Abstract

Background: Breathing is one of the vital functions of an organism. Respiratory muscles ensure the enlargement and reduction of the volume of the thoracic cavity, thereby facilitating the exchange of respiratory gases. The way muscles engage can be termed as a breathing pattern. This pattern is determined by the specific characteristics of an individual and is influenced by multiple factors. The aim of this study is to determine whether the breathing route (through the nose/mouth) affects the activity of respiratory muscles.

Methods: The study involved 10 healthy subjects. The movement of the diaphragm was measured using M-mode ultrasonography (UZ), and the activity of accessory respiratory muscles was assessed using EMG. Subjects breathed through their nose and mouth during resting breathing, and subsequently during deep breathing.

Results: The movement of the diaphragm during resting breathing was different between breathing through the nose and mouth ($P < 0.0001$). Greater movement was observed in 8 subjects while breathing through the mouth, and in 1 subject while breathing through the nose. On average, the movement was 20% greater during mouth breathing. During deep breathing, the movement of the diaphragm was also different between breathing through the nose and mouth ($P < 0.02$). EMG activity of the muscles showed differences only in a few muscles and subjects, with no statistically significant difference observed in their activity.

Conclusion: The breathing route significantly influenced the work of the diaphragm, with greater movement observed during mouth breathing during calm breathing. The activity of accessory respiratory muscles directly influenced by the breathing method was not observed. The issue of the influence of breathing through the nose or mouth on the breathing pattern requires further investigation, especially through EMG examination of the diaphragm activity.