Inner Ear Sensitivity Measurement System

Noise-induced hearing loss is common in warfighters, especially those exposed to loud weapon systems. Hearing loss may compromise the effectiveness of a mission, as radio communication and one-on-one communication may be misunderstood in the heat of battle. The current method of objectively measuring hearing sensitivity requires very bulky and expensive equipment, often encompassing half an hour for an entire testing session. Thus, detection of the earliest moments of noise induced hearing loss (e.g. on the battlefield) are often not detected due to time and equipment constraints. To address the lack of user-friendly hearing sensitivity measurement systems, Drs. Jason Riggs and Oliver Adunka have developed a mobile app which interfaces with a custom wireless headphone with built-in EEG sensors and captures the ear’s biological response to sound in one minute or less. The app controls stimulus delivery and response processing, allowing a user to track hearing sensitivity over time. The headphones are placed over the ears and objectively measure the electrophysiological activity of the inner ear, unlike a subjective test in which the user listens to several sounds and indicates how many sounds they are able to hear. This new system requires no user input and allows for detecting early moments of noise induced hearing loss. In addition to aiding military personnel, this product can benefit musicians, industrial workers, and healthcare professionals with its potential to reduce the incidence of acquired hearing loss.

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