

# EYE AND VISION

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## Visual-manual tracking in antiorthostatic hypokinesia (“BedRest”)

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During examinations of 23 subjects (12 in the control group) in antiorthostatic hypokinesia (lying position in experimental bed with  $-70^\circ$  angle) of 2 months model experiment “BedRest”, visual-manual tracking (VMT) parameters were studied. In the study of VMT eye movements were recorded by electrooculography method (EOG), hand movements – by a joystick using biological visual feedback (on the screen represented the current angle/position of the joystick). Examinations were conducted using computerized stimulation programs, which were presented on the screen of the hardware-software complex “Sensomotor” (smoothly linearly and sinusoidally on the horizontal and vertical planes, with a 0.16 Hz frequency in  $\pm 10^\circ$  range). We analyzed time, amplitude and velocity characteristics of the visual and manual tracking (VT and MT), including efficiency ratio and gain as ratios of respectively amplitudes and velocities of eyes/hand movements to the stimulus movement. Studies were carried out once before the experiment (on 9-10 days before the bedrest - baseline data collection), during the experiment on 3, 5, 10, 25, 40, 58 days of BedRest. After completion of the experiment,

examinations of VMT were carried out on 1, 3(4), 7-10 days. According the results, during assessment of the parameters of VMT it follows that antiorthostatic hypokinesia affects not only on the characteristics of eye movements tracking, as evidenced by an increase in the latency of reaction, change in accuracy and velocity of visual stimulus tracking but also changes in accuracy of important indicator of the operating activity - manual tracking. Total reaction time of the VT was significantly lower (!) than the BDC during stay in experimental bed and in the first days after experiment, same reaction we can see and after SF. It was found that the conditions of antiorthostatic hypokinesia have a greater impact on the accuracy of the VT than the accuracy of MT. Full return of characteristics of the VMT to the baseline was observed only on R+10 days after experiment. Comparison of the results obtained at cosmonauts after long-duration space flight, with the results of “BedRest” experiment showed the similarity of character changes of measured parameters of VMT, but changes after SF were more pronounced than after «BedRest».

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