

TOUCH AND MASSAGE in Early Child Development

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Scientific Studies of Massage Benefits:

Infant Massage Studies on Healthy Babies

Less irritable and better sleep:

New parents most frequent complaints or challenging issues most reported to pediatricians are of “colic” and sleep problems. In a study to address these problems, parents were taught to massage their 3- to 6-month-old infants before bedtime. Results showed that the ***massaged infants became less irritable, fell asleep faster, stayed asleep longer and spent more time in quiet, alert states during the daytime.*** Parents who had engaged in this study, implied that it “saved their ***marriages***” by having received massage instruction to help calm their infants and get them to sleep. See Appendix, Study #1

Better sleep:

One study centered on children who were experiencing problems sleeping. The average age of the children in this study was about 18 months. They were divided into two groups. One group was read bedtime stories, while the other group received a daily 15-minute massage by a parent before bedtime. Parents maintained a diary for a one-month period. ***The children who received massage fell asleep faster and experienced less sleep problems than the control group children only read to.*** It was also discovered that the massage group children exhibited improvements in their waking time, spending more time awake, active, and alert. See Appendix, Study #2 for details.

Higher levels of melatonin:

An additional study in 2002 dealing with massage and sleep was performed. This study measured the levels of melatonin in the urine. During a twelve-week period, researchers found that the ***infants receiving massage therapy had significantly higher levels of melatonin***, helping to develop circadian rhythms in infants. See Appendix, Study #3

Increased growth rate:

A majority of infant massage studies performed at Touch Research Institute involved premature babies. The earliest study, from 1986, was focused on twenty preterm babies, born approximately nine weeks prior to term, compared to twenty control babies. The study group received gentle stroking and passive limb movements three times a day, 15 minutes per session, for ten days. ***The babies receiving the stroking and mobilizations had a growth rate that was 47% higher than the babies in the control group.*** See Appendix, Study #4

Greater weight gain, superior developmental assessments, and heightened parent-infant relationship:

An additional study linked growth of preterm infants to massage. This one, performed in 1987, found that the infants receiving the massage had a greater weight gain as a result of being massaged. ***Not only did their growth rate increase, but the infants also had superior performance on overall developmental assessments and heightened parent-infant relationship.*** See Appendix, Study #5

Increased growth seemed to be a consistent result in various studies. In a 1990 study of 40 preterm babies who received three 15-minute sensory stimulation sessions for ten days ***grew at a 21% higher rate*** than babies in the control group. They showed lower signs of discomfort, as gauged by facial grimacing and fist clenching, and released from the hospital an average of five days sooner than the control babies. See Appendix, Studies #6 and #7

Massage specifically affects sympathetic nervous system:

A study was conducted in 1991 to determine which neuroendocrine responses were responsible for the increased growth and development of preterm infants who received massage. Infants that were an average of 10 weeks premature received 15-minute massage three times a day for ten days. At the beginning and end of the studies, urine samples were taken to measure for norepinephrine, epinephrine, dopamine, cortisol, and creatinine. Blood samples were taken for cortisol and growth hormones. The test group and control group had similar results in several of the readings, but the ***babies who received the sensory stimulation had a significant increase in norepinephrine and epinephrine.*** The results concluded that the ***massage was specifically affecting the sympathetic nervous system.*** See Appendix, Study #8 for details.

Moderate Pressure increased weight gain, decreased crying and stress behavior:

In an effort to discover what level of pressure was most effective for preterm infant massage, 68 babies, an average of ten weeks premature, were divided into groups receiving light pressure and moderate pressure massage. Each group received three 15-minute sessions per day for five days, and their weight monitored daily. ***Those babies who received the moderate pressure treatment had significant increases in weight gain. In addition, they showed less fussiness, crying, and stress behavior. The results also revealed a greater benefit in sleep patterns, heart rate, and vagal tone. The overall conclusion was that moderate pressure was most beneficial.*** See Appendix, Study #9

Less stress behavior:

