

Rethinking Swaddling

By Nancy Mohrbacher, IBCLC, FILCA

Many of us think of swaddling as a useful way to calm and comfort small babies. For years, when I made home visits to new families as a lactation consultant in private practice, I used to teach mothers and other family members techniques for swaddling newborns as a way to keep their hands contained when they put them to the breast.

However, recently, I received an email from a parent educator whose friend had heard me speak at a recent breastfeeding conference. Her friend quoted me as saying that “swaddling is bad,” and as a *Happiest Baby* instructor, the educator was concerned. She said she believed that swaddling must be okay since it was “something other

cultures have used for a long time.” She asked me to share with her the studies I cited in my talk.

I responded by clarifying that I had not actually said “swaddling is bad,” but that in recent years, my opinion on swaddling has changed. In my book, *Breastfeeding Answers Made Simple: A Guide for Helping Mothers* (2010), I note that, although swaddled babies appear calmer and sleep more, research has found that regular swaddling can contribute to negative breastfeeding outcomes. Routinely swaddling babies during the first few days of life is associated with a delay in the first breastfeeding, less effective suckling at the breast, decreased intake of mother’s milk and greater infant

weight loss. Routine swaddling during the first few months of life is associated with a variety of other negative health outcomes. I emailed the educator some of the studies I described during my talk so that she could read them and come to her own conclusions.

When I read the studies cited at the end of this article for the first time, the question I asked myself was, “Are swaddled babies really *happier*, or does swaddling cause newborns to shut down?” There is no doubt that a calmer baby makes new parents’ lives easier and more pleasant, but I wondered from the baby’s perspective whether swaddling is a positive or a negative.

Swaddling and Early Breastfeeding

As the parent educator who wrote to me noted, swaddling—also known as bundling—has been practiced historically in many parts of the world. Research has found that swaddled babies arouse less and sleep longer (Franco et al., 2005). That may sound good, but in the early hours and days after birth this can lead to less breastfeeding, which has definite drawbacks (see below).

Although many studies have examined the effects of swaddling, in one review of the research, every randomized control trial compared swaddling with practices involving separation from mother, such as keeping babies in



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incubators or giving them a pacifier or massage (van Sleuwen, Engelberts et al. 2007). None of the studies compared swaddling with being held or carried by the mother.

Swaddling Delays the First Breastfeeding and Leads to Less Effective Suckling

In a U.S. study of 21 babies after a vaginal birth, researchers compared two groups (Moore & Anderson, 2007). Immediately after birth, one group was laid tummy down, skin-to-skin on the mother's body, removed for a short examination, and then returned to the mother's body where these babies remained in skin-to-skin contact for two hours. The other group was shown briefly to the mother after birth, examined, and swaddled with hands free and returned to the mother. The group that was swaddled during their first two hours showed delayed feeding behaviors, suckled less competently at their first breastfeeding, and established effective breastfeeding later.

Combining Swaddling with Other Newborn Stressors

When swaddling is added to other newborn stressors, there are more negative repercussions. One study of 176 mothers and babies done in Russia with a team of Swedish, Russian, and Canadian researchers was designed to measure the effects of postpartum practices and resulted in several published papers (Bystrova, Matthiesen, Vo-

rontsov et al., 2007; Bystrova, Matthiesen, Widstrom et al., 2007; Bystrova, Widstrom et al., 2007; Bystrova et al., 2003). These researchers compared outcomes in four groups of newborns, who were

1. kept in skin-to-skin contact with mother for 30 to 120 minutes after birth;
2. held in mother's arms wearing clothes;
3. separated from mother at birth and returned to her after two hours;
4. taken to the hospital nursery at birth and returned to mother for breastfeeding seven times each day at regular intervals.



In each group, some babies were swaddled and some wore clothes. The researchers reported that skin-to-skin contact reduced “the stress of being born” and found the babies kept skin-to-skin after birth had the highest body temperatures (Bystrova et al., 2003).

Swaddled babies separated during their first two hours lost more weight. Among the babies taken to the nursery for the first two hours after birth and then returned to their mothers for the rest of the hospital stay (group 3 above), the swaddled babies had a significantly greater weight loss

on their third and fifth days (Bystrova, Matthiesen, Widstrom et al., 2007). This significant difference in weight indicates that the first two hours after birth may be a “critical period” during which mother-baby separation can undermine infant stability and growth.

Swaddled babies kept in the nursery were colder and consumed less milk. Among the babies in the “nursery group” (group 4 above), some were swaddled and some were not. Those babies in the nursery group who were swaddled had the lowest foot temperature of any of the babies in any of the study groups. Overall, the babies in the nursery group consumed 37% less mother's milk on their fourth day compared with the babies kept with their mothers. Newborns who were both separated and swaddled consumed less mother's milk overall than those who were not swaddled. Their mothers also produced less milk on the fourth day and they had a shorter duration of breastfeeding overall (Bystrova, Matthiesen, Widstrom et al., 2007).

Swaddled babies in the nursery lost more weight despite consuming more formula. In addition to separation, supplementing with formula (another physiological stressor) was found to produce greater weight loss among the swaddled newborns. The only study babies to receive formula were some of those in the nursery group. The supplemented and unsupplemented babies in the nursery group consumed similar amounts of milk daily, but the

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supplemented newborns who were also swaddled lost significantly more weight on their third and fifth days as compared with the newborns who were either not swaddled or not supplemented (Bystrova, Matthiesen, Widstrom et al., 2007). The researchers suggested possible reasons for this greater weight loss among the swaddled, separated, and supplemented babies:

- By severely limiting baby's movements, swaddling causes stress, which contributed to the greater weight loss.
- Swaddled babies receive less touch, which was found to compromise growth in one study of preterm babies (Ferber et al., 2002).

