Bacterial hazard in dental practice.

How clean is the water in your dental unit?

We talk to Professor Walsh about the current problems with water quality in DUWL and new recommendations from ADA guidelines.

Q Professor Walsh, what really is the biofilm?

A Biofilm is a very well structured layer of different microorganisms such as bacteria and fungi that form colonies in wet places. Mould in you shower or slime in your garden are forms of biofilm. Dental plaque is a biofilm and we all know how difficult it is to remove it. The dental unit waterlines are definitely a great environment for the growth of complex biofilms.

Q How does biofilm affect human health?

A There are several conditions linked to the presence of organisms living inside the biofilm. One of them is legionella pneumophila, which can cause legionairres disease but also condition called pontiac fever, that many people mistake for a flu. We need to remember that many patients might have a compromised immune system, such as elderly, diabetics, smokers etc. and they are more prone to the infections from aerosols, generated by ultrasonic scalers and high speed handpieces. The aerosols transmit the microorganisms from the dental unit biofilm into the air and both patients and staff breathe this in and potentially can get infected.

Q What are the findings from the research in terms of water quality in dental unit waterlines?

A In the last 25 years we have done a range of studies around the topic of water quality in DUWL. What we found is very consistent with the reports from UK, US and Europe. The studies confirm that if there is no flushing and water additives used the level of bacteria is very high and way above the 200 CFU's limit recommended by ADA. The threshold of 200 CFU's is used as a guide to consider water of a medical grade.

We also have found variations between the water quality in different brands of dental chairs. On the contrary we found out that when continuous treatment of water is taking place, combined with periodic shock treatment and water testing, the contamination was very low. Unfortunately, only about 1 in 5 of the dental practices would comply with the regulations, most surgeries do not even realise that they have a problem.

Q Is the water coming into dental unit same quality as the water coming out of the instruments?

A No, this is not the case at all. The dental chair consists of several meters of very narrow dental tubing, where the water flows very slowly and has a tendency to stagnate. The chlorine from the mains usually gasses off and simply becomes inactive. Unfortunately, if we do not use an active water treatment, the quality of the exit water is not as good as input. It is no wonder, when you drink from the dental cup you have to spit out into the spittoon!

Q Why is it important to test your waterlines on regular basis?

A With different types of tubing and designs of the dental chairs as well as different quality of water being fed in the system, different locations and climates we have a very complex system, that needs to be individually measured. If you actually never test your water and simply rely on speculations, you will never know how your water is performing according to the guidelines.

Q Why is it important to do the shock treatment?

A Shock treatment is different from the continuous water disinfection. It is designed to detach and break down the biofilm, rather than suppress the growth of bacteria. Once microorganisms are formed into biofilm, they are much more difficult to kill. Only a specific intervention to detach and break down the biofilm can do it, and the shock treatment is specifically designed for it. It breaks down biofilm into little pieces and allows it be rinsed, leaving the surface clean.



Professor Laurence Walsh

Q Can bleach solution be considered a shock treatment?

A I have concerns regarding using the household bleach as a shock treatment. Research shows a lot of problems with the stability of bleach, for example exposure to light, degradation because of time and temperature. Unless you test the available free chlorine in your domestic bleach, you actually do not know, if it is active at all. Perhaps it has been sitting in the warehouse for a long time. When we use the designated product designed specifically to break down the biofilm, we know, that it is chemically active, so the efficacy is predictable. Domestic bleach can also interact with the central blocks founded in the dental chair and cause severe corrosion. You would not use it unless the manufacturer guarantees it.

Q Once the waterlines are clean how do maintain the clean system?

A Once the system and clean and tested, we need to implement the antimicrobial chemical, that will stop the organisms from replicating. There are different products that can do this. How they differ is based on how quickly they work and how stable they are over the period of time. Sometimes the best solution is to combine the best and most effective agents and put them together to achieve the ideal efficacy and stability.

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How clean are your dental unit waterlines

Did you know...

Non treated dental unit waterlines are likely to have 200 to 400 times higher CFU's counts than recommendations from the ADA guidelines!

