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Ear asymmetries and sex differences in neonatal TEOAEs

Berninger, E.

Karolinska Institutet, Karolinska University Hospital

Background/aims: the aim of this study was to analyse TEOAEs obtained from more than 30,000 newborns that passed universal hearing screening during a six-year period, to study ear asymmetries and sex effects, specifically in the frequency domain.

Methods: this bedside, universal, screening approach was based on TEOAEs that were recorded in the non-linear mode with ILO 288 (Otodynamics Ltd.) using an electrically constant stimulus. A Matlab program was developed for retrieving data from the TEOAE files generated by ILO 288. This program was also used for computing levels in non-overlapping half-octave frequency bands, geometrically centred at 707, 1,000, 1,414, 2,000, 2,828, and 4,000 Hz.

Results: highly significant mean lateral asymmetries (right > left) and sex differences (female > male) existed in entire TEOAE level (n=60,431), S/N TEOAE, and in half-octave frequency bands (700-4,000 Hz). Mean lateral and sex entire TEOAE level differences were 1.1 dB and 1.3 dB, respectively. At high frequencies, the sex effect exceeded the ear effect. Stimulus levels were not affected by ear or sex.

Conclusions: highly significant ear asymmetries and sex differences existed in TEOAEs, thus reflecting physiological differences at the level of organ of Corti, at birth. The effect of sex exceeded the ear effect at high frequencies, and inter-aural TEOAE level differences in half-octaves centred between 1,414 and 2,828 Hz were significantly larger in males.