This research indicates that swaddling may be physically stressful for babies.

Alternatives to Swaddling After Birth

Common sense tells us that wrapping a baby in a blanket should help keep him warm. However, research has found mother-baby skin-to-skin contact to be far more effective at maintaining a newborn's body temperature. If the room is cool or there are other reasons to be concerned about the baby's temperature, a much better strategy than either swaddling or putting baby in an infant warmer is to keep baby on mother's body, putting blankets (either warmed or unwarmed) over both mother and baby (Galligan, 2006; Ludington-Hoe, Ferreira, Swinth, & Ceccardi, 2003; WHO, 2003). If the mother is not willing or available, skin-to-skin contact with the father is an excellent second choice.

Mother-baby body contact is also important for other reasons. In addition to keeping baby warm, it also releases baby's inborn feeding reflexes (Colson, Meek, & Hawdon, 2008), which leads to more breastfeeding. This has been found even among late preterm babies (Colson, DeRooy, & Hawdon, 2003).

Postpartum practices associated with more early breastfeeding should be encouraged, as more feedings in the first 24 hours of life have been associated with lower rates of exaggerated newborn jaundice on baby's sixth day and less weight loss and greater milk intakes on the third and fifth days (Yamauchi & Yamanouchi, 1990).

Regular Swaddling During the Early Months

But what about swaddling after hospital discharge? Once a baby is breastfeeding well, is there any reason to avoid swaddling? Many who advise new parents promote swaddling as a way to soothe fussy babies. While swaddling may be helpful when used occasionally, research from around the world has found negative health outcomes associated with routine swaddling during the first months.

- **Greater risk of respiratory illness.** One study of 186 babies in Turkey and China found that babies who were routinely swaddled during their first three months were four times more likely to develop pneumonia and other respiratory infections compared with babies who were not swaddled (Yurdakok, Yavuz, & Taylor, 1990).

- **Greater risk of hip dysplasia.** When babies are swaddled tightly and their legs cannot bend and flex, this creates a greater risk of hip dysplasia, sometimes called "developmental dysplasia" (Sahin, Akturk et al. 2004; van Sleuwen, Engelberts et al. 2007).
- **Greater risk of SIDS in prone sleeping positions.** One Australian case-control study that compared 22 babies who died of sudden infant death syndrome (SIDS) to 213 babies who did not found that swaddled babies laid face down (prone) to sleep were at 12 times greater risk for SIDS than babies laid face up (supine), compared to a three times greater risk in babies laid face down who were not swaddled (Ponsonby, Dwyer, Gibbons, Cochrane, & Wang, 1993).
- **Greater risk of overheating.** If also in warm surroundings, swaddled babies are at risk of overheating, which in rare cases has been fatal (van Gestel, L'Hoir, ten Berge, Jansen, & Plotz, 2002).

Changing Perspectives

After looking into the research, my own opinion of swaddling has changed. Rather than assuming babies should be swaddled after birth to keep them warm, I understand that in most cases a mother's body is her newborn's best "baby warmer." My opinion of swaddling during breastfeeding has also changed. Rather than recommending mothers turn their babies into "baby burritos" to prevent waving arms from making latch more difficult, now I

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understand the role of “arm cycling” and other inborn feeding reflexes in helping babies get to the breast and feed (Colson et al., 2008). Instead, I suggest mothers simply lean back into semi-reclined, “laid-back” feeding positions. With baby tummy down on mother’s body, gravity makes these same inborn reflexes work for rather than against breastfeeding.

Although swaddling may sometimes be helpful, in light of this research, it may be best to limit its use and suggest parents consider alternatives during fussy times, such as skin-to-skin contact and baby carriers.

