Abstract

Title: Breathing and its parameters in increased demands on postural stability

Aims: The main objective is to carry out a quantification research of wind parameters and specify mechanical parameters to compare the effect of increased postural stability claim for breath, prepare the correct research methodology and carry out independent measurements.

The first part of the thesis is focused on the search process of the issue. In the second part of special research was done, where we panned respiratory parameters while standing on the ground and on unstable platform and position of markers in 3D space.

Methods: 1. Measurement of respiratory parameters using lung spirometer

                2. Measurement of defined points in 3D space using Qualisys technology

We measured quiet breathing and consciously deep breathing when standing on the ground or when standing on a balance pad. Total 4 measurements were carried out after 20 seconds. The experiment involved 14 probands aged 22-31 years, 10 women and 4 men. The average age of the probands was 24.5 years, mean height was 172.5 cm and mean weight 68.6 kg. From our study were excluded smokers, professional players of wind instruments, professional athletes, pregnant women, children, people with chronic respiratory disease, CNS disorders, persons with motor limitations, or thoracic spine injury in anamnesis. We scanned passive markers in the ankle, processus spinosus C7 and L5.

Results: Objectively, we managed to prove the theory of inverted pendulum. Markers which were situated higher reached longer distance than markers situated below. The lower limbs due to a greater number of points of loose can absorb a small disturbances therefore the L5 marker had the shortest distance during the measurements on the unstable platform. Furthermore, we were able to prove the influence of internal disturbing deviations to stabilization process because the distance travelled of each markers always grown when breath was increased. Tidal volumes did not show significantly greater differences between stands on the floor and on the unstable platform.

Key words: breathing, lung volumes, equilibrium of vertical posture, inverted pendulum