

Comparative study of brain processes related to space-induced and clinical oculomotor disturbances

Results:

The studies included 3 groups of subjects: control group (C - 15 subjects), schizophrenic patients (S - 35 subjects), volunteers, exposed to 6-day dry immersion (DI - 12 subjects). All participants had right hand and right eye preference. Subjects performed visually-guided saccades and antisaccades. EEG was recorded from 19 standard sites. Mean amplitude of averaged potentials was assessed at 600 ms before the stimulus and at 600 to 100 ms before saccade onset.

The saccade characteristics did not differ in groups C and DI. Patients exhibited in the antisaccade task delays in the performance of correct saccades ($p < 0,05$) and larger number of directional errors ($p < 0,001$).

In control subjects the target stimulus was preceded by a vertex predominantly bilateral slow negative potential shift; left- and right-side saccades were preceded by PSN, that was larger at the midline and left sites, with parietal maximum before visually-guided saccades, and with frontal and parietal maximums before antisaccades. The PSN amplitude declined significantly in the DI and Sch groups as compared with the C group. However, in immersed subjects the foci of negativity shifted to the right hemisphere so that the PSN amplitude decreased sharply in the left and increased in the right hemisphere, with significant decrease in Fz, F3, Pz and P3. Significant decline of the PSN amplitude was the most characteristic in schizophrenic patients in the sagittal frontal and central regions (Fz and Cz).

The PSN shifts observed after exposure to simulated weightlessness and in schizophrenic patients could be caused by the alterations of sensory inputs' activities in weightlessness and fine frontal structural disorder of the brain in case of schizophrenia

Published work:

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