References

- Bystrova, K., Matthiesen, A. S., Vorontsov, I., Widstrom, A. M., Ransjo-Arvidson, A. B., & Uvnas-Moberg, K. (2007). Maternal axillar and breast temperature after giving birth: effects of delivery ward practices and relation to infant temperature. *Birth*, 34(4), 291-300.
- Bystrova, K., Matthiesen, A. S., Widstrom, A. M., Ransjo-Arvidson, A. B., Welles-Nystrom, B., Vorontsov, I., et al. (2007). The effect of Russian Maternity Home routines on breastfeeding and neonatal weight loss with special reference to swaddling. *Early Human Development*, 83(1), 29-39.
- Bystrova, K., Widstrom, A. M., Matthiesen, A. S., Ransjo-Arvidson, A. B., Welles-Nystrom, B., Vorontsov, I., et al. (2007). Early lactation performance in primiparous and multiparous women in relation to different maternity home practices. A randomised trial in St. Petersburg. *International Breastfeeding Journal*, 2, 9.
- Bystrova, K., Widstrom, A. M., Matthiesen, A. S., Ransjo-Arvidson, A. B., Welles-Nystrom, B., Wassberg, C., et al. (2003). Skin-to-skin contact may reduce negative consequences of “the stress of being born”: a study on temperature in newborn infants, subjected to different ward routines in St. Petersburg. *Acta Paediatrica*, 92(3), 320-326.
- Colson, S., DeRooy, L., & Hawdon, J. (2003). Biological Nurturing increases duration of breastfeeding for a vulnerable cohort. *MIDIRS Midwifery Digest*, 13(1), 92-97.
- Colson, S. D., Meek, J. H., & Hawdon, J. M. (2008). Optimal positions for the release of primitive neonatal reflexes stimulating breastfeeding. *Early Human Development*, 84(7), 441-449.
- Ferber, S. G., Kuint, J., Weller, A., Feldman, R., Dollberg, S., Arbel, E., et al. (2002). Massage therapy by mothers and trained professionals enhances weight gain in preterm infants. *Early Human Development*, 67(1-2), 37-45.
- Franco, P., Seret, N., Van Hees, J. N., Scaillet, S., Groswasser, J., & Kahn, A. (2005). Influence of swaddling on sleep and arousal characteristics of healthy infants. *Pediatrics*, 115(5), 1307-1311.
- Galligan, M. (2006). Proposed guidelines for skin-to-skin treatment of neonatal hypothermia. *MCN; American Journal of Maternal Child Nursing*, 31(5), 298-304; quiz 305-296.
- Ludington-Hoe, S. M., Ferreira, C., Swinith, J., & Ceccardi, J. J. (2003). Safe criteria and procedure for kangaroo care with intubated preterm infants. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 32(5), 579-588.
- Mohrbaccher, N. (2010). *Breastfeeding Answers Made Simple: A Guide for Helping Mothers*. Hale Publishing: Amarillo, TX.
- Moore, E. R., & Anderson, G. C. (2007). Randomized controlled trial of very early mother-infant skin-to-skin contact and breastfeeding status. *Journal of Midwifery & Women's Health*, 52(2), 116-125.
- Ponsonby, A. L., Dwyer, T., Gibbons, L. E., Cochrane, J. A., & Wang, Y. G. (1993). Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *New England Journal of Medicine*, 329(6), 377-382.
- van Gestel, J. P., L'Hoir, M. P., ten Berge, M., Jansen, N. J., & Plotz, F. B. (2002). Risks of ancient practices in modern times. *Pediatrics*, 110(6), e78.
- WHO. (2003). *Integrated management of pregnancy and childbirth: Pregnancy, childbirth, postpartum & newborn care*. Geneva, Switzerland: World Health Organization.
- Yamauchi, Y., & Yamanouchi, I. (1990). Breastfeeding frequency during the first 24 hours after birth in full-term neonates. *Pediatrics*, 86(2), 171-175.
- Yurdakok, K., Yavuz, T., & Taylor, C. E. (1990). Swaddling and acute respiratory infections. *American Journal of Public Health*, 80(7), 873-875.

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Nancy began helping breastfeeding families as a volunteer in 1982, becoming board-certified in 1991. From 1993 to 2003 she founded and maintained a large private lactation practice in the Chicago area, where she worked with thousands of breastfeeding families. She still lives in Chicago, where she works as Lactation Consultant for Ameda Breastfeeding Products. In 2008 the International Lactation Consultant Association (ILCA) officially recognized Nancy's contributions to the field of breastfeeding by awarding her the designation FILCA, Fellow of the International Lactation Consultant Association. Nancy was one of the first of 16 to be recognized for their lifetime achievements in breastfeeding.

More Debate on *Swaddling*

Editor's Note: In the September 2010 issue of the International Journal of Childbirth Education (Volume 25, Number 3, pages 7-10) we published an article by Nancy Mohrbacher, IBCLC, FILCA, entitled "Rethinking Swaddling". You can read the article at: [http://www.icea.org/sites/default/files/09-10%20\(Reduced\).pdf](http://www.icea.org/sites/default/files/09-10%20(Reduced).pdf) We received the following letter in response to the article from Harvey Karp, MD, Assistant Professor of Pediatrics at the USC School of Medicine, and author of "The Happiest Baby on the Block". This letter is followed by a response from Ms. Morbacher.

Dear Editor,

Over the past decade, the ancient practice of swaddling has had a renaissance.

In large part, the impetus for this has been to reduce infant crying (including the 10-20% of colicky babies who cry for over 3 hrs/day).¹

Infant irritability - and the parental exhaustion it provokes - is much more than a nuisance. It can cause numerous serious problems (e.g. marital stress²; parental depression^{3 4 5 6 7 8}; early weaning^{9 10}; shaken baby syndrome^{11 12 13}; SIDS/suffocation^{14 15}; excess MD/ER visits¹⁶; over treatment for acid reflux¹⁷; maternal smoking^{18 19}; and possibly even motor vehicle accidents²⁰ and maternal²¹ and infant obesity²²), which place large emotional burdens on young families and a considerable economic burden on our communities.

Recently, this journal published a review entitled "Rethinking Swaddling" by Mohrbacher.²³ It noted meager benefits to wrapping and a host of possible risks, e.g. hip dysplasia, breastfeeding failure, respiratory infection, SIDS/suffocation, delayed development and neurological "shut-down". Unfortunately, this review contained numerous errors of omission that may lead readers to false impressions.

The review warned that tight swaddling might prevent hip movement and predispose to hip dysplasia. However, reports associating dysplasia and wrapping come from cultures using antiquated techniques (legs straight and tightly bound together; often with a rigid cradleboard placing the hips under additional stress).^{24 25 26 27} The International Hip Dysplasia Institute²⁸ and Harvard-based pediatric orthopedists²⁹ note that swaddling, allowing hip flexion and abduction, is safe.

