

# The "fourth trimester": A framework and strategy for understanding and resolving colic

By [Harvey Karp, MD](#)

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One pediatrician's quest to find the answer to colic leads to a hypothesis about the condition and a five-step technique pediatricians can teach parents to calm their crying baby.

*"There is a reason behind everything in nature." Aristotle*

One of the most frustrating problems parents and physicians face is a baby who won't stop crying. It is not a rare event: Approximately 15% to 20% of infants younger than 3 months old cry or fuss for more than three hours a day, and 50% of infants cry or fuss for two hours a day.<sup>1</sup>

Why are these babies crying? What can we do to help them and their families? These questions have remained mysteries for thousands of years.

During my training as a physician in the early 1970s, I was taught that colic was short-lived and self-limited and that its cause was unknown. I was instructed to recommend simple calming measures (rocking, walking, car rides, etc.) and to prescribe a sedative or an anticholinergic or paregoric (a mixture of opium and ethanol). Then, in 1980, during a fellowship in child development at UCLA, I attended a lecture that challenged my understanding of colic. I was astounded to learn that the !Kung San tribe of Southern Africa was "colic free." Ninety percent of the time, !Kung parents could calm their crying baby within 30 seconds.<sup>2</sup>

For the next 20 years, I sought to discover how these parents were able to soothe their babies so quickly, to clarify the biologic basis for their methods, and to adapt and refine them into techniques that my patients could employ. In 2002, the results of my research were released in a book, *The Happiest Baby on the Block* (Bantam Books), and a video of the same name.

In this article, I present a hypothesis to explain colic (what I call the missing fourth trimester); explain a previously unreported neonatal response (the calming reflex) that is a virtual "off switch" for crying in infants younger than 3 months; and describe five simple techniques that activate this reflex (the five S's).

First, let's take a step back and discuss crying and how it affects caregivers, and critically review the four major contemporary theories of the cause of colic.

## **The crying reflex**

Crying isn't all bad. It was a brilliant way of getting a cave mother's attention, and it remains a brilliant way of getting a 21st century mother's (or father's) attention. It is one of the most important of the 70 neonatal reflexes that babies are born with. Like an acoustic umbilical cord, crying is a powerful, long-distance connection between a baby and caregiver. This alarm system consists of a newborn emitting a 80 to 100 dB sound for prolonged periods (an extraordinary ability far exceeding the fortitude of most adults).<sup>3</sup>

Unfortunately, this reflex sometimes goes awry, and the summoning cry turns into a persistent scream. In 1962, T. Berry Brazelton reported that among 80 infants in his practice, 25% cried and fussed for more than 3.4 hours a day.<sup>4</sup> This confirmed the landmark 1954 article by Wessel and colleagues, who codified our current definition of colic in the "rule of 3's"—crying that lasts more than three hours a day, more than three days a week, or more than three weeks.<sup>5</sup>

These observations became the impetus for the past 40 years of research into colic. Many studies using acoustical analyzers have established two important points: 1) the basis of a cry (hunger, overstimulation, etc.) *cannot* be identified from the sound of that cry, and 2) the high pitched, shrill cries of colicky babies are not diagnostic because they overlap with the cries of noncolicky infants.<sup>6</sup> In fact, a study of experienced nurses showed that they did no better at knowledgeably identifying the cause of a distress cry (birth, pain, hunger) than if they had guessed (cries were taped at birth, at circumcision, and before a feeding, then played in random order for nurses to identify).<sup>7</sup>

In essence, crying in early infancy is an excellent signal of need, but a poor signal of what is needed. It is a graduated system of alerts, with mild cries giving the impression of mild need and intense cries giving the impression of urgent need. The trouble is that some babies skip right past a mild cry into an intense cry, even when their need isn't urgent. Like a smoke alarm, which blasts out the same sound regardless of whether the toast is burning or the house is in flames, a colicky baby emits the same powerful shriek regardless of whether he is startled, needs to burp, or is in true pain. This can be terribly burdensome to new parents.

