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QUALITATIVE ANALYSIS OF THE PRESENCE OF END-POSITION NYSTAGMUS IN
ASTRONAUTS AFTER LONG TERM SPACE FLIGHTS. RESULTS OF “FIELD TEST”
EXPERIMENT

Abstract

In the first days after a spaceflight (SF), space motion sickness is observed, which is based on disturbances in the sensory systems activity. Gravity is a natural stimulus for the receptors of vestibular apparatus, which plays an important role in intersensory interactions. Changes indicating an increase

in excitability of the vestibular apparatus during SF (Kornilova et al., 2017) suggest a high probability of the occurrence of end-position nystagmus after prolonged SF. Russian-American experiment "Field Test" included a nystagmus test. 22 ISS crewmembers (flight duration 159.819.5 days) participated in the experiment: twice before flight and several times after flight, starting within 3 hours after landing. In a seated position, astronauts tracked with their eyes only (without moving their head) horizontal and vertical movements of the researcher's finger from the central position to the gaze end points (right, left, upper). Eye movements were recorded with a video camera. The videos were analyzed qualitatively for presence of nystagmus. Preflight, end-position nystagmus was detected in 5-11. The greatest changes were observed on landing day. Among 18 crewmembers, nystagmus was detected in the right position (72). Partial recovery was observed 1-4 days after SF. However, a noticeable decrease in the frequency of manifestation of the nystagmus was observed only 10-13 days after landing (n=16). End-position nystagmus is usually considered a clinical sign of cerebellar alterations. However, it is often described in healthy people with a prevalence of up to 21. In a similar study involving 18 astronauts, participants of long-term SF, the frequency of occurrence of end-position nystagmus also increased in the first hours after SF (Reschke, Good and Clement, 2017). However, in this study, a detailed analysis of the presence of nystagmus in various directions was conducted for the first time. Of particular interest is the frequent detection of an end-position nystagmus in the right position after SF - this phenomenon may be a sign of presence of a central vestibular imbalance (Robinson et al., 1984), which also occurs in patients with cerebellar disorders (Bayer and Dietrich, 2011). The results allow us to expand our understanding of the severity and frequency of vestibular disorders and the dynamics of their recovery after prolonged SF. The study is supported by the Russian Academy of Sciences (63.1) and NASA HRP.