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Title: Breathing pattern and thoracoabdominal motion during breathing exercises in healthy subjects

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Body: Background: Breathing exercises have been commonly used by physical therapists. However, it has not been fully elucidated the mechanisms underlying these exercises. Aims: To evaluate the impact of breathing exercises (diaphragmatic breathing-DB, inspiratory sighs, sustained maximal inspiration and intercostal exercise) on breathing pattern and thoracoabdominal motion in healthy subjects. Methods: 15 subjects of both sexes, aged 23 ± 1.5 years old and with normal pulmonary function were studied. Subjects were evaluated by optoelectronic plethysmography in supine position with a trunk inclination of 45° during quiet breathing(5 min.) and breathing exercises(5 min. each), in a random order. Statistical analysis was performed by Friedman test and one-way ANOVA for repeated measures($p < 0.01$). This study was approved by the Ethics Committee. Results: All breathing exercises significantly increased tidal volume(VT) and reduced respiratory frequency(f) in comparison to quiet breathing. DB exercise was responsible for the lowest VT while sustained maximal inspiration exercise promoted the greatest reduction in f. Inspiratory sighs and intercostals exercises were responsible for the highest values of minute ventilation. The lowest contribution of the rib cage(RC) and the highest contribution of the abdomen(AB) for VT occurred during DB. Regarding thoracoabdominal asynchrony, all exercises increased significantly the phase angle between RC and AB in relation to rest. On the other hand, phase angle between pulmonary and abdominal RC increased significantly only during DB. Conclusion: Breathing exercises have different impact on the breathing pattern of healthy subjects. Financial Support: CAPES, FAPEMIG.