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DETERMINATION OF FUNCTIONAL CAPABILITIES, THE LEVEL OF PHYSICAL PERFORMANCE AND THE STATE OF MAIN PHYSIOLOGICAL BODY SYSTEMS IN THE FIRST HOURS AFTER THE ACCOMPLISHMENT OF LONG-TERM SPACE FLIGHTS ("FIELD TEST")

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Introduction:

Long-term stay in weightlessness is accompanied by alterations in the activity of main physiological body systems including sensory-motor, skeletal-muscular disturbances and cardiovascular deconditioning. However, up to now, there are no data on the state and level of functional performance of cosmonauts/astronauts directly after flight, nor are there data to help define the dynamic recovery of functional characteristics and work efficiency which are greatly needed to provide the safety and planning of their activity once they reach space objects.

Material & Methods:

The Russian and American scientists are currently engaged in a joint experiment known as the "Field Test" with the goal of studying the functional performance and the state of main physiological body systems directly after landing and their temporal recovery dynamics.
The functional performance is identified during the test by temporal characteristics of the movements of spatial translation, the stability of the vertical stance for 3.5 min, and the kinematic characteristics of walking – non-complicated and complicated. The following characteristics are identified as physiological characteristics of the test: a) orthostatic tolerance during stand test, b) back muscle tone; c) vertical stability - by characteristics of the correction responses to unexpected perturbations of the vertical stance, and d) support reactions during the performance of the full battery of tests.

Results:

To date, a pilot version of the "Field Test" has been conducted with participation from four Russian cosmonauts. The results of studies have shown that in 1 – 5 hours after landing the functional abilities of the cosmonauts are considerably reduced. All the test movements at this time are considerably slower than preflight and the more complicated the task is, the greater

significant reduction in orthostatic tolerance: during the first test that occurs 1 – 5 hours after landing, two of four cosmonauts declined to continue the task after the orthostatic test (one of them did not wear the anti-G suit "Centaurus" during testing). Blood pressure during moving out of prone posture to vertical stance in one of the cosmonauts and of sitting to standing position in the other dropped to the precollapse level.

Discussion & Conclusions:

The results of the studies have confirmed the feasibility, the usefulness and the safety of conducting tests as close as possible to the landing. The program of "Field Test" experiment will be continued and extended.

References: