

## Abstract

**Objectives:** The aim of this study was to point out patients who suffer from exertional dyspnea and create an appropriate physiotherapeutic intervention for them. In these subjects, no cardiorespiratory or neuromuscular dysfunction causing dyspnea is usually diagnosed, and the spirometric examination is without any significant functional defect. We found notably decreased strength of the inspiratory (P<sub>I</sub>max) and/or expiratory (P<sub>E</sub>max) muscles below 70 % of standard value. Functional disorders in myoskeletal system and breathing pattern were also found.

**Methods:** This work is an intervention unblinded study without a control group. The experimental group consists of 12 probands (n = 12). The age range is between 35 and 75 years. Only patients without diagnosed cardiorespiratory or neuromuscular diseases leading to rest or exertional dyspnea were included.

The physiotherapeutic intervention involved manual therapy (soft tissue, muscles and fascial techniques and mobilization), kinesiotherapy (analytic exercises and exercises based on developmental kinesiology) and respiratory physiotherapy (correction of breathing pattern, contact breathing, breathing trainers Threshold IMT and Threshold PEP for respiratory muscle training).

The total duration of the physiotherapeutic intervention was set up for 10 weeks, one individual physiotherapy session a week – in total 10 sessions 30-45 minutes long. The examination and treatment took place in ambulant facility REHAMIL s.r.o. in Lysá nad Labem under the supervision of PhDr. Jitka Malá, PhD and pneumologist MUDr. Šárka Klimešová, PhD.

To evaluate the therapeutic improvement, we measured P<sub>I</sub>max, P<sub>E</sub>max, modified dyspnea scale (mMRC), quality of life questionnaire (WHOQOL-BREF), 6-minute walk test (6MWT) together with Borg's dyspnea scale, Otto inclination and reclination distance, respiratory amplitude in four levels of the chest and the diaphragm test.

**Results:** The effectiveness of the physiotherapeutic intervention was demonstrated in the reduction of dyspnea in the last 14 days assessed by the modified dyspnea scale (p = 0.002), the reduction in exertional dyspnea assessed by the Borg's dyspnea scale (p = 0.005), by increasing the maximum static strength of inspiratory (P<sub>I</sub>max; p = 0.00028) and expiratory (P<sub>E</sub>max; p = 0.046) muscles, increasing the Otto inclination distance (p = 0.0042) and decreasing the Otto reclining distance (0.0006) and improving the results of the diaphragmatic test in the 1st (p = 0.023) and 3rd (p = 0.023) phase of this test. A statistically insignificant

improvement was shown in the 2nd phase of the diaphragm test ( $p = 0.134$ ). A marginally significant improvement was shown in the level of quality of life assessed according to WHOQOL-BREF for the domain of psychological health ( $p = 0.08$ ), but not for other domains, ie physical health ( $p = 0.575$ ), social relationships ( $p = 0.944$ ) and environmental health ( $p = 0.415$ ).