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Human Physiology in Space (2)

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## RECOVERY OF MUSCLE STRENGTH AFTER LONG AND SUPER-LONG SPACE FLIGHTS

**Abstract**

It is important to determine the dynamics of the recovery of strength, for the correct planning of tasks adequate to the performance of a person after a long stay in zero gravity. The purpose of the study was to determine the dynamics of the recovery of strength and strength endurance of the legs muscles of the cosmonauts after a long-term space mission. Methods. Changes for 25 cosmonauts after flights from 143 to 201 days were analyzed. Repeated flights were considered as separate cases. The case of recovery of strength after 340 days flight (cosmonaut M) is described separately. The cosmonauts were divided into two groups, depending on the "Weight" used in the resistive exercises for the leg muscles on the ARED during the flight. The "Weight" in group A ( $n = 27$ ) was from 70 to 130 Isokinetic testing of the legs muscles was carried out before the flight and on R+4 and R+15. Results. The strength and strength endurance of group A after the flight was close to the pre-flight level. The strength of the leg muscles in one case even increased on R+4. Average values of the leg muscle strength group A on R+4 and R+15 was the same. Strength and strength endurance losses of the leg muscles after the second flight were less than after the first. In group B, strength and strength endurance losses of the leg muscles were significantly greater than in group A. The strength of the ankle muscles and strength endurance losses even increased by the R+15 and was significantly greater than on R+4. For cosmonaut M ankle strength losses were 10%. Thus, an increase of the "Weight" at resistive training significantly reduced the strength losses. In interplanetary flight, the value of "Weight" should be greater or equal to the weight of the cosmonaut on Earth. It is necessary to improve the countermeasure system for interplanetary flight. Supported by RAS 63.1.