An important study was also undertaken to measure stress behaviors on neonatal infants. Babies from a neonatal intensive care unit were randomly divided into a massage therapy group and a control group. The massage group received moderate pressure stroking over most of their body along with limb flexion and extension exercises. Three 15-minute

sessions per day over a five-day period were conducted. ***The massaged babies exhibited less stress behaviors than those in the control group, indicating to the researchers that the massage therapy had a significant calming effect on them.*** The researchers felt this notable due to the considerable amount of stress factors in a NICU hospitalization. See Appendix, Study #10

Higher mental scores:

Benefits of infant massage are not only weight gain and pain reduction. ***The result of a study that followed up with preterm infants when they were two years old showed that they had significantly higher mental scores*** than a control group who had only skin-to-skin care instead of massage from their mothers. See Appendix, Study #11

Relief from depression and anxiety on mothers:

Various massage studies have revealed that anyone providing massage also benefits greatly. One of these studies focused on mothers who were experiencing depression and anxiety. One group of mothers performed massage on their babies, while the second group watched someone else perform massage on their babies. ***Mothers from both groups experienced relief from their depression following the massage, however only the mothers who actually performed the massage on their infants had their anxiety levels decrease.*** See Appendix, Study #12

Greater involvement from fathers:

Fathers experienced benefits too from interacting with their babies through massage and bathing. First time fathers in an Australian study showed that babies who received massage and bathing from their father had positive responses such as increased eye contact, smiling, and vocalization. Also noted was a lower incidence of avoidance behaviors by the infant with their fathers. ***Fathers who had taken the hands-on role exhibited greater involvement with their babies.*** See Appendix, Study #13.

Similar results were found in another study, in which fathers gave their babies bedtime massages every day for a month. By the end of the study, ***fathers who massaged their infants showed more enjoyment and expressed more warmth during interactions with their babies.***

See Appendix, Study #14

Elderly benefit from both giving and receiving massages:

Elderly volunteers were studied to determine the benefit from giving massage therapy to infants and receiving massage themselves. The results showed that “grandparent” volunteers who received and provided massage reported lower anxiety levels, fewer symptoms of depression and improved mood after both giving and receiving massages. Their stress hormones also decreased after giving massages. After only 1 month of giving or receiving massages, their scores on a lifestyle questionnaire improved. They had more

social contacts, made fewer trips to their doctors' offices. Their sleep and their self-esteem also improved. A somewhat surprising finding was that these improvements were greater after 1 month of giving the infant massages than after 1 month of receiving massages.

Thus, it was determined that massage therapy was effective not only for the infants receiving them, but also for adults giving these massages. See Appendix, Study #15

Conclusion:

A plethora of scientifically performed studies have proven over and over that massage therapy provides significant opportunities to promote the growth and health in infants. The benefits go way beyond just physical results, to improving sleep, comfort, and mood in children and even in the caregivers performing the massages. Using mothers, fathers, or elderly volunteers to deliver the massage profoundly impacts the person giving the massage by lowering stress hormones and likely improving health and boosting immunity, given that cortisol kills immune cells. ***Infant massage should be taught and promoted as widely as possible to bring these wonderful benefits to the maximum number of children, their caregivers, and the community as a whole,*** especially into high-risk populations where factors such as poverty, drug abuse, and generational child abuse or neglect may be present.

Appendix

Publisher's Citations and Summary of Scientific Studies Quoted

Study #1

Field T, Grizzle N, Scafidi F, Abrams S, Richardson S. Massage therapy for infants of depressed mothers. *Infant Behavior and Development*. 1996; 19:107-112.

Study #2

Field, T. & Hernandez-Reif, M. (2001). Sleep problems in infants decrease following massage therapy. *Early Child Development and Care*, 168, 95-104.

METHODS: Infants and toddlers (mean age=1.5 years) with sleep onset problems were given daily massages by their parents for 15 minutes prior to bedtime for 1 month.

