Transient-evoked stimulus-frequency and distortion-product otoacoustic emissions: Effects of level and hearing status.

Transient-evoked stimulus-frequency otoacoustic emissions (SFOAEs), recorded using a nonlinear differential technique, and distortion-product otoacoustic emissions (DPOAEs) were measured in 17 normal-hearing and 10 hearing-impaired subjects. Temporal envelopes of OAE waveforms were obtained by narrow-band filtering at the stimulus or DP frequency and were compared to time-frequency representations (TFRs) of ear canal recorded responses for selected subjects. Equivalent auditory filter bandwidths were calculated as a function of stimulus level from SFOAE latencies by assuming that cochlear transmission is minimum phase. Mean SFOAE latencies in normal ears at 2.7 and 4.0 kHz decreased with increasing stimulus level and were larger at 4.0 kHz than latencies in impaired ears, suggesting that the time-domain method of measuring pip-evoked SFOAE latencies may provide a fast and non-invasive indirect measure of cochlear tuning. DPOAE latencies varied less with level than SFOAE latencies. The *pp*DPOAEs often had two (or more) peaks separated in time with latencies consistent with model predictions for distortion and reflection components. Changes in *pp*DPOAE latency with level were partly explained by a shift in relative amplitudes of distortion and reflection components. There was good correspondence between temporal envelopes obtained using narrow-band filtering and TFR analysis. This validates the TFR technique for exploring OAE responses elicited by stimuli more complex than a pure tone.