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The Management of Dental Unit Waterlines

Recent news, legal actions, and the evolution of DUWL regulations

Charles D. Schlesinger DDS, FICOI

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This often-overlooked aspect of maintaining a dental office has, in recent years, come to the forefront of the news. A 2023 report from RDH Magazine revealed alarming statistics from a survey of dental professionals about waterline maintenance and safety. Ten percent of respondents reported doing nothing to treat their dental unit waterlines (DUWLs), and even more concerning, 24 percent reported not testing waterlines at all.[i]

In recent years there has been an increasing number of litigation cases related to waterline contamination in dental offices. These lawsuits typically arise when patients or staff are exposed to harmful bacteria, such as *Legionella*, *Pseudomonas* and *Nontuberculous Mycobacterium Abscessus*, due to inadequate maintenance or treatment of dental unit waterlines.

Plaintiffs often claim that contaminated water led to infections or illnesses, citing failures in proper disinfection protocols and lack of compliance with regulatory standards.

Legal actions have prompted dental practices to improve their waterline treatment procedures, invest in advanced filtration systems, and adhere more strictly to guidelines set forth by organizations like the Centers for Disease Control and Prevention (CDC) and the American Dental Association (ADA). Settlements and judgments have sometimes resulted in significant financial penalties, reputational damage, and increased scrutiny from health authorities. As awareness grows, dental offices are encouraged to maintain rigorous water quality monitoring to mitigate legal risks and ensure patient safety.

The CDC reports that dental unit waterlines can harbor **harmful bacteria and other microorganisms**

BACKGROUND

Several studies have revealed that dental unit waterlines (DUWLs) are often contaminated by large numbers of various micro-organisms. Microbial contamination in DUWLs can originate from the municipal waterline that directly feeds into the dental unit, the suck-back of patients' saliva into the line due to the lack of adequate valves, and contamination from bottled water systems. The environmental conditions inside the conduits of the dental unit may facilitate the proliferation of micro-organisms and the consequent formation of biofilm on the interior surface of the pipes of DUWLs.[ii]

Legionella, in particular, thrives in dark places with stagnant water between 77°F and 113°F degrees. *Pseudomonas*, as shown by Mesquita et al., has a pathogenic potential influenced by the light regimen.[iii] Essentially, because waterlines are dark, they are the perfect environment for the proliferation of more dangerous bacteria. Suck-back is a significant infection control problem in conventional metal air-water syringes, saliva ejectors, and high-speed handpieces.

Dental turbines rotate at high speed, and, during the slowdown phase, exert an aspirating effect, which causes organic material present on the tip of the instrument to be drawn inside, thereby giving rise to the phenomenon of back-contamination of the water supply. [iv]

Contaminated water can harbor bacterial levels thousands of times higher than those allowed in drinking water. Therefore, even if dental handpieces are thoroughly sterilized, connecting them to a contaminated water supply will render sterilization efforts ineffective.

The formation of biofilm in dental unit waterlines (DUWLs) is a universal problem, as indicated by the results of many studies in several countries. Biofilms constitute the main reservoir for continued contamination of water supply systems. [v]

What's Lurking in Your Waterlines

- Pseudomonas
- Legionella
- Nontuberculous Mycobactium Abscessus

** In untreated water*

Nontuberculous Mycobacterium (NTM)

- Infection requires surgical removal of infected tissue to include removal of several permanent teeth and tooth buds
- Significant alveolar and cortical bone destruction
- IV antibiotics that can cause permanent hearing loss

Some of the main determinants of microbial contamination in DUWLs are a very small lumen size (0.5–2 mm) of the tubing used, high surface-to-volume ratio (6:1), and low throughput and the materials of which the tubing is made. Indeed, during working hours, the water flows, albeit for brief periods; outside of working hours, however, the water stagnates. Together, these factors provide the micro-organisms present in the water ample opportunities to build up a strong matrix-encapsulated biofilm that can resist antimicrobial treatments.[vi vii viii ix x xi] This means that the health of both dental staff and patients could be at risk if water is not appropriately treated. [xii]

LEGAL SUITS

Key cases involved major outbreaks in Georgia and California, exposing practices using untreated tap water and neglecting maintenance, which prompted legal action and regulatory attention.

