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Linearity of the middle ear before and after reconstruction

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Purpose: To determine if the human middle ear is linear both before and after reconstruction. This is important for hearing aid use at high presentation levels, and also determines if reconstruction changes linearity.

Methods: Five fresh human temporal bones were used. The stapes vibration amplitudes were measured in response to increasing amplitudes of sound stimulation at 70, 90 and 110dB SPL. This was performed at several discrete frequencies. The incus was then removed, and a PORP prosthesis placed. The experiments were repeated

Results: The responses both before and after reconstruction were superimposable once corrected for presentation sound pressure level.

Conclusions: The human middle ear is linear within the tested range in both the intact ear and the reconstructed ear.