Is your water line watersafe®?

schülke watersafe®
The new standard in protection against biofilm

Completely remove biofilm in the dental unit water line with the schülke watersafe® starter kit. Then protect from biofilm re-growth with continual dosing of schülke watersafe® cleaning solution, and disinfect the water bottle quarterly with schülke watersafe® bottle cleaner. Quarterly testing is recommended to ensure potable water quality using schülke watersafe® dip slides.

Biofilm Removal

schülke watersafe® Starter Kit
For the complete removal of biofilm and long-term protection against re-growth in dental unit water lines

• Unique initial biofilm removal stage
• Independently proven and tested
• Simple and easy to use
• Does not affect clinical work or damage equipment
• Contains 1 litre cleaning solution to protect against biofilm re-growth for at least 3 months

Buy a starter kit get 1,000 FREE Plus Rewards points*

Biofilm Protection

schülke watersafe® Cleaning Solution
Continuous use solution to protect against biofilm re-growth in water lines

• Protects against biofilm re-growth and is physiologically harmless
• 100 litres of in-use solution
• Can be mixed in advance and stored for up to 14 days

schülke watersafe® Bottle cleaner
For quarterly disinfection of the water bottle feeding the dental unit

• Prevents contamination in the water bottle entering the water line
• 5 minute contact time

Testing & Validation

schülke watersafe® HPC dip slides
For quarterly testing of dental unit water

• Easy to use and verifies potable water quality
• Highly accurate results: to within one colony forming unit
• Contains grid to assist with colony counting

schülke watersafe® Rapid Legionella detection kit
For water lines

• Ideal for detection of Legionella in hot and cold water systems and water lines
• Displays result after 25 minutes of incubation so potential outbreaks can be treated quickly and effectively

*Terms and conditions: Valid on all schülke watersafe® starter kit purchases from 1st May 2014 to 30th June 2014 only. Schülke & Mayr UK Ltd reserve the right to end this offer at any point without notification. Free membership to schülke Plus Rewards is available by visiting www.schulkeplusrewards.co.uk
Introduction
Effective infection control is a cornerstone of good dental practice. Biofilms are emerging as an increasing problem across all healthcare settings and the dental environment is no exception. The management of dental unit waterlines (DUWL) has become a key focus for infection control, as they can easily become contaminated with microorganisms, which rapidly lead to biofilm development. However, technological advances in disinfectants designed for use with DUWL mean the potential threat posed by biofilms could be virtually eradicated if best practice is followed.

Dental Unit Waterlines (DUWL)
Dental unit waterlines are an integral part of surgery equipment, but the water is not sterile and contains high numbers of bacteria (Walker, 2003). Although the large volumes of water produced are mainly removed by high volume aspiration, some is almost certainly swallowed by the patient (Smith, 1999) and droplets may be inhaled by staff.

How safe is your water?
A study of water obtained from DUW systems from 35 dental surgeries showed that in 95% of water samples, microbial loading exceeded European Union drinking water guidelines (Walker, 2000). The study authors believe that these ‘values probably underestimate the true microbial load to which a patient is exposed.’

A major concern is contamination with Legionella species, in particular L. pneumophila, the causative agent of Legionnaires’ disease (Smith, 1999). Transmission of Legionella to humans occurs when water containing the bacterium is aerosolised in droplets and inhaled (Smith, 1999). It has been reported that dental staff have a higher prevalence of Legionella antibodies compared to the general public, suggesting that aerosols generated by dental equipment are a possible source of infection (Smith, 1999).

DUWL and biofilm formation
It was reported as early as 1963 that water from dental lines can be heavily contaminated with microorganisms (Smith, 2002). The source of bacterial contamination within the dental unit water supply is due to micro-colonies of proliferating microorganisms on the inner surface of the water lines. Frequent periods of water stagnation in DUWLs (due to the intermittent nature of their use) together with the properties of the plastics from which they are manufactured; promote the attachment and colonisation of biofilm-forming microorganisms (Szymanska, 2003).

Biofilms are adherent colonies of bacteria, fungi and protozoa embedded in a matrix of extracellular polymeric substances that form along the inner surface of DUWLs and are responsible for high levels of contamination of DUWLs (Walker, 2003). The nature of DUWLs is such that they will develop a biofilm and water flowing down the biofilm coated waterlines will contribute to microbial load in the water as it exits the tubing (Szymanska, 2003). Biofilms protect organisms from the effects of heat and chemicals, thus reducing their susceptibility to the disinfection process (Smith, 2002).

Regulations and guidance
HTM 01-05 clearly states the acceptable maximum level of microbial contamination in section 6.79: ‘Where monitoring is undertaken, the TVC (total viable count) should be expected to lie in the range 100 to 200 colony forming units per millilitre (cfu/ml).’ However, the EU Directive 98/83 states that the European standard for drinking water should be less than 100 CFU (colony forming units). Once water enters the DUWLS the number of bacteria begins to increase with numbers as high as 1.6 x 10^5 CFU/ml-1 having been recovered in the outflow (Walker, 2003).

Biofilm control
Although flushing of water lines is recommended by HTM 01-05, studies (Walker, 2003) have shown that flushing alone results in only a small reduction in biofilm TVC (9.1%) and an even smaller reduction in biofilm coverage (only 0.5%).

A study evaluating a range of disinfectants to control biofilm contamination in DUWLs (Walker, 2003) states that a number of criteria need to be fulfilled in order for a product to be considered for use in DUWLs:

i. Killing of bacteria in the water phase
ii. Killing of biofilm bacteria
iii. Removal of biofilm from surfaces

Biofilms need to be removed as well as ‘killed’ as a ‘killed’ biofilm could still act as a source of endotoxins allowing rapid recolonisation of new biofilm (Walker, 2003). Any disinfectant selected should meet these three criteria.

schülke watersafe®
A study which evaluated a range of disinfectant products (Walker, 2003) in their ability to control mixed species biofilm contamination found that most disinfectants did not meet all three of the above criteria. However a product such as schülke watersafe® (previously known as schülke DUWL) provides complete elimination of viable bacteria and 100% reduction of biofilm coverage (Walker, 2003).

The study also found that biofilm regrowth following disinfection occurs within 7 to 14 days, suggesting that weekly treatment programmes are not likely to be sufficient to reduce microbial counts to levels that comply with EU drinking water standards (Walker, 2003), schülke watersafe® provides a one-off initial treatment to completely remove biofilm, followed by a continual dosing regime to protect against biofilm regrowth.

An additional advantage of schülke watersafe® is the disinfectant’s compatibility with DUWLs. A number of disinfectants may not be compatible with the brass components used as connectors in DUWLs (Walker, 2003), whereas schülke watersafe® is approved for routine use in DUWLs and is compatible with the construction materials found in them.

Conclusion
The safety of dental treatment requires that good quality water is used. Understanding the nature, formation and ways to eliminate biofilm is a major step towards reducing health risks for both patients and dental personnel, therefore ensuring the use of the optimum product for the effective removal of biofilm is essential. Through rigorous testing and development, schülke watersafe® disinfectant offers practices a major weapon in biofilm removal, and the first solution to truly provide a complete removal and maintenance program in an easy to use application.

References
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