Regarding nursing, the review cited a Russian study comparing babies swaddled during the first hours of life versus those held skin-to-skin.^{30 31 32} (The swaddling technique used was so tight some babies' feet became colder from reduced blood flow.)

The review raised concern regarding some swaddle-related issues of this study (e.g. delayed 1st breastfeeding and greater weight loss), but conspicuously failed to note the researchers' conclusions, "Swaddling did not have any significant effect on milk production." "Milk production/ingestion four days after birth or the duration of nearly exclusive breastfeeding did not differ between the groups allowed skin-to-skin contact, being in mother's arms dressed or swaddled, or exposed to a short-term separation after birth."

The review also misrepresented an American study³³ comparing the effect of hands-free swaddling versus skin-to-skin contact on nursing, during the first 2 hours. Once again, the review reported some transient effects of swaddling (delayed feeding behaviors and less efficient suckling at first nursing), but omitted the study's conclusion, which supported swaddling: There was no difference in breastfeeding difficulties or nursing exclusivity between the two groups. The infants suckled equally well "regardless of their micro-environment (skin-to-skin or swaddled contact), provided their mothers had erect nipples."

The review was misleading in its report of work by Ferber, et al.³⁴ saying, "Swaddled babies receive less touch, which was found to compromise growth in one study of preterm babies." However, this was a massage study that never mentioned swaddling. Additionally, the authors

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stated massage augmented growth, not that routine care compromised it.

“Rethinking Saddling” cited a 1990 study reporting a 400% rise in pneumonia and lung infections with wrapping.³⁵ But, it never mentioned a 2007 study of over 500 babies reporting no swaddle-related increase in pneumonia.³⁶ Also omitted were studies proving that swaddled babies have normal blood oxygenation and little to no change in respiratory rate,^{37 38 39 40} which argues against wrapping being related to pneumonia.

When discussing SIDS, Mohrbacher chose to note an increased SIDS rate with prone swaddling found in an Australian study⁴¹, but omitted the study’s finding that this risk became statistically insignificant when controlled for the presence of pillows in the bed. And, she ignored the fact that supine bundling was associated with a 30% reduction in SIDS risk ratio in the same Australian study and in a New Zealand study, as well.⁴²

Furthermore, Morhbacher made no mention of studies showing normal to improved sleep arousability with supine swaddling.^{39 40 45 46} (Arousability is a factor believed to lower SIDS risk.) She also made no mention of other likely SIDS reducing effects of swaddling (e.g. reducing the likelihood of prone placement, or covering the face with a blanket or accidentally rolling prone).⁴⁷ In an editorial on SIDS and swaddling, a leading researcher opined, “All in all, it would appear that the advantages of swaddling supine-sleeping infants outweigh the risks, if any.”⁴⁸

Mohrbacher repeatedly mentioned swaddling as stressful and cautioned, “Are swaddled babies really happier, or does swaddling cause newborns to shut down?” Yet, she omitted, or was unaware of, evidence that swaddling is genuinely calming, including a study of swaddled 6-week-olds reporting normal visual alertness, even after eating (i.e. they were not “shut down”)⁴⁹ as well as evidence that wrapping has no effect on heart rate (HR) or actually reduces it and moderates its swings^{37 38 39}⁵¹ (which associated with reduced sympathetic tone and calm state).

Finally, the review ignored evidence of the likely and proven benefits of swaddling, such as:

Improved nursing success – Excessive crying (and the exhaustion it triggers) potentially interferes with

nursing through: diminished lactogenesis or let down⁵² because of stress and fatigue; difficulty with latch-on; mastitis^{53 54}; reduced confidence⁵⁵ and family support; increased postpartum depression^{3 4 5 6 7 8}; a rise in cigarette smoking¹⁹; and physician advice to adopt dietary restrictions or complete cessation of nursing.⁵⁸

Two large CDC studies (over 30,000 nursing moms), found that the top reason babies (over one month) were weaned early was because their mothers thought they disliked the milk or were still hungry.¹⁰ For many of these women crying was likely a major contributor to these erroneous beliefs and would likely be improved with wrapping.

Furthermore, swaddled babies in Mongolia slept 38 and 46 minutes more per day than unwrapped infants (at 6 and 12 weeks, respectively).⁶⁰ Nursing infants in Pennsylvania slept 30-45 minutes/night more if their mothers were taught swaddling (as a part of The Happiest Baby™ program).²² This amount of sleep may promote nursing by reducing maternal exhaustion and marital tension.

Hundreds of WIC clinics in Oklahoma, Massachusetts and Pennsylvania teach swaddling (as part of Happiest Baby™ classes) to boost nursing initiation and continuation rates by reducing infant irritability and increasing sleep.^{62 63}

SBS prevention – Over 1300 children suffer Shaken Baby Syndrome each year. Their average age is 3-4 months and the #1 trigger for this assault is infant crying.^{11 12 13}

It is expected that reducing infant crying will help reduce the incidence of SBS. One report found 89% of parents who shake their babies visited a doctor to get help to reduce the infant’s crying before the assault occurred.¹³ For this reason, numerous SBS prevention programs teach swaddling, as part of a cry reduction intervention.^{66 67 68 69}

