

## Basic Child Development



Understanding a baby's neurological development greatly enhances a mother's understanding of her baby's behaviors. Here we will focus mostly on the early weeks and months after birth when a postpartum doula is more likely to be supporting a baby's family.

Child development refers to biological, psychological, and emotional changes that a child exhibits through phases of early life. In general, these phases pass from complete dependency in the early months and years, to increased independence into adulthood. The five main areas of development as a child grows are physical, emotional, spiritual, intellectual, and social. The intellectual area for a young baby is the Sensorimotor Stage which is the time between birth and two years of age. During this time the baby experiences the world mostly through his sensory perceptions and motor skills. The development of these skills further his gross motor skills helping him to navigate his environment. Birth to two years of age are the most rapid periods of child development.

The baby in the womb is equipped with what we call neonatal reflexes or primitive attitudinal reflex postures which are global responses to movement. This means that any movement of the baby exhibits a total body response that is predictable. These should be fully present at birth and then they are gradually inhibited by higher centers in the brain by the first three to twelve months after birth. These reflexes are involuntary and necessary for survival.

By full gestation, the baby's neurological system is well developed in terms of oral needs, because newborn babies need to be experts in suckling and breastfeeding as means of survival. Other primitive reflexes present related to oral needs include sucking, swallowing, blinking, peeing, hiccupping, rooting, and defecating.

However, the rest of the baby's body is still governed by other primitive reflex postures at birth and into the early months at home. These reflexes are utilized by the baby to turn and move through the mother's pelvis. They are gradually inhibited and integrated into functional movements over the first months of life. Here are some primitive reflexes you may observe in your postpartum doula work.

## Reflexes

A reflex is an automatic, involuntary response to stimulus. Reflexes that are specific to newborns were essential for their survival at one time and are still present at birth from primitive programming, helping the baby to turn and rotate through the pelvis to be born, and then assisting the adaptation to life outside the womb. It is these reflexes that are active during self-attachment when a baby crawls up his mother's abdomen to find the life giving nipple.

The nervous system of a newborn is still developing after birth and a number of primitive reflexes will be present not yet integrated into his body. They are integrated over the course of the first months or year of life. The reflex response can provide a clue as to the baby's maturity and overall health, as well as being a way for the baby to communicate. Remnants of labor medications in a newborn's system can and do blunt some of these instinctive reflexes, to some degree. Some of the more fascinating newborn reflexes are listed below:

- **ATNR - Asymmetrical Tonic Neck Reflex:** You can elicit the ATNR in the newborn by turning the baby's head to one side and watching the arm and leg on that side extend or straighten and the arm and leg on the other side flex or bend. Turn the baby's head to the other side and watch the opposite occur - the arm on that side will extend and the opposite arm will flex. This reflex is inhibited and integrated by six months of age. If not, further developmental milestones will be compromised.
- **STNR - Symmetrical Tonic Neck Reflex:** This reflex is initiated with movement of the head. When the baby's head is extended, both arms straighten and both legs bending. When the baby's head is flexed with chin towards the chest, the both arms will straighten and both legs will bend. This reflex is inhibited and integrated by six months of age to enable crawling.
- **Startle or Moro Reflex:** The startle or Moro reflex occurs most often if the baby is on his back and feels as though he is falling, is surprised, or hears a loud noise. He will fling his arms and legs outward and then inward, as though he were trying to grasp onto something to keep from falling. His fingers will curl into a "c" shape. He may cry out, grimace and/or reflexively bite down. This is a good example of a protective reflex that enabled primitive attachment behaviors. This reflex is inhibited and disappears in three to six months after birth. The absence of this reflex is an ominous sign of underlying neurological damage.

