Dental Unit Waterline Safety

Standards of Care & Infection Control

Protocol

Presented by: Naketa Stoudemire

THE REAL IMPACT: PATIENT SAFETY

https://youtu.be/WYAa4mnILpQ?si=5HOgkrPWzXToSZ8S

Would any of you drink water from the dental unit?

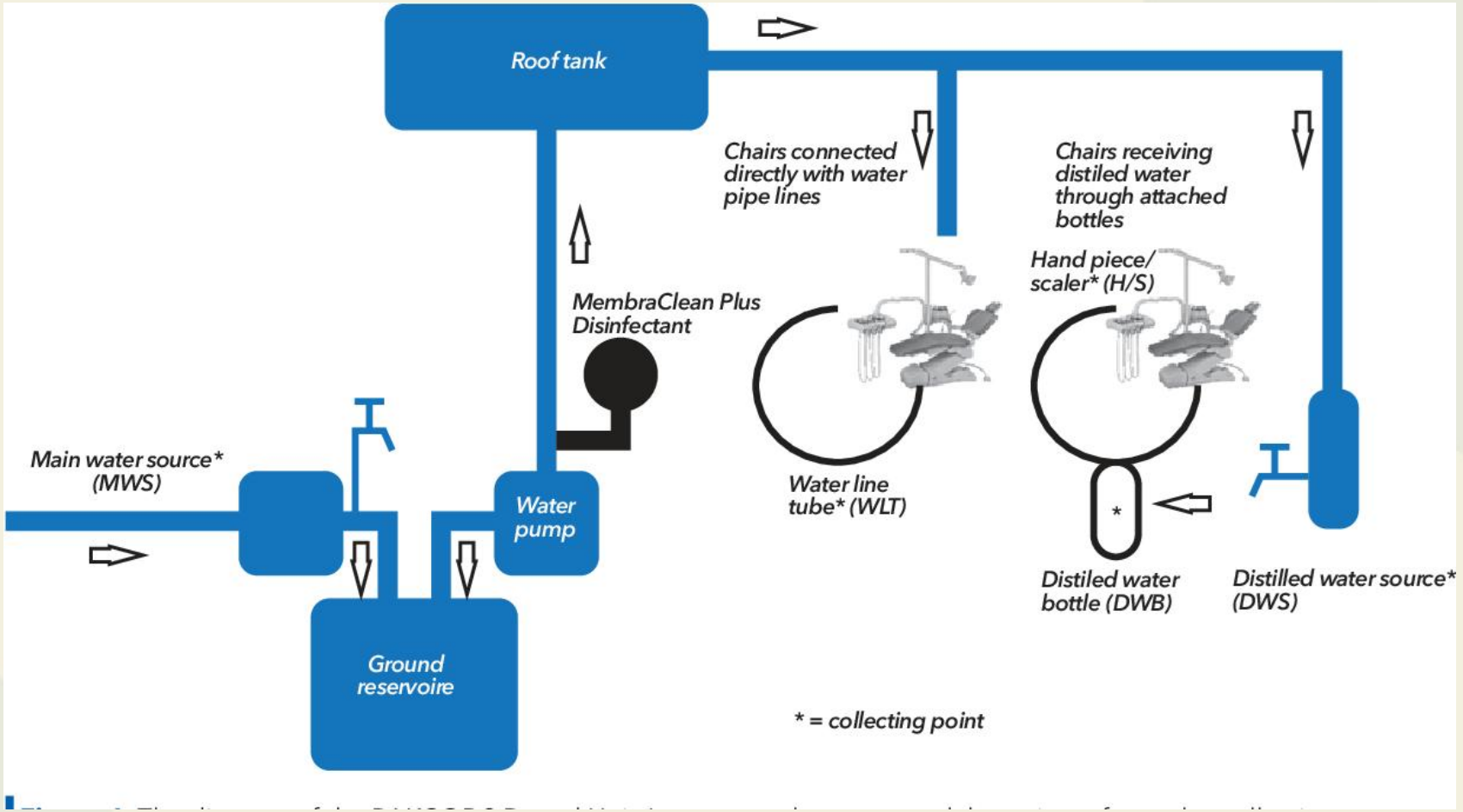
Why or why not?