Postpartum depression (PPD) prevention – PPD affects 15% of all new mothers⁷⁰ (and as many as 25% of their partners).⁷¹ Several studies have identified infant crying and maternal fatigue as common initiators of PPD.^{3 4 5 6 7 8} At a Brown University colic clinic, 45% of mothers bringing their fussy baby (average age 2 months) for an evaluation were found to have moderate-severe PPD.⁶

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Swaddling has been taught in PPD prevention and parent support programs at Duke University⁷⁴ and Virtua Health (in the setting of Happiest Baby™ classes).⁷⁵

Unlike traditional cultures, we don't need to wrap babies for safe transport or to shield them from harsh weather. However, modern parents are often stressed, overworked, unskilled at infant care and lacking family support. For this reason, groups like the American Academy of Pediatrics recommend swaddling as an aid in reducing stress by improving a parent's ability to calm their upset baby and promote sleep.^{59 77 78}

Over 2500 certified Happiest Baby™ educators teach safe swaddling (among other baby calming/sleep techniques) across North America. This includes over 1000 professionals working for state and local health departments (e.g. Massachusetts, Minnesota, Pennsylvania, Wyoming).

Babies are comforted by nursing, carrying, massage and skin-to-skin contact. In addition to these ancient techniques, the time-honored technique of swaddling deserves recognition as a key tool to promote sleep, soothe crying and increase parental confidence.

References

- ¹ St. James-Roberts I: Distinguishing between infant fussing, crying and colic: How many phenomena? in Lester B, Barr R (eds): Colic and Excessive Crying, Report of the 105th Ross Conference on Pediatric Research, 1997, pp 3–14
- ² Levitzky S, Cooper R. Infant colic syndrome: maternal fantasies of aggression and infanticide. *Clin Pediatr (Phila)*. 2000;39: 395–400
- ³ Papousek M, von Hofacker N. Persistent crying in early infancy: a non-trivial condition of risk for the developing mother-infant relationship. *Child Care Health Dev*. 1998;24:395–424.
- ⁴ Murray L, Cooper P. The impact of irritable infant behavior on maternal mental state: a longitudinal study and a treatment trial. In: Barr R, St James-Roberts I, Keefe M, eds. *New Evidence on Unexplained Early Infant Crying: Its Origins, Nature and Management*. Skillman, NJ: Johnson & Johnson Pediatric Institute; 2001:149–164
- ⁵ Miller AR, et al. Crying and motor behavior of six-week-old infants and postpartum maternal mood. *Peds*. 1993;92:551–8
- ⁶ Maxted AE, et al. Infant colic and maternal depression. *Infant Ment Health J*. 2005;26:56–68
- ⁷ Corwin EJ, et al. The impact of fatigue on the development of postpartum depression. *J Obstet Gynecol Neonatal Nurs*. 2005;34:577–86
- ⁸ Howell EA, et al. Correlates of early postpartum depressive symptoms. *Matern Child Health J*. 2006;10:149–57

⁹ Ahluwalia IB, et al. Why do women stop breastfeeding? Findings from the Pregnancy Risk Assessment and Monitoring System. *Peds*. 2005;116:1408–12

¹⁰ Li, R, et al, Why Mothers Stop Breastfeeding: Mothers' Self-reported Reasons for Stopping During the 1st Year, *Peds* 2008; 122:s69–76

¹¹ Catherine N, Ko J, Barr RG. Should we do more to get the word out? Causes of, responses to, and consequences of crying and colic in popular parenting magazines. *J Dev Behav Pediatr. Behavioral Pediatrics* 2005;26:14–23

¹² Barr RG, et al., Age-related incidence curve of hospitalized Shaken Baby Syndrome cases: Convergent evidence for crying as a trigger to shaking, *Child Abuse & Neglect* 30 (2006), pp. 7–16

¹³ Talvik I, et al Shaken baby syndrome and a baby's cry. *Acta Paediatr*. 2008 Jun;97(6):782–5.

¹⁴ Willinger, M. et al. Factors Associated With Caregivers' Choice of Infant Sleep Position, 1994–1998. The National Infant Sleep Position Study. *JAMA*. 2000;283: 2135–42

¹⁵ Von Kohorn I, et al. Influence of Prior Advice and Beliefs of Mothers on Infant Sleep Position, *Arch Pediatr Adolesc Med*. 2010; 164: 363–9

¹⁶ St James-Roberts I, Halil T: Infant crying patterns in the first year: Normal community and clinical findings. *J Child Psychol Psychiatry* 1991; 32:951–68

¹⁷ Sutphen J. Is it colic or is it gastroesophageal reflux? *J Pediatr Gastroenterol Nutr*. 2001;33(2):110–1

¹⁸ Gaffney KF, Henry LL. Identifying risk factors for postpartum tobacco use. *J Nurs Scholarsh*. 2007;39:126–32

¹⁹ Gaffney K, et al. Mothers' Reflections about Infant Irritability and Postpartum Tobacco Use Birth, 2008;35:66–72

²⁰ 2004 Sleep in America Poll Final Report, National Sleep Foundation, March 2004, p 165 <http://www.sleepfoundation.org/sites/default/files/2004SleepPollFinalReport.pdf>

²¹ Taheri S, et al. Short sleep duration is associated with reduced leptin, elevated ghrelin, and increased body mass index (BMI). *Sleep*. 2004;27:A146–7.