### **How colic affects caregivers**

Over the past 50 years, a network of consultants, support groups, clinics, and books has been created to help mothers who have problems breastfeeding. In contrast, little concrete help exists for the 50% of families whose babies cry or fuss for more than two hours a day. Most pediatricians admit that they can offer no remedy for inconsolable babies (other than car rides, trials of antireflux medications, and dietary changes). And most infant care books either confuse parents or stifle their hope that calming their baby is even possible.

All this is especially disconcerting because crying jolts an adult's nervous system. It raises our heart rate and alters our skin conductance.<sup>8</sup> And the effects of crying are more than physiologic. Colicky babies may shatter a parent's fantasy of having the perfect baby

and of being the perfect parent. Mothers of fussy babies have tearfully told me they decided against having more children after experiencing the strain of colic. Persistent crying can provoke exhaustion, breastfeeding failure, marital discord, postpartum depression, and child abuse.

- **Exhaustion.** Caring for a fussy baby can be exhausting not only because of all the crying but also because these infants tend to sleep less. Colicky babies sleep an average of 1.5 fewer hours per day and wake more frequently than noncolicky babies.<sup>9</sup>
- **Breastfeeding failure.** Crying can make latch-on difficult, inhibit let-down, diminish milk supply (secondary to stress and fatigue), decrease a woman's confidence in her milk's quality and quantity, and erode her spouse's and family's support for her nursing.
- **Marital stress.** Persistent crying causes marital stress. One report noted severe marital discord in 91% of couples whose babies had a diagnosis of colic.<sup>10</sup>
- **Postpartum depression.** Colicky crying can cause fatigue and feelings of being an incompetent parent, both of which may provoke and exacerbate postpartum depression.<sup>11</sup>
- **Child abuse.** Infant crying has often been linked to child abuse. A review of 1,416 cases of shaken baby syndrome (average age, 3.5 months) found that 95% were preceded by crying.<sup>12</sup>

Clearly, colic causes substantial morbidity and mortality. But what is its root cause?

### **The four theories of colic**

Infant crying has been attributed to everything from the evil eye, to "blowing off steam," to exercise for the lungs. Today, there are four main theories of the cause of colic: gastrointestinal disorders, maternal anxiety, difficult temperament, and brain immaturity.

**GI disorders.** In 1553, the first English language book on pediatrics, *The Booke of Chylidren*, described colic as a "peine in the gut." The very word *colic* comes from the ancient Greek word *kolikos*, meaning "pertaining to the intestine." Two broad categories of GI problems are reputed to be associated with colic: minor problems (gas, cramps, swallowed air, overfeeding) and major problems (food intolerance and acid reflux).

**Minor GI problems.** Severe pain from these minor problems seems a logical cause of a baby's cries. Fussy infants often grunt and double up, experience borborygmi, have a pained sounding cry, and yell out shortly after eating. Also, an antispasmodic drug has been shown to lessen crying.<sup>13</sup>

Gas and cramps fail to explain several characteristics of colic, however. Colic starts at 2 weeks of age and ends at 3 months,<sup>4</sup> but gas starts shortly after birth and lasts long after three months.<sup>14</sup> Premature infants have intestinal gas from the first days of life, as

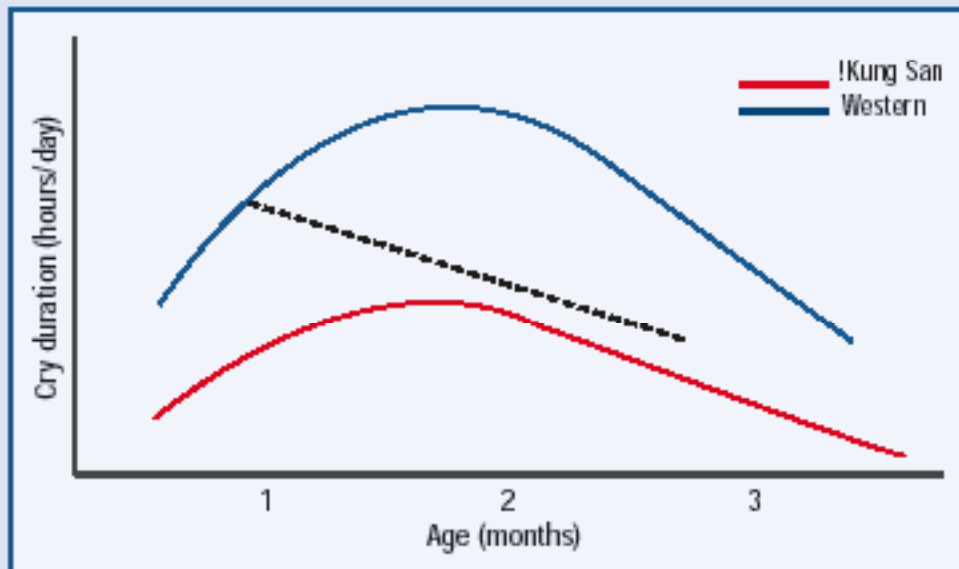
is evident from abdominal radiographs, but onset of colic in these babies is delayed until two weeks after their due date. Colic peaks in the evening, but gas occurs all day. Fussy babies are often calmed with rocking or shushing, but these actions can't stop pain. Colic is absent from some cultures around the world,<sup>2</sup> but gas isn't.

