Intuition: The BYU Undergraduate Journal of Psychology

Volume 14
Issue 2 *The Mega Edition*

Article 14

2019

# Helping Babies: The Mental and Physical Effects of Massage Therapy on Preterm Infants

Sadie Johnson
*Brigham Young University*

# Helping Babies: The Mental and Physical Effects of Massage Therapy on Preterm Infants

## Cover Page Footnote

Abdallah, B., Badr, L. K., & Hawwari, M. (2013). The efficacy of massage on short and long term outcomes in preterm infants. Infant Behavior & Development, 36(4), 662-669. doi:10.1016/j.infbeh.2013.06.009 Choi, H., Kim, S., Oh, J., Lee, M., Kim, S., & Kang, K. (2016). The effects of massage therapy on physical growth and gastrointestinal function in premature infants: A pilot study. Journal of Child Health Care, 20(3), 394-404. doi:10.1177/1367493515598647 Diego, M. A., Field, T., & Hernandez-Reif, M. (2009). Procedural pain heart rate responses in massaged preterm infants. Infant Behavior & Development, 32(2), 226-229. doi:10.1016/j.infbeh.2008.12.001 Diego, M. A., Field, T., Hernandez-Reif, M., Deeds, O., Ascencio, A., & Begert, G. (2007). Preterm infant massage elicits consistent increases in vagal activity and gastric motility that are associated with greater weight gain. Acta Paediatrica, 96(11), 1588-1591. doi:10.1111/j.1651-2227.2007.00476.x Field, T., Diego, M. A., Hernandez-Reif, M., Deeds, O., & Figuereido, B. (2006). Moderate versus light pressure massage therapy leads to greater weight gain in preterm infants. Infant Behavior & Development, 29(4), 574-578. doi:10.1016/j.infbeh.2006.07.011 Gitau, R., Modi, N., Gianakoulopoulos, X., Bond, C., Glover, V., & Stevenson, J. (2002). Acute effects of maternal skin-to-skin contact and massage on saliva cortisol in preterm babies. Journal of Reproductive and Infant Psychology, 20(2), 83-88. doi:10.1080/02646830220134595 Hernandez-Reif, M., Diego, M., & Field, T. (2007). Preterm infants show reduced stress behaviors and activity after 5 days of massage therapy. Infant Behavior & Development, 30(4), 557-561. doi:10.1016/j.infbeh.2007.04.002 History of Massage Therapy. (n.d.). Retrieved from https://www.allalliedhealthschools.com/massage-therapist/massage-therapy-history/ How Much Sleep Do Babies and Kids Need? (n.d.). Retrieved from https://www.sleepfoundation.org/excessive-sleepiness/support/how-much-sleep-do-babies-and-kids-need Kelmanson, I. A., & Adulas, E. I. (2009). Massage interventions and developmental skills in infants born with low birth weight. Early Child Development and Care, 179(7), 889-897. doi:10.1080/03004430701538794 Phillips, R. B., & Moses, H. A. (1996). Skin hunger effects on preterm neonates. Infant-Toddler Intervention, 6(1), 39-46. Premature birth. (2017, December 21). Retrieved from https://www.mayoclinic.org/diseases- conditions/premature-birth/symptoms-causes/syc-20376730 Procianoy, R. S., Mendes, E. W., & Silveira, R. C. (2010). Massage therapy improves neurodevelopment outcome at two years corrected age for very low birth weight infants. Early Human Development, 86(1), 7-11. doi:10.1016/j.earlhumdev.2009.12.001 Scafidi, F. A. (1986). Effects of tactile/kinesthetic stimulation on the clinical course and sleep/wake behavior of preterm neonates. Infant Behavior & Development, 9(1), 91-105. doi:10.1016/0163-6383(86)90041-X Scafidi, F. A., Field, T. M., Schanberg, S. M., Bauer, C. R., Tucci, K., Roberts, J., . . . Kuhn, C. M. (1990). Massage stimulates growth in preterm infants: A replication. Infant Behavior & Development, 13(2), 167-188. doi:10.1016/0163-6383(90)90029-8 Scafidi, F. A., Field, T., & Schanberg, S. M. (1993). Factors that predict which preterm infants benefit most from massage therapy. Journal of Developmental and Behavioral Pediatrics, 14(3), 176-180. doi:10.1097/00004703-199306010-00008 Siritaratiwat, W., PhD., & Saetan, O., M.Sc. (2011). Does a program of massage improve gross motor development in orphans aged between 1-12 months? A randomized controlled trial. International Journal of Child and Adolescent Health, 4(2), 155-164 Vaivre-Douret, L., Oriot, D., Blossier, P., Py, A., Kasolter-Péré, M., & Zwang, J. (2009). The effect of multimodal stimulation and cutaneous application of vegetable oils on neonatal development in preterm infants: A randomized controlled trial. Child: Care, Health and Development, 35(1), 96-105. doi:10.1111/j.1365-2214.2008.00895.x