²² Paul IM, et al, Preventing Obesity during Infancy: A Pilot Study, *Obesity*, 2011,19; 353–61

²³ Mohrbacher N. Rethinking Swaddling. *Int J Child Ed*. 25; 2010; 7–10

²⁴ Sahin F, et al. Screening for developmental dysplasia of the hip: results of a 7-year follow-up study. *Pediatr Int*. 2004;46:162–166

²⁵ Dogruel H, et al. Clinical examination versus ultrasonography in detecting developmental dysplasia of the hip. *Int Orthop*. 2008; 32:415–9

²⁶ Kremli MK, et al. The pattern of developmental dysplasia of the hip. *Saudi Med J*. 2003;24:1118–20

²⁷ Kutlu A, et al. Congenital dislocation of the hip and its relation to swaddling used in Turkey. *J Pediatr Orthop*. 1992;12:598–602

²⁸ <http://www.hipdysplasia.org/For-Physicians/Pediatricians/default.aspx>

²⁹ Mahan ST, Kasser JR. In Reply Safe Swaddling and Healthy Hips: Don't Toss the Baby out With the Bathwater: *Pediatrics*. 2008;121:1077

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- ³⁰ Bystrova K, et al. Maternal axillar and breast temperature after giving birth: effects of delivery ward practices and relation to infant temperature. *Birth*. 2007; 34, 291-300
- ³¹ Bystrova K, et al. The effect of Russian Maternity Home routines on breastfeeding and neonatal weight loss with special reference to swaddling. *Early Human Development*, 2007; 83, 29-39.
- ³² Bystrova K, et al. Early lactation performance in primiparous and multiparous women in relation to different maternity home practices. A randomised trial in St. Petersburg. *International Breastfeeding Journal*. 2007; 2:9
- ³³ Moore ER, Anderson GC. Randomized controlled trial of very early mother-infant skin-to-skin contact and breastfeeding status. *Journal of Midwifery & Women's Health*. 2007;52:116-25.
- ³⁴ Ferber SG, et al. Massage therapy by mothers and trained professionals enhances weight gain in preterm infants. *Early Hum Devel*, 2002;67:37-45
- ³⁵ Yurdakok K, et al. Swaddling and acute respiratory infections. *American Journal of Public Health*, 1990, 80, 873-5
- ³⁶ Manaseki-Holland S. Investigation of the Effect of Swaddling on Lower Respiratory Tract Infection in Infants From Mongolia [PhD thesis]. London, United Kingdom: London University; 2005
- ³⁷ Gerard CM, Harris KA, Thach BT. Physiologic studies on swaddling: an ancient child care practice, which may promote the supine position for infant sleep. *J Pediatr*. 2002;141: 398-404
- ³⁸ Lipton E, et al: Swaddling, a child care practice: Historical, cultural and experimental observations. *Pediatrics* 1965;35(Sup) 521-67
- ³⁹ Franco P, et al. Influence of swaddling on sleep and arousal characteristics of healthy infants. *Pediatrics*. 2005;115(5):1307-1311
- ⁴⁰ Richardson HL, et al. Minimizing the risks of sudden infant death syndrome: to swaddle or not to swaddle? *J Ped* 2009;155:475-81
- ⁴¹ Ponsoyby, A, et al, Factors potentiating the risk of Sudden Infant Death Syndrome associated with the Prone Position. *NEJM* 1993; 329: 377-82
- ⁴² Mitchell et al, Head Covering and the Risk for SIDS: Findings From the New Zealand and German SIDS Case-Control Studies, *Peds* 2008; 121: e1478-83
- ⁴³ Franco P, et al. Increased cardiac autonomic responses to auditory challenges in swaddled infants. *Sleep* 2004;27:1527-32
- ⁴⁴ Richardson HL, et al. Influence of swaddling experience on spontaneous arousal patterns and autonomic control in sleeping infants. *J Pediatr*. 2010.157:85-91
- ⁴⁵ van Sleuwen, et al. Swaddling: A Systematic Review, *Pediatrics* 2007;120:e1097-e1106
- ⁴⁶ Thach B. Does Swaddling Decrease or Increase the Risk for Sudden Infant Death Syndrome? *J Peds* 2009;155:461-2
- ⁴⁷ Giacomani SL. Hunger and motor restraint on arousal and visual attention in the infant. *Child Dev* 1971; 42: 605-14.
- ⁴⁸ Franco P, et al. Increased cardiac autonomic responses to auditory challenges in swaddled infants. *Sleep* 2004;27:1527-32
- ⁴⁹ Ueda T, et al. Influence of psychological stress on suckling-induced pulsatile oxytocin release. *Ob Gyn* 1994;84:259-62
- ⁵⁰ Riordan JM, Nichols FH. A Descriptive Study of Lactation Mastitis in Long-Term Breastfeeding Women. *J Hum Lact* 1990; 6:53-8
- ⁵¹ Irwin M et al. Partial night sleep deprivation reduces natural killer and cellular immune responses in humans *J Fed Am Soc Exper Bio*. 1996,10:643-53
- ⁵² Pauli-Pott U, et al. Infants with “colic”-mothers’ perspectives on the crying problem. *J Psychosom Res* 2000;48: 125-3248
- ⁵³ AAP Committee on Nutrition, Hypoallergenic Infant Formulas. *Peds*. 2000; 106:346-9
- ⁵⁴ Semira Manaseki-Holland, et al, Untitled, Conference – Tracking Progress in Maternal, Newborn and Child Health Countdown to 2015, Maternal, Newborn & Child Survival, 2010 June 7-9 Washington, DC
- ⁵⁵ <http://www.pabreastfeeding.org/newsletters/PABC%20Newsletter%20Fall%202007.pdf>
- ⁵⁶ http://webcache.googleusercontent.com/search?q=cache:BwcXR9BeoT8J:www.communityactioninc.org/index.php%3Foption%3Dcom_content%26view%3Darticle%26id%3D125%26Itemid%3D12+massachusetts+happiest+baby+wic&cd=1&hl=en&ct=clk&gl=us&source=www.google.com
- ⁵⁷ Child Abuse and Neglect: An introductory manual for professionals and paraprofessionals Colorado Dept of Public Health and Environment Oct 2006 pg 5;11
- ⁵⁸ National Association of Children's Hospitals and Related Institutions. Profile Series, Children's Hospitals at the Frontlines, The Prevention of Child Abuse and Neglect Jan 2007. p 9,10
- ⁵⁹ http://www.aap.org/practicingsafety/Toolkit_Resources/Module1/swadling.pdf
- ⁶⁰ http://www.pascan.org/pdf/crying_card_eng.pdf
- ⁶¹ Wisner KL, et al Postpartum Depression A Major Public Health Problem *JAMA*. 2006;296:2616-8
- ⁶² Paulson JF, et al. Prenatal and Postpartum Depression in Fathers and Its Association With Maternal Depression A Meta-analysis *JAMA*. 2010;303:1961-9.
- ⁶³ Personal communication – William Meyer, PhD, Durham, NC.
- ⁶⁴ Johannes B, Menei L. Calming Techniques Ease Mother's Minds. *Spectrum Nursing Magazine*, Mar 28, 2007
- ⁶⁵ Jana LA, Shu J. Heading Home With Your Newborn. New York, NY: American Academy of Pediatrics; 2005,
- ⁶⁶ Steven P. Shelov, MD, Editor in Chief , Caring for your baby and young child: birth to age five, 5th edition New York, NY: Bantam Press; 2009.