GEORGIA

Lawsuit filed in Clayton County, Georgia; almost two dozen children between the ages of 6 and 10 contracted nontuberculous Mycobactium abscessus infections after getting pulpotomies at the Dentistry For Children In Georgia LLC, formerly Dentistry for Children of Jonesboro.

The complaint claims a Mycobacterium abscessus "outbreak" occurred at the dental clinic's Jonesboro location between 2014 and 2016 and was a result of "severely contaminated water" used during irrigation and drilling.

"Water testing performed after the outbreak showed the microbial levels present in the defendant's water supply was more than 182 times the maximum acceptable level," the complaint contends. A suspected 23 children contracted an infection, according to the lawsuit.

The lawsuit contends the infections happened because Dentistry for Children of Georgia failed to "actively monitor the water quality, failed to disinfect their waterlines, and failed to ensure adequate leadership, protocols, and response to issues related to infection prevention and water quality."

As a result of the Georgia lawsuits, new laws have become a reality for Georgia Dental offices. Dental professionals will now be required to prove that the water they use meets EPA standards of 500 CFU/ml or less, meaning all dental unit waterlines must be tested quarterly. [xiii]

CALIFORNIA

A lawsuit filed against an Anaheim dental clinic alleged that several children contracted bacterial infections from the use of dirty water.

In 2016, a bacterial outbreak in the Anaheim office of Children's Dental sickened dozens of children ranging in age from 2 to 11. Orange County Healthcare Agency officials concluded the bacteria came from the dental office's water system, so they forced the clinic to install new plumbing. [xiv]

As a result, numerous children were affected by a strain of bacteria found in the clinic's contaminated water, causing severe infections that required victims to undergo serious medical treatment. This crisis hospitalized 73 children while hundreds more faced dangerous infections. [xv]

150 families have filed lawsuits against Children's Dental, which has since been acquired by Orange, a California-based Western Dental practice. The Anaheim clinic in question is not owned or operated by Western Dental, but has changed hands. The procedures in question occurred between April and July 2016 when 500 pediatric patients underwent pulpotomies.

This is not the first time the clinic has faced issues with its waterlines. In 2016, Children's Dental shut down twice after tests showed bacteria in the water. [xvi]

CDC BULLETIN

In 2022, the Centers for Disease Control and Prevention (CDC) issued a Health Alert Network (HAN) Health Advisory to emphasize the importance of following existing recommendations for maintaining and monitoring dental waterlines. The CDC provides guidelines on infection control in dental settings which contain recommendations to treat dental unit waterlines and monitor water quality. Because of the potential to form biofilm, the CDC recommends that all dental unit waterlines be treated regularly with disinfectants to meet the Environmental Protection Agency (EPA) regulatory standards for drinking water (i.e., ≤500 colony forming units (CFU)/mL of heterotrophic water bacteria). [xvii]

CDC RECOMMENDATIONS FOR DENTAL PRACTICES

- Ensure that the dental facility has an infection prevention plan that includes policies and standard operating procedures dedicated to maintaining and monitoring water quality.

- Provide staff training on how to properly maintain and monitor dental water quality. Training should be based on the manufacturer's instructions for use of the products and devices used in the dental facility, provided for all new hires, and provided when new equipment is purchased, and then at least annually.
    - Contact the manufacturer of the treatment product or device if you have questions about the instructions for use.

- Document all maintenance records, monitoring results, and employee trainings. Accurate record keeping is an important component of a dental infection prevention program, ensures proper protocols have been met, and establishes accountability. Records should be maintained according to state and federal requirements.

- Report infections suspected to be associated with receiving health care, including dental care, to the appropriate public health authorities. [xviii]

The problem isn't your water...It's your waterlines.

Water that is safe at the source doesn't guarantee it's safe at the dental chair.

THE SOLUTION

The **Sterisil® SAFE**Water **Solution** is a simple and effective way to test, shock and maintain a water supply that is safe for both your patients and staff. The problem is not the water, but the waterlines. Water that's safe at the source doesn't guarantee it's safe at the dental chair.

Without proper maintenance, microbial counts in dental unit waterlines can rapidly exceed 500 CFU/mL, the CDC limit for safe drinking water.

The **Sterisil® SAFE**Water **Solution** simplifies water safety with products that are designed to work better together and a recommended best practices protocol that ensures consistent waterline safety, compliance, and protection for your patients.

