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Title: Comparison of incentive spirometers on thoracoabdominal mechanics and inspiratory muscular activity in elderly

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Body: The aging process is characterized by physiological and functional modifications which impair the pulmonary function. Incentive spirometry (IS) has been widely used in clinical practice for lung expansion; however, the effect of volumetric (VIS) and flow-oriented IS (FIS) on thoracoabdominal mechanics and respiratory muscular activity in healthy elderly is poorly known. Objective: To compare the effect of VIS and FIS in the pulmonary ventilation and thoracoabdominal synchrony as well as in inspiratory muscular activity in healthy elderly. Methods: Sixteen healthy elderly (9 females, 71±4yrs, BMI=24±2Kg/m²) performed VIS and FIS (randomized sequence). Chest wall kinematics (optoelectronic plethysmography) and respiratory muscular activity (surface electromyography) was evaluated simultaneously. Synchrony between upper ribcage and abdominal motion was calculated (phase angle). All measurements were evaluated during quiet and deep breathing. One way repeated measures ANOVA with post hoc Newman Keuls test were used and significance level was set at 5%. Results: No change was observed between the use of VIS and FIS in total pulmonary volume (respectively, 1.4±0.7 vs 1.2±0.6L; p>0.05) and inspiratory muscular activity for sternocleidomastoid and upper intercostal (respectively, 34±25 vs 49±24 10⁻³mV and 16±10 vs 19±10 10⁻³mV; p>0.05). However, thoracoabdominal asynchrony was observed during use of FIS compared to VIS (respectively, 18±15 vs 11±8 in the phase angle; p<0.001). Conclusion: Although volumetric and flow incentive spirometers induce similar increase in lung volumes and inspiratory muscular activity in healthy elderly, FIS promotes thoracoabdominal asynchrony.