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In reply,

I welcome the chance to respond to Dr. Karp's comments. Although swaddling is traditional in some cultures, not all traditional practices are necessarily safe or appropriate (in the extreme, think foot binding and female genital mutilation). As with any intervention, parents deserve to know the potential risks of routine swaddling. Otherwise a decision to swaddle is not an informed one. It is also important for those of us who work with parents to be sure the guidance we give new parents is sound. As British researcher Peter Fleming wrote:

Advice that is given routinely about the care of healthy babies must have at least as strong an evidence base as the treatment of those babies who are ill, because healthy babies are far more common, and the potential for unsuspected harm is relatively great, a lesson already bitterly learned for infant sleeping position (Fleming, Blair, Pollard, Platt, Leach, Smith, Berry, Golding, & the CESDI SUDI Review Team 1999).

As my article described, the evidence on swaddling is decidedly mixed. To begin at the beginning, Karp's book acknowledges that lengthy crying usually starts no earlier than about two weeks of age. Even so, he encourages parents to swaddle their babies from birth for 12 to 20 hours each day (Karp, 2002, p. 212). But he is hardly the first to suggest routine swaddling. Without any evidence to support this practice, U.S. newborns have long been swaddled in birthing facilities before being laid in isolettes by their mother's bed or in the hospital nursery.

Why is this a problem? By definition a swaddled newborn is not in ventral skin-to-skin contact with his mother, which research indicates is best practice for both mother and baby after birth. When after delivery a newborn is laid tummy-down on his mother's semi-reclined body, he is kept warm more effectively than with a mechanical warmer, and as he makes his way to her breast, his touch and movements increase maternal oxytocin release (Matthieson, Ransjo-Arvidson, Nissen, & Uvnäs-Moberg, 2001). This prepares mother's body hormonally for breastfeeding and helps cement her emotional bond with her baby (Uvnäs-Moberg, 2003). The original goal of kangaroo care was to decrease the number of abandoned

preterm babies in Colombia, and it worked (Rey & Martínez, 1983). Even after a cesarean birth, with help mothers can hold their babies in skin-to-skin contact across their chest and breastfeed immediately, an approach that is used increasingly in the U.S.

A large study (N=21,842) found that the longer mothers and babies stay in skin-to-skin contact during the first three hours after birth, the more likely they are to be exclusively breastfeeding at hospital discharge (Bramson, Lee, Moore, Montgomery, Neish, Bahjri, & Melcher, 2010). When skin-to-skin contact exceeds one hour, mother and baby are three times more likely to be exclusively breastfeeding at discharge compared with those who had no skin-to-skin contact after birth.

Although Karp disagreed with the conclusions I drew from some of the studies cited in my article, there is no debate about the conclusions of the meta-analyses published by the *Cochrane Review*, which exists to provide evidence-based guidelines on best practices. After examining 30 studies with 1,925 participants, a *Cochrane Review* article concluded that when full-term, healthy babies received early skin-to-skin contact after birth, "babies interacted more with their mothers, stayed warmer, and cried less. Babies were more likely to be breastfed, and to breastfeed for longer, if they had early skin-to-skin contact" (Moore, Anderson, & Bergman, 2007).

This early mother-baby body contact may be even more important for late preterm babies, who are at greater risk of underfeeding. Preliminary research indicates that during the first days of life, spending long periods in ventral contact with mother's body, unswaddled but lightly dressed, is associated with more breastfeeding—even during sleep—and reduces the need for supplements in these at-risk newborns (Colson, DeRooy, & Hawdon, 2003). This is not surprising since it is body contact that triggers babies' inborn feeding behaviors (Colson, Meek, & Hawdon, 2008). During swaddling, normal breast and body contact is absent at a time when babies should be feeding often to prevent exaggerated newborn jaundice and reduce the mother's risk of breast engorgement.

