

Effects of hearing protection on auditory annoyance from ultrasonic scalers used by dental hygiene students

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ABSTRACT

Researcher have reported that ultrasonic frequencies associated with high-frequency tools and ultrasonic cleaners can cause auditory annoyance in humans. Dental hygienists, for example, routinely use ultrasonic scalers to remove deposits from patients' teeth. Although the ultrasonic intensity of the scaler ranges from 68 to 75 dBA, motion from the scaler's parts, and from the air and fluid it propels when contacting teeth, produce more intense sounds that are audible and, reportedly, annoying. The purpose of this study (now being completed during Spring, 2008) is to measure effects of hearing protection on auditory annoyance from ultrasonic scalers used during training of dental hygiene students. Participants alternate between wearing or not wearing ER20 high-fidelity earplugs during several sessions of cleaning their patients' teeth using an ultrasonic scaler. After cleaning, all participants, whether wearing or not wearing earplugs, rate auditory annoyance of the scaler on a 7-point Likert-type scale. After cleanings, participants wearing earplugs also rate physical discomfort of their earplugs on a different 7-point Likert-type scale. Investigators also measure each subject's hearing thresholds with and without earplugs and sound intensities of ultrasonic scalers during cleanings. Specifically, investigators employ an untreated control group design (with dependent, pretest and post-test samples and switching replications) to answer these questions: (1) do earplugs reduce participants' auditory annoyance from the scalers; (2) do participants' auditory annoyance from the scalers differ over time when wearing or not wearing earplugs; and (3) do participants' physical discomfort from wearing earplugs decrease over time?