

EXERCISE AND PARKINSONS: COMPARING INTERVENTIONS AND EXPLORING NEURAL MECHANISMS

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Contact information of lead PI Country

USA

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EXERCISE AND PARKINSONS: COMPARING INTERVENTIONS AND EXPLORING NEURAL MECHANISMS

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Parkinson's disease & PD-related disorders

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Research Abstract

DESCRIPTION (provided by applicant): Parkinson disease (PD) is characterized by substantial disability and reduced quality of life, both of which can be attributed in large part to difficulties with walking. Evidence suggests that exercise may be an important adjunct to traditional treatments, particularly with respect to locomotor function. In particular, dance and treadmill training have been individually shown to improve walking performance and quality of life. At present it is not clear whether dance or treadmill training have similar effects or if one is superior to the other. Moreover, our understanding of the mechanisms by which these exercise interventions convey benefits is extremely limited. This study aims to address these knowledge gaps by directly comparing dance, treadmill training and stretching (control group). The primary area of interest is the effects on gait, with secondary measures of disease severity, balance, and quality of life. We will determine not only the effects of the interventions on locomotor performance, but will also investigate the effects of the interventions on brain connectivity and brain function at rest and during imagined walking tasks. Participants will be randomly assigned to dance, treadmill training, or a stretching/flexibility control group. Participants will be assessed over a period of 6 months at 3 different time points. We hypothesize that both dance and treadmill training will lead to improvements in forward walking, but that dance will result in greater improvements in backward walking compared to treadmill training. Furthermore, we hypothesize that the tango and treadmill interventions will have different effects of brain function and connectivity. We expect dance to enhance the activity and connectivity of the premotor and supplementary motor areas. We expect treadmill training to enhance activity and connectivity of the primary somatosensory cortex and the cerebellum. We do not expect changes in brain activity or connectivity in the control group. Relevance PD affects 1-1.5 million Americans, leading to substantial disability, reduced quality of life, and an annual expenditure of more than \$34 billion in health care costs. Difficulties with walking are a major contributor to disability and walking speed is a strong predictor of mortality. Exercise therapies hold promise for improving walking as well as quality of life. In particular, dance and treadmill training have been reported to improve walking, but head-to-head comparisons of these methods have not been made and the neurophysiologic effects of these interventions remain unknown. This study will directly compare the effects of dance, treadmill training and stretching (control group) and will utilize neuroimaging techniques to explore the neurophysiologic effects of these interventions on brain function and connectivity. The results obtained will help us to better understand whether and how exercise influences function in PD and which brain regions are involved. The knowledge gained has the potential to alter our approach to the treatment of gait difficulties in PD, as it may assist in the development of new or improved exercise interventions and/or identification of new surgical targets for deep brain stimulation.

Lay Summary

Parkinson disease (PD) affects 1-1.5 million Americans, leading to substantial disability, reduced quality of life, and an annual expenditure of more than \$34 billion in health care costs. Problems with walking are a major contributor to disability in PD and the development of treatments to address gait dysfunction is critical to reduce mortality, improve quality of life and reduce costs for care. Exercise is a promising adjunct therapy that may provide important benefits with respect to walking and other aspects of function, but knowledge is lacking regarding which form of exercise is best. Additionally, we have a very limited understanding of the underlying neurophysiologic mechanisms of exercise and its effects on locomotor control. This study will directly compare the two exercise programs, tango dancing and treadmill training,

to each other and to a control group that participates in a stretching program to determine their effects on gait and function in people with PD. We will utilize brain imaging techniques to examine how participation in these exercise programs modifies brain function. The information gained will inform the development of optimal exercise interventions, and perhaps other treatment approaches, designed to specifically target walking problems in PD.

Further information available at:

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Investments > €500k

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United States of America

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Parkinson's disease & PD-related disorders

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