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## The Benefits of Exercise in Parkinson Disease

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Parkinson disease (PD) is a disabling neurodegenerative disease for which current treatments are suboptimal. As exercise is generally safe, inexpensive, and associated with secondary benefits, interest in exercise as a treatment for the motor symptoms of the disease is increasing. In this issue of the journal, Shulman and colleagues<sup>1</sup> offer compelling evidence that exercise can improve gait and fitness among individuals with PD. This research adds to the evidence regarding the value of interventions for PD beyond medications and surgery and offers an opportunity for patients to be active participants in their care.

Shulman et al performed a comparative, prospective, randomized, single-blinded clinical trial of 3 types of exercise among patients with PD and gait impairment. Sixty-seven patients were randomized to either lower-intensity treadmill exercise, higher-intensity treadmill exercise, or a combination of stretching and resistance training. For their primary outcome of gait speed, all training types increased distance walked in 6 minutes at 4 months, but lower-intensity treadmill exercise led to the greatest increases. For their secondary outcome of cardiovascular fitness, both treadmill groups demonstrated improvement. In contrast, the stretching-resistance group improved muscle strength and motor scores on the Unified Parkinson Disease Rating Scale. The authors conclude that all 3 types of exercise have benefits, and patients may benefit most from a combination of lower-intensity training and stretching and resistance.

The investigation by Shulman et al adds to the growing body of literature demonstrating the value of exercise in PD (Figure).<sup>2</sup> In 2001, the Cochrane Collaboration examined randomized controlled trials that compared physiotherapy to placebo, and only 11 trials were eligible for their systematic review. At that time, authors concluded that there was “insufficient evidence to support or refute the efficacy of physiotherapy in Parkinson’s disease.”<sup>3</sup> By 2012, the evidence had increased, and Cochrane’s updated review included 33 trials and discussed 6 additional ongoing studies.<sup>4</sup> Using these new data, the authors concluded that while differences between physiotherapy and placebo groups in motor performance and other measures were small, they would be clinically meaningful to patients. The Table highlights the results of select randomized controlled trials from recent reviews<sup>4-12</sup> or that were conducted. While the investigation by Shulman et al certainly

stands out in its rigorous method and large patient participation, each study demonstrates the importance of exercise in improving the health and well-being of individuals with PD.

Beyond its benefits on physical health, exercise gives patients amore active role in the management of their PD. Patients are thirsting for such a role, which is consistent with a patient-centered care model in which health care is “closely congruent with and responsive to patients’ wants, needs, and preferences.”<sup>13(p152)</sup> Patients with PD specifically want more information about nonpharmacological interventions and are not satisfied with the information that they receive.<sup>14</sup> The study by Shulman et al provides physicians and patients with evidence about what patients can do to improve and take charge of their health.

In 2001, the Institute of Medicine raised patientcentered care to a national priority by identifying patientcentered care as 1 of 6 core needs for health care.<sup>15</sup> The Patient Protection and Affordable Care Act of 2010<sup>16</sup> took patient-centered care to a research and funding level by creating the Patient-Centered Outcomes Research Institute. In a 2012 *JAMA* article, the directors of the newly created Patient-Centered Outcomes Research Institute emphasized the importance of the patient in assessing health care options, saying, “Engagement of patients at every step of the research process is viewed as essential, including in the selection of research questions, study design, conduct, analysis, and implementation of findings.”<sup>17(p1636)</sup>

The study by Shulman et al directly engages patients in research and in their health. Exercise programs among those with neurological disorders increase the patients’ sense of self-efficacy,<sup>18</sup> their sense of involvement in their care and overall belief in their abilities to perform certain activities. In addition, patient involvement leads to higher satisfaction with care, and greater likelihood of following provider recommendations.<sup>19</sup> In essence, exercise puts the patient—not a pill—at the center of care, which is exactly where patients want and ought to be.

