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Auditory Status of Youth Who Shoot Recreational Firearms

Audiology & Speech-Language Sciences

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Firearms generate high level impulse sounds that are known to damage the delicate structures of the inner ear and cause hearing loss (Axelson et al., 1987, Holmes et al. 1997, Kramer and Woods, 1982). Otoacoustic emissions (OAEs) are low-level sounds that are produced by the cochlea's outer hair cells. Almost all people with normal hearing and some with hearing-impairment will produce OAEs. The presence or absence of OAEs can provide information about inner ear changes due to hazardous noise exposures. OAEs have been found to demonstrate early signs of noise induced hearing loss (NIHL) before it becomes evident on a conventional hearing test (Arnold et al., 1990, Avan et al., 1995, 1997, Dorn et al., 1999, Konopka et al., 2005, Yates and Withnell, 1999). Ahmed et al. (2001) has also suggested that ultra-high-frequency (UHF) hearing loss may also be an early indicator of NIHL. The purpose of this research is to evaluate the auditory status of youth (aged 10-15 years) who shoot recreational firearms as compared to a control group that does not shoot. For this study, auditory status will be evaluated with conventional audiometry using pure-tone air conduction hearing testing 500-8000 Hz, ultra-high-frequency audiometry (HFA) 10000-20000 Hz and distortion product otoacoustic emissions (DPOAEs). For DPOAE testing, each participant will have a 12 frequency DPOAE scan administered (1600-6300 Hz). DPOAE data will consist of the distortion product amplitude (DP), noise floor (NF), and signal to noise ratio (SNR) for each test frequency. Data collection is currently underway, and preliminary findings suggest a trend towards reduced UHF hearing thresholds and DPOAE amplitudes for the experimental group shooting recreational firearms.