

Effects of Circuit Training with and without Respiratory Muscle Training on Inspiratory Muscle Strength and Physical Fitness in the Elderly

Nattanon Sata* Dr.Naruemon Leelayuwat* Dr.Orathai Tankamnerdthai*,**¹

ABSTRACT

The number of older people is growing around the world. The elderly is natural cause of change in respiratory muscle strength, cardiovascular function, and muscle strength that of all can cause to limit physical performance. Circuit training (CT) can improve cardiovascular and pulmonary function leading to increased physical fitness in the elderly. Respiratory muscle training (RMT) also could improve pulmonary function and respiratory muscle strength in the elderly. Although CT and RMT each may provide benefit to elderly, there has been no study to investigate the combination of RMT and CT on respiratory muscle strength and physical fitness in older adults. Therefore, the aim of this study was to investigate the additional effect of inspiratory muscle training (IMT) to CT on inspiratory muscle strength and physical fitness in the elderly. Fifty-one elderly participants were randomized to circuit training with respiratory muscle training group (CRTG) (n = 26) or to circuit training without respiratory muscle training group (CTG) (n = 25). In the CRTG, they performed IMT with CT 40 min/day, 3 days/week for 12 weeks. In the CTG, they performed only circuit training 40 min/day, 3 days/week for 12 weeks. Inspiratory muscle strength (P_{Imax}) and physical fitness (Timed up and go test (TUG), 30-second chair stand test, single leg stance test, handgrip test, leg dynamometer, and chair sit- and-reach test) were assessed before and after the study period (single-blind study). Results showed that after the 12-weeks of study period within CTG and CRTG, P_{Imax} and physical fitness were significantly improved in both groups ($p < 0.05$). Moreover, when compared between group showed P_{Imax} (44.15±12.02 in CTG and 53.33±17.65 in CRTG) and TUG (6.67±1.26 in CTG and 5.87±1.36 in CRTG) in CRTG had significantly higher than the CTG ($p < 0.05$). These data demonstrated that IMT with CT improves inspiratory muscle strength and dynamic balance in the elderly. Thus, the respiratory muscle training with circuit training may be suggested to be an alternative exercise for the elderly.

Keywords: Elderly; Respiratory muscle strength; Physical fitness; Circuit training; Respiratory muscle training.

¹ *Corresponding author: Orathai Tankamnerdthai, PhD, Assistant Professor, Department of Physiology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand, E-mail: torata@kku.ac.th*

**Exercise and Sport Sciences program, Graduate School, Khon Kaen University, Khon Kaen, Thailand.*

***Department of Physiology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand.*