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Title: Respiratory muscle training is safe and effective in malnourished patients

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Body: Malnutrition is prevalent in 50% of hospitalized patients worldwide and causes systematic damage, including the respiratory system and muscles and leading to increased predisposition to infections and respiratory muscle weakness. The safety and effectiveness of respiratory muscle training in this population are poorly studied. Objective: To assess the effect of specific respiratory muscle training in malnourished patients. Methods: This prospective, randomized and controlled study enrolled 29 malnourished patients with no previous pulmonary disease (BMI<20Kg/m^2 and serum albumin<3.5g/dL). Patients were randomly divided into 3 groups: sham training (CG, n=10), inspiratory (ITG, n=10) and expiratory (ETG, n=9) training. The intensity of ITG and ETG training was at 30% of maximal inspiratory or expiratory pressure (respectively, MIP and MEP). Training sessions were conducted daily in the afternoon for 30 minutes (3 sessions of 10 min, during 7 days) using the threshold IMT® or PEP®. All patients received the same nutritional support. Maximal respiratory pressures and lung function was evaluated before and after the protocols. The evaluator was blinded to patient's group. Two way repeated measures ANOVA and post hoc Newman-Keuls test were performed and significance level was set at 5%. Results: All groups were similar in gender, age, BMI and serum albumin. No patient demonstrated any signs of respiratory distress. After training period, there was increase in MIP in the ITG (59.9±25.8 x 107.9±52.6cmH_2O; p=0.02) and MEP in the ETG (46.5±12.9 x 81.1±23.2cmH_2O; p=0.01) compared to CG. Conclusion: The respiratory muscle training is safe in malnourished patients and promotes a specific increase in the trained muscle.