RESULTS: Based on parent diaries, the massaged versus the control children (who were read bedtime stories) showed fewer sleep problems and had a shorter latency to sleep onset by the end of the study. Forty-five-minute behavior observations by an independent observer also revealed more time awake, alert and active and more positive affect in the massaged children by the end of the study.

Study #3

Ferber, S.G., Laudon, M., Kuint, J., Weller, A., & Zisapel, N. (2002). Massage therapy by mothers enhances the adjustment of circadian rhythms to the nocturnal period in full-term infants. *Journal of Developmental and Behavioral Pediatrics*, 23, 410-415.

METHODS: This study investigated the effect of massage therapy on phase adjustment of rest-activity and melatonin secretion rhythms to the nocturnal period in full-term infants. Rest-activity of infants was measured by actigraphy before and after 14 days of massage therapy (starting at approximately age 10 days) and subsequently at 6 and 8 weeks of age. Melatonin was assessed in urine samples at 6, 8, and 12 weeks of age. RESULTS: At 8 weeks the controls revealed 1 peak of activity at approximately 12 midnight and another one at approximately 12 noon, whereas in the treated group, a major peak was early in the morning and a secondary peak in the late afternoon. At 12 weeks, nocturnal melatonin excretions were significantly higher in the treated infants. Thus, massage therapy by mothers in the perinatal period serves as a strong time cue, enhancing coordination of the developing circadian system with environmental cues.

Study #4

Field, T., Schanberg, S., Scafidi, F., Bauer, C., Vega-Lahr, N., Garcia, R., Nystrom, J., & Kuhn, C. (1986). Tactile/kinesthetic stimulation effects on preterm neonates. *Pediatrics*, 77, 654-658.

METHODS: Tactile/kinesthetic stimulation was given to 20 preterm neonates (mean gestational age, 31 weeks; mean birth weight, 1,280 g; mean time in neonatal intensive care unit, 20 days) during transitional ("grower") nursery care, and their growth, sleep-wake behavior, and Brazelton scale performance was compared with a group of 20 control

neonates. The tactile/kinesthetic stimulation consisted of body stroking and passive movements of the limbs for three, 15-minute periods per day for 10 days. RESULTS: The stimulated neonates averaged a 47% greater weight gain per day (mean 25 g versus 17 g), were more active and alert during sleep/wake behavior observations, and showed more mature habituation, orientation, motor, and range of state behavior on the Brazelton scale than control infants. Finally, their hospital stay was 6 days shorter, yielding a cost savings of approximately \$3,000 per infant. These data suggest that tactile/kinesthetic stimulation may be a cost-effective way of facilitating growth and behavioral organization even in very small preterm neonates.

Study #5

Field, T., Scafidi, F., and Schanberg, S. (1987). Massage of preterm newborns to improve growth and development. *Pediatric Nursing*, 13, 385-387.

METHODS: The data reviewed here suggest that the growth and development of preterm neonates can be facilitated by tactile-kinesthetic stimulation. RESULTS: Greater weight gain and superior performance on developmental assessments persisted across the first 6 months for the group of infants that received the massage treatment. These enduring effects may be mediated by better parent-infant interactions. Heightened responsiveness of the neonate may enhance the early parent-infant relationships which may, in turn, contribute to optimal growth and development at later stages in infancy.

Study #6

Field, T. & Schanberg, S. M. (1990). Massage alters growth and catecholamine production in preterm newborns. Gunzenhauser, N., Brazelton, T. B., and Field, T. Johnson & Johnson. *Advances in Touch*. Skillman, N. J.

METHODS: Forty medically stable preterm neonates received tactile/kinesthetic stimulation for three 15-minute periods during three consecutive hours every day for ten days. RESULTS: Despite similar formula and caloric intake, the treatment infants averaged a 21 percent greater daily weight gain than the control infants over the treatment period. In addition, the treatment group showed superior performance on the NBAS on the habituation cluster following the treatment period, and less time in active sleep and less facial grimacing, mouthing/yawning, and clenched fists.

