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BODY COMPOSITION AND BONE STATUS OF WOMEN OF REPRODUCTIVE AGE EXPOSED TO THE CONDITIONS OF 3 AND 5-DAY "DRY" IMMERSION WITHOUT COUNTERMEASURES

Abstract

The development of manned cosmonautics will inevitably lead to the need for active inclusion of professionals in various fields of knowledge, who can perform specialized tasks in space, into the crews of manned missions. Thus, people with different levels of space training will take part in manned flights, and among them there will be quite a lot of women. However, the physiological reactions of the female body are still insufficiently studied in space flight (SF), and most of the countermeasures have been developed earlier taking into account the men adaptive reactions. But in the last decade, scientists have paid more and more attention to research aimed at studying the characteristics of the adaptation of the female body to the SF conditions. To study the acute period of adaptation to SF conditions, we used "dry" immersion (DI) as a generally recognized model of gravitational unloading. Two series of experiments were carried out without the use of countermeasures, which are a 3-day DI (6 women) and a 5-day DI (7 women), age from 24 to 40 years. Bone status, mineral density, and body composition (DXA, Hologic/LUNAR) were analyzed before and after DI. Body composition was determined in standard areas (head and neck, torso, extremities). The sum of the body composition indexes corresponds to the total weight, which is highly consistent with the results of weighing on a medical scale. The bone status of the experiment participants in standard areas was qualified as "normal" or "osteopenia" in accordance with the WHO classification T-score. Bone mineral density and bone mineral content in the studied areas and throughout the body did not change statistically significantly after DI. The total weight in the experiment with 5-day DI decreased by 3.4%, mainly due to lean mass (-5.17%). The lean mass of the body decreased by 4.7%, and of the legs - by 8%. In the 3-day DI experiment, the legs lean mass also decreased by 7%. Changes in fat mass after DI were significant in a number of cases, but we do not consider them, since they are due to the

individual characteristics and eating behavior of the participants outside the experiment. We can assume a decrease in gravitational locomotor load and increased fluid removal in the early period of adaptation as reasons for the decrease in lean mass (mainly muscular, in the extremities) already after 3-day DI. This work was supported by the RSF grant 19-15-00435