

Exercise, Cognition and Physical Function in Individuals with Parkinson's Disease

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Background/Purpose: Individuals with PD experience walking deficits, balance and posture alterations, muscular weakness and deconditioning, as well as progressive cognitive decline. Exercise has been proposed as an adjunctive therapy in PD treatment. However, there is still a lack of information regarding the optimal frequency of exercise training for cognitive and physical benefits in this population. The purpose of the present study is first, to identify the effects of a high – frequency and a low – frequency exercise intervention program on the physical function in individuals with PD without dementia; and second, to determine the correlation between changes in walking speed and changes in executive function (EF) after 12 weeks of exercise intervention.

Method: Forty-three participants (M age = 68.5 (SD = 11.3), 26 males), with PD stages 2 and 3 completed the Short Physical Performance Battery (SPPB), and an auditory switch task prior to exercise, and at the conclusion of 12 weeks of the exercise intervention. Summary performance scores for the SPPB used the summation of the test scores for standing balance, walking speed, and rising from a chair 5 times, while global switch costs and response accuracy were calculated for EF. The participants were classified into a high - frequency exercise group (N = 23, M age = 68.6 (SD = 5.8) that exercised 4-5 times/ week, and a low - frequency exercise group (N = 20, M age = 67.6 (SD = 4.5) who exercised 3 times or less/ week.

Analysis/Results: Mixed factorial ANOVA indicated significant interaction between time and group, $F(1, 41) = 8.37, p < .05, \eta^2 = 0.17$ for SPPB summary performance scores, and a significant interaction between group and task $F(2, 82) = 7.91, p = .001, \eta^2 = 0.16$, and time and task, $F(2, 82) = 5.55, p < .05, \eta^2 = 0.11$ for the SPPB scores calculated by task. Also, linear regression analysis revealed a significant correlation for differences in walking speed and differences in executive function following 12 weeks of high – frequency exercise, $F(1, 21) = 25.921, p < .0005$, and a weak correlation for low – frequency exercise, $F(1, 18) = 3.404, p = 0.082$.

Conclusions: Based on the results it is apparent that changes in physical function are dependent on the frequency of weekly exercise, and also that differences in walking speed following a high – frequency exercise program could predict changes in executive function in individuals with PD.