701. Physiological factors in the stability of body posture

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(Received 3September 2011; accepted 4 December 2011)

Abstract. This article investigates the oscillations of body posture before and after physical activity with eyes open and closed. The paper analyses visual perception of the surroundings and what impact it has on body balance stability.

Keywords: body posture, physiological factors, accelerometer.

Introduction

Maintaining and ensuring proper body orientation rest on the interaction of skeletal muscles and nervous system. The components of the skeletal muscles, determining balance stability, are the amplitude of motion, flexibility of spine, mechanical muscular characteristics and biomechanical brain correlation [1-3].

Balance is governed by physiological factors, balance organs (cerebellum, inner ear), muscular receptors (Golgi apparatus, spindle; spindles react to stretching, Golgi apparatus to pressure) and vision. Balance is stabilized using visual, vestibular and proprioreceptive information. Optimal interaction of vision and somatosensory impulses enables appropriate control of body segment orientation and stability. Lack of visual information disturbs the control of balance, body segment position and reaction to the surroundings. The significance of balance and movement control gains much more importance in older age and in people having suffered or suffering from nervous system diseases (especially stroke). In those cases deterioration or complete loss of skeletal muscle coordination and general body balance is especially noticeable. This results in aggravated bio-psychosocial functions and adaptation in surrounding environment and society.

The sensory system is actively involved in the control of the motor: it regulates the guidance of movement, is engaged in perception of the environment and movements and fulfils the role of a stimulus for the reflex movements. Vision identifies objects and their movement in the environment, providing with information on the latter, as well as on the position of body segments and movement of the surroundings with respect to other body parts. The same information is also received by other sensory organs – balance apparatus in the inner ear, muscular spindles, Golgi body and joint capsule receptors. Nevertheless, people devoid of vision impairment while moving in space mostly use afferent vision impulses. Having encountered vision impairment motor body reactions are being controlled by information received from tactile, aural or other senses, whereas for people with normal vision this kind of information is only supplementary. Compared with visual, the role of proprioreceptive information in controlling psychomotor functions and stability of people with normal vision is only minimal. Still, with diminishing or disappearing visual information, the lack of it in regulating balance can be compensated by strengthened proprioreceptive, tactile and aural function, which can be evoked by the method of general as well as special physical practice. All the information received by the receptors is administered by the central nervous system, sending nervous impulses to muscles which by contracting and relaxing in turn help to maintain the balance [1].