Swallowed air is also an unconvincing explanation for colic. Radiographs of fussy babies show they have more air in the GI tract when they finished crying than when they began.<sup>15</sup> And two double-blind, controlled studies have proved that simethicone drops are no more effective at calming crying than is placebo.<sup>16,17</sup>

Overfeeding is another unconvincing explanation for colic. Human milk is low in fat and protein, and animals with this chemical profile tend to nurse almost continuously. Also, the !Kung San nurse their children 50 to 100 times a day, but their babies never experience colic.<sup>18</sup> (See Figure 1 for a comparison of cry duration among !Kung San infants and Western babies.)

FIGURE 1

### Crying in Western babies compared with hunter-gatherer babies



Relationship of infant crying curves in typical Western and !Kung San infants. Dashed line indicates effect on crying of moving Western caregivers toward the practices of hunter-gatherer societies, where parenting methods customarily give babies more of the five S's, described on pages 103 to 110.

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Finally, the beneficial effect from anticholinergic drugs may be due in large part to their sedative effect. In fact, the maker of dicyclomine hydrochloride, the only anticholinergic drug ever shown to help colic, removed its indication for colic in 1984 after the drug caused several cases of respiratory depression, coma, and death in young infants.

**Major GI problems.** Food intolerance and gastroesophageal reflux disease (GERD) are commonly considered to be causes of persistent crying. Foods that contain caffeine or other stimulant chemicals (cola, chocolate, coffee, tea, Chinese or over-the-counter cold medicines) may be passed to the baby through breast milk and may provoke crying. The principle culprit for food-related crying, however, is believed to be cow's milk protein. Numerous studies have shown that a subset of colicky babies cry less when cow's milk protein is removed from their diet (either by eliminating it from their mother's diet if she is nursing or by using a casein or whey hydrolysate hypoallergenic formula).<sup>19</sup> This sensitivity seems to explain only 10% to 15% of colic cases, however.<sup>20</sup>

Over the past 25 years, the number of children given a diagnosis of GERD has increased 20-fold.<sup>21</sup> Many of those patients are infants younger than 3 months. Reflux is rarely associated with irritability.<sup>22</sup> In one study, only one in 24 infants under 3 months referred to a gastroenterologist for evaluation of unexplained crying had an abnormal pH probe.<sup>23</sup> In a double-blind, crossover study, Moore and colleagues treated 30 irritable infants (3 to 12 months of age) who had GERD (without erosive esophagitis) with omeprazole. The medicine significantly decreased esophageal acidity, but did not reduce irritability.<sup>24</sup>

Best current estimates are that, at most, only 2% to 4% of colic is secondary to GERD. This, coupled with the fact that antireflux medications have a significant potential to cause morbidity, should temper a practitioner's eagerness to prescribe these agents. Metoclopramide may increase crying, ranitidine tastes terrible, and recently released medicines may have serious health effects that have yet to be realized (after years of widespread use, cisapride was taken off the market after being associated with 302 deaths, 24 in children younger than 6 years of age). Furthermore, labeling a child as having GERD may increase the chances of his parents seeing him as a "vulnerable child."<sup>25</sup>

In conclusion, it appears that neither food intolerance nor GERD causes the majority of cases of colic. Nor does either explain the peaking of colic at 6 weeks and its disappearance at 3 months (gastroesophageal reflux peaks at 4 months of age and lasts eight to 12 months<sup>26</sup>); the delayed onset of colic in premature babies; the worsening of colic in the evening; the benefit of rocking or shushing; or the absence of persistent crying in other cultures.