WORRY-FREE WATERLINE SAFETY

SAFEWATER
SOLUTION
By Sterisil®

REFERENCES

[i] Williamson A. Dental unit waterline safety: What is (and isn't) going well. Rdhmag.com. Published November 29, 2023. Accessed January 10, 2025.

[ii] Spagnolo A, Sartini M, Cristina M. Microbial Contamination of Dental Unit Waterlines and Potential Risk of Infection: A Narrative Review. Pathogens. 2020 Aug 13;9(8):651.

[iii] Mesquita C, Ribiero A, Gomes A, Santos P. Absecense of Light Exposure Increases the Pathogenicity of Pseudomonas Aeruginosa Pneumonia -Associated Clinical Isolates. Biology (Basil) 2021 Aug 27: 10(9):837.

[iv] Cicciù M. Water Contamination Risks at the Dental Clinic. Biology. 2020;9:43. doi: 10.3390/biology9030043.

[v] Szymańska J. Biofilm and dental unit waterlines. Ann. Agric. Environ. Med. 2003;10:151–157.

[vi] Hoogenkamp M.A., Brandt B.W., de Soet J.J., Crielaard W. An in-vitro dynamic flow model for translational research into dental unit water system biofilms. J. Microbiol. Methods. 2020;171:105879. doi: 10.1016/j.mimet.2020.

[vii] Walker J.T., Marsh P.D. Microbial biofilm formation in DUWS and their control using disinfectants. J. Dent. 2007;35:721–730. doi: 10.1016/j.jdent.2007.

[viii] Garg S.K., Mittal S., Kaur P. Dental unit waterline management: Historical perspectives and current trends.
J. Investig. Clin. Dent. 2012;3:247–252.

[ix] Barbeau J., Nadeau C. Dental unit waterline microbiology: A cautionary tale. J. Can. Dent. Assoc. 1997;63:775–779.
x Shajahan I.F., Kandaswamy D., Lakshminarayanan L., Selvarajan R. Substantivity of hypochlorous acid-based disinfectant against biofilm formation in the dental unit waterlines. J. Conserv. Dent. 2017;20:2–5.

[xi] Sedlata Juraskova E., Sedlackova H., Janska J., Holy O., Lalova I., Matouskova I. Legionella spp. in dental unit waterlines. Bratisl. Lek. Listy. 2017;118:310–314. doi: 10.4149/BLL_2017_060.

[xii] Centers for Disease Control and Prevention . Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta GA Centers Disease Control Prevention, US Dept of Health and Human Services. Centers for Disease Control and Prevention; Atlanta, GA, USA: 2016.

[xiii] https://proedgedental.com/learning-center/georgia/

[xiv] https://www.nbclosangeles.com/news/local/parents-lawsuits-dental-group-in-anaheim/2375/

[xv] https://verdictvictory.com/blog/dan-hodes-lead-counsel-childrens-dental-group-lawsuit/

[xvi] https://www.beckersdental.com/dentists/california-dental-ojice-shut-down-for-water-contamination-in-2016-infection-issues-allegedly-persist/

[xvii] https://archive.cdc.gov/#/details?url=https://www.cdc.gov/han/2022/han00478.html

[xviii] Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Oral Health; March 2017.

SAFEWATER SOLUTION
By Sterisil®

The Sterisil® SAFEWATER Solution is Safety Simplified

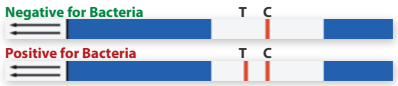
The only end-to-end solution for dental unit waterlines.

TEST

*FAST*Check15®

15-minute in office waterline test strip

- ✓ Fast, reliable, real-time results
- ✓ Quickly validate water quality and take action to remediate immediately



SHOCK

Citrisil™ Shock

Specifically formulated to clean dental unit waterlines

- ✓ Shock treatments that ensure peak safety levels
- ✓ No straw changes or dummy straws when shocking*

MAINTAIN

Sterisil® Straw

No daily maintenance required

- ✓ Continuously treats waterlines for 365 days
- ✓ Eliminates need to empty bottles and flush lines at the end of each day

*When using Sterisil® Straw

Regular in-office testing, combined with proper shock protocols, will help you pass more tests, and keep your operatories up and running.

The only complete solution designed to work *better together*.

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