Today, we will learn about the safety of dental waterline units because DUWL contamination is a direct patient safety issue. We have a professional, legal, and ethical responsibility to maintain standards of care and prevent harm to our patients.

SESSION OBJECTIVES

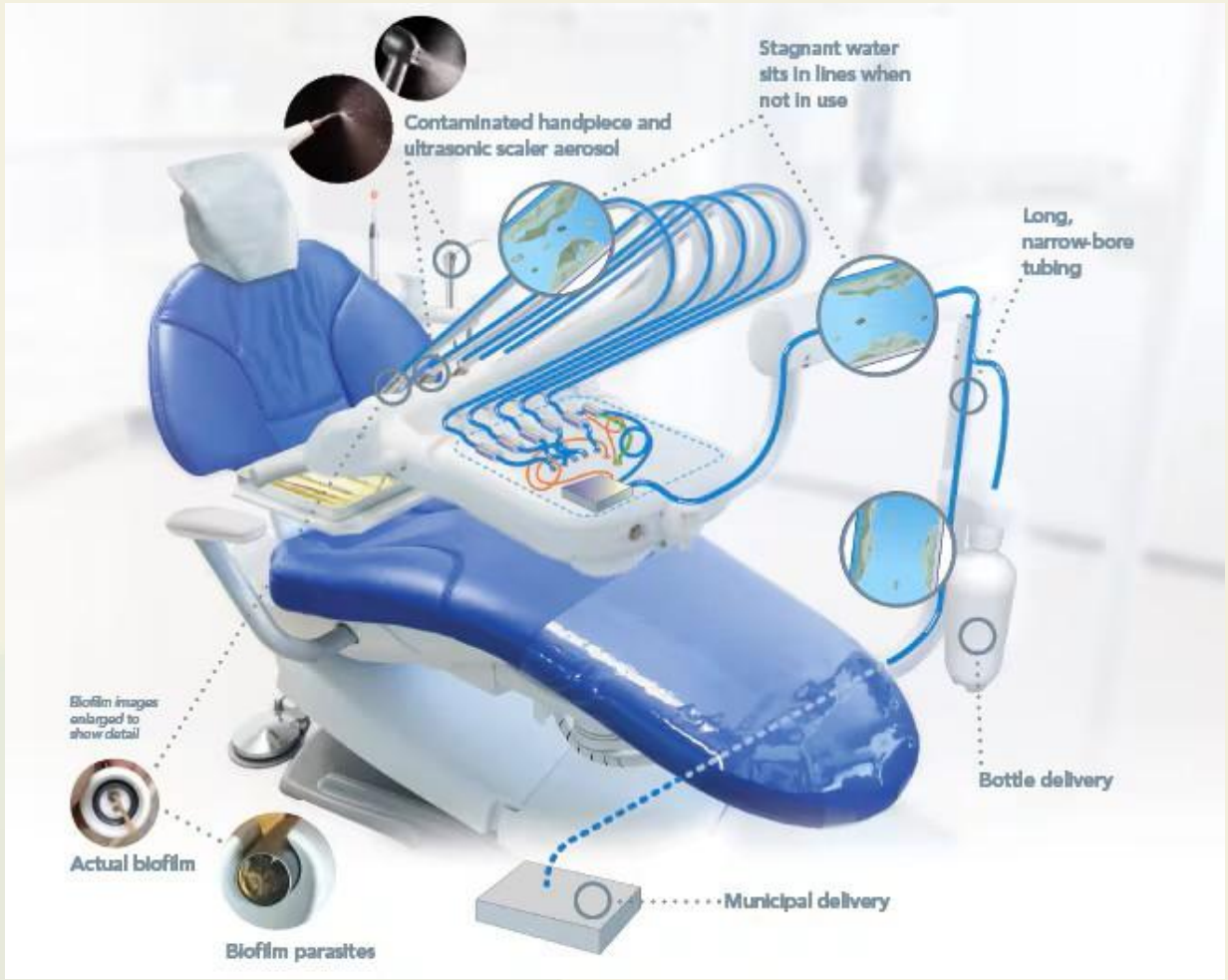
- **Define** DUWLs and primary sources of contamination.
- **Explain** biofilm formation and systemic risks in the dental office.
- **Demonstrate** appropriate DUWL standards and daily maintenance procedures.
- **Differentiate** between compliant and non-compliant practices in the dental office.
- **Advocate** for strict adherence to safety protocols.

