



AOTA Evidence Briefs

Developmental Delay in Young Children

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

DD #14

Tactile and kinesthetic stimulation improve weight gain and behavior in premature babies

Kilgo, J., Holder-Brown, L., Johnson, L. J., & Cook, M. J. (1988). An examination of the effect of tactile-kinesthetic stimulation on the development of preterm infants. *Journal of the Division for Early Childhood, 12*, 320–327.

Level: IIB2c

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

Why research this topic?

Premature infants spend their early weeks of life in intensive care, where the emphasis is on their biological survival. They receive little handling but much treatment that intrudes on their bodies—blood sampling, intravenous feeding, and so on. The high-tech environment of the intensive care unit may be a contributing factor to developmental delay in these infants. Research suggests that **tactile** (see *Glossary*) and **kinesthetic** (see *Glossary*) stimulation facilitates development and improves weight gain in premature infants. However, there has been variation in the positive effects of such stimulation on certain variables. Kilgo and her colleagues (1988), variously of Virginia Commonwealth University (Richmond) and the University of Alabama, Tuscaloosa, sought to determine the effects of tactile and kinesthetic stimulation on weight gain and two other variables not studied as extensively.

What did the researchers do?

The researchers selected 20 premature infants (gender not reported) from the intensive care units of three hospitals in Alabama. All weighed 2,400 grams (5.25 lbs.) or less at birth; had a **gestational age** (see *Glossary*) of 36 weeks or less; were able to feed by tube or by mouth; and had no serious medical complications.

Ten babies at one hospital constituted the treatment group; 10 at the other two hospitals made up the **control group** (see *Glossary*). The treatment group received stimulation from an occupational therapist, an occupational therapy assistant, or a trained volunteer for three 15-minute periods a day, for 10 days, always before a scheduled feeding. The periods consisted of three 5-minute phases, with the first and third phases involving tactile stimulation (*Glossary*) with the infant lying on his or her stomach, and the second phase involving kinesthetic stimulation with the infant lying on his or her back. They followed a strict protocol.

The researchers were interested in the following outcome areas: *weight gain* (as calculated from daily weighings); behavior, specifically, **habituation** (see *Glossary*), **orientation** (see *Glossary*), motor [behavior], **range of state** (see *Glossary*), **regulation of state** (see *Glossary*), **autonomic regulation** (see *Glossary*), and *reflexes* (all as measured by the Brazelton Neonatal Behavioral Assessment Scale); and *length of hospital stay*. The behavior measures were taken before and after the intervention.

What did the researchers find?

The infants in the treatment group **significantly** (see *Glossary*) increased their weight, whereas those in the control

group did not. Further, the gains of the treatment group were significantly greater than those of the control group. On the behavioral assessments, the treatment group significantly improved on all measures, but the control group did not.

There were no significant differences between the groups in length of hospital stay.

What do the findings mean?

- The findings support the use of tactile and kinesthetic stimulation to improve weight gain and behavior in premature infants.
- The findings should boost confidence in funding tactile and kinesthetic stimulation as standard procedure with premature babies. They also suggest a productive direction for research: for example, longitudinal studies on the effects of such stimulation.

What are the study's limitations?

- The recruitment of subjects was not clear.
- No **randomization** (see *Glossary*) of subjects.
- One hospital sample received treatment; the control group was from two other hospitals.
- Medical treatment of preterm population; questionable reliability among three hospitals.
- Treatment was not replicable; amount of touch pressure was not quantified.
- Cohort year is unknown.
- Latency effects of treatment were not measured (central nervous system [CNS] compromise).
- Small sample; no demographics given about the 3 samples.

Glossary

control group—a group that received special attention similar to that which the treatment group received, but did not receive the treatment.

autonomic regulation—signs of physiological stress seen as tremors, startles, and changes in skin color.

gestational age—age from conception, rather than from birth.

habituation—response decrement to repeated auditory, visual, and tactile stimulation.

kinesthetic—relating to the sense perception of movement of muscles and tendons.

orientation—response to animate and inanimate stimuli, and overall alertness.

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.

range of state—the rapidity, peak, and liability of changes of one's condition, situation, or status.

regulation of state—efforts to modulate his or her own state control.

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, 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 feel that a 1-foot increase will make his or her client functional.

tactile—relating to touch or to the sense of touch.

■ 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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