Infection Outbreak of 67 Children Shines Light on Water Risks at Dentists Offices

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Mimi Morales recovers in Children's Hospital of Orange Country in late September after surgery for a dental infection she contracted at Children's Dental Group in Anaheim, Calif. She had three permanent teeth, one baby tooth and part of her jawbone removed.

When people go to the dentist, they generally expect to leave in better health than when they walked in. But the water that dentists use to rinse teeth sometimes carries infectious bacteria.

The Orange County Health Care Agency in California says that **67 children** who received so-called baby root canals, or pulpotomies, have been hospitalized with dangerous bacterial infections. Dentists perform pulpotomies to remove infected pulp inside a baby tooth so the rest of the tooth can be spared.

The infections were caused by *Mycobacterium abscessus*, which the health department traced back to the water at Children's Dental Clinic of Anaheim.

"The reason we're so concerned is this infection is very hard to treat with antibiotics," says Dr. Eric Handler, health officer with the Orange County Health Authority. Instead, the tissue is surgically removed. "Treatment can be very traumatic and deforming."

As of February, 2017, there are 67 confirmed and probable infections linked to the clinic. In each case, the children had to be hospitalized. The Orange County Health Care Agency had found abnormal levels of microbes in the water.

Deepa Bharath and Courtney Perks at *The Orange County Register* report that several children have had surgery to treat infections, including a 7-year-old girl who had "three permanent teeth, a baby tooth, and a part of her jaw bone" removed.

Although infections like these are rare, this isn't the first time *Mycobacterium abscessus* has been traced to a dental office. In Georgia in 2015, more than 20 children who had pulpotomies were later hospitalized with confirmed or suspected mycobacterium infections.

Dr. Melissa Tobin-D'Angelo, a medical epidemiologist with the Georgia Department of Public Health who investigated the 2015 outbreak, said "We don't want to discourage parents from having their children see their dentists two times a year as recommended."

Investigators learned that the water supply to the building wasn't contaminated. Ultimately, they traced the infection to the dental unit waterlines—the flexible plastic tubes that carry water to the hoses that rinse your mouth.

Keeping waterlines clean can be a challenge for dentists.

A Bacterial Incubator

Dental unit waterlines are very good at growing bacteria, says Dr. Nuala Porteous, an associate professor of dentistry at University of Texas Health Science Center Dental School in San Antonio. In her research, she looks at how to control infection risks in dental offices, including the microbes that live in waterlines.

Mimi Morales says she's "flabbergasted" that her granddaughter, Mimi, 7, ended up in the hospital with an infection following a pulpotomy in July.

"If you think about the last time you went to the dentist, they only use the water sometimes," Porteous says. "There's a lot of stagnant water."

And bacteria love to grow in stagnant water. How prevalent they are is hard to say. A study of dental waterlines in the U.S. found harmful bacteria 68 percent of the time.Mycobacterium isn't the only kind of germ that can thrive in waterlines. Pseudomonas and legionella can, too. Both types of bacteria can cause pneumonia-like illnesses.

"These are organisms that are typically found in water and groundwater" says John Molinari, a microbiologist and professor emeritus at the University of Detroit Mercy School of Dentistry. "With legionella, you're more likely to get sick when there's a lot of bacteria, like when you get biofilms," says Molinari.

Fighting Biofilms

A biofilm is a group of microorganisms—typically bacteria, fungi or a mixture of microbes—that live in a colony. These microbes communicate with each other and even feed and protect each other. And that can make them very hard to remove. The outer layers might die as cleaning chemicals rush through the pipes, but the inner layers can survive.

A paper published online Sept. 13 in the journal *Pathogens and Disease* "found fungi, bacteria, viruses, and protozoa in dental unit waterlines" Damien Costa, at the University of Poitiers in France and the lead investigator on the study, told Shots in an email.

Generally, dental offices use a combination of chemicals. Some are added continuously to the water in low concentrations, while other, stronger disinfectants are used intermittently. Filters and disinfectant cartridges can be added to the ends of lines, and the ADA recommends occasionally draining and purging the waterlines with air.

Dentists should be able to tell if the bacteria-killing maintenance for their equipment is working. **Dentists can send water samples to testing companies to make sure bacterial counts fall within CDC guidelines.**