WHAT ARE DENTAL UNIT WATERLINES?



Narrow plastic tubes that deliver water to handpieces, air/water syringes, and ultrasonic scalers.

SOURCES OF CONTAMINATION



Sources of Contamination

Municipal: City water mains.

Patient Backflow: "Suck back" during pressure drops.

Stagnation: Overnight and weekend sitting.

CAUSE OF CONTAMINATION

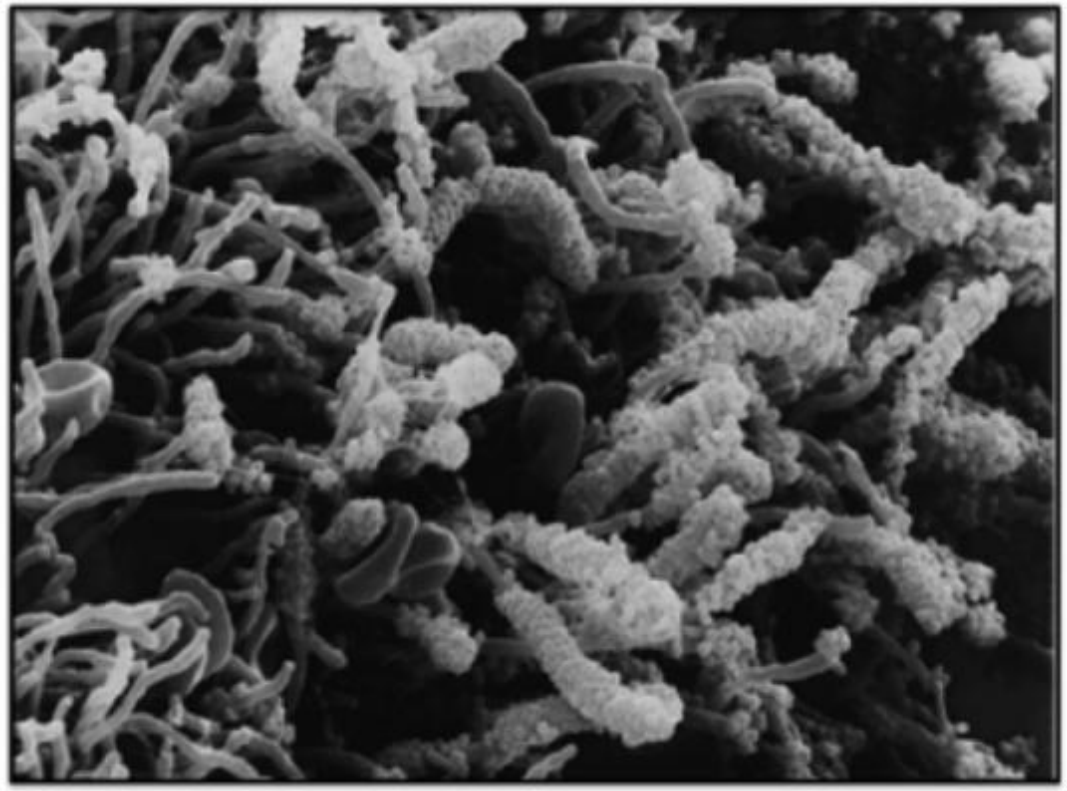
BIOFILM: THE "PERFECT STORM"

Formation Process

Microorganisms attach to inner tubing walls and secrete a protective **"slime layer"** that resists chemical germicides.