# Helping Babies: The Mental and Physical Effects of Massage Therapy on Preterm Infants

**Sadie Johnson**
Brigham Young University

## Abstract

The purpose of this paper is to address and review the literature regarding the effects of massage therapy on preterm infants. Each of the studies done focused on infants aged 0–12 months. The literature specifically looks at irritability states, stress, analgesia, weight-gain, sleep-wake cycles, cognition, and gastrointestinal function. In accordance with the studies reviewed in this article, I deduce that massage therapy can be used with preterm infants to reduce irritability and stress, increase weight-gain, support greater rest, facilitate short-term cognitive improvement, and create a greater improvement in gastrointestinal function. Massage therapy can also reduce pain in infants who have received painful procedures. I will review the limitations of my research, discuss the implications that have come from this review, and summarize my findings.

Massage dates back to 2700 BCE as a form of medical care and is still used today. (Allied Health, 2016). Massage has been used as a therapy for several conditions, including the treatment of depression, cancer, HIV, and fibromyalgia. However, a critical component to this therapy that should be examined is its benefit for infants, particularly preterm infants.

Some studies have already been performed to discover the effects of massage therapy on preterm infants. Research has found that infant massage therapy can help treat several complications that may arise from premature births. Complications include, but are not limited to, respiratory, heart, brain, gastrointestinal, blood, metabolism, and immune system problems. Long-term complications include cerebral palsy, impaired learning, vision problems, hearing problems, dental problems, behavioral and psychological problems, and chronic health issues (Mayo Clinic, 2017).

This literature review will analyze the mental effects that massage therapy has on preterm infants, particularly viewing irritability states, stress, and cognition. It will further analyze the physical effects of massage therapy, particularly involving analgesia, weight-gain, sleep-wake cycles, and gastrointestinal function. Each of these categories notably affects the mental and physical health of premature babies. For clarification, in this review, infant refers to children 0–12 months old. The physical and cognitive conditions that will be reviewed fall under short-term conditions; however, providing care for these conditions early on may result in a healthier life term. It is critical that a therapy is found to support these infants through the difficulties of premature infancy.

## Methods

All articles were found through the database PsycINFO through the EBSCO search engine using the keywords “massage therapy” or “massage” or “massage therapies” AND “infant” or “baby” or “newborn” AND “physical” or “cognitive.” The limitations applied to this search were the words English language and peer-reviewed. Based on these keywords, 42 of the 77 articles were chosen to be reviewed. Of these 42 chosen, 27 were excluded; 11 of which were

excluded because they were reviews, one because of the participants' age variance, and 15 because of the inclusion of infants that were not preterm infants. Fifteen articles were included in this review because of their discussion of physical and/or cognitive effects of massage on preterm infants.

## Results

### *Irritability and Stress*

Preterm infants may struggle with stress regulation, especially after distressing events such as delivery. Phillips and Moses (1996) studied 31 preterm infants in an experimental study focusing on weight gain and irritability states. They concluded that the 13 infants who received massage therapy preserved a calmer state than the 18 infants in the control groups. In addition to irritability states, Field et al. (1986) studied neonates' behavior on the Brazelton Neonatal Assessment Scale and found those in the experimental group to have a "more mature orientation, motor, habituation, and range of state behavior" compared to the control group (Field et al., 1986, p. 654). In their approach to stress, Gitau et al. (2002) utilized saliva samples from clinically stable preterm infants to compare cortisol levels between infants who received maternal touch and massage therapy versus those who did not. They found that cortisol levels were reduced when infants were touched and massaged. They believe these effects to be short-term and suggest further research to determine long-term effects. These findings suggest that massage therapy can be used to reduce irritability and stress in preterm infants.

