Ozonated water solves suction blockage problems

By Joseph Allbeury

Ozone is an unstable, triatomic form of oxygen that is recognised as a powerful disinfectant that bacteria cannot form resistance or tolerance to. Its only by-product is diatomic oxygen.

In dentistry, ozone gas has been used directly to "kill" caries in the mouth in one novel approach but more commonly, ozonated water is used as a disinfectant for dental unit waterlines, wiping down of benchtops, instrument baths and even as a mouth rinse. In some countries, ozone autoclaves are also available.

Dr David Young, an experienced dental surgeon practising in a busy 4-chair clinic in the Sydney suburb of Chatswood, first heard about using ozone to counter biofilms in dental unit water lines from an article on dental unit water lines (DUWL) by Prof. Laurie Walsh, head of the ADA's infection control committee and technical editor of this magazine.

"It certainly got me interested," Dr Young said. "At the time I had been pretty annoyed by an ongoing biofilm problem at the surgery. I was also speaking to a dentist who had a machine that ozonated the water as it came in through the mains to the whole practice. His plumber said he had the cleanest toilets in town!

"In our previous location, it never happened. But ever since we've been in our current location, we've had a chronic problem with biofilms in the suction lines. The plant room and suction motor is located in the basement carpark and the suction lines, as a result, are quite long.

"We'd be working on a patient when all of a sudden, the suction performance

Dr David Young, with the Biowell point-of-use water ozonation unit installed at his practice to specifically address ongoing problems with biofilm build-up in the dental unit water lines of his busy 4-chair clinic in the Sydney suburb of Chatswood. After 12 months of use, all problems with suction efficiacy have been eliminated.

would become impaired. One of us would have to go downstairs, gown-up, put on protective glasses and gloves and clean slabs of black jelly out of the suction filter. This might happen daily for several days. Then it would be fine again for a few weeks.

"Obviously, what Prof. Walsh was saying about high surface area to fluid volume ratio in dental unit water lines was happening in my suction lines. There was stagnation and bacterial proliferation over the large surface area of the interior of the pipes along the length of the suction lines. Biofilm would grow over the course of a month and then the suction would pull it off in slabs and block the filter. It was an inconvenient, unpleasant task to deal with.

"We'd consulted two service technicians and used the usual suction cleaning agents in the prescribed ways, but nothing short of flooding and holding hypochlorite solutions in the pipes was preventing this from occurring. Doing this was hazardous and frankly, a pain in the neck.

"Even though nobody could guarantee it would work, I took a punt and bought the point-of-use Biowell ozone water system from Mint Devices."

The Biowell water ozonation unit was subsequently installed above the sink at the clean end of the sterilisation area at Dr Young's practice.

"At the end of the day, we suck a bucket of freshly ozonated water through each surgery's suction lines before the usual cleaning agent protocol," Dr Young explained.

"Since we've started doing this a year ago, we have had no blockages in the suction system. For the first time in a year, I thought I had better go down and check the filters and I was amazed to find it was completely clean and clear.

"I had also been concerned about the DUWLs of course. Our chairs take 2 litre bottles and we had been relying on a protocol using colloidal silver tablets to keep the DUWLs clean.

Ozonated water from the Biowell system is used in the dental unit water bottles throughout the day at the practice. It disinfects without leaving a chemical residue or by-product. At the end of the day, a bucket of freshly ozonated water is also sucked through each surgery's suction lines, before the usual cleaning agent.

"Before using the system, we tested the water in each surgery by taking samples to the local pathology clinic. I was shocked at the results. In one line, there were over 3000 colony forming units (CFU) per millilitre. The ADA guideline is no more than 200 CFUs/ml for medically compromised patients!"

Before using ozonated water for the first time, Dr Young carried out a "shock treatment" of all the water lines with a 1:10 solution of 4% sodium hypochlorite to remove any biofilm.

"We stopped using the silver colloid tablets, which are quite expensive and started filling up the bottles with ozonated water, which essentially prevents biofilms from accumulating on a continual basis. The DUWLs are run empty at the end of the day.

"After a couple of months, we tested the water again. The results came back at a CFU count of less than 1. After almost a year, we tested again and one of the lines in the least used room had less than 20 CFUs/ml, still well under ADA guidelines. I may do a shock treatment again in a few months.

"After a year of using the ozonated water, the dental units are functioning perfectly and the problems we were experiencing with the suction system have been eliminated. It has been a great investment.

"I am thinking point-of-use ozonation is the great missing link in infection control. It is ideal because it kills everything without leaving a chemical residue or by-product. It is safe and easy to use. You just have to front up and make the investment in the machine.

Dr Young is currently researching other uses for the ozonated water produced by the Biowell ozone unit in the dental setting.

For more information on Biowell water ozonation systems, contact Mint Devices on (02) 8090-0994 or visit the website www.biowellozone.com.au.