- **Rooting Response:** The rooting response is seen when the baby turns his head toward the stimulus, opening his mouth when touched or stroked on the corner of his mouth or cheek. A mother can elicit this response in a baby to encourage nursing. Rooting is rarely seen in a baby who is awake by the age of four months, but may still be present in a sleeping baby up to seven months of age.
- **Suck, Swallow, Gag Reflexes:** Most mothers are surprised how forceful and strongly the baby can tug on her finger when placed in her baby's mouth. The sucking is rhythmic and is coordinated with swallowing. The sucking reflex can be elicited by simply stroking the baby's lips, especially when he is awake and alert. Touching the tip of the baby's tongue will cause him to stick his tongue out in anticipation. Stimulating the roof of the baby's mouth will entice him to stick his tongue out even farther and begin sucking. However, stimulation on the back of the baby's throat will cause the baby to thrust his tongue forward and downward and lower his jaw to push the object out (the gag reflex). The gag reflex allows a baby to rid himself of excess mucous in his airways after birth and protects him from choking on anything for the rest of his life. Suck and swallow reflexes allow the baby to drink milk from their mothers' breasts. They are inhibited and integrated by the third to fourth months.
- **Prone Crawling Reflex:** When the baby is placed on his stomach, with his head in midline and his arms alongside his body, he may spontaneously move his arms and feet in a crawling motion. He can be encouraged to crawl by stimulating the soles of his feet. The crawling reflex allows a baby to self-attach to his mother's nipple, but is usually inhibited and integrated by three to four months of age.
- **Positive Supporting Reflex also known as the Stepping or Walking reflex:** If the baby's feet are placed firmly on the surface and he is tilted forward a little, the stepping or walking reflex will be stimulated and the baby will first lift one foot, and then the other. The stepping or walking reflex lasts for about six weeks.
- **Standing Reflex:** When held under the arms, some babies will extend their legs and appear to be able to hold their own weight. This is called the standing reflex.
- **Palmar Grasp or Grasping Reflex:** When a new mother places her finger in her new baby's palm and feels him grip tightly, she will often exclaim "Look how strong he is!" This is the Palmar or Grasping Reflex. This reflex is inhibited and integrated by the ninth to tenth months.
- **Plantar Grasp:** The plantar grasp occurs when pressing a finger on the balls of the baby's feet, causing his toes to curl. These reflexes diminish after a couple of months and are usually gone by six months of age.

## Neonatal reflexes

(Table by GGS Information Services.)

Reflex	Stimulation	Response	Duration
<b>SOURCE :</b> Table after Child Development, 6th ed. Wm. C. Brown Communications, Inc., 1994.			
Babinski	Sole of foot stroked	Fans out toes and twists foot in	Disappears at nine months to a year
Blinking	Flash of light or puff of air	Closes eyes	Permanent
Grasping	Palms touched	Grasps tightly	Weakens at three months; disappears at a year
Moro	Sudden move; loud noise	Startles; throws out arms and legs and then pulls them toward body	Disappears at three to four months
Rooting	Cheek stroked or side of mouth touched	Turns toward source, opens mouth and sucks	Disappears at three to four months
Stepping	Infant held upright with feet touching ground	Moves feet as if to walk	Disappears at three to four months
Sucking	Mouth touched by object	Sucks on object	Disappears at three to four months
Swimming	Placed face down in water	Makes coordinated swimming movements	Disappears at six to seven months
Tonic neck	Placed on back	Makes fists and turns head to the right	Disappears at two months

Read more: <http://www.healthofchildren.com/N-O/Neonatal-Reflexes.html#ixzz5BoT4T3JK>

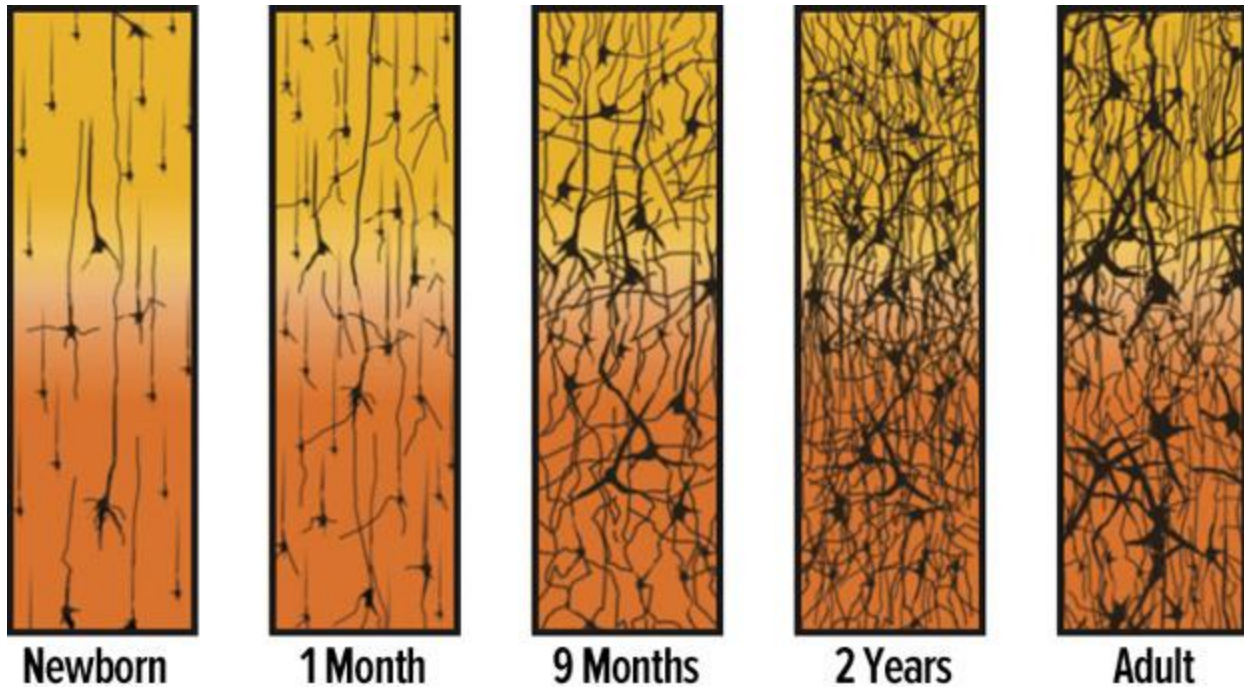
## **Brain Development**

At the time of birth for a baby at normal gestation, the brain is the most rapidly growing part of his body. In fact, this is why ACOG (American College of Obstetrics and Gynecology) has issued guidelines that inductions not be performed before 39 weeks gestation so the baby can grow in his mother's womb as long as possible.

