

Individual dose-response relationship evaluated through otoacoustic emission measurements in controlled noise exposure: a pilot study

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Abstract:

Over 30 million of North American workers are exposed daily to noise doses that may induce hearing loss. Unfortunately, current practices to prevent occupational noise-induced hearing loss (NIHL) based on group average of exposure/damage relationships do not account for the individual's susceptibility. Consequently, NIHL remains one of the biggest cause of invalidity and indemnity in North America.

To improve hearing conservation in the workplace, a procedure to continuously measure hearing fatigue using otoacoustic emissions (OAE) has been developed using a portable and robust OAE system designed for noisy field use.

A pilot study has been conducted on human subjects in laboratory, playing back pre-recorded noise samples at realistic levels while recording the accumulated individual noise dose. To monitor the temporary effects (response) on the individuals' inner-ear during the exposure, OAEs were measured periodically on three subjects simultaneously using both the designed OAE system and a clinical OAE system as reference. Audiometric thresholds, stapedius and medial olivocochlear reflex and speech in noise were also measured pre and post exposure to monitor other potential effects on hearing. Preliminary results of this pilot study are presented and analysed in the broader context of the dose-response relationship that could indicate individuals' susceptibility to NIHL.