

Electrophysiological assessment of auditory plasticity after relatively long intervals of sequential cochlear implantation

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Previous studies have described auditory plasticity in bilaterally-implanted children with relatively short interval between surgeries (± 1 year). The surplus value of structural clinical application of bilateral CI in the light of cost-benefit, auditory performance and auditory plasticity is still a point of discussion in many countries.

Aim Electrophysiological evaluation of plasticity changes on brainstem and cortical level in sequentially bilaterally implanted children with a relatively long period between first (CI1) and second implantation (CI2).

Materials and methods Electrically-evoked auditory brainstem and cortical responses were obtained at 6, 12 and 24 months post activation for CI1 and CI2, viz., and compared within- and between-subjects. Early (III, V) and late latency responses (P1 to N2) were analysed between ears and over time and compared with control groups (unilateral CI and normal hearing children).

Results and conclusions Both electrophysiological data revealed significant prolonged latencies for CI2 compared to CI1 initially and showed convergence after 24 months of bilateral CI use, i.e. CI2 becomes similar to CI1. Cortical responses follow maturational patterns of normal hearing and unilaterally-implanted children. Age of receiving CI2 as well as time between two implantations (up to 86 months) does not prevent CI2 from developing. Present data suggest that proposed critical age (i.e. 3.5 years for unilateral CI) of receiving a CI, is possibly much lower for bilateral sequential implantation, i.e. receiving of CI1 (at least) well before the age of 3.