their lips around the saliva ejector.
2. When suction tubing attached to the ejector is positioned above the patient's mouth.
3. When a saliva ejector is used at the same time as other evacuation (high-volume) equipment.[10]

Thus, this system line needs to be cleaned appropriately to reduce the possibility of cross-contamination and to maintain patient safety.

The other segment of the evacuation line system is the high-volume evacuation line and the "trap" that is made to collect more solid-type patient materials. Traps should be cleaned and/or disposed of regularly. Many manufacturers of dental chair units recommend cleaning traps weekly, but again, patient volume can play a role in this protocol. Also, remember that traps containing amalgam scrap are considered hazardous waste and require the use of appropriate personal protective equipment as well as appropriate hazardous waste containers for storage and disposal.[8,9]

Can the same cleaning/disinfectant products used for "water in" be used for "water out"?

No. Evacuation line cleaning products are different. And because evacuation lines collect not only patient materials, but also dental amalgam scrap, the products must meet a different standard set by the EPA. The EPA states, "Vacuum lines that discharge amalgam process wastewater to [publicly owned treatment works] must not be cleaned with oxidizing or acidic cleaners, including but not limited to bleach, chlorine, iodine, and peroxide that have a pH lower than 6 or greater than 8."[11] Bleach or chlorine-containing products should not be used, as they maximize the oxidation and dissolution of mercury into the water system.[9,12] Evacuation line products should be compatible with amalgam separator units, so consultation with the manufacturer as well as knowledge of both the amalgam separator instructions for use (IFU) and the evacuation line cleaner IFU is vital for efficient and effective performance of both.

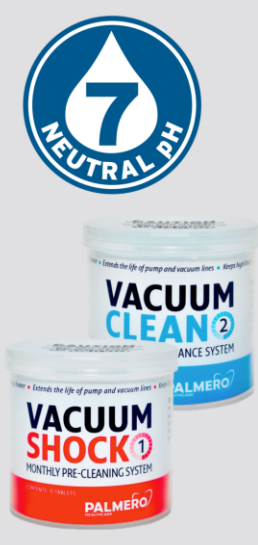
Did You Know?

EPA passed a rule specific to **Best Management Practices for Dental Amalgam Waste**, prohibiting the use of bleach or chlorine-containing cleaners that may lead to the dissolution of solid mercury when cleaning chair-side traps and vacuum lines.

Palmero's Evacuation Product Line – **Vacuum Shock™ and Vacuum Clean™** - features neutral formulations with a pH of 7 that follows best management practices (BMPs) identified by the EPA to help ensure the efficiency of amalgam separators. These products are carefully formulated; they do not contain bleach, chlorine, iodine, peroxide, or any oxidizers.

- Chlorine can cause corrosion of metal components; it should never be used in suction lines.
- Oxidizers can cause mercury to release from amalgam particles which can contaminate the water.

Source: www.epa.gov/eg/dental-effluent-guidelines



Dental unit waterline maintenance and monitoring must become a regular infection control procedure in the dental practice to ensure patients are receiving safe water during the delivery of dental care and the practice complies with EPA standards. Dental team members must be calibrated and standardized to ensure protocols are consistent for both "water in" and "water out" in the dental setting.

We want to thank Dr. Schrubbe for answering our questions, and we invite you to evaluate our safety and protection solutions. For more information, visit palmerohealth.com, call 800-344-6424 or email customerservice@palmerohealth.com.

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