Dental Unit Water -

How does it affect you?

10 Years After

We are now arriving at the 10th anniversary of the Dental water-line issue. Of course we knew it existed before, but widespread research and discussion from the ADA to the CDC made it visible to us all. There were several television programs that sensationalized the issue of Dental water quality from the patient's perspective. Then, it seems like almost one hundred methods of improving dental water were promoted, many costly and time consuming. The Dental profession has an enviable record of adopting the best Infection Control practices, when compared with other professional disciplines. This issue was no exception. Since each professional practice is unique, there were no text-book solutions to the variables of equipment types, staff training and physical layouts when addressing this topical health issue. For the most part we felt that we had conquered this issue.

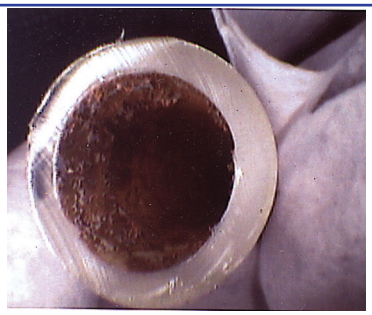
First there was concern about the patient ...

Then there was concern about the unit ...

The Unit

The early attemps at improving the quality of the water delivered to the patient concentrated mainly on the reduction of bacteria and fungi. Chlorine (Hypochlorite/Bleach) and Peroxide (H_2O_2) products were used regularly until it was realized that corrosion of the Dental Unit from the valves to the control block was occurring. Given the high cost of parts and service, these chemicals posed financial consequences for the concerned practitioner.

Three weeks of Biofilm build-up



What about you?

Given all the discussion about bacterial reduction in the dental water, followed by worry about the longevity of the dental unit, when did anyone think about you? Dealing with the Dental Unit water is actually more hazardous for the Dentist, Assistant or Hygienist than anyone else. There are several aspects of both the content of the dental water and the chemicals used to disinfect it.
Let's look at the dangers from your point of view to identify safer ways of living with dental water contamination.

Microbiology Basics

The key to understanding where problems may exist or develop in the future is to understand four basic principles. They are:

1: Bacteria multiply rapidly in an exponential manner and may double their population every 20 minutes.

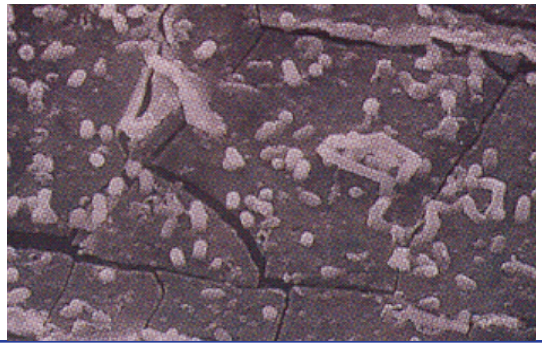
2: Temperature hastens their development and reproduction.

3: Materials in contact with the water-borne bacteria, such as plastics, can augment the problem of biofilm formation.

4: Blood is routinely a component of aerosol mists created by handpieces and scalers.

Microbiological Concerns

Dentists, Assistants and Hygienists are continually subject to aerosols which almost always contain blood. They are generated from cutting, polishing or scaling. Studies have also shown that "oral" bacteria can be found in dental tubings.[1] Given the number of patient visits each day and the quantity of aerosols generated, an investment in quality masks is essential. The cleaning and disinfection of the waterline will also reduce the risk of bacteria and fungus being transmitted from previous patients. The ultrasonic scaler is also a key waterline to treat regularly.



Chemical Concerns

Dental Waterline Cleaners and Disinfectants should be handled with care especially those in the Chlorine or Peroxide families. Initially damage to skin or clothes is possible and consequent flushing may impart some chemical into the mouth of a patient. Disinfection of the lines with bleach can leave bacterial endotoxins in the water that can be aerosolized and may end up in your eyes provoking an immune response and blurred vision which optometrists have coined the name "Sands of Sahara" Cleaning of the waterlines with oxidative products such as Peroxide or Bleach can yield biofilm reaction products that are carcinogenic such as Chloroform. [2]

Chemistry Basics

The waterline disinfection process imparts several chemical dangers specifically:

1: Bleach (Hypochlorite NaOCl) is reactive with Biofilm and produces THM's (Trihalomethanes) including Chloroform.

2: Bacterial endotoxins from dead bacteria exist in significant amounts in dental water especially after treatment with Chlorine.

3: Cleaning and disinfection products are often toxic or corrosive. Ensure that none touches either hands or mouth.

Take Care of Yourself

It is important to consider your personal safety when looking at the entire dental waterline contamination issue. By taking care of yourself, you consequently will take care of your patients and equipment. Take precautions and by taking a holistic view of this issue, you will not compromize your personal health, your co-workers or your patients. Look for quality products that won't harm you, damage your equipment or create new chemistries. Take care of yourself, and the world around you will be better.

Dean Swift B.Sc. B.Ed. FADM

References

1 H. Staat, University of Louisville, AADR Abstract March, 1998
2 R. Puttaiah, Baylor College, IADR Abstract March 1997
3 R. Puttaiah, Baylor College, IADR Abstract March 1997