Dead regions in the cochlea: Implications for speech recognition and applicability of articulation index theory

Dead regions in the cochlea have been suggested to be responsible for failure by hearing aid users to benefit from apparently increased audibility in terms of speech intelligibility. As an alternative to the more cumbersome psychoacoustic tuning curve measurement, threshold-equalizing noise (TEN) has been reported to enable diagnosis of dead regions. The purpose of the present study was first to assess the feasibility of the TEN test protocol, and second, to assess the ability of the procedure to reveal related functional impairment. The latter was done by a test for the recognition of low-pass-filtered speech items. Data were collected from 22 hearing-impaired subjects with moderate-to-profound sensorineural hearing losses. The results showed that 11 subjects exhibited abnormal psychoacoustic behaviour in the TEN test, indicative of a possible dead region. Estimates of audibility were used to assess the possible connection between dead-region candidacy and ability to recognize low-pass-filtered speech. Large variability was observed with regard to the ability of audibility to predict recognition scores for both dead-region and no-dead-region subjects. Furthermore, the results indicate that dead-region subjects might be better than no-dead-region subjects at recognizing speech of marginal audibility.

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