Abstract EFAS/DGA 2007

Brain activation patterns during auditory processing in children with right versus left Cochlear Implants

Henkin, Y. (1,2), Attali, O. (1), Yaar-Sofer, Y. (1,2), Hildesheimer, M. (1,2), Kishon-Rabin, L. (1)

(1) Department of Communication Disorders, Sackler Faculty of Medicine, Tel-Aviv University, Tel Aviv, Israel
(2) Speech and Hearing Center, Chaim Sheba Medical Center, Tel Hashomer, Israel

Preliminary findings in a small group of children with cochlear implants (CI) showed that during speech processing children with right CI exhibited similar activation patterns to those of normal hearing subjects (i.e. bilateral temporal lobe) whereas children with left CI exhibited enhanced ipsilateral temporal lobe activation (Henkin et al., 2004). The objective of the present study was to further substantiate this notion by evaluating the time-course and brain structures involved in auditory processing of linguistic and musical stimuli in a group of prelingually deafened children with right versus left CI. A group of children implanted with the Nucleus 24 CI prior to the age of 48 months, which were using their implants for at least four years, and a group of normal hearing age-matched controls, participated in the study. Auditory event-related potentials (AERPs) were recorded while subjects performed oddball discrimination tasks consisting of musical and speech stimuli with increasing acoustic/phonetic difficulty. The low-resolution electromagnetic tomography (LORETA) algorithm was used to compute the 3-dimensional current density distribution which generated the P3 potential to target stimuli. The effect of side of CI and task on the characteristics of the P3 potential (i.e. latency, amplitude, scalp distribution) and on current density distribution will be reported. These data may contribute to the better understanding of the reorganization of the brain of hearing-impaired individuals who gained some of the auditory capabilities via a CI, and may contribute to decision making regarding ear of implantation.