

Effect of Modified Arm Swing Exercise on Oxidative Stress in Patients
with Chronic Obstructive Pulmonary Disease

Tunkamnerdthai, O (M.Sc.)^{1,2,*}, Auvichayapat, P (M.D.)¹, Punjaruk, W (Ph.D.)¹, Leelayuwat, N (Ph.D.)^{1,2},
Zacoue, U (M.N.S.)³, Boonsawat, W (Ph.D.)⁴ Patjanasontorn, B (M.D.)⁴

¹Department of Physiology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

²Exercise and Sport Sciences Development and Research Group, Khon Kaen University, Khon Kaen, Thailand

³Pulmonary unit, Srinagarind hospital, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

⁴Departments of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

*Corresponding author: torata@kku.ac.th

Abstract

Introduction: Oxidative stress resulting from cigarette smoking plays an important role in the pathogenesis of chronic obstructive pulmonary disease (COPD). COPD is characterized by persistent respiratory symptoms and airflow limitation leading to decreased dynamic lung volumes and flow rates. Exercise training is a recommendation to improve lung function and oxidative stress. However, there has been no study to focus on the effect of modified arm swing exercise (MASE) in patients with COPD. Therefore, this is the first study to evaluate the effectiveness of the MASE training on dynamic lung volumes, flow rates and oxidative stress in patients with COPD.

Methods: Twenty stable COPD patients (aged 63.81±7.22yrs) without cardiovascular complication were recruited from KhonKaen province. They performed MASE by clenching both hands during both arms swinging, kneeling about 15 degrees combining with pursed-lip breathing for 30 minutes per day, 6 days per week for 12 weeks. Forced expiratory volume in the first second (FEV₁), forced vital capacity (FVC), FEV₁/FVC, forced expiratory flow at 25-75% (FEF_{25-75%}), peak expiratory flow (PEF), superoxide dismutase (SOD) and malondialdehyde (MDA) were measured before and after the MASE training.

Results: After the MASE training, levels of SOD were significantly increased from 1.02±0.41 to 1.28±0.45U/mL (p < 0.01). Moreover, levels of MDA were significantly decreased from 3.59±1.40 to 2.79±0.98µM/L (p < 0.01) after the MASE training. However, FEV₁, FVC, FEV₁/FVC, FEF_{25-75%} and PEF did not change after the MASE training.

Conclusions: Our study demonstrated that the MASE training is effective to increase antioxidant and decrease oxidant in patients with COPD.

Keywords: COPD, Low-intensity exercise training, Oxidant, Antioxidant