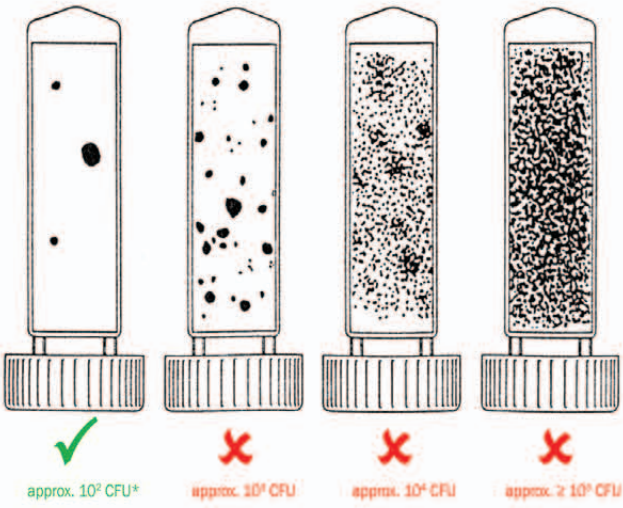
Disinfection with tablets, filters or distilled water will not always remove biofilm from waterlines.

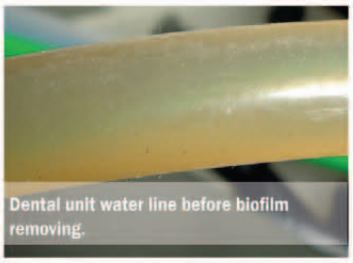
Only periodical water re-testing will guarantee the effectiveness or failure of the treatment used.

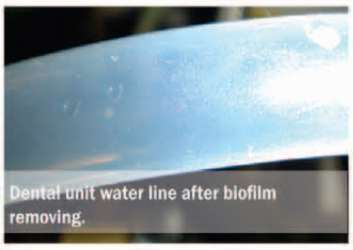
Each surgery requires a customised evaluation and water treatment planning depending on the level of contamination, type of dental equipment, climate and the quality of the public water.



A simple water test can give you an indication of whether your water is safe




Dental unit water line before biofilm removing.


Dental unit water line after biofilm removing.



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Q Are we going to see some changes in terms of water testing in the new ADA guidelines?

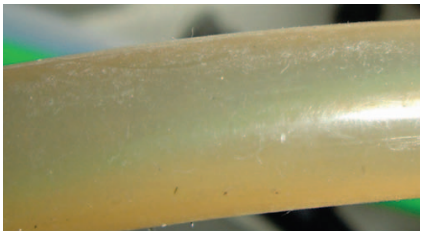
A The ADA guidelines are based on evidence and when we review them we take studies and research into consideration. Given a lot of recent evidence of the bacteria presence in the DUWL, we will be recommending the dental surgeries to start water testing on regular basis and if they find out that the levels are higher than recommendation from ADA, they will have to intervene with the shock treatment and retest the water again. In the new ADA guidelines, we will be talking about the full protocol around water testing, shock treatment and retesting the water. This is new to the previous guidelines, but a very important addition to our recommendations in Australia.

Q Are there any issues with dropping white tablets into the bottle attached to the chair without wearing the gloves?

A Yes, if we do it without gloves we can contaminate the system with the organisms from our skin. As a matter of fact, there is a whole system of hygiene protocol around the chair bottles. We always recommend cleaning them and leaving them to dry overnight to prevent from the regrowth of microorganisms. It is very important to read carefully the manufacturer instructions. Often surgeries use tablet system, but completely ignore the shock treatment and follow up with the water test. They do not realise that by putting a tablet into the bottle they are not following all the instruction steps carefully and as a result they ending up with the non-compliant system.

Q If the dental unit is plumbed into the mains, how do perform the shock treatment?

A Some chairs come with the dosing bottles others have external bottles attached to them. If the unit does not have a bottle the retrofit is very easy. All you need to do is to ask your service technician about it. This very simple addition will allow you to use chemical additives for daily disinfection and periodic shock treatment. ◆



Dental unit water line before biofilm removing.



Dental unit water line after biofilm removing.

Professor Laurence Walsh AO

Laurie is a clinically active specialist in special needs dentistry who is based at the University of Queensland in Brisbane. His research group have undertaken extensive research in infection control and clinical microbiology, and Laurie has been teaching these subjects for over 25 years at postgraduate level, including as chief examiner in microbiology for the RACDS for the past 20 years. He has presented invited courses and lectures on infection control across Australia and internationally. Laurie has written well over 60 articles on infection control and in addition published over 320 journal papers and a further 190 technical reports and literature reviews. He has been a member of the ADA Infection Control Committee since 1998, and served 6 years as its chair. He has contributed extensively to infection control guidelines and other resources in use nationally.

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