**Maternal anxiety.** In the past, researchers, including Brazelton,<sup>27</sup> have speculated that maternal anxiety was a cause of infant crying. Little evidence supports this claim. Paradise found that mothers of colicky babies are no more inherently anxious than other mothers.<sup>28</sup> In fact, it is usually colicky infants who cause maternal anxiety—not the

other way around.<sup>29</sup> Also, colic is as common in a couple's fifth baby as in their first.<sup>28</sup> This argues against anxiety playing a role in colic, because parents tend to be more anxious with their first baby than subsequent ones.

I have observed, however, that anxious mothers may make their baby's crying worse by impatiently jumping from one calming intervention to another without paying attention to their baby's response and acting in a contingent fashion.

***Difficult infant temperament.*** Researchers have evaluated colicky infants to see if they display a specific temperamental profile—intensity, poor adaptability, sensitivity. (This profile is similar to the behaviors typically associated with congenital hypertonia, a colic theory popular in the early 20th century.) Numerous studies have found the association with temperament to be small.<sup>30</sup>

***Brain immaturity.*** Newborns have immature brains that are incompletely myelinated, with a paucity of glial cells and synaptic connections. This immaturity is evident in the slow transmission of impulses from the retina to the occipital cortex during the first three months of life.<sup>31</sup> Newborns also have frequent tremors, irregular breathing, crossing of their eyes, and poor state control. (State control is the higher brain's ability to regulate awareness. It facilitates the smooth passage from sleep to wakefulness and vice versa, prolongation of desired states like sleep and quiet alertness, and a baby's unaided cessation of crying.)

Supporting the theory that brain immaturity is the cause of colic are the facts that fussy babies often have poor state control and their crying greatly diminishes after 3 to 4 months of age. This theory fails, however, to explain, first, why premature infants, who have very immature state control, do not experience colic until after their due date, and, second, the absence of colic in other cultures.

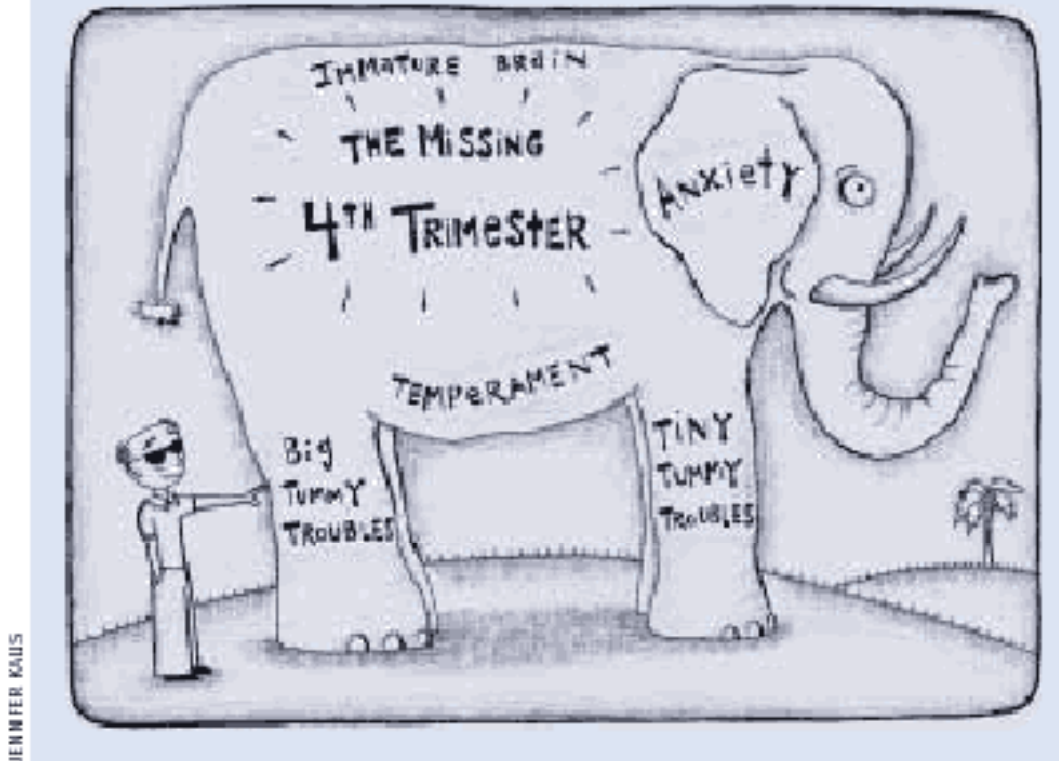
So, if none of the four modern theories of colic adequately explains this mysterious condition, what does?

### **The "missing fourth trimester"**

Like the parable of the blind men and the elephant, colic researchers have for too long focused on isolated parts of the problem without clearly seeing the whole (Figure 2). The four theories explain subgroups or aspects of colic; however, they overlook the root cause—something I call the missing fourth trimester. As odd as it may sound, our babies cry because in some important ways they are born three months too soon.

FIGURE 2

## Colic: Missing the big picture



Baby horses can run on their first day of life; they are truly ready to be born. By comparison, our newborns are very immature; more like fetuses than infants. Human fetuses must be born by 9 months' gestation because their brains are so big: The diameter of a dilated cervix is 10 cm, while the diameter of a full-term baby's head is more than 11 cm. It is not until after about three months that babies truly "wake up" and begin smiling, rolling over, sucking their fingers, and cooing.

The theory of the missing fourth trimester is compatible with all known characteristics of colic:

- ***Delayed onset in premature babies.*** The paucity of alert time in these babies may simulate life in the womb. It is not until two weeks post-term that babies enter a period of increased attention to the world.
- ***Symptoms suggestive of intestinal pain.*** These are probably an overreaction of an immature neurologic system to normal intestinal sensations (e.g., the gastrocolic reflex).
- ***Evening predominance of crying.*** This may be caused by a gradual accumulation of stress throughout the day in the absence of calming rhythmic stimulation.

- ***Calming effect of relaxing and shushing.*** These two things directly mimic the womb.
- ***Absence of colic in certain cultures.*** The parents in these cultures imitate the womb for the baby all day long with constant holding and rocking and frequent nursing.
- ***Cessation of colic after approximately three months.*** This fits perfectly with the theory of the missing fourth trimester.

Recreating the sensory milieu of the womb calms newborns not because they're nostalgic for the "good life" they had in the womb but because it triggers a profound soothing response—what I call the calming reflex—that halts crying and promotes relaxation.

Before birth, fetuses experience a continuous symphony of stimulation. They are snugly enveloped by the walls of the uterus, frequently jiggled, and surrounded by the constant whoosh of blood coursing through the placental arteries (a noise louder than a vacuum cleaner!). Although parents around the world intuitively mimic the rocking, holding, and shushing of the uterus, in our culture we are taught to whisper and tiptoe in the presence of newborns. We are taught that they need quiet and stillness. This, in my view, is absolutely incorrect. Of course, babies should be protected from chaotic overstimulation, but I believe that many more young infants in our culture suffer from *understimulation*.

At birth, babies are suddenly deprived of the rhythmic, entrancing sensations of the womb. Many newborns handle this abrupt transition without difficulty. However, in the absence of calming uterine rhythms, the irregular, if not jarring, ambient stimuli of their homes may overwhelm infants who have poor state control and provoke persistent crying.

### **The calming reflex**

The calming reflex is a previously unreported "primitive" reflex that, according to my observations and experience, is virtually an off switch for a young baby's crying. Why did this reflex first evolve? Was it needed to quiet crying so as to avoid attracting predators or frightening off prey? No. I believe the calming reflex evolved not to calm fussy babies, but to calm agitated fetuses.

During the last months of pregnancy, this response puts fetuses in a trance, keeping them motionless and head down. This lessens the chance they'll move around too much and accidentally get stuck in a position that would make vaginal delivery hazardous or impossible.

