DENTAL UNIT WATERLINE MANAGEMENT

Dental Water Management

DentaPure™ Cartridges

What you can't see may harm your patients, your staff and your practice's reputation.

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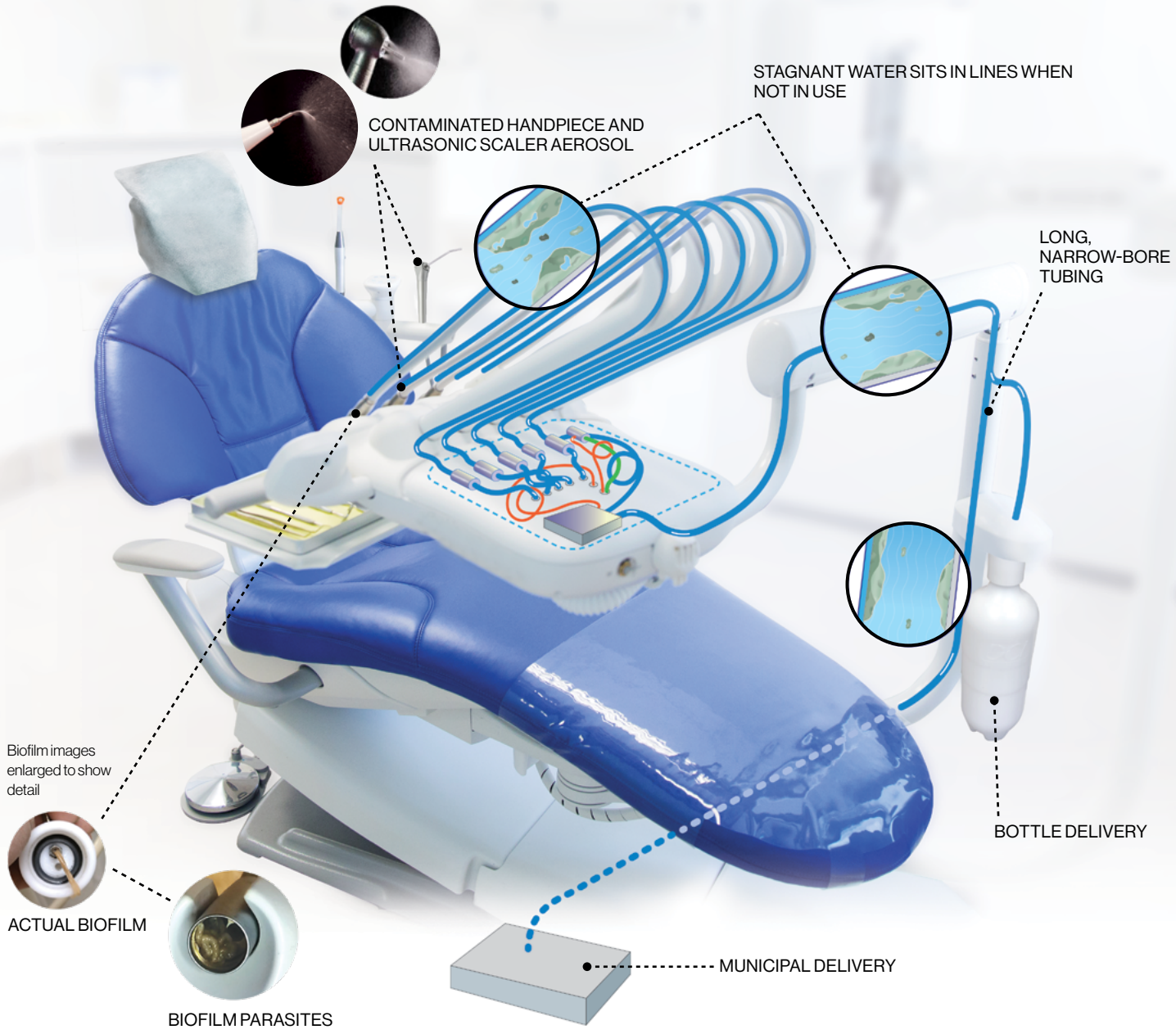
The untreated procedural water in your dental unit waterlines is contaminated

Removal or inactivation of DUWL biofilms requires use of chemical germicides[1]



[1] CDC MMWR: Guidelines for Infection Control in Dental Health-Care Settings - 2003