The risks associated with swaddling older babies are different. Karp discounted some of the articles cited
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in my article because of the swaddling techniques used. However, not all parents receive the same swaddling instructions. Many hear about swaddling from a friend or relative who might not be so diligent about imparting critical information.

In response to a 2008 article in *Pediatrics* in which researchers found an association between swaddling in older babies and hip dysplasia (Mahan & Kasser, 2008a), Karp made a similar point in his letter to the editor. The researchers responded: “...concerns of improper technique and the risk that this poses to the hips should be emphasized” and “families who swaddle their neonate should understand the potential risk to the hip” (Mahan & Kasser, 2008b).

Although Karp claims parents who follow his program will be rewarded with reduced infant crying and longer sleep (and therefore by assumption greater marital harmony and less depression and Shaken Baby Syndrome), research refutes these claims. In one study of 35 mothers, Karp’s method was taught by DVD—with swaddling being the first of his “5 S’s”—and babies’ crying and sleep were tracked at 1, 4, 6, 8, and 12 weeks (McRury & Zolotor, 2010). The researchers concluded that his method “does not seem to be efficacious in decreasing total crying among normal infants.” ***No statistically significant differences were found between the intervention and control groups in either daily total crying or sleep at any of the 5 age points.***

Another study of 700 mothers and babies found that calming practices in order of effectiveness were: holding (87%), breastfeeding (82%), walking (67%), and rocking (63%) (Howard, Lanphear, Lanphear, Eberly, & Lawrence, 2006). In this study, starting with breastfeeding when baby became fussy (rather than ending with sucking as the 5th of Karp’s five “S’s”) was found to be “a strong predictor of partial (overall) [breastfeeding] duration and... rated as a highly effective calming method by parents.”

Because “one-size-fits-all” approaches to baby care never work well for everyone, I suggest parents adopt only strategies they feel comfortable with that respect the needs of everyone—large and small—in their family. It is logical to start with practices that are in harmony with the physiology underlying ages-old mother-baby post-birth

interactions – lengthy skin contact, holding, and nursing – and to modify them only as needed.

My own philosophy can be simply described as “do what works and don’t do what doesn’t work.” Although this may sound obvious, in my experience many new parents persist with interventions that aren’t working, particularly those that come neatly packaged and well marketed.

References

- Bramson, L., Lee, J.W., Moore, E., Montgomery, S., Neish, C., Bahjri, K., Melcher, C.L. (2010). Effect of early skin-to-skin mother infant contact during the first three hours following birth on exclusive breastfeeding during the maternity hospital stay. *Journal of Human Lactation*, 26(2), 130-37.
- Colson, S., DeRooy, L., & Hawdon, J. (2003). Biological Nurturing increases duration of breastfeeding for a vulnerable cohort. *MIDIRS Midwifery Digest*, 13(1), 92-97.
- Colson, S. D., Meek, J. H., & Hawdon, J. M. (2008). Optimal positions for the release of primitive neonatal reflexes stimulating breastfeeding. *Early Human Development*, 84(7), 441-449. Colson 2008
- Fleming, P.J., Blair, P.S., Pollard, K., Platt, M.W., Leach, C., Smith, I., Berry, P.J., Golding, J. & the CESDI SUDI Review Team. (1999). Pacifier use and sudden infant death syndrome: Results from the CESDI/SUDI casew control study. *Archives of the Diseases of Childhood*, 81, 112:116.
- Howard, C.R., Lanphear, N., Lanphear, B.P., Eberly, S., & Lawrence, R.A. (2006). Parental responses to infant crying and colic: The effect on breastfeeding duration. *Breastfeeding Medicine*, 1(3):146-155.
- Karp, H. (2002). *The Happiest Baby on the Block: The New Way to Calm Crying and Help Your Newborn Baby Sleep Longer*. New York: Bantam Books, p. 121.
- Mahan, S.T., & Kasser, J.R. (2008a). Does swaddling influence developmental dysplasia of the hip? *Pediatrics*, 121, 177-178.
- Mahan, S.T. & Kasser, J.R. (2008b). In reply—*Pediatrics*, 121(5), 1077.
- Matthieson, A., A. Ransjo-Arvidson, E. Nissen, and K. Uvnäs-Moberg, K. (2001). Postpartum maternal oxytocin release by newborns: Effects of infant hand massage and sucking. *Birth*, 28, 13-19.
- McRury, J.M. & Zolotor, A. (2010). A randomized, controlled trial of a behavioral intervention to reduce crying among infants. *Journal of the American Board of Family Medicine*, 23(3), 315-322.
- Moore, E.R., Anderson, G.C., & Bergman, N. (2007). Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database of Systematic Review*, 3, Art No. CD003519. DOI: 10.1002/14651858.CD003519.pub2.
- Rey, E. & Martínez, H. (1983). *Manejo racional del niño prematuro*. Bogotá, Colombia: Universidad Nacional, Curso de Medicina Fetal.
- Uvnäs-Moberg, K (2003). *The Oxytocin Factor: Tapping the Hormone of Calm, Love, and Healing*. Cambridge, MA: Da Capo Press.