

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Human Health : Countermeasures (2)

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RESEARCH EXPERIMENT "SONOCARD" ABOARD THE INTERNATIONAL SPACE STATION.
POSSIBILITIES AND PROSPECTS.

Abstract

Introduction. Starting in ISS increment-16, research experiment SONOCARD has been pursued with the goal to examine possibility to collect additional data for crew medical monitoring while they are asleep. Methods. A miniature (the size of a cigarette pack) device is put in a T-shirt pocket before sleep. By means of accelerometer sensor, located inwardly the device, chest wall microoscillations produced by heart beats, are registered. The results of the investigation are sent to the Earth by Internet channel. Data analysis consists of calculating heart rate, respiration rate, motor activity, and heart rate variability analysis (HRV). Results. Preliminary results of the experiment on in-sleep physiological data collection demonstrated potentiality of the contactless technology for studying the recovering processes in sleep. For this purpose the linear trend of stress-index (SI) is valued, which falls usually during night. The presence and amplitude of near-90-minutes waves in heart rate (HR) and HRV indices fluctuations is defined. During one of the last ISS missionst HR values varied from 47,60 up to 64,48 bpm and the average mean was 53,1 bpm. The respiration rate during sleep was about 9,9 breathings per minute. Average duration of sleeping was 7-8hours. With the beginning of third flight month the disadvantage track record of evaluated factors have been observed during sleep (the HR increasing, high motor activity, absence of the stress index reduction). Normalization of the recovering processes during sleep was noted in the course of the further flight. Conclusion. It is possible to suppose that existed sleep changes were conditioned by the process of transition from stage of the unstable adaptation to microgravity conditions to stage of relatively stable adaptation. The operative data analysis is useful for medical control of cosmonauts. Our results evidence the applicability of new technology to the needs of space medicine.