Effects of Shock Treatment for Water Delivered by Dental Unit Water Systems

—Trial in the Tsurumi University Dental Hospital—

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**Abstract:** Water delivered by dental unit water systems (DUWS) has been shown to contain high numbers of microorganisms. Biofilms accumulating on the inner surface of the DUWS tubing may be responsible for the high contamination levels of DUWS water. In the United States, the Centers for Disease Control and Prevention has proposed a guideline for DUWS water of $\leq 500$ CFU/ml and the American Dental Association has a guideline of $\leq 200$ CFU/ml. However, Japan has no evidence-based guidelines to control bacterial numbers in DUWS.

We investigated the contamination of DUWS water in seventeen dental units in the Tsurumi University Dental Hospital in 2003, and considered the decontamination material, the material safety data and the application method. Next, we carried out "shock treatment" (a process that chemically removes the biofilm in the DUWS) in 2004. In the shock treatment, a solution was run through the entire DUWS tube at the end of the workday, and was left to sit overnight. At the beginning of the next workday, the lines were purged with ordinary flushing methods. This treatment was carried out on three consecutive nights.

The counts from all sampled units ranged from $2.4 \times 10^3$-$6.1 \times 10^4$ CFU/ml even for those with DUWS filters or anti-suck-back devices present. Although contamination was reduced after water flushing of most dental units, some still had high contamination levels. Nevertheless, the shock treatment greatly reduced the contamination of the DUWS.

However, a cock on the dental unit waterlines entrance and a device to run the solution into the DUWS tube were required, as well as measures to prevent clogging of the tube and water leakage. We also found that it is necessary to continue the periodic treatment, and so we have been regularly performing this treatment.

**Key words:** Dental unit water systems, Biofilm, Shock treatment