At birth, a baby has almost all of the neurons he will ever have in life and they are growing rapidly producing more than a million neural connections each second. Between birth and three years of age, the baby/child's stimulation from his environment, experiences, and relationships greatly influence this development. The greater the sensory stimulations, the greater the brain development. In fact, the synapses between the neurons are two times greater than in adulthood. By age three they will have reached nearly 80% of adult volume.<sup>1,2,3</sup>

Experiences are key to brain development because they both determine what information enters his brain and influences how his brain processes the information. This is why the ages of 0-3 are often discussed as the crucial years of child development and ones that will determine all future endeavors and his personality. These are the years to protect children and help them feel safe and happy.

Just playing with a newborn baby and into the first months of life, we can see that babies delight in sensory stimulation and we delight in their reaction to it, wanting to give more and more. The diagram below shows synapse density - how the number of synaptic connections increases greatly in the first two years of life. In adulthood surplus synaptic connections are gradually eliminated depending again on life experiences, relationships, and the environment – a process called blooming and pruning.<sup>4</sup> Repeated use strengthens synapses. If the amount of input increases, synapses in that part of the brain will grow more.



Synapse Density Over Time <sup>5</sup>

Though genes play a role in brain development, it is the brain's ability to shape itself that helps us to adapt more quickly and be more responsive to outside stimuli. Another way to say this is that genes provide the blueprint for the brain, but it is the child's environment and experiences carry out the construction.

**Here is a brief outline of early brain development from conception to age three:**

Brain development begins within the first few weeks of conception.

In this time, the neural tube begins to form with a layer of specialized cells folding over onto itself forming a tube shaped structure. It continues closing and eventually forms the brain and spinal cord.<sup>6,7</sup>

At about seven weeks the first neurons and synapses begin to develop in the spinal cord. The embryo is now able to make its first movements which provides sensory input and further spurs brain development.<sup>8</sup>

In the second trimester folds in the brain begin to appear and synapse formation is beginning.<sup>9</sup>

Myelination begins to form on axons of the neurons for the purpose of increasing speed of processing information.

In the third trimester, more complex brain activity is carried out such as fetal breathing and more regular responses to external stimuli. Early learning is now possible in the cerebral cortex.<sup>10,11</sup>

In the first year of life the complexity of development increases exponentially. At birth they can recognize their mother's voice and discriminate between happy and sad expressions. The rapid development of motor skills causes the cerebellum to triple in size, and sight develops into full binocular vision.<sup>12,13</sup>

By about three months, rapid growth of brain structures such as the hippocampus and language circuits occur allowing the baby to recognize a foreign language in the home and improve her power of recognition.<sup>14,15</sup>

### **Importance of Early Experiences**

It has been known for many years that the earliest experiences a baby has, the greater is the impact on her brain. As a postpartum doula, you play an important role helping to provide some of these experiences and educating the parents about the importance of sensory stimuli and positive early experiences. Children are very vulnerable to persistent negative experiences during this time. These include being left to cry for long periods of time, unsuccessfully having their needs met, and even hearing tones of voice in the home where there may be arguing and fighting. It may be frustrating to new parents about how much constant attention their baby needs. Emphasize that investing in this time now with their baby is well worth it and will likely result in a more secure, well adjusted, and happy adult. It is a window of opportunity with great impact.

Recommend that parents read "Zero to Five: Essential Parenting Tips Based on Science by Tracy Cutchlow. (Pear Press, Seattle, WA. 2014) for an excellent and easy to read guide for parenting children.

### **Sleep**

Babies in the womb are asleep most of the time, even when their mother feels them kicking and hiccupping. In fact the fetus is more active while asleep than we are which explains why pregnant women can feel kicking anytime. In the first weeks at home after birth, they are still sleeping most of the time but are just beginning to oscillate between wakefulness and sleep. They also show copious rapid eye movements which are symbolic of dreaming.

Immediately after birth there are only two sleep stages, REM (active) and non-REM sleep (quiet) sleep. Set patterns of sleeping and waking in newborns are typically absent or very weak.<sup>16</sup> In the early weeks, parents have to adapt their sleeping cycles to their baby's irregