AOTA Evidence Briefs
Parkinson's Disease

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

P #9

Aerobic exercise may help clients with Parkinson's disease maintain functional ability

Bridgewater, K. J., & Sharpe, M. H. (1996). Aerobic exercise and early Parkinson's disease. *Journal of Neurological Rehabilitation, 10,* 233–241.

Level IIB2b

Nonrandomized controlled trial, 2 groups, less than 20 participants per condition, moderate internal validity, moderate external validity

Why research this topic?

Before this study by Bridgewater and Sharpe (1996), no research found had examined the effects of aerobic exercise on various symptoms of persons with Parkinson's disease. Yet the literature suggested that exercise would be beneficial.

What did the researchers do?

The researchers, from the University of South Australia (Adelaide) designed a study to investigate the effects of a 12-week aerobic exercise class on selected aspects of Parkinson's disease. Through the Parkinson Syndrome Society of South Australia and newspaper advertisements in the Adelaide metropolitan area, they recruited 26 healthy people (16 men and 10 women) with early **idiopathic** (*see Glossary*) Parkinson's disease. Five were in **stage 1** of the disease, 13 were in **stage 2**, and 8 were in **stage 3** (*see Glossary*). The researchers divided the 26 participants into exercise and control groups. The average ages of the groups were 67.3 and 66.5 years, respectively. The average duration of the disease for both groups was 4 years.

The exercise group met twice a week for 12 weeks, with each session consisting of 15 minutes of warm-up exercises done to music, 20 to 30 minutes of aerobic exercise (various walking activities), and 5 to 10 minutes of cool-down and stretching. A physical therapist trained as a fitness instructor conducted the classes, assisted by another physical therapist.

Members of the control group maintained their pre-study activity level and attended "Interest Talks" on health issues every 3 weeks.

A physiotherapist, neurologist, and cardiologist assessed each participant at baseline, immediately following intervention at 12 weeks, and at 16 weeks (4 weeks after completion of the program). The neurologist and cardiologist were unaware of the group assignments.

The outcome areas of interest were *cardiorespiratory fitness* (as measured by performance on a treadmill); *signs of Parkinson's disease and motor impairment* (as measured by the Webster Rating Scale [WRS] for Parkinsonian Disabilities); *functional ability* (as measured by the Northwestern University Disability Scale [NUDS]); h*abitual activity* (as measured by the Human Activity Profile [HAP]); and *mood* (as measured by the Levine-Pilowsky Depression Questionnaire).

What did the researchers find?

On the test of cardiorespiratory fitness, the researchers found a **significant** (*see Glossary*) difference between participants in the exercise and control groups immediately following the intervention and 4 weeks after intervention ended. across the three assessments. Also, from baseline to 12 weeks, they found a significant increase in fitness level for the exercise group but not the control group. At the 16-week assessment both groups showed a tendency toward further increases, but the tendency was not significant.

On the measure of signs and motor impairment, **no significant** (*see Glossary*) differences were apparent between the groups across the assessments.

On the measure of functional ability, there was a significant difference between the groups across the assessments. Further, at the 12-week assessment the exercise group showed a near-significant increase in its score. The control group, by contrast, showed a significant decrease.

On the measure of habitual activity, a significant difference between the groups occurred across the assessments, and again the exercise group showed a significant improvement across the project.

On the measure of mood, there were no significant differences between the groups across the assessments. However, the exercise group did show a significant improvement from baseline to the 16-week assessment.

What do the findings mean?

- For therapists and other providers, the study supports the use of aerobic exercise to improve the functional ability of clients with early Parkinson's disease. The exercise group's improvement was nearly significant, and the control group showed a significant decrease in functional ability. This suggests that aerobic exercise may serve an important role in maintaining abilities.
- The study provides preliminary support for funding programs that incorporate aerobic exercise for clients with early Parkinson's disease. Because improved functional ability reduces the need for health care services and personal assistance, these reductions may translate into lower costs.

What are the study's limitations?

The results of the study may have limited generalizability because the sample was not randomly selected and the sample size was small (n=26). These design flaws threaten validity because the findings may not be applicable to the population of persons with Parkinson's disease.

Glossary

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

Hoehn & Yahr—system of classifying symptoms

Stage 1: unilateral involvement only, usually with minimal or no functional impairment.

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.

nonsignificant or no significance—A statistical term that refers to study findings that are likely to be due to chance differences between the groups rather than to other factors (like the treatment of interest). A nonsignificant result is not generalizable outside the study. Like significance, a nonsignificant result does not indicate the clinical effect. Often studies will show nonsignificant results, yet the treatment group's mean will be better than the control group's. This is usually referred to as a trend in the right direction. Because significance is closely determined by sample size, nonsignificant results would often become significant if the sample size were increased.

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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