Factors:

+ Small bore diameter (high surface area).
+ Low flow rates.
+ Frequent water stagnation.



KEY PATHOGENIC THREATS

Legionella

Causes **Legionnaires' Disease**; thrives in warm, stagnant water; lethal to the vulnerable.

Pseudomonas

Common opportunistic pathogen in healthcare; forms robust biofilms.

Mycobacteria

Nontuberculous species highly resistant to heat and standard chemicals.

CDC WATER STANDARD

≤ 500

CFU / mL

All dental units must meet EPA drinking water standards for nonsurgical care. This is the **absolute maximum** allowable limit for heterotrophic bacteria.

MAINTENANCE & MONITORING

- **Daily Flushing:** 20–30 seconds between patients; 2 minutes at morning start.
- **Chemical Treatments:** ICX tablets or cartridges; regular antimicrobial "shock" cycles.
- **Routine Testing:** Mail-in or in-office monitoring (Quarterly minimum).
- **Documentation:** Maintain a log of tests, failures, and corrective actions.

SHOCK TREATMENT

CASE STUDY 1: SAMPLING ERROR

Scenario Element	Detail / Result
The Professional	Alex, Dental Assistant
The Error	Sampled immediately after procedure without flushing.
Lab Result	1,200 CFU/mL (FAIL)
Critical Next Step	**DOCUMENTATION:** Recording failure and "shock" treatment.

CASE STUDY 2: STAGNATION

The Observation: After a 4-day weekend, water is cloudy with a faint odor.

The Cause: Rapid proliferation of biofilm due to long-term stagnation.

The Fix: 2-minute flush; immediate shock treatment if odor/cloudiness persists.

In Summary

- You have learned how biofilm forms in DUWLs.
- You know the risk that biofilm formation in DUWLds poses to patients.
- You know how to maintain and monitor DUWLs according to CDC standards.

CDC compliance is the baseline for ethical practice. It is everyone’s responsibility to ensure the safety of the patient entrusted to your care.

References

1. American Dental Association. (2024). Dental unit waterlines.

https://www.ada.org/resources/ada-library/oral-health-topics/dental-unit-waterline

2.Bayani, M., Raisolvaezin, K., Almasi-Hashiani, A., & Mirhoseini, S. H. (2023).

Bacterial biofilm prevalence in dental unit waterlines: A systematic review and meta-analysis. BMC Oral Health, 23(158). https://doi.org/10.1186/s12903-023-02885-4

3. Buitrago, J. M., Kolbe, R. J., & Siqueira, M. F. (2023).

Dental unit waterline testing practices: An 11-year retrospective study. BMC Oral Health, 23(867). https://doi.org/10.1186/s12903-023-03590-y

4. CBS Mornings. (2016, October 11). Was Calif. dentist tied to bacterial infections not following protocol? [Video]. YouTube. http://www.youtube.com/watch?v=WYAa4m

5. Centers for Disease Control and Prevention. (2024). Dental unit water quality.

https://www.cdc.gov/dental-infection-control/hcp/summary/dental-unit-water-quality.html

6. Chen, P., Zeng, J., Hong, F., Li, C., Wang, H., & Yu, X. (2024).

The importance of biofilm contamination control for dental unit waterlines: A multicenter assessment. Journal of Oral Microbiology, 16(1).

https://doi.org/10.1080/20002297.2023.2299496

7. U.S. Food and Drug Administration. (2025). Dental unit waterlines.

https://www.fda.gov/medical-devices/dental-devices/dental-unit-waterlines