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Hemispheric interaction of cortex potentials during phonemic analysis in children with normal speech development and with dysarthria.

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Research goal: was to study the system organization peculiarities of neurophysiologic mechanisms, providing speech activity during phonemic analysis (phoneme recognision).

Method: the structure of interregional interactions of brain bioelectric potentials has been studied, using multiparametric EEG analysis during recognition of predetermined phoneme in the context of auditory presented words in children aged five to six with normal speech development *(n* = 15) and with dysarthria *(n* = 13) .

Results: comparison of EEG correlation analysis in children with and without speech dysfunction allowed to reveal similarity as well as differences in cortical biopotentials distant interaction organization during phoneme recognition. Differences in BEA interaction patterns consisted of character and degree of frontal and central zones participation in the phonemic recognition processes. In children with dysarthria degree of right hemisphere inferior frontal zones statistical EEG connections decreased, while in children without speech pathology such a decreasing took place in symmetrical region of the cortex. Beside that in children with speech disturbances intensification of BEA interaction of both hemispheres frontal zones with activity of anterior and middle temporal zones was obtained. Probably such more than normally expressed frontal zones participation reflects the necessity of higher control and voluntary regulation of phonemic analysis, which indicates the degree of difficultness of this activity for children with dysarthria. In children without speech disorders phonemic analysis based on using acoustic and articulation images of the sound and was reflected in central and posterior temporal zones interaction. In addition to this in children with dysarthria occipital zones were activated, that probably was related with actualization of letter visual image. Quantitative comparison of spatial interaction patterns of cortical bioelectric potentials recorded during the tasks performance in children of both groups showed a high degree of their statistical similarity. It was shown in hemispheric interaction intensification between temporal, parietal, TPO cortex zones and occipital areas.