Study #7

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.

METHODS: Forty preterm infants (M gestational age = 30 weeks; M birthweight = 1176 gms; M duration ICU care = 14 days) were assigned to treatment and control groups once they were considered medically stable. Assignments were based on a random stratification of gestational age, birthweight, intensive care duration, and study entrance weight. The treatment infants (n = 20) received tactile/kinesthetic stimulation for three 15-minute periods

during 3 consecutive hours per day for a 10-day period. Sleep/wake behavior was monitored and Brazelton assessments were performed at the beginning and at the end of the treatment period. RESULTS: The treated infants averaged a 21% greater weight gain per day (M=34 vs. 28 gms) and were discharged 5 days earlier. No significant differences were demonstrated in sleep/wake states and activity level between the groups. The treated infants' performance was superior on the habituation cluster items of the Brazelton scale. Finally, the treatment infants were more active during the stimulation sessions than during the nonstimulation observation sessions (particularly during the tactile segments of the sessions).

Study #8

Kuhn, C., Schanberg, S., Field, T., Symanski, R., Zimmerman, E., Scafidi, F., and Roberts, J. (1991). Tactile kinesthetic stimulation effects on sympathetic and adrenocortical function in preterm infants. *Journal of Pediatrics*, 119, 434-440.

METHODS: The purpose of this study was to investigate the neuroendocrine response in preterm infants to a pattern of tactile-kinesthetic stimulation that facilitates their growth and development. Preterm infants (mean gestational age 30 weeks, mean birth weight 1176 gm) received normal nursery care or tactile-kinesthetic stimulation for three 15-minute periods at the start of three consecutive hours each day for 10 days. On day 1 and day 10 of the study, a 24-hour urine sample was collected for norepinephrine, epinephrine, dopamine, cortisol, and creatinine assays and a blood sample was taken by heelstick for cortisol and growth hormone assays. RESULTS: Urine norepinephrine and epinephrine values increased significantly only in the stimulated babies. Urine dopamine and cortisol values increased in both groups, and serum growth hormone decreased in both groups. Individual differences in urine norepinephrine, epinephrine, dopamine, and cortisol values were highly stable across the 10 days despite a 10-fold range of values among the infants. The results of this study suggest that tactile-kinesthetic stimulation of preterm infants has a fairly specific effect on maturation and/or activity of the sympathetic nervous system. In addition, this study has defined catecholamine and cortisol secretion across gestational age in normal preterm infants. Finally, these data suggest that highly stable individual levels of catecholamine and cortisol secretion are established by birth in humans.

Study #9

Field, T., Diego, M., Hernandez-Reif, M., Deeds, O., Figueiredo, B. & Ascencio, A. (2006). Moderate Versus Light Pressure Massage Therapy Leads to Greater Weight Gain in Preterm Infants. *Infant Behavior and Development*, 29, 574-578

METHODS: Sixty-eight preterm infants (M GA=30 weeks) were randomly assigned to a moderate or to a light pressure massage therapy group to receive 15 massages three times per day for 5 days. Behavior state, stress behaviors and heart rate were recorded for 15min before and during the first 15-min therapy session. Weight gain was recorded over the 5-day therapy period. RESULTS: The moderate versus light pressure massage group gained significantly more weight per day. During the behavior observations the moderate versus

light pressure massage group showed significantly lower increases from the pre-session to the session recording on: (1) active sleep; (2) fussing; (3) crying; (4) movement; and (5) stress behavior (hiccupping). They also showed a smaller decrease in deep sleep, a greater decrease in heart rate and a greater increase in vagal tone. Thus, the moderate pressure massage therapy group appeared to be more relaxed and less aroused than the light pressure massage group which may have contributed to the greater weight gain of the moderate pressure massage therapy group.

Study #10

Hernandez-Reif, M., Diego, M., & Field, T. Preterm Infants Show Reduced Stress Behaviors and Activity after 5 days of Massage Therapy. (2008). *Infant Behavior and Development*, 30, 557-561.

