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MEDICAL SUPPORT OF EXPERIMENTS IN THE CONDITIONS OF DRY IMMERSION AS A MODEL FOR IDENTIFYING THE MEDICAL RISKS OF SPACE FLIGHT

Abstract

The Dry Immersion (DI) model was developed at IBMP in the 1970s and has since been successfully used by researchers to replicate the physiological effects of space flight. Numerous experiments conducted in DI for a period from few hours to 7-10 days have allowed to create a system of medical support of such experiments and describe the medical risks associated with this model. In 3-7-day experiments, the main medical problems are nasal congestion, sleep disturbances, back pain, gastrointestinal disorders in the first three days of exposure, headaches, neurological decompensation and orthostatic intolerance, starting from 2-3 days of DI. With longer exposures, the range of medical risks expands. Most subjects, starting from 10 days of immersion, after the tilt test demonstrated the appearance of petechial rash in the distal parts of the lower limbs with predominant localization on the back of the foot, ankles and the lower part of the shin. Such symptoms indicate possible changes on the part of the microcirculatory bed in microgravity conditions. Also, starting from 7-8 days of exposure, there were skin problems in the dystal divisions of lower limbs in the type of maceration, with areas of redness and detachment of the epidermis upper layer, mainly between the toes. These changes were not accompanied by any discomfort. No pathological changes of skin microflora has been revealed by the microbiological tests. The use of hydrophobic ointments, starting from the beginning of DI exposure, has allowed in some cases to decrease the level of skin maceration or significantly shift their occurrence to the end of DI. Long-term exposures (21 days) are characterized by generally more pronounced asthenia of the body and longer processes of recovery after DI completion. Of particular interest are the specifics of medical accompaniment in the Dry Immersion with the participation of women, to whom the final part of the report will be devoted.
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