



# AOTA Evidence Briefs

## Cerebral Palsy

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

### CP #14

## Positioning does not seem to affect quality of arm movement in people with cerebral palsy

McPherson, J. J., Schild, R., Spaulding, S. J., Barsamian, P., Transon, C., & White, S. C. (1991). Analysis of upper extremity movement in four sitting positions: A comparison of persons with and without cerebral palsy. *American Journal of Occupational Therapy*, 45, 123–129.

### Level: IIB2b

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

### Why research this topic?

Occupational therapists often use “adaptive positioning” (adjustment of the sitting position) with patients who have cerebral palsy because they assume it will reduce abnormal muscle tone, help stabilize posture, and increase control of upper limbs. However, few studies have tested the correctness of the assumptions, and the best of those that have, have produced contradictory results. These contradictory results may have emerged because the studies used different dependent measures and perhaps ones that were not sensitive to qualitative changes in response to treatment.

### What did the researchers do?

McPherson and his colleagues (1991), variously of the University of Wisconsin–Milwaukee, Carroll College (Waukesha, Wisconsin), Shared Therapeutic Services (Milwaukee), and the State University of New York at Buffalo, designed a study focused on the effects of adaptive positioning on changes in the quality of movement in patients with cerebral palsy. Twelve participants (6 men and 6 women) volunteered for the study. All were between 18 and 21 years old. Six had spastic cerebral palsy. The other six had no known condition that affected movement.

A high-speed camera filmed each participant as he or she performed a reaching task under four conditions: (1) seated in a positioning chair with the seat-to-backrest angle at 90°; (2) seated in a wheelchair; (3) seated in a positioning chair with a wedge to encourage 15° of posterior tilt at the hip; and (4) seated in a positioning chair with a wedge to encourage 15° of anterior tilt at the hip.

All the participants had 10 practice trials under the first condition before the researchers began to collect data.

The outcome area of interest was *movement elements*, defined as “one wave of acceleration or deceleration of a particular magnitude” (p. 124), as recorded by the camera and related equipment. The more movement elements, the more discontinuous the movement.

## What did the researchers find?

In all four conditions, the participants with cerebral palsy used **significantly** (see *Glossary*) more movement elements (shifts in acceleration and deceleration in the same reaching task) than the other participants.

Sitting position did not affect the quality of the reaching movements of either set of participants.

The differences in number of movements between the two groups were attributable to differences in number in the hand and the forearm, but not in the upper arm.

## What do the findings mean?

- The findings suggest that there are qualitative differences in arm movements of people who have cerebral palsy and people who have no diagnosis, and that these differences can be measured. The findings also suggest that positioning as described in this study does not alter the quality of these movements.
- The findings suggest a direction for research: replication of the study with a larger sample and investigation of the effects of positioning on people with cerebral palsy who have more severe impairment, particularly in the upper extremities.

## What are the study's limitations?

- **Convenience sample** (see *Glossary*); **no randomization** (see *Glossary*).
- Characteristics of study sample only described by age, gender, and diagnosis.
- Generalization limited to young adults with spastic cerebral palsy who reside in institutions.

## GLOSSARY

**convenience sample**—A sample that was selected because it was available and capable. It, therefore, may not represent the true population.

**randomization**—Randomization refers to the practice of assigning participants to either the treatment or control group using random allocation. Random allocation methods include flipping a coin or using a random number table. Randomization is meant to prevent the possibility that the experimenter might subconsciously let his or her opinions and preferences influence into which group a participant goes. Randomization also helps to ensure that the two groups are essentially equal on many demographic variables, although randomization does not always create equal groups.

Nonrandomized studies are not considered to be true experiments but are often referred to as quasi-experimental. Serious biases can occur when studies are nonrandomized.

**significance (or significant)**—A statistical term that 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, 6 feet, while the control group was able to walk, on average, 5 feet. While the outcome may be statistically significant, a clinician may not feel that a 1-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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