PSYCHOPHYSICAL STUDIES IN CHILDREN AND THE DEVELOPING AUDITORY SYSTEM

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A number of psychophysical studies have been conducted on cochlear implant patients who became deaf early in life. The implant prosthesis manufactured by Cochlear Pty. Limited was used. The aims of these studies have been to compare the performance of early-deafened and postlinguistically deafened adult patient groups, and to determine any relationships between the performance of early-deafened patients and variables that may influence performance, such as duration of deafness and age at implantation. The studies have also been concerned with the development of appropriate test procedures for early-deafened patients, who vary considerably in age and cognitive ability.

The perception of differences between electrodes has been investigated in discrimination and pitch estimation studies. In a series of different discrimination studies, performance generally varied as a function of the distance between stimulated electrodes on the array. For most patients, there were some differences in discrimination performance for electrodes at different positions on the array. The influence of loudness cues on electrode discrimination performance was also examined in some of these studies. In the pitch estimation study, a tonotopic order of percepts for stimulation on different electrodes on the array has been recorded for five of the 11 patients tested. There did not appear to be consistent patterns in the electrode discrimination and pitch estimation data related to patient variables such as the age at onset of profound deafness, duration of deafness prior to implantation, post-operative experience and chronological age.

Studies of temporal resolution have included gap detection thresholds. For a group of 21 patients, thresholds were less than 10 ms for 14 patients, between 10 and 40 ms for six patients, and at 95 ms for one patient. Between-patient variability in thresholds was largest for the congenitally deaf patients and variability tended to decrease with increases in the age at onset of profound deafness.

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