Stages of biofilm growth in untreated waterlines

UNCONTAMINATED WATERLINE

BIOFILM FORMATION, EARLY STAGE

BIOFILM MATURATION

Actual size: 2 mm

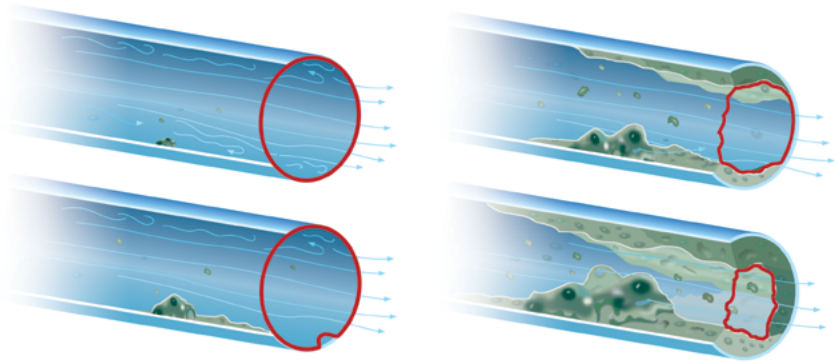
The challenge with dental unit waterlines

Narrow tubing → microbial colonization → biofilm growth

Research shows that the extremely narrow design of waterline tubing promotes water stagnation and bacterial accumulation[1]

Using an in-line water heater? If your water exceeds 20º C, you're promoting even more microorganism growth[1].

Stages of biofilm development



The biofilm problem

Biofilm is a complex matrix of bacteria, fungi and algae bound together in a sticky gel of polysaccharides that forms a microcolony. The microcolony attaches to a surface, such as the interior of dental unit waterline tubing.

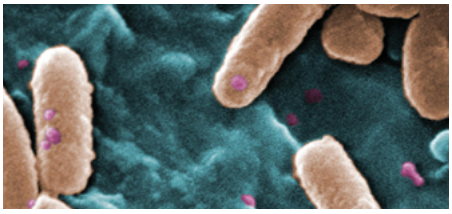
Once colonies of microorganisms start surviving inside your waterlines, they begin to build a sticky matrix that creates visible biofilm, or "slime". This sticky, slimy substance protects the biofilm community, allowing for further multiplication of microorganisms. When left untreated, or improperly maintained, the water flowing through these contaminated DUWLs can potentially harm your patients, your staff and ultimately your practice's reputation.

Bacteria by the numbers

- Untreated waterlines can reach up to 1,000,000 CFU/mL[1]
- Microbial counts in newly installed dental waterlines can reach as high as 200,000 CFU/mL within 5 days[2]

Documented diseases and ailments caused by opportunistic waterline bacteria:

Legionnaires' disease
Legionella pneumophila, Credit: Shutterstock



Pneumonia
Pseudomonas aeruginosa,
Credit: CDC / Janice Haney Carr

Respiratory and soft tissue infections
Nontuberculous Mycobacteria (NTM),
Credit: OMICS International

Discover the problem you may not realize you have.

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[1] CDC MMWR: Guidelines for Infection Control in Dental Health-Care Settings - 2003

[2] Barbeau J., Tanguay R., Faucher E., Avezard, C., Trudel L., Co^te L. and Pre'vost A.P. 1996. Multiparametric Analysis of Waterline Contamination in Dental Units. Amer Soc for Microbiology. 62,11:3954–3959

The reality

Impact of non-compliant DUWL treatment is too great to ignore

Multiple incidents of mycobacterial infections and at at least one fatality from Legionnaires' disease have all been traced back to contaminated dental unit waterlines

A major infection control breach in 2016 at a Southern California pediatric dental clinic resulted in over 70 children being hospitalized and treated for Mycobacterium (NTM) infections following pulpotomies.

Over 20 children required medical treatment as a result of infection acquired at an Atlanta, GA area pediatric dental clinic following a similar bacterial outbreak attributed to contaminated dental unit water in September 2015.

Prognosis for nontuberculous mycobacterial infections in children

- Most children require surgical treatment[3]
- Comes with risk of damage to the facial nerve and will always result in a scar[3]
- Swelling, redness and pain around the infected tooth can occur, with the bacteria often spreading to the gum and jawbone. In those cases, stopping the infection often means removing part of the jaw itself, making it a longterm issue for these children[4]

Treatment continues when affected children leave the hospital

- IV antibiotic treatment frequently prescribed post-operatively[3]
- Antibiotic treatment can last up to 24 months in some cases[5]
- Comes with a risk of high-frequency hearing loss[6]
- Even if infections are diagnosed early, adequate treatment may be complicated by inability to reduce immune suppression, antibiotic adverse reactions and patient allergy[5]

How is your dental office treating DUWLs to minimize the potential for microbial growth?

How Cervicofacial nontuberculous mycobacterial (NTM) lymphadenitis impacts children

Unilateral, non-tender, cervical lymphadenopathy with violaceous discoloration[3]. (Image not associated with CA or GA outbreaks.)