METHODS: Preterm infants residing in an NICU were randomly assigned to a massage therapy or to a control group. The preterm infants in the massage therapy group received three 15-min massages each day for 5 consecutive days, with the massages consisting of moderate pressure stroking to the head, shoulders, back, arms and legs and kinesthetic exercises consisting of flexion and extension of the limbs. Infant stress behaviors and activity were recorded on the first and last day of the study. **RESULTS:** Preterm infants receiving massage therapy showed fewer stress behaviors and less activity from the first to the last day of the study. The findings suggest that massage has pacifying or stress reducing effects on preterm infants, which is noteworthy given that they experience numerous stressors during their hospitalization.

Study #11

Procianoy, R.S., & Mendes, E.W., & Silveira, R.C. (2009). Massage therapy improves neurodevelopment outcome at two years corrected age for very low birth weight infants. *Early Human Development*, 86, 7-11.

METHODS: preterm infants were randomly assigned to massage therapy by mothers plus skin-to-skin care or just skin-to-skin care during their hospital stay. **RESULTS:** Growth at 2years corrected age was similar in both groups. The massage group had borderline higher motor scores and significantly higher mental scores.

Study #12

Feijo, L., Hernandez-Reif, M., & Field, T., Burns, W., Valley-Gray, S., and Simco, E. (2006). Mothers' depressed mood and anxiety levels are reduced after massaging their preterm infants. *Infant Behavior and Development*, 29, 476-480.

METHODS: Forty mothers whose preterm infants were about to be discharged from the Neonatal Intermediate Care Nursery (NICU) were randomly assigned to two groups: the first group of mothers conducted preterm infant massage and the second group only observed their preterm infants receiving massage. **RESULTS:** Both groups of mothers had lower

depressed mood scores following the session. However, only the group who massaged their infants had lower anxiety scores after the session.

Study #13

Scholtz, K., & Samuels, C. A. (1992). Neonatal bathing and massage intervention with fathers: Behavioral effects 12 weeks after birth of the first baby. *International Journal of Behavioral Development*, 15, 67-81.

METHODS: Australian families with first-born babies were studied for effects of a 4-week-postpartum training program (demonstration of baby massage and the Burleigh Relaxation Bath technique), with emphasis on the father-infant relationship. 16 families were assigned to the treatment group and 16 served as controls. RESULTS: At the 12-week home observation, the treatment group infants greeted their fathers with more eye contact, smiling, vocalizing, reaching, and orienting responses and showed less avoidance behaviors. During a 10-min observation, the treatment group fathers showed greater involvement with their infants.

Study #14

Cullen, C., Field, T., Escalona, A. & Hartshorn, K. (2000). Father-infant interactions are enhanced by massage therapy. *Early Child Development and Care*, 164, 41-47.

METHODS: Fathers gave their infants daily massages 15 minutes prior to bedtime for one month. RESULTS: By the end of the study, the fathers who massaged their infants were more expressive and showed more enjoyment and more warmth during interactions with their infants.

Study 15# 27. Field T, Hernandez-Reif M, Quintino O, Schanberg S, Kuhn C. Elder retired volunteers benefit from giving massage therapy to infants. *Journal of Applied Gerontology*. 1998;17: 229-239. 28. Copeland JRM, Dewey ME, Wood N, Searle R, Davidson IA, McWilliam C. Range of mental illness among the elderly in the community. Prevalence in Liverpool using the GMS-AGECAT package. *The British Journal of Psychiatry: the Journal of Mental Science*. 1987; 150:815-823. 29. Gaylord SA, Zung WWK. Affective disorders among the aging. In: Carstensen LL, Edelstein BA, eds. *Handbook of Clinical Gerontology*. New York, NY: Allyn & Bacon; 1987:139-151. 30. Post F. Functional disorder II. Treatment and its relationship to causation. In: Levy R, ed. *Psychiatry of Late Life*. London, England: Blackwell Scientific; 1982:213-229.