FDI DRAFT POLICY STATEMENT (revision)

Dental Unit Water Systems and Microbial Contamination

Revision submitted for adoption by the FDI General Assembly:
September 2016, Poznan, Poland
Original version adopted by the FDI General Assembly:
August 2005, Montréal, Canada

**CONTEXT**

Dental Unit Water Systems (DUWS) are used to rinse, clean and cool the operative site and equipment while working on soft and hard tissues. They can either be connected with the local water supply or, if there are no acceptable microbial contamination standards, to bottle-systems.

A characteristic feature of a dental unit water line is the capacity to rapidly develop biofilms on the inner surfaces of its tubes and associated containers. Generally, these biofilms contain such microbes, which grow at ambient temperature, are relatively harmless saprophytic organisms and cause disease only under exceptional circumstances, mainly in immunity compromised hosts.

The major source of microbes for biofilm development in DUWS is considered to be the municipal or the local water supply, which usually provides potable water with extremely low levels of saprophytic bacteria. Another possible source of organisms that may contaminate DUWS is a temporary drop of pressure in the local water supply. Contamination may also be due to retraction of patients’ saliva or blood into the DUWS. However, this risk is minimized in modern dental units, which are now routinely fitted with anti-retraction valves.

Patients and oral health care workers are regularly exposed to water and aerosols generated from the dental unit.

**DEFINITIONS**

**Biofilm:** A biofilm is a community of microbes growing on a substrate and encased in a matrix of extracellular polymeric material. Biofilms are not very sensitive to disinfection agents. The growth of biofilms in DUWS is enhanced through contamination by retrograde bacterial reflux, (room) temperature ideal for bacterial growth, stop periods (weekends, holiday), high surface-volume-ratio of the water-carrying pipes, pipe-material and low and discontinuous flow rate

**Amoeba:** (Also ameba) A single-celled (protozoan) organism. Amoeba can infect the bowels causing diarrhea and the liver causing abscess formation. A single amoeba can contain hundreds of Legionellae [1] and set them free when it is dying or being destroyed.
Legionella: (Legionella pneumophila) Pathogenic group of Gram-negative bacteria. Inhaling of legionella-containing aerosol can cause Legionnaires' Disease or Pontiac Fever. There is one published case of a fatal infection related to a legionella-contaminated dental unit [2]

PRINCIPLES
The aim of this Policy Statement is to make dentists aware of the basic principles of the DUWS and provide guidance on how to minimize risk with easy-to-follow procedures.

POLICY
There are no scientific studies on which pathogens (bacteria, fungi, protozoans) in what concentration in the DUWS will cause nosocomial infections. For healthy patients with normal risk for infection, recommendations often use the acceptable amount of heterotrophic bacteria in drinking water, which is less than or equal to 500 colony forming units per millilitre of water [3] in DUWS for all interventions that need rinsing/cooling, including minor surgery without further primary wound closure.

For patients with high risk of infection (e.g. by cystic fibrosis, granulocytopenia, aplastic anemia or immunosuppression) and, for all interventions with further primary wound closure, only sterile solutions (external cooling) are advised.

Disinfection of the DUWS according to the manufacturers’ recommendations, together with flushing all water lines every morning for 2 minutes (without transmission instruments) will significantly reduce the amount of potential pathogens. Water examinations to check delivered local water and the DUWS are advised once a year (or according to national rules or regulations).

Dental manufacturers are responsible for manufacturing equipment with materials suitable for disinfection, which also reduce or eliminate the growth of biofilms in the waterlines of the dental units.

DISCLAIMER
The information in this Policy Statement was based on the best scientific evidence available at the time. It may be interpreted to reflect prevailing cultural sensitivities and socio-economic constraints.

REFERENCES