Child with a cervicofacial Mycobacterium haemophilum lymphadenitis presenting as a fluctuant swelling with red skin discoloration[5]. (Image not associated with CA or GA outbreaks.)

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[3] Haahr Iversen R., Illum P. Cervicofacial nontuberculous mycobacterial lymphadenitis in children. Dan Med J 59/1; 1-4

[4] Dr. Matthew Zahn, Orange County Healthcare Agency

[5] Jerome A. Lindeboom et al. Clin. Microbiol. Rev. 2011;24:701-717

[6] Hatzenbuehler L.A., Tobin-D'Angelo M, Drenzek C., Peralta G., Cranmer L.C., Anderson E.J., Milla S.S., Abramowicz S., Yi J., Hilinski J., Rajan R., Whitley M.K., Gower V., Berkowitz F., Shapiro C.A., Williams J.K., Harmon P., Shane A.L.; Pediatric Dental Clinic–Associated Outbreak of Mycobacterium abscessus Infection, Journal of the Pediatric Infectious Diseases Society, Vol 6, Iss 3, 1 Sept. 17, P e116–e122

The solution

Reduce your daily DUWL treatment to a simple annual routine

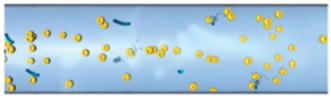
One DentaPure™ Cartridge = 365 days of compliant, dental unit water*

The DentaPure™ Cartridge provides compliant treatment water, ensuring that your practice meets or exceeds microbiological water quality standards.

How it works:

The DentaPure™ Cartridge contains non-allergenic iodinated resin beads

As water passes through, the resin releases 2 - 6 ppm of elemental iodine (I_2) during a typical dental treatment



The elemental iodine controls the bacteria, keeping dental unit water compliant for 365 days*

Did you know?

- Elemental iodine as found in the DentaPure™ Cartridge is not known to cause sensitivity reactions
- Elemental iodine (I_2) contains no allergenic proteins. Patients are not allergic to iodine; they are allergic to the protein sometime attached to it[7]. Contact Crosstex with any questions or concerns related to iodine and patient treatment
- The DentaPure™ Cartridge uses the same technology developed for NASA to ensure that water consumed in space is safe from harmful levels of bacteria and many other harmful organisms
- Many university systems and dental schools rely on the DentaPure™ Cartridge for compliance in their clinics

* Or, 240L of water if usage records are kept ; compliant with the current EPA potable water standard <500 CFU/mL

[7] Schabelman E., Witting M. The relationship of radiocontrast, iodine, and seafood allergies: a medical myth exposed, J Emerg Med. 2010 Nov; 39(5):701-7. doi: 10.1016/j. jemermed. 2009.10.014. Epub 2010 Jan 4.

The benefits

Minimize the potential for microbial growth

Compliant[1]

- DentaPure™ Cartridges continuously provide one-year or 240L of compliant[8] procedural water that exceeds the current EPA standard (<500 CFU/mL) for potable water.
- EPA registered to provide ≤200 CFU/mL for one-year or 240L of water[9].
- FDA 510k[9].
- Use is not restricted by the EPA Rule BMP for dental amalgam waste[10].

Effective

- Reduces patient and staff bacterial exposure by eluting elemental Iodine into water used during patient treatment.
- Elemental iodine (I_2) is non-allergenic – no protein is attached to it[11].

Simple

- For use in independent water bottles and dental units municipally plumbed to city water.
- For use with all potable water.
- Minimal maintenance required following installation.
- Fewer protocols reduce the possibility of human error.
- No routine shocking.
- Bottle-style cartridges can be quickly and easily installed by office staff.
- Dispose of depleted cartridges in the regular office trash.
- Cost-effective.

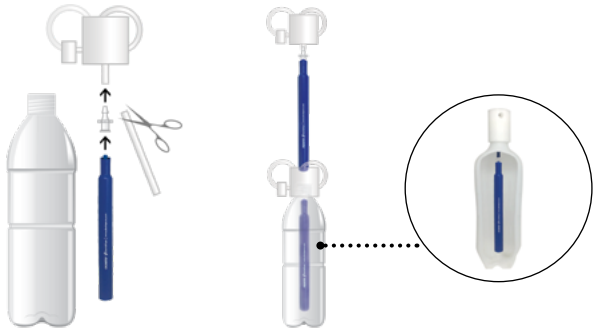
Reliable

- Will not interfere with dental materials and bonding[12].
- No concerns with corrosion or etching[13].
- No harsh chemicals.

