

The International 22<sup>nd</sup> Puijo Symposium  
"PHYSICAL EXERCISE IN CLINICAL MEDICINE –  
CRITICAL APPRAISAL OF SCIENTIFIC EVIDENCE"  
June 24 - 28, 2014 Kuopio, Finland

**INFLUENCE OF STRENGTH TRAINING ON NEUROMUSCULAR ADAPTATIONS IN PATIENTS WITH PARKINSON'S DISEASE.**

Bartira Pereira Palma<sup>1</sup>, Carla Silva-Batista<sup>1</sup>, Valmor Tricoli<sup>1</sup>, Hamilton Roschel<sup>1</sup>, Maria Elisa Piemonte<sup>2</sup>, Marco Túlio De Mello<sup>3</sup>, Carlos Ugrinowitsch<sup>1</sup>.

<sup>1</sup>School of Physical Education and Sport, University of São Paulo; <sup>2</sup>Department of Physical Therapy - Faculty of Medical Science, University of São Paulo; <sup>3</sup>Center for Psychobiology and Exercise Studies, Federal University of São Paulo, Brazil. bartirapalma@usp.br

**OBJECTIVE:**

To assess the effects of strength training on neuromuscular variables in patients with Parkinson's disease (pPD).

**METHODS:**

Eight men and four women (68.7 ± 9.1 years), in stages 2 and 3 of the disease (tested and trained in the clinically "on" state) were divided into two groups: control group (CG) and strength training group (STG). The STG underwent 12 weeks of strength training, twice a week. Peak torque (PT), rate of torque development (RTD), half relaxation time (HRT), root mean square (RMS) of electromyography, electromechanical delay (EMD) during maximum ballistic voluntary isometric contraction of the knee extensor muscles (i.e. vastus lateralis (VL) and vastus medialis (VM) muscles) were obtained before and after the training period. Significance level was set at p≤0.05.

**RESULTS:**

PT and RTD showed significant improvements (122.8±52.1 N·m - 150.3±57.5 N·m; 322.5±202.3 N·m - 382.5±215.5 N·m, respectively) from before to after training. VL and VM RMS were significantly increased (56.5±32.0 - 70.1±40.7; 72.2±34.5 - 86.1±39.8 respectively). HRT and vastus lateralis EMD showed significant reductions (153.6±85.6 ms - 142.7±84.4 ms; 396.2±57.3 ms - 355.8±44.3 ms respectively) whereas VM EMD did not show significant reductions (399.3±37.1 ms - 389.2±33.3 ms).

**CONCLUSION:**

Strength training seems to be effective in increasing neuromuscular performance of pPD. Further randomized controlled trials are necessary to elucidate the impact of the improved neuromuscular performance on functionality and motor symptoms.