

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Human Physiology in Space (2)

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MOTOR STEREOTYPE DESTRUCTION IN LONG TERM SPACE FLIGHTS. EYE-HEAD  
COORDINATION

**Abstract**

The purpose of the study was to explore effects of long-duration exposure to weightlessness on characteristics of the gaze fixation reaction (GFR) in target acquisition task. The study was provided with 7 cosmonauts – members of 186-198 days Mir missions. Test sessions were performed 4 times before launch, once a month during flight, and twice after landing (R+2 and R+5). The subjects were to perform the target acquisition task in the horizontal and vertical planes on targets that appeared at a distance of 16 angular degrees in a random order right- left, up- and downwards from the center. Characteristics of eye and head movements were recorded with the MONIMIR system (Austria). Before flight target acquisition was provided by joint eye and head movements. Time of gaze fixation amounted to 520-650 ms in all the members of the group before space flight (SF). Within the time of recording equal 1200 ms in gaze fixation on the target was successful in 97-99% of cases. During SF organization of reaction changed and the joint movement in 60% cases was divided into two separated following each other motor acts: eye movement and the movement of head. At the same time there was observed the significant increase of the number of eye movements' corrections (correction saccades). Time of gaze fixation in flight extended by 900-1000 ms and more being the longest on FD-105. The number of GFR completed in 1200 ms reduced considerably in SF amounting by month 4 only 68-72%. After landing, most GFR characteristics returned to baseline values, however, on R+2 the time of gaze fixation was still 680-730 ms at most, regaining the preflight values only on R+5. Changes in the GFR characteristics recorded in the course of long-duration SF point out to motor stereotype destruction and dominance of visual input in organization of gaze fixation reaction.