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LOCOMOTOR ACTIVITY EVOKED BY THE SUPPORT ZONES STIMULATION

Abstract

Results of the recent studies have shown that under conditions of horizontal legs suspension (Gurfinkel V.S., Selionov V.A., 1969) the mechanical stimulation of the soles' support zones in the regimen of locomotions is followed in 80% of cases by the evoked leg movements, that in 53% of cases demonstrated the obvious features of natural walking with consistent alternation of the leg muscles activities (Tomilovskaya E.S. et al., 2013; Kozlovskaya I.B. et al., 2013). In 31% of cases evoked movements activity didn't have alternating features and was characterized by a slow increase of EMG amplitude. These data allowed to conclude that support afferentation is capable to activate the locomotor generator and that the effects of the soles' stimulation include the rhythmic (locomotor) and non-rhythmic (postural) components of walking.

Studies of the role of support afferentation in control of locomotor activity and mechanisms of its interactions with other afferentations, such as that perceiving the information of body weight distribution and body orientation in space, were continued in the experiments with the vertical suspension of the body. The results of these studies have confirmed the universal character of the phenomenon of the initiation evoked of locomotor activity by stimulation of support zones of soles and its independence from other afferentations. Initiation of locomotor activity, which was revealed before in the model of horizontal suspension of legs, was recorded persistently also under conditions of vertical suspension, in which along with support stimuli other afferent inputs were also activated, signals of which inform the CNS about body weight distribution as well as body orientation.

The works are directed to implement in practice the new means and methods of motor functions restoration, built on the mechanisms of plasticity and sensory integration in brain and spinal cord neural network.

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