



# Audiometric assessment in noise-induced hearing loss

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Received: 13 September 2021; Accepted: 30 September 2021; Published: 01 November 2021.

doi: 10.21037/ajo-21-32

View this article at: <https://dx.doi.org/10.21037/ajo-21-32>

Noise induced hearing loss (NIHL), long known as boilermaker's deafness, is so common in modern society that an entire industry has been generated.

The authors believe that the rate of malingering in claims for industrial deafness (NIHL) is so low, that pure tone audiometry (PTA) can be considered the "gold standard" test (1-3). This test, properly carried out, will produce accurate thresholds on which a compensation claim can be based. This is also confirmed in a report commissioned by the NSW State Insurance Regulatory Authority (SIRA), which regulates the NSW Workers Compensation scheme (4,5). Further, in trained hands, the test can be carried out rapidly and it gives reproducible results.

There are three basic requirements to accurately assess the PTA.

Firstly, an audiogram needs to be carried out in a modern, sound treated audiometric booth. All audiometric testing in industry should be done in an audiometric booth that meets standards specified in the Occupational, Safety and Health Act (OSHA) Hearing Conservation Amendment, quoted by Sataloff and Sataloff (6).

Secondly, regular calibration of the audiometer is required. Modern digital audiometers are less likely to develop inaccuracies than do older vacuum tube machines. In addition to regular formal calibration an audiologist can carry out calibration daily by performing his/her own audiogram. Sataloff lists eight other minor checking procedures that can be performed by the audiologist on a daily basis (7).

Thirdly, the clinician requires a recognized Australian qualification and be an accredited member of an Australian Audiology body, such as Audiology Australia (AA) or the Australian College of Audiology (ACAud) (8,9), Further an audiometrist with a full Australian qualification can

accurately and professionally assess NIHL (10).

Occasionally, audiometric tests produce variability due to lack of attention, a variation in the patient's decision-making process, physiological or bodily noise (e.g., coughing, heavy breathing), differences in bone transducer placement and of course lack of cooperation or frank malingering (11). When one considers test-retest variation when no change in hearing is anticipated, test-retest differences of  $\pm 5$  dB for all frequencies can be expected (8).

When there is serious doubt about the accuracy of a pure tone audiogram, cortical evoked response audiometry (CERA) will mostly provide accurate thresholds; however, a disadvantage of CERA is that the results can be affected volitionally. For example, responses are better if a patient concentrates on an auditory signal than if he/she attempts to ignore it. Cortical evoked responses may also be altered substantially by drugs and state of consciousness. These tests need special equipment, a skilled tester, they are expensive, time consuming and may have a subjective interpretation of the results (12).

Albert *et al.* (13) as cited in DeJonckere & Lebacqz found that in reliable subjects, CERA overestimated actual psychoacoustic (behavioural) thresholds by 9–13 dB between 1,000–3,000 Hz.

In our opinion, a properly performed pure tone audiogram is so accurate that the only role for CERA in the estimation of NIHL is when the client is undoubtedly malingering and giving wildly differing audiology results, which are clearly inconsistent with his/her ability to understand speech.

## Acknowledgments

Funding: None.

## Footnote

*Provenance and Peer Review:* This article was commissioned by the editorial office, *Australian Journal of Otolaryngology*. The article did not undergo external peer review.

*Conflicts of Interest:* The authors have completed the ICMJE uniform disclosure form (available at <https://dx.doi.org/10.21037/ajo-21-32>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/ajo-21-32

**Cite this article as:** Galioto OM, Pearse EL, Fagan PA. Audiometric assessment in noise-induced hearing loss. *Aust J Otolaryngol* 2021;4:34.