



AOTA Evidence Briefs

Parkinson's Disease

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

P #4

Slow stretching or karate training may improve grip strength and fine motor coordination in persons with Parkinson's disease

Palmer, S. S., Mortimer, J. A., Webster, D. D., Bistevins, R., & Dickinson, G. L. (1986). Exercise therapy for Parkinson's disease. *Archives of Physical Medicine and Rehabilitation*, 67, 741–745.

Level IB2b

Randomized controlled trial, less than 20 participants per condition, moderate internal validity, moderate external validity

Why research this topic?

Research on the role of exercise in improving the management of Parkinson's disease has not produced consistent findings or clear relationships. Yet clinical reports on the effects of exercise programs have generally emphasized their benefits.

What did the researchers do?

To examine the role of exercise more closely, Palmer and colleagues (1986), PhDs and MDs affiliated with the Veterans Administration Medical Center in Minneapolis, compared the effects of two exercise programs. Both programs took place for 1 hour a day, three times a week, for 12 weeks. One program, delivered by a corrective therapist, relied on slow-stretch exercises recommended by the United Parkinson Foundation. The other program, delivered by a rehabilitation nursing student with a black belt in karate, used upper-body karate training preceded and followed by stretching.

Participants in the programs were recruited by sending a letter to persons with **idiopathic** (*see Glossary*) Parkinson's disease at the Parkinson's Disease Clinic of the Veterans Administration Medical Center. Fourteen participants were selected on the basis of their stabilization on a regimen of drug therapy and their ability to attend the evaluation and exercise sessions. All were being treated with anti-Parkinson's medications, and 2 were also taking medication for depression. None had any physical problems that would put them at risk for injury from the exercises.

The participants were matched in pairs according to similarities in stage of disease, gender, and age. One person from each pair was then randomly selected to participate in the slow-stretch program and the other was assigned to the karate training. In the resulting division, 5 in each group were at **stage 2** (*see Glossary*) of Parkinson's, 1 in each group was at **stage 3** (*see Glossary*), and 1 in each group was at **stage 4** (*see Glossary*). Six men and 1 woman made up each group. The average ages were 63.9 years for the slow-stretch group and 65.9 years for the karate-training group.

The outcome areas of interest were *motor signs*, such as **bradykinesia** (*see Glossary*), rigidity, and arm tremor (as measured by the Parkinson's Disease Motor Battery); *activities of daily living (ADL)* (as measured by a dressing task; e.g., the time required to put on and take off a shirt and shoes and socks); *grip strength* (as measured by a **dynamometer**) (*see Glossary*); *motor coordination and speed* (as measured by a nine-hole pegboard test, the Minnesota Rate of Manipulation Test, a button-board test, an arm-swing test, and a test of rapid alternating arm move-

ments); and *maximum-acceleration arm extensions and long-latency stretch responses* (both as measured by a special apparatus). For both groups a technician who was unaware of the study's purpose or of group assignments administered the Parkinson's Disease Motor Battery before therapy and every other week during therapy. An occupational therapist who was unaware of group assignments administered the tests of ADL, grip strength, and motor coordination and speed immediately before and after the 12 weeks of therapy. The tests of arm extension and stretch responses were administered at baseline, 6 weeks, and 12 weeks.

What did the researchers find?

Six of seven participants in each group showed a progressive improvement in gait. For the karate group, the change was **significant** (see *Glossary*). Both groups showed improvements in grip strength and motor coordination and decreases in arm tremor. However, neither group showed a significant change in rigidity, maximum rate of forearm pronation or supination, or improvement in the dressing task.

Both groups showed significant increases in grip strength, speed on the placing-and-turning test, and speed on the rapid-alternating-arm-movement test. Further, the slow-stretch group significantly improved its performance on the arm-swing test. Neither group showed a significant change in performance on the tests of dressing and undressing or on the tests of arm extensions and stretch responses.

What do the findings mean?

■ For therapists and other providers, the findings support the benefits of two kinds of exercise programs for clients with Parkinson's disease: slow stretching and karate training. Two occupational therapy outcomes of interest—grip strength and fine motor coordination, both important components of ADL—showed improvement after each intervention.

What are the study's limitations?

The results of the study may have limited generalizability due to the convenience sample and the small sample size (n=14). These design flaws threaten internal validity of the study because the findings may not be applicable to the population of persons with Parkinson's disease. In addition, other design flaws may have contributed to a lack of improvement on dressing and undressing tasks. The researchers did not address the validity or reliability of the test. Variability in the type of shirt used in the task, such as a pullover versus a shirt with buttons, may have contributed to error in the measure.

Glossary

bradykinesia—"extreme slowness of movements and reflexes" (*Merriam-Webster's Medical Dictionary*)

dynamometer—"an instrument for measuring the force of muscular contraction especially of the hand" (*Merriam-Webster's Medical Dictionary*)

idiopathic—"arising spontaneously or from an obscure or unknown cause" (*Merriam-Webster's Medical Dictionary*)

Hoehn & Yahr—system of classifying symptoms

Stage 2: bilateral or midline involvement, without impairment of balance.

Stage 3: first sign of impaired righting reflexes. This is evident by unsteadiness as the patient turns or is demonstrated when he is pushed from standing equilibrium with the feet together and eyes closed. Functionally, the patient is somewhat restricted in his activities but may have some work potential depending upon the type of employment. Patients are physically capable of leading independent lives, and their disability is mild to moderate.

Stage 4: fully developed, severely disabling disease; the patient is still able to walk and stand unassisted but is markedly incapacitated.

Stage 5: confinement to bed or wheelchair unless aided.

Hoehn, M. M. & Yahr, M. D. (1967). Parkinsonism: Onset, progression, and mortality. *Neurology*, 17(5), S11–S26.

significance (or significant)—A statistical term, this refers to the probability that the results obtained in the study are not due to chance, but to some other factor (such as the treatment of interest). A significant result is likely to be generalizable to populations outside the study.

Significance should not be confused with clinical effect. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client's ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than the control group. However, if you read the study you may find that the treatment group was able to walk, on average, 6 feet, whereas the control group was able to walk, on average, 5 feet. Although the outcome may be statistically significant, a clinician may not believe that a 1-foot increase will improve his or her client's function.

■ Terminology used in this document is based on two systems of classification current at the time the evidence-based literature reviews were completed: *Uniform Terminology for Occupational Therapy Practice—Third Edition* (AOTA, 1994) and *International Classification of Functioning, Disability and Health (ICIDH-2)* (World Health Organization [WHO], 1999). More recently, the *Uniform Terminology* document was replaced by *Occupational Therapy Practice Framework: Domain and Process* (AOTA, 2002), and modifications to *ICIDH-2* were finalized in the *International Classification of Functioning, Disability and Health* (WHO, 2001).

This work is based on the evidence-based literature review completed by Susan Murphy, ScD, OTR/L, and Linda Tickle-Degnen, PhD, OTR/L, FAOTA.

For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



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