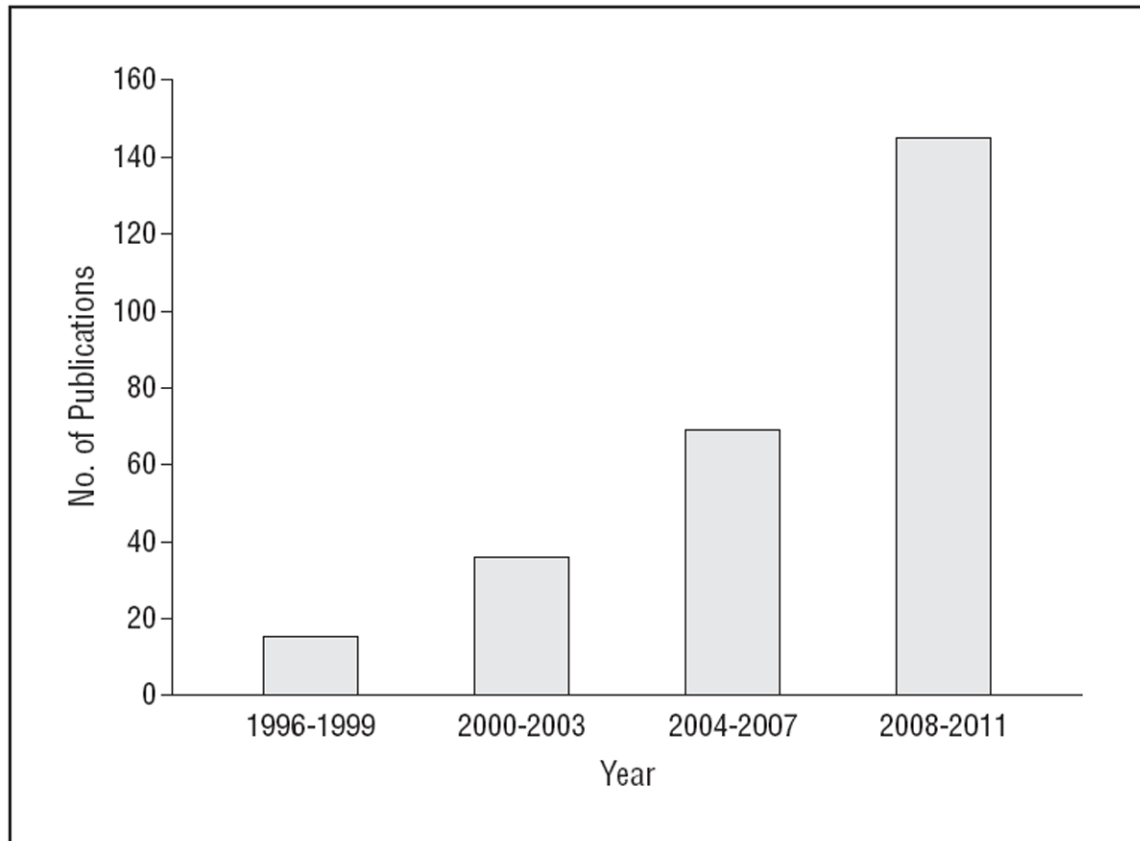
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**Figure.** Publications of randomized controlled trials of exercise and Parkinson disease, 1996-2011. Databased on a MEDLINE search of *Parkinson disease*, *Parkinson*, or *Parkinson's* and *exercise* conducted on August 21, 2012. The search was restricted to randomized controlled trials using a standardized search strategy from the *Cochrane Handbook for Systematic Reviews of Interventions*.<sup>2</sup>

**Table**  
**Select Randomized Controlled Trials of Exercise as Treatment for Symptoms of Parkinson Disease**

Source	Funder	Intervention	No.	Primary Outcomes	Primary Conclusion
Shulman et al. <sup>1</sup> 2012	Michael J. Fox Foundation	High-or low-intensity treadmill or stretching and resistance training	67	Gait speed	High-or low-intensity treadmill and stretching and resistance improves gait speed
Li et al. <sup>2</sup> 2012	National Institute of Neurological Disorders and Stroke	Tai chi, resistance training, or stretching	195	Balance testing	Tai chi improves balance
Ashburn et al. <sup>6</sup> 2007	Action Medical Research, John and Lucille Van Geest Foundation	Home physiotherapy	142	Falling rates	Physiotherapy had a trend toward a reduction in falls
Schmitz-Hübisch et al. <sup>7</sup> 2006	German Parkinson patients' organization (dPV)	Qigong	56	UPDRS	Qigong improved UPDRS scores
Ellis et al. <sup>8</sup> 2005	Not reported	Physiotherapy and medication	68	Health questionnaire including mobility subscale	Physiotherapy improves mobility subscale of health questionnaire
Protas et al. <sup>9</sup> 2005	Veteran Affairs	Gait training	18	Gait parameters and reports of falls	Gait training improves gait and balance and reduced falls
Hirsch et al. <sup>10</sup> 2003	Not reported	Balance and resistance training or balance training alone	15	Balance and muscle strength	Balance and resistance training improves balance and strength
Schenkman et al. <sup>11</sup> 1998	National Institute of Health, Claude D. Pepper Older Americans Independence Center, National Center for Research Resources	Relaxation with muscle activation	51	Spinal flexibility and physical performance	Relaxation, muscle activation improves flexibility, physical performance

Abbreviation: UPDRS, Unified Parkinson Disease Rating Scale.