

The study of changes in EEG activity in spatial tasks in disabilities children in primary school

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Work is devoted to research of features of formation of the alpha rhythm at rest on the cognitive load in children 9 - 10 years. We compare the group of visually impaired children, and with 80% vision.

Experimental neuropsychological studies are carried out for two groups of children of 10 people each (a group with visual impairments, up to 25 %, a group with practically normal vision from 80 %). Exclusion criteria from the study are concomitant neurological diagnoses. In addition, each child is preliminarily tested psychologically to exclude problems of cognitive deficit and psycho-emotional instability. We record 19 EEG channels for each child according to the standard 10-20 scheme. The experiment lasts about 25 minutes for each child and includes a state of calm wakefulness with closed eyes (before (*ca0*) and after (*ca1*) cognitive test) and a cognitive test of counting repetitive groups of short sound stimuli with rest pauses. The duration of stages *ca0* and *ca1* are 3 minutes each. The cognitive test consists of 3 active stages of counting for 3 minutes, 4 stages of rest (*r0*, *r1*, *r2*, *r00*) for 2 minutes. The subject is instructed to count the number of short beeps. The beeps number varies from 1 to 4. The subject reacts to each group by pressing the corresponding number button on the remote control held in his hands. The groups of sound stimuli are separated by pauses with the durations are set randomly in the range [5 - 8] s.

Numerical analysis of EEG data is based on an assessment of the dynamics of vibrational activity in the range of 8 - 12 Hz using continuous wavelet transform. This frequency range corresponds to the classical concept of the alpha rhythm of the cerebral cortex. We compare the power of the arising alpha-rhythm for states *ca0* and *ca1*, *r0* and *r00*, *r1* and *r2*. In general, a decrease in the power of the alpha rhythm is demonstrated for the disabilities children group in comparison with the group of practically healthy subjects. Spatial maps of the distribution of the alpha rhythm are presented, demonstrating the displacement of the center of this vibrational activity to the parietal regions from the typical occipital regions.