AOTA Evidence Briefs
Stroke

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

S #13

Purpose may enhance stroke clients' upper-limb performance

Nelson, D. L., Konosky, K., Fleharty, K., Webb, R., Newer, K., Hazboun, V. P., Fontane, C., & Licht, B. C. (1996). The effects of an occupationally embedded exercise on bilaterally assisted supination in persons with hemiplegia. *American Journal of Occupational Therapy, 50,* 639–646.

Level IC2c

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

Why research this topic?

To build a science on the principle of "occupationally embedded exercise," or purposeful activity, researchers must explore its effects with different populations and on different variables. As of the mid-1990s, there was only one study of the use of occupationally embedded exercise with stroke patients and only one other that addressed motor control issues often encountered in stroke patients.

What did the researchers do?

Nelson and colleagues (1996), variously of the Medical College of Ohio (Toledo), of the University of Michigan Medical Center (Ann Arbor), and in private practice, sought to add to the body of knowledge on occupationally embedded exercise by conducting a study with stroke clients, the population most often seen by occupational therapists. Their particular interest was whether occupationally embedded exercise would enhance stroke clients' performance of activity requiring bilaterally assisted supination. Supination in this case is "rotation of the forearm and hand so that the palm faces forward or upward" (*Merriam-Webster's Medical Dictionary,* 1997). "Bilaterally assisted supination" means using the unimpaired arm to assist in supination of the impaired arm.

The participants who completed the study were 26 stroke clients (14 men and 12 women) recruited by occupational therapists at their places of employment in California, Michigan, and Texas, following a standard procedure. The participants averaged 68.4 years in age. All of them had a diagnosis of hemiplegia (total or partial paralysis of one side of the body) caused by a first and only stroke that had occurred 9 days to 7 months earlier, and all were at least 45 years old. Further screening focused on (a) spasticity (heightened muscle tone accompanied by exaggerated tendon reflexes) in the pronators (the muscles that rotate the forearm and hand to make the palm face backward or downward);(b) full passive range of supination after a brief warm-up exercise; (c) no functional supination; (d) ability to grasp a 3-centimeter dowel bilaterally with overlapping fingers; (e) no contraindications to supination exercise; and (f) sufficient visual perception and comprehension to participate in the experimental conditions, as evaluated by their ability to match playing cards by number.

The researchers were interested in the following outcome area: *supination* (as measured by how far the participants could rotate a handle).

The participants were randomly assigned in a stratified balanced way (which ensured that none of the clinical sites would provide a disproportionate number of participants to either group) to an occupationally embedded exercise group or a rote exercise group. The former played a simple dice game in two sets of 10 repetitions; the latter performed the same amount of rote exercise. An occupational therapist delivered the interventions in a clinic, one time only.

What did the researchers find?

The occupationally embedded exercise group achieved **significantly** (*see Glossary*) greater handle rotation (requiring more supination) than the rote exercise group.

What do the findings mean?

For therapists and other providers, the findings suggest that occupationally embedded exercise enhances stroke clients' performance of activity requiring bilaterally assisted supination.

What are the study's limitations?

The study has one limitation: The therapist may have known the study's hypothesis and unintentionally influenced the results.

Reference

Merriam-Webster's medical dictionary (10th ed.). (1997). Springfield, MA: Merriam-Webster, available on-line at www.intelihealth.com/cgi-bin/dictionary.cgi.

Glossary

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 one that 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. However, if you read the study you may find that the treatment group was able to walk , on average, six feet, while the control group was able to walk, on average, five feet. While the outcome may be statistically significant, a clinician may not feel that a one foot increase will make his or her client functional.

■ 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).

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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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