### *Cognition*

Abdallah et al.'s (2013) quasi-experimental design study examined cognitive scores among preterm infants who were massaged versus a control group. Those who received massages displayed higher cognitive scores after 12 months of corrected age (the age of the preterm infant from their birth). Additionally, Adulas and Kelmanson (2009) discovered that massage therapy can advance the developmental skills of preterm infants with low birth weight, including, "social, self-help, gross motor, fine motor and language

skills" (p. 890). This study did include four children who were born at term, but the majority (32) were preterm. These babies were healthy and were subjects of massage therapy for eight months.

In addition to discoveries on neuro-health within preterm babies, Mendes et al. (2010) discovered that neurodevelopment improved at the corrected age of two years when massages were given by mothers and skin-to-skin care was administered in the neonatal hospital stay. Although they did find that neurodevelopment improved in those infants who were given massages, they also found that both the control and experimental groups had similar growth by the age of two years. This evidence shows that short-term cognitive growth may occur by massage, but further research needs to be performed to test long-term cognitive capabilities.

### *Analgesia*

Massage therapy has also been seen to reduce pain in infants who received painful procedures. Preterm infants undergo several painful procedures to aide their development; however, repetition of these painful procedures can lead to detriments in the development of the infant's nervous system (Diego, Field, & Hernandez-Reif, 2009). Therefore, measurements are being taken to reduce the pain these infants experience from the procedures in order to preserve a healthy nervous system. Diego et al. (2009) proceeded to test the effect of moderate massage, light massage, and no massage on infants who underwent a mildly painful procedure. They found that those who received the moderate-pressure massage exhibited a decreased heart rate compared to the light-pressure massage group and control group. This research suggests that moderate-pressure massage may reduce nervous system responses and may elicit a healthier nervous system for preterm infants who undergo painful procedures.

Additionally, Abdallah et al.'s (2013) study on the long-term and short-term effects of massage therapy on preterm infants looked at the premature infant pain profile (PIPP) scores after 12 months of corrected age. The PIPP score system factors crying, vital signs, facial expressions, etc. to interpret pain. They found that the infants who were massaged showed significantly lower scores on the PIPP

score system after a heel-stick, or a small prick with a 24-gauge needle, versus PIPP scores from procedures done before the massage. Comparatively, these massaged infants also had lower PIPP scores at discharge than the control group. Overall, these two studies indicate that massage therapy can have an effect on the analgesic control for premature infants through lower vital signs and lower scores on PIPP.

### *Weight Gain*

Preterm infants typically struggle with low birth weight; many studies have been performed to focus on weight gain through the treatment of massage therapy. Phillip and Moses's (2006) study also found that of their 31 preterm infants, the 13 who were massaged gained 42% more body weight than the 18 infants in the control groups. However, one study did show that weight gain was not an effect of massage therapy for the preterm infants they sampled. Abdallah et al.'s (2013) study did not see any weight gain. Along with no weight gain, hospital stay duration, motor scores, and breastfeeding duration did not differ between the experimental and control groups. Vaivre-Douret et al. (2009) also studied weight gain in preterm infants through massage therapy facilitated by vegetable oils. Their main findings were that initial weight gain and "secondary outcomes were linear growth, neurological maturation, psychomotor development, and number of days of admission" (p. 96). Zwang et al. (2009) found the group that did not have oil applied, but were still massaged, had higher fatty acids in the post-test period and were heavier in weight. Scafidi et al. (1993) found treated infants had greater weight gain in comparison to the control group.

