



AOTA Evidence Briefs

Developmental Delay in Young Children

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

DD #4

Massage therapy promotes weight gain in premature infants

Scafidi, F. A., Field, T. M., Schanberg, S. M., Bauer, C. R., Tucci, K., Roberts, J., Morrow, C., & Kuhn, C. M. (1990). Massage stimulates growth in preterm infants: A replication. *Infant Behavior and Development, 13*, 167–188.

Level: IA1a

Randomized controlled trial, 20 or more participants per condition, high internal validity, high external validity

Why research this topic?

Research on **tactile** (see *Glossary*) and **kinesthetic** (see *Glossary*) stimulation with premature infants has shown it to have positive effects. However, there are inconsistencies among several of the studies regarding weight gain, activity level, and sleep or wake state.

What did the researchers do?

Scafidi and his colleagues (1990), variously affiliated with the University of Miami (FL) and Duke University (Durham, NC), thought that methodological weaknesses might account for the inconsistencies. They conducted the present study to replicate their own previous studies and correct for methodological limitations. The sample consisted of 40 premature infants (15 boys and 25 girls) from the intermediate care units of the University of Miami's hospital, 67.5% of them Black, 17.5% Hispanic, and 15% White. Criteria for inclusion in the study were a **gestational age** (see *Glossary*) of fewer than 36 weeks; an absence of congenital heart malformations, gastrointestinal disorders, and severe central nervous system dysfunction; no genetic abnormalities; no mothers addicted to substances; a stay in the intensive care unit of fewer than 45 days; and an entry weight into the study of between 1,000 and 1,450 grams (2.19 and 3.17 lbs., respectively). All were medically stable, did not need breathing assistance, and were not receiving intravenous medications or feedings.

The researchers randomly assigned the infants to a treatment or a **control group** (see *Glossary*) following a special procedure to match the groups in gestational age, birthweight, duration of intensive care treatment, and entry weight at the beginning of the study. They enrolled the treatment and control groups on alternating weeks. As a result, only one treatment and one control group infant were participating in the study at any given time.

Both groups received standard medical and nursing care. The treatment group also received 15 minutes of massage therapy an hour during 3 consecutive hours each day over a 10-day period (weekdays only). The therapy consisted of three standardized 5-minute phases. The first and third phases involved tactile stimulation, the second involved kinesthetic stimulation. In the tactile phases, the newborn lay on his or her stomach and was stroked in each region of the body in a specific order. In the kinesthetic phase, the newborn lay on his or her back and had his or her arms and legs gently bent and straightened.

The researchers were interested in the following outcome areas: **habituation** (see *Glossary*), **orientation** (see *Glossary*), **motor behavior**, **range of state** (see *Glossary*), **regulation of state** (see *Glossary*), **autonomic stability**, and **abnormal reflexes** (all as measured by the Brazelton Neonatal Behavior Assessment Scale, adminis-

tered before and after the 10-day stimulation period); sleep/wake behavior (e.g., quiet sleep, active sleep, drowsiness, fussing, smiling, and grimacing; as recorded on a time-lapse videotape taken for 8 hours on the first and last days of treatment and as noted in four 45-minute observations conducted across the study period); and daily weight gain (as calculated from daily weighings).

What did the researchers find?

On the behaviors measured by the Brazelton Scale, the treatment group performed **significantly** (see *Glossary*) better than the control group on habituation only.

Statistical analysis of the 45-minute observations and the 8-hour videotapes revealed no differences between the groups in sleep and wake behavior. However, the information from the 45-minute observations was different than that from the 8-hour videotapes, the latter providing higher estimates of wakefulness and lower estimates of sleep.

A comparison of activity level during the stimulation sessions and the nonstimulation periods revealed that the infants were significantly more active during the stimulation sessions.

On the measures of weight gain, the treatment group averaged a significantly greater daily weight gain than the control group over the treatment period. There were some interesting differences in the results when compared with earlier findings. For example, both groups showed greater daily weight gains than groups in previous studies did. This may have been due to changes in the formula being fed to infants in the intermediate care unit.

What do the findings mean?

- The findings replicate the researchers' previous results, suggesting that supplemental tactile and kinesthetic stimulation can improve the clinical course of healthy premature infants (28–32 weeks gestational age). The infants who received tactile and kinesthetic stimulation showed greater daily weight gain independent of their caloric intake. Also, the stimulation increased the infants' activity level during the stimulation sessions.
- The findings should boost confidence in funding intervention programs that use tactile and kinesthetic stimulation to promote weight gain in healthy premature infants. Policymakers should be particularly interested in this form of intervention because of its cost-effectiveness.
- The findings also suggest some productive directions for research—for example, investigation of the use of tactile and kinesthetic stimulation with smaller, sicker infants and exploration of the most appropriate time for implementing such an intervention.

What are the study's limitations?

- One hospital setting.
- Predeominantly a Black, inner-city sample.
- Year of cohort not specified.
- Latency effects of intervention not measured (central nervous system [CNS] compromise).

Glossary

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

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.

range of state—the rapidity, peak, and liability of state changes.

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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