

**The Immediate Effect and 2-Week Effect of Transcranial Direct Current Stimulation (tDCS)
on Physical Performance and Respiratory Muscle Strength in The Elderly**

Piangdaw Adchaithor* Dr.Paradee Auvichayapat** Dr.Wiyada Punjaruk** Dr.Orathai Tunkamnerdthai***¹

ABSTRACT

Introduction: In the aging process, brain volume is reduced, which involved with decreased motor control such as walking and balance. Transcranial direct current stimulation (tDCS) is a brain stimulation technique, which is able to modulate cortical excitability with a weak direct current. However, there has been no evidence to focus on beneficial effects of tDCS stimulation on respiratory muscle strength in older people. Therefore, the study aimed to investigate immediate effect and 2-week effect of tDCS on physical performance and respiratory muscle strength in the elderly. **Methods:** 16 participants (6 men and 10 women, age 72.62 ± 5.68 years) received 20 min of a-tDCS (2 mA) over the M1 for 20 min, 3 times/week for 2 weeks. 10-meter walk test (10MWT), timed up and go test (TUG), five times sit to stand test (FTSST), six-minute walk test (6MWT), hand grip strength, leg strength, and respiratory muscle strength were assessed on the first day before tDCS application, immediately, and 2 weeks after the last session of tDCS stimulation. **Results:** The findings of repeated-measures ANOVA showed that 10MWT, TUG, FTSST, 6MWT, hand grip strength, leg strength, and inspiratory muscle strength were significantly improved both immediately and after 2-week of tDCS stimulation ($F(1.57$ to $1.96, 23.52$ to $29.45) = 7.44$ to $50.05, p$ -value < 0.001 to 0.005), compared with pre-test. **Conclusion:** The present findings showed that the application of 20-min tDCS over the M1 for 2 weeks can improve physical performance and respiratory muscle strength in the elderly. This technique should be concerned for planning appropriate management in order to increase physical performances to independently perform daily activities in the elderly.

Keywords: Transcranial direct current stimulation (tDCS); Immediate effect, 2-week effect; Physical performance; The elderly

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

**Student, Ph.D. of Exercise and Sport Sciences Program, Graduate School, Khon Kaen University.*

***Associate Professor, Department of Physiology, Faculty of Medicine, Khon Kaen University.*

****Assistant Professor, Department of Physiology, Faculty of Medicine, Khon Kaen University.*