Choi et al. (2015) researched the growth and development of preterm infants and their response to massage therapy. They discussed that massage therapy could be used in the neonatal intensive care unit (NICU) for developmental care for the benefit of an infant's growth, as proven in their study. They also proposed that more research be done to suggest this. Supporting Choi et al.'s (2015) research, Field et al. (2007) found that massage therapy is effective in supporting greater vagal activity and gastric motility, which may be an underlying source of weight gain in preterm infants. These results

from these studies support massage therapy as a means of weight gain for preterm infants. All but one study of the six studies reviewed deemed massage therapy beneficial to weight gain in preterm infants.

### *Sleep-Wake Cycles*

It is recommended that infants ages 0–11 months old receive 12–17 hours of sleep per day (Sleep Foundation, 2020). Monitoring the sleep-wake cycles of these infants is crucial to maintain a healthy infant, especially preterm infants, who need sleep to develop. Furthermore, infants in Scafidi et al.'s (1993) study had a greater alert/wake time when going through massage treatment. In correlation with Scafidi et al.'s study, including behavior in neonates, Field et al. (2006) studied two groups involved in massage therapy: a moderate-pressure group and a light-pressure group. They recorded the infants' pre-session and in-session activity and found moderate massage manifested significantly smaller increments of increase for "(1) active sleep; (2) fussing; (3) crying; (4) movement; and (5) stress behavior (hiccupping)" (p. 1). These findings compliment Scafidi et al.'s research that resulted in a more-active wake state and less-active sleep state as well as Gitau et al.'s (2002) research on stress behavior.

### *Gastrointestinal Function*

Choi et al. (2016) and Field et al. (2006) also studied gastrointestinal function in preterm infants as well as their physical growth. Choi et al. (2016) discovered that gastric residual, or fluid in the stomach, was significantly lower before feeding and that bowel movements increased for preterm infants in the experimental group. Field et al. (2006) found similar results. They found that after their five-day experiment, the experimental group had increased weight gain, vagal activity, and gastric motility (which may have caused the weight gain). These two studies complement the idea that massage therapy elicits a greater gastrointestinal function in these preterm infants, an important function for all humans.

## Discussion

Implications from this review suggest further programs be implemented in hospitals to care for preterm infants. In-home

massage therapy programs can be enacted as well to support preterm infants. Scafidi et al. (1986) stated that because of the improvement of the preterm infants in their study, the hospital saved $3,000 per infant as they were sent home 6 days earlier than those in the control group. Perhaps these extra funds could be applied to support these two proposed programs of hospitalized and in-home massage therapy. One limitation of my research comes from the fact that only one database was researched, PsycINFO on EBSCO. This may cause a lack of sufficient data and may have excluded significant articles from other databases.

The research that has been reviewed has supported the notion that massage therapy is effective in combating the difficulties in preterm infants. Though more research can be done to support the long-term effects of massage therapy on preterm infants, the literature reviewed supports positive short-term effects of massage therapy performed on preterm infants. This research ultimately supports massage therapy as a sustainable method to treat the difficulties that preterm infants face, particularly stress levels, potential cognitive problems, analgesia, weight gain, sleep-wake cycles, and gastrointestinal function.

## References

Abdallah, B., Badr, L. K., & Hawwari, M. (2013). The efficacy of massage on short and long term outcomes in preterm infants. Infant Behavior & Development, 36(4), 662–669. https://doi.org/10.1016/j.infbeh.2013.06.009

Allied Health. (2016). *History of massage therapy & how it evolved*. https://www.allalliedhealthschools.com/massage-therapist/massage-therapy-history/

Choi, H., Kim, S., Oh, J., Lee, M., Kim, S., & Kang, K. (2016). The effects of massage therapy on physical growth and gastrointestinal function in premature infants: A pilot study. Journal of Child Health Care, 20(3), 394–404. https://doi.org/10.1177/1367493515598647

Diego, M. A., Field, T., & Hernandez-Reif, M. (2009). Procedural pain heart rate responses in massaged preterm infants. Infant Behavior & Development, 32(2), 226–229. https://doi.org/10.1016/j.infbeh.2008.12.001

Diego, M. A., Field, T., Hernandez-Reif, M., Deeds, O., Ascencio, A., & Begert, G. (2007). Preterm infant massage elicits consistent increases in vagal activity and gastric motility that are associated with greater weight gain. Acta Paediatrica, 96(11), 1588–1591. https://doi.org/10.1111/j.1651-2227.2007.00476.x

Field, T. M., Schanberg, S. M., Scafidi, F., Bauer, C. R., Vega-Lahr, N., Garcia, R., Nystrom, J.

