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Researchers enlist symptom-specific exercise in battle against Parkinson's Disease

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The Parkinson's Disease Exercise Initiative, a new collaboration between the Gardner Center at the University of Cincinnati (UC) Neuroscience Institute and the Cincinnati YMCA, is taking aim at a progressive disease by meeting it head-on with progressive exercise.

The comprehensive program, located at the Central Parkway YMCA, includes an array of exercises designed to target specific motor symptoms caused by Parkinson's disease, a progressive neurological disorder that results in a shortened, shuffling stride, freezing in place, decreased speed of movement and a loss of balance. The Exercise Initiative seeks to add another modality to the current standard of Parkinson's care, which includes medication and deep brain stimulation surgery.

"One gentleman came to us using a walker," says Brian Terpstra, PhD, director of the Exercise Initiative and a postdoctoral fellow in UC's department of neurology. "After 14 weeks of symptom-specific exercise, he no longer uses it."

Improvement doesn't mean patients can sit back and rest, however.

"As patients get better, you have to push them like they're athletes," says Terpstra, a former Indiana Golden Gloves champion who has a master's degree in exercise physiology and a PhD in neurology. "You can't treat them with kid gloves just because they have Parkinson's. If you don't increase the speed on the treadmill, for example, their brain will get used

to what they're doing and the adaptations that are helping will subside. So we refer to progression two ways. There is the progression of Parkinson's disease, which will slowly get worse over time. And we try to combat that with the exercise physiology world's concept of progression: the increase of stimulus difficulty over time."

The benefits of exercise training for people with Parkinson's disease are well established and have been a theme during the eight-year history of the Sunflower Revolution, whose annual free symposium and expo will be held Sept. 10 at the Oasis Conference Center in Loveland, Ohio. The Parkinson's Disease Exercise Initiative, which is funded by the James J. and Joan A. Gardner Family Center for Parkinson's Disease and Movement Disorders and the Jerry Wuest-Pete Hershberger Golf Classic, ramps up UC's commitment to exercise and includes a research component.

Of the dozen patients who currently participate in the program, three are enrolled in a research study designed to quantify the program's value and to discover whether exercise conveys potential cost reductions to patients. Evidence of cost savings could persuade insurance companies to cover the cost of exercise programs for patients, says Terpstra, the study's principal investigator.

Terpstra and his team will also measure motor scores, depression, quality of life, overall disability and quality of gait in study participants who have engaged in regular 60- to 90-minute training sessions over a period of 14 weeks.

The shuffling and freezing that help characterize Parkinson's disease are not merely frustrating for patients and families. They can lead to falls.

"If those of us without Parkinson's lose our balance, we take a step and catch ourselves," Terpstra says. "A person with Parkinson's doesn't have

that reflex and may fall. One of our goals with the initiative is basically to retrain that reflex and teach patients compensatory mechanisms to regain their balance."

To that end—and with careful supervision—participants find themselves standing on a wobbly surface and then trying to catch, bounce and throw an 18-pound medicine ball. In another drill, they try to catch and throw back smaller balls that come at them in rapid succession. The multi-tasking is designed to make them lose their balance and force them to take a proper compensatory step to regain it.

Drills that focus on lengthening gait may require the participant to walk over five-inch-high blocks arranged on the floor like a ladder or take large steps to land inside color-coded squares. These drills involve visual cues—the ladder and squares—in an attempt to bypass brain circuitry that has been damaged by Parkinson's and to summon another part of the brain, the visual cortex, to take over some of the responsibility.

At the treadmill, Terpstra uses auditory cues—his voice—to keep a participant striding rhythmically, while exercise specialist Timothy Kemme stands close by to assure a safe training environment.

"One of the most important things to note about exercise is that an injury, whether it's from exercising or falling at home, is serious," Terpstra says. "If you break your hip and can't move, period, it has the opposite effect of exercising and can cause a downward spiral of your symptoms."

Co-investigators for the exercise training study are Alberto Espay, MD, and Fredy J. Revilla, MD, of UC Health and the department of neurology, and George Mandybur, MD, of the Mayfield Clinic and the department of neurosurgery.