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## Effect of Balance Training on Multiple Sclerosis Related Fatigue: A Randomized Controlled Trial

## Amina Awad<sup>1</sup>\*, Hussien Shaker<sup>1</sup>, Amira M. El Gohary<sup>2</sup>, Salma Marzouk<sup>2</sup>, Amr Hassan<sup>3</sup>

 <sup>1</sup>Department of Physical Therapy for Neuromuscular Disorders and its Surgery, Faculty of Physical Therapy, Cairo University, Cairo, Egypt
<sup>2</sup> Clinical Neurophysiology Unit, Department of Neurology, Faculty of Medicine, Cairo University, Cairo, Egypt
<sup>3</sup>Department of Neurology, Faculty of Medicine, Cairo, Egypt

Abstract: Fatigue is a multidimensional and complex widespread symptom among patients with multiple sclerosis (MS). Fatigue and impaired upright postural control (balance) are common complaints in patients with MS; influencing each other. This work was aiming to investigate the benefits of balance training program in reducing fatigue in patients with remitting-relapsing (RRMS). This randomized controlled trialincluded 30 patients with RRMS; 10 in the control group and 20 in the study group with matched general and clinical characteristics. All patients were treated for successive four weeks (12 therapeutic sessions). Both groups had been treated by aerobic exercises using stationary bicycle endurance training with intensity of 65 % to 70% of the age predicted maximum heart rate (MHR). While the study group had received a designed balance training program in addition. Outcome measures included the fatigue severity scale (FSS) and the relative power ratio between slow to fast waves of quantitative electroencephalogram (QEEG) activity using the equation  $(\theta + \alpha/\beta)$ . This study was registered with http://www.pactr.org/, number (PACTR201611001853408).Patients in the study group showed a statistically significant improvement in the FSS (P=0.025, 95%) CI = 31.84 to 43.65). The  $(\theta + \alpha/\beta)$  ratio had significantly improved in both groups; the study group (P=0.0001, 95% CI= 1.63 to 2.51) and the control group (P=0.036, 95% CI= 1.80 to 2.95), however, improvement was more marked in the study group (P=0.03).Balance training exercises are effective in facilitating the sensory-motor integration and consequently reducing fatigue perception in patients with MS.

Keywords: Balance training, Fatigue, quantitative electroencephalogram, Multiple Sclerosis.

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