Abstract:

2f1-f2 distortion product otoacoustic emission (DPOAE) input/output functions were recorded in 796 ears with sensorineural hearing loss at up to 50 frequencies between 500 Hz and 8 kHz in a wide level range from L2 = 20 to L2 = 65 dB SPL at up to 10 levels ("scissor paradigm", L1 = 0.4 L2 + 39, f2/f1 = 1.2). DPOAEs were accepted as valid for signal-to-noise ratios (SNR) only if they exceeded 6 dB. To assess the DPOAE threshold, DPOAE input/output functions (L2-DPOAE sound pressure diagram) were subject to linear regression and extrapolation; the point of intersection with the L2 coordinate was then interpreted as DPOAE threshold [1]. The linear fit of the function pDP(L2) = a + bL2 (whereby a and b represent the threshold and the slope of the DPOAE growth, respectively), reflects compression and sensitivity of the cochlear amplifier. Using a weighted least mean square error (LMSE) regression, more than 70% of the DPOAE I/O functions of the data set can be used for the threshold estimation. High correlation and relatively small differences between objectively estimated DPOAE threshold and subjectively determined hearing threshold of pure-tone audiograms prove that the weighted extrapolation of DPOAE I/O functions can be a valuable clinical tool for the objective assessment of cochlear hearing loss.