Easy installation in minutes

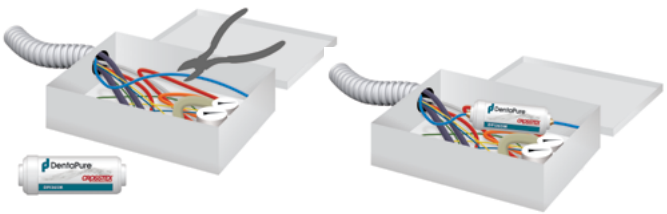
Independent water bottle systems

The DentaPure™ DPI365B10 Cartridge is easily installed by dental office staff via included luer fitting onto your dental unit's existing pickup tube



Municipally plumbed systems

The DentaPure DPI365M10 Cartridge for units plumbed directly to city water installs in the Jbox via included poly-flo fittings. Service Technician installation recommended



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Note:

While DentaPure™ Cartridges do not require monitoring, HuFriedyGroup supports all recommended/required monitoring guidance. Follow the DentaPure™ Cartridge IFU to ensure results within an acceptable range. Contact HuFriedyGroup for remediation support for results outside of the EPA current standard for potable water guidelines. DO NOT shock, or run anything other than water through a functional DentaPure™ Cartridge.

8. Compliance with current EPA potable water standard <500 CFU/mL
9. DentaPure™ Cartridge EPA Est. No. 52252-MN-001 / EPA Reg. No. 74245-5 / FDA 510K #K992893
10. https://www.epa.gov/eg/dental-effluent-guidelines-documents
11. Schabelman E., Witting M. The relationship of radiocontrast, iodine, and seafood allergies: a medical myth exposed, J Emerg Med. 2010 Nov;39(5):701-7. doi: 10.1016/j. jemermed.2009.10.014. Epub 2010 Jan 4.
12. Puttaiah R. Effects of Low Grade Iodine in Dental Unit Waterlines On Shear Bond Strength of a Dentin Bonding Agent, Baylor College of Dentistry
13. Data on file.

Revolutionize your waterline maintenance

Daily waterline maintenance becomes a simple, annual routine*

Benefits for both independent water bottle systems & municipal systems plumbed to city water:

- NO routine shocking
- NO distilled water required
- NO harsh chemicals
- NO silver
- NO special disposal requirements
- NO allergenic iodine proteins[7]
- NO concerns with dental materials and bonding[12]
- NO concerns with dental unit corrosion or etching[13]
- An effective method of treating municipally plumbed dental units when no other cost-effective treatment is available

Using tablets? Using tablets for waterline compliance may come at a cost to your practice.

The disadvantages of tablet use add up:

- Approximate cost for following tablet Instructions For Use (IFU) = € 821/year for one operatory†
- Shocking and monitoring: Required procedures included in ALL tablet IFUs - Necessary to maintain compliant CFU counts
- Staff time and expense to manage daily tablet use as well as shocking and monitoring procedures per IFUs
- Tablets must be added at every water change and given the proper time to dissolve
- Service technician calls may increase due to a gradual buildup of tablet residue and undissolved tablets potentially blocking connections and narrow passageways. Tablet residue and undissolved tablets may also adversely affect expensive handpieces over time
- Potential risk of staff exposure to daily chemicals

Using any of the following alone in a self-contained water system to control bacteria?

- Tap
- Distilled
- Sterile
- Commercially Bottled
- Reverse Osmosis
- Individual Office Filtration System
- Commercial Water Filtration System in Building

- Simply using source water containing <500 CFU/mL of bacteria in a self-contained water bottle will not eliminate bacterial contamination in treatment water if biofilms in the water system are not controlled. "Removal or inactivation of DUWL biofilms requires use of chemical germicides[1]"
- Based on biological instability of reverse osmosis water, efforts to minimize bacterial growth in the distribution system (DUWL) should be actively treated for compliance to CFU/mL[14]

For more information on how the multi-award-winning DentaPure™ Cartridge can help simplify your DUWL maintenance protocols, visit:

HuFriedyGroup.eu/
Dental-Unit-Waterlines

Product ordering Information:

Ref.#	Description	Quanlity
DPI365B10	Independent Water Bottle Cartridge	1 Each
DPI365M10	Municipal Cartridge	1 Each
DPTEST	Iodine Test Strips	50 Test Strips/Bottle

* Or, 240L of water if usage records are kept

† Includes cost for initial shock, daily tablets, shocking per IFU and quarterly waterline testing

[12] Puttaiah R. Effects of Low Grade Iodine in Dental Unit Waterlines On Shear Bond Strength of a Dentin Bonding Agent, Baylor College of Dentistry

[13] Data on file

[14] Park SK1, Hu JY. Assessment of the extent of bacterial growth in reverse osmosis system for improving drinking water quality. J Environ Sci Health A Tox Hazard Subst Environ Eng. 2010;45(8):968-77

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