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Tai chi helps Parkinson's patients with balance and fall prevention

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Exercise is important for a healthy lifestyle but it is also a key part of therapy, rehabilitation and disease management. For Parkinson's disease, exercise routines are often recommended to help maintain stability and the coordinated movements necessary for everyday living. An NIH-funded study, reported in the February 9, 2012 issue of the *New England Journal of Medicine*,* evaluated three different forms of exercise – resistance training, stretching, and tai chi – and found that tai chi led to the greatest overall improvements in balance and stability for patients with mild to moderate Parkinson's disease.

Clinical trial participants assigned to the tai chi exercise group practice slow fluid arm movements in class. Photo credit: Courtesy of Fuzhong Li., Ph.D.

Parkinson's disease is a movement disorder that is caused by the loss of brain cells which control coordinated and purposeful motions. This cell loss results in tremor, rigidity, slowed movement (known as bradykinesia) and impaired balance (postural instability). While some symptoms, such as tremor, at least benefit from drug therapy initially, the medications currently available to treat Parkinson's are not as effective in restoring balance. This is a special concern for Parkinson's patients because postural instability frequently leads to falls.

Several studies have demonstrated that resistance training, for instance with ankle weights or using weight-and-pulley machines, has positive effects on balance and gait. As a result, doctors often suggest exercise or prescribe physical therapy to address problems with instability.

Fuzhong Li, Ph.D., research scientist at the Oregon Research Institute in Eugene, was part of a team of researchers who, in 2007, published a pilot study showing that tai chi was a safe exercise for individuals with mild to moderate Parkinson's disease. "We had been using tai chi for balance training in healthy older adults, " Dr. Li commented, "and older adults and patients with Parkinson's disease share some difficulties with falls."

Tai chi is a balance-based exercise that originated in China as a martial art. While there are many different styles, all are characterized by slow, relaxed and flowing movements. In both the pilot study and the recent *New England Journal of Medicine* study, patients performed a tai chi routine designed to challenge patients' stability and address the balance and stability-related symptoms of Parkinson's. The routine included slow, intentional, controlled movements that maximized the swing time of arm and leg motions, and repeatedly incorporated gradual shifts of body weight from one side to another, varying the width of their base of support by standing with feet together or further apart.

With support from the NIH's National Institute of Neurological Disorders and Stroke (NINDS), Dr. Li and colleagues conducted a larger clinical trial to compare tai chi to resistance training and stretching. The study assigned a total of 195 patients with mild to moderate Parkinson's disease to one of three exercise groups: tai chi, resistance training, or stretching. Patients attended class twice a week for 24 weeks. The investigators assessed balance and movement control by testing how far patients could lean and shift their center of gravity without losing balance, and how directly the patients could reach out to a target, with a minimum of extraneous movement.

After six months, the patients in the tai chi group showed the greatest amount of improvement in balance and stability. Furthermore, patients in the tai chi and resistance training groups had a significantly fewer falls over the six month period compared to participants in the stretching group.

"There is a learning curve involved," Dr. Li noted, adding that improvement is seen after four to five months of continued practice twice a week, and this trend is similar to what he had noted in his studies of older people.

Dr. Li described tai chi as similar to resistance training, the more commonly recommended physical therapy, in that it requires repetitive movement. Tai chi, however, not only involves shifting a person's weight and center of gravity, but it is also practiced at a dramatically slow speed and greatly emphasizes intentional control of movement.

"In tai chi we emphasize very slow and intentional movement," Dr. Li commented. "That imposed a lot of challenge, especially to those in the tai chi group who were used to fast movement."

Dr. Li also noted that tai chi is very safe and can be performed without equipment and in limited space.

Beth-Anne Sieber, Ph.D., a program officer at NINDS, said that falls are a dangerous side effect of Parkinson's disease and commented on the significance of Dr. Li's work. "The key observation in Dr. Li's study is that a specifically designed sequence of tai chi movements improves postural stability and prevents falls for an extended period of time in persons with Parkinson's disease. In addition, tai chi sequences can be tailored to improve balance in a spectrum of patients with mild to moderate symptoms." Dr. Sieber also noted that this study is indicative of a growing interest in examining how physical activity may improve symptoms of Parkinson's disease. Further research will provide additional information on ways in which physical activity can improve disease symptoms and quality of life for people with Parkinson's disease.

- By Nicole J. Garbarini, Ph.D.

For more information about Parkinson's disease, visit: **www.ninds.nih.gov/PD**.

*Li, F. et al. "Tai chi and postural stability in patients with Parkinson's disease." *New England Journal of Medicine*. February 9, 2012. Volume 366 (6), pages 511-9.

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