& Kuhn, C. M. (1986). *Tactile/kinesthetic stimulation effects on preterm neonates.* American Academy of Pediatrics. https://pediatrics.aappublications.org/content/77/5/654.short.

Field, T., Diego, M. A., Hernandez-Reif, M., Deeds, O., & Figuereido, B. (2006). Moderate

versus light pressure massage therapy leads to greater weight gain in preterm infants. Infant Behavior & Development, 29(4), 574–578. https://doi.org/10.1016/j.infbeh.2006.07.011

Gitau, R., Modi, N., Gianakoulopoulos, X., Bond, C., Glover, V., & Stevenson, J. (2002). Acute

effects of maternal skin-to-skin contact and massage on saliva cortisol in preterm babies. Journal of Reproductive and Infant Psychology, 20(2), 83–88. https://doi.org/10.1080/02646830220134595

Hernandez-Reif, M., Diego, M., & Field, T. (2007). Preterm infants show reduced stress

behaviors and activity after 5 days of massage therapy. Infant Behavior & Development, 30(4), 557–561. https://doi.org/10.1016/j.infbeh.2007.04.002

Kelmanson, I. A., & Adulas, E. I. (2009). Massage interventions and developmental skills in

infants born with low birth weight. Early Child Development and Care, 179(7), 889–897. https://doi.org/10.1080/03004430701538794

Mayo Clinic. (2017). *Premature birth.* https://www.mayoclinic.org/diseases-conditions/premature-birth/symptoms-causes/syc-20376730

Phillips, R. B., & Moses, H. A. (1996). Skin hunger effects on preterm neonates. *Infant-Toddler Intervention,* 6(1), 39–46. https://doi.org/10.1177/0894318402239068

Procianoy, R. S., Mendes, E. W., & Silveira, R. C. (2010). Massage therapy improves

neurodevelopment outcome at two years corrected age for very low birth weight infants. *Early Human Development,* 86(1), 7–11. https://doi.org/10.1016/j.earlhumdev.2009.12.001

Scafidi, F. A. (1986). Efects of tactile/kinesthetic stimulation on the clinical course and sleep/wake behavior of preterm neonates. *Infant*

*Behavior & Development*, 9(1), 91–105. https://doi.org/10.1016/0163-6383(86)90041-X

Scafidi, F. A., Field, T. M., Schanberg, S. M., Bauer, C. R., Tucci, K., Roberts, J., . . . Kuhn, C. M. (1990). Massage stimulates growth in preterm infants: A replication. *Infant Behavior & Development*, 13(2), 167–188. https://doi.org/10.1016/0163-6383(90)90029-8

Scafidi, F. A., Field, T., & Schanberg, S. M. (1993). Factors that predict which preterm infants benefit most from massage therapy. *Journal of Developmental and Behavioral Pediatrics*, 14(3), 176–180. https://doi.org/10.1097/00004703-199306010-00008

Siritaratiwat, W. & Saetan, O., M. (2011). Does a program of massage improve gross motor development in orphans aged between 1–12 months? A randomized controlled trial. *International Journal of Child and Adolescent Health*, 4(2), 155–164.

Sleep Foundation. (2020). *How much sleep do babies and kids need?* https://www.sleepfoundation.org/excessive-sleepiness/support/how-much-sleep-do-babies-and-kids-need

Vaivre-Douret, L., Oriot, D., Blossier, P., Py, A., Kasolter-Péré, M., & Zwang, J. (2009). The effect of multimodal stimulation and cutaneous application of vegetable oils on neonatal development in preterm infants: A randomized controlled trial. *Child: Care, Health and Development*, 35(1), 96–105. https://doi.org/10.1111/j.1365-2214.2008.00895.x