

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Poster Session (P)

Author: Prof. Inesa Kozlovskaya
Institute for Biomedical Problems, Russian Federation, ikozlovs@mail.ru

Dr. Elena Tomilovskaya
Institute for Biomedical Problems, Russian Federation, finegold@yandex.ru

Dr. Tatiana Moshonkina
Institute of Physiology named by I.P. Pavlov, Russian Academy of Sciences (RAS), Russian Federation,
tmoshonkina@gmail.com

Prof. Ruslan Gorodnichev
Academy of Sports and Physical training of Velikie Luki, Russian Federation, vlgifc@ellink.ru

Prof. Yury Gerasimenko
Insitute of Physiology named by I.P. Pavlov of the RAS, Russian Federation, yuryg@ucla.edu

MECHANOSTIMULATION OF THE SUPPORT ZONES OF THE SOLES EVOKES THE STEPPING
MOVEMENTS IN HUMANS UNDER SUPPORTLESS CONDITIONS**Abstract**

Introduction. Results of longstanding studies of the nature and mechanisms of negative effects of microgravity on the motor system allowed to consider that support withdrawal is a key factor in development of the disturbances under conditions of microgravity and that support afferentation plays a leading role in the control of tonic muscle system (Kozlovskaya et al., 1981-2011). The goal of the present study consisted in finding out the role of the support afferentation in regulation of locomotor activity.

Methods. Experiments were provided with participation of 19 volunteers suspended in horizontal position with the legs placed separately on two freely moving platforms (Gurfinkel, Selionov et al., 1998). The support zones of the soles had been stimulated mechanically with the regimen of walking and running of 75 and 120 steps/min using the mechanostimulator – Compensator of support unloading (CSU). Characteristics of evoked movements were assessed by the videoanalysis and electromyographic recordings of legs and thigh muscles activity.

Results and Conclusions. Stimulation of the support zones was followed in most cases by leg movements: this activity in 53% of cases had obvious locomotor features with consistency and alternation of muscles activity characteristics of natural walking. The frequency of evoked movements was not equal to that of stimulation. In 25% of cases evoked movements were not alternating and were characterized by a gradual increase of EMG amplitude. Thus the results of the study have shown that support afferentation is capable to activate the locomotor generator and that the effects of this stimulation include the rhythmic (locomotor) and non-rhythmic (postural) components of walking. The study was supported by RFBR grant of oriented fundamental research.