The calming reflex is actually a group of reflexes—tactile, vestibular, auditory, and, perhaps, others. Like all neonatal reflexes, they work quickly and almost irresistibly but require precise actions to trigger them. In my clinical experience, I have found that the

calming reflex can be activated by five maneuvers that mimic uterine sensations—I call them the five S's.<sup>32</sup> These techniques may take some practice, but, like riding a bicycle, are easy after a few attempts. (Advice for parents on the [five S's](#) appears below.)

**First S—Swaddling.** Swaddling, or snug wrapping, imitates the restrictiveness of the womb during the last two months of pregnancy. I recommend wrapping babies with their arms straight at their sides. Wrapping with flexed arms usually fails because the arms soon wiggle free. Swaddling is the cornerstone of calming. It lowers a baby's heart rate, decreases startling, and increases sleep.<sup>33,34</sup> Moreover, wrapped babies are much more responsive to the other four S's and stay soothed longer when their arms can't flail and disturb them.

Swaddling is the only "S" that does not directly turn on the calming reflex. In fact, many babies struggle even more for a minute or two when first swaddled with straight arms; that's probably because their biceps are hypertonic from their position in utero—we don't know with certainty.

Babies do not need to be swaddled all day long; however, fussy babies or infants who need to sleep more at night can greatly benefit from snug wrapping in a large square blanket 12 to 20 hours a day. Loose swaddling will actually make fussy babies more upset.<sup>35</sup> Tight swaddling may even lessen the risk of sudden infant death syndrome (SIDS) by keeping babies from accidentally rolling onto the stomach. It is recommended that parents avoid overheating or loose wraps (both risks for SIDS).<sup>36</sup> Also, parents should be advised never to swaddle a baby onto a board; this overextends the hip and may result in dysplasia of the femoral head.

For instructions and guidance for parents on swaddling correctly, see "[Swaddling 101](#)", and "[How to swaddle your baby](#)".

**Second S—Side or stomach position.** The back is the safest position for sleeping but the worst position for calming fussiness. Being supine triggers the very upsetting Moro reflex. In the womb, babies are in the fetal position getting constant ventral stimulation.

This "S" can be activated by putting a baby on her side, on her stomach (again, not for sleeping), or over an adult's shoulder. Some babies are so sensitive to position that, even on their side, they won't calm down if they are rolled the least bit toward their back.

**Third S—Shushing.** Most world cultures use a sound like "Shhh!" to tell someone to be quiet. Many languages even weave these sounds into their word for "be quiet." Examples are "hush" in English, "soos" in Armenian, and "shuu" in Vietnamese.

The "shhh" sound imitates the sound of blood flow that fetuses hear. It has been measured at 75 to 88 dB.<sup>37</sup> This white noise is approximated by harsh, loud sounds from hair driers (85 dB) and vacuum cleaners (75 dB).

The noise needs to be as loud as a baby is crying for it to trigger the calming reflex. Continued white noise (at levels up to 80 dB) can keep the reflex turned on and help babies stay soothed and asleep.

**Fourth S—Swinging.** A lot of movement occurs in the womb. (Imagine what it's like in there when a mother is walking down the stairs.) As anyone who has carried a baby in a sling or sat with one in a rocking chair knows, motion is soothing to a newborn. No wonder women often notice their fetuses get active when they go to bed. Slow motion, however, is usually ineffective at soothing babies who are upset. Turning on the calming reflex in a crying baby requires fast, low-amplitude movements of the head (to stimulate the vestibular apparatus). This motion is like a fine shimmy or shiver (my patients call this the "Jell-o head" jiggle). The head is supported so it moves with the body, and it goes back and forth only about an inch but very quickly—120 to 180 times a minute! This imitates the fetus's in utero experience and is completely different from the large amplitude, whiplash-like swings that cause shaken baby syndrome. Nonetheless, parents should be warned never to jiggle their baby when they're angry or frustrated.

Calming motion can also be delivered by a mechanical swing. The infant should be swaddled first, then belted into fully reclined seats and rocked at the fast speed. Swings work best to keep babies happy after they have been calmed.

**Fifth S—Sucking.** Non-nutritive sucking is the icing on the cake of calming. It duplicates a baby's finger sucking in utero. Sucking has a soothing and state-organizing effect on newborns. Babies can be calmed by having them suck on a breast, finger, or pacifier, but, to prevent nipple confusion, it's best to avoid pacifiers until breastfeeding has been going well for two to three weeks.

Some babies can be calmed mid-scream with sucking. It has been used to calm newborns after painful procedures, like blood tests.<sup>38</sup> For most babies, however, sucking is most effective once they begin to be soothed by other calming measures.

**Other modalities.** Other ways of calming the baby that imitate the womb include: massage, warm baths, skin-to-skin contact, pressure on the top of the head, and walks outside. (I believe walking outside gives babies a constant flow of entrancing sensations, including fresh air, background sounds, light, and walking movement, all of which mimic the womb.) As infants pass the "fourth trimester," the calming reflex does not disappear but it gradually becomes less reliable (a pattern typical of all "primitive" reflexes).

### **The "cuddle cure"**

The calming reflex is, in my experience, a highly predictable response to the five S's. Once swaddled, some babies are most helped by one of the other S's, such as shushing, being placed in the prone position, swinging, or sucking. Many colicky babies, however, need three to five S's done simultaneously and vigorously to activate the reflex. My patients call this approach the "cuddle cure."

Calming a colicky baby is like "dancing" with her. The parent starts with the baby's level of intensity and then, using the five S's, leads her down to a soft landing! The vigor of the intervention is important to get a baby's attention. Parents who calm their babies with car rides often say they need to jolt them by hitting every pothole and speed bump to keep them quiet. Others invent routines, such as playing loud music while bouncing on the bed. Vigor is also why fathers are often better at calming babies than mothers; they're willing to be a little more energetic with their wrapping, rocking, and shushing.

Some parents ask if imitating the uterus for hours a day will spoil their baby. I assure them that it will not. Before birth, babies receive stimulation in the womb 24 hours a day. So even holding and rocking a baby 12 hours a day is—from the baby's perspective—a 50% cutback. Gradually, after two or three months, parents find their babies need less of the rhythmic calming of the fourth trimester. They are ready for the world!

### **Success—the sixth S**

The concept of the missing fourth trimester offers clinicians a practical, new understanding of the needs of all babies. The calming reflex and five S's provide an effective remedy for all fussy infants that is simple, inexpensive, and, in my experience, even helps lessen crying in babies with reflux and milk intolerance. Additionally, this approach empowers parents and has the potential to improve breastfeeding, reduce marital stress, lessen depression, and prevent child abuse. I characterize my work as a common-sense compilation and organization of decades of infant research and two decades of personal observation. The five S's are being used by hospitals and health-care providers across the country. Recognizing the importance of validating my approach, controlled studies are being developed to test my hypothesis rigorously. (These studies may involve, for example, testing the response to my video vs. another baby video at birth by evaluating a daily cry/sleep diary, or using the video with patients identified as having colic or referred to a pediatric gastrointestinal specialist for evaluation of reflux.)

For infants who are not responding to the five S's, practitioners should consider other causes of crying. However, the leading reason that the five S's fail to calm a baby is that they are not being done precisely right. Parents need to be informed that it may take a few days of practice before they become proficient at turning on the calming reflex.

Crying is challenging, but, with this new approach, it does not have to be an aversive experience. In fact, parents who learn to soothe their babies feel successful and competent, and then the crying becomes part of a positively reinforcing cycle.

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**DR. KARP** is assistant professor of pediatrics, UCLA School of Medicine, Los Angeles, and is in private practice in Santa Monica, Calif. He is author of the book *The Happiest Baby on the Block* (Bantam Books), the subject of which is the basis for this article, and producer of a video of the same name.

## **The five S's**

### **Five steps for parents to turn on the calming reflex**

#### **Swaddling**

Tight swaddling is the cornerstone of calming. Swaddling also helps keep babies from accidentally flipping onto their stomach. Avoid overheating and loose blankets.

#### **Side or stomach position**

All babies should be put to sleep on their back.\* However, being on the side or stomach is best for calming the baby; it turns on the calming reflex and shuts off the Moro reflex. (The Moro reflex makes a baby's arms shoot out when he is startled by his own crying.)

#### **Shushing**

Loud, harsh, white noise mimics the noise of blood flowing through placental arteries when a fetus is in the womb. The louder a baby cries, the louder the shushing has to be to calm him.

### **Swinging**

Lying motionless deprives newborns of sensory stimulation. Swinging (rhythmic, jiggly movement) in rapid, tiny movements, like a shiver (two to three times a second), soothes agitated babies. Use slow, broad swinging to keep your baby soothed. Never shake a baby in anger.

### **Sucking**

Sucking triggers the calming reflex and deepens a baby's level of relaxation.

### **. . . and one V**

To stop a baby's cycle of crying, you must *meet his level of intensity*. Once the screaming diminishes for a few moments, you can gradually lessen the *vigor* of the calming maneuvers.

\*This recommendation is consistent with the American Academy of Pediatrics' statement on the prevention of sudden infant death syndrome (SIDS).

Source: Karp H32

## **GUIDE FOR PARENTS**

### **Swaddling 101**

*Remember—always put your baby to sleep on her back!*

#### ***When can I start swaddling?***

Babies can be swaddled as soon as they're born. It makes them feel cozy and warm, like they're "back home."

#### ***Do all babies need to be swaddled?***

Many calm babies do well with no swaddling at all. But the fussier your baby is, the more she'll need to be swaddled. Tight bundling is so successful at soothing infants that some babies even have to be *unswaddled* to wake them up for feedings.

#### ***Should the swaddling always be snug or are loose blankets okay?***

Never put your baby into bed with loose blankets. Make sure her swaddling is snugly wrapped around her so it doesn't loosen during the night. Loose blankets can get around a baby's face and contribute to sudden infant death syndrome (SIDS).

***How can I tell if my baby is overheated or overwrapped?***

Premature babies often need incubators to keep them toasty, but full-term babies just need a little clothing, a blanket, and a room that is between 65° and 70° F. If the temperature in your home is warmer than that, you can skip some clothing. In hot weather, you can wrap your baby naked in a light cotton blanket. (Parents living in warm climates often put cornstarch powder on their baby's skin to absorb sweat and prevent rashes.) Always check to see if your baby is overheated by feeling her ears and fingers. If she's hot, red, and sweaty, she's overwrapped. If she's only slightly warm and not sweaty, her temperature is probably perfect.

***How can I tell if I'm swaddling my baby too tightly?***

In traditional cultures, parents swaddle their babies tightly because loose wraps invariably pop open. Although some Americans worry about tight swaddling, most of the time bundling fails because it is done too loosely. For your peace of mind, here's an easy way for you to make sure your wrapping is not too tight. Slide your hand between the blanket and your baby's chest. It should feel as snug as your hand slid between your pregnant belly and the elastic waistband of your pants at the end of your ninth month.

***Can swaddling help a baby sleep?***

Yes! In fact, even babies who don't need wrapping to keep calm often sleep more when they're swaddled. Bundling keeps them from startling themselves awake. In my experience, swaddling plus white noise can add one to two hours to a baby's nighttime sleep.

***If a baby has never been swaddled, at what age is it too late to start?***

Even if you have never swaddled your baby before, swaddling may still help soothe her "fussies" during her first three months of life. But, be patient. You may have to wrap her a few times before she gets used to it. Try doing it when she's already sleepy and in her most receptive frame of mind.

***When is a baby too old to continue to be swaddled?***

The age for weaning off the wrapping varies from baby to baby. Many people think they should stop swaddling after a few weeks, when their baby starts resisting it. But, actually, this is when swaddling becomes the most valuable. To decide if your infant no longer needs to be wrapped, try this: After she reaches 2 to 3 months of age, swaddle her with one arm out. If she gets fussier, continue wrapping (with both arms in) for a few more weeks. However, if she still sleeps well with one arm out, she probably doesn't need

swaddling any more. Most babies are ready to be weaned off wrapping by 3 to 4 months of age, although some continue to need the wrapping to help them sleep up to 9 months of age.

***How many hours a day should a baby be wrapped?***

All babies need some time to stretch, bathe, and get a massage. But, you'll probably notice your baby is calmer if she's swaddled 12 to 20 hours a day, to start with. (Remember, as a fetus, she was snuggled 24 hours a day.) After one or two months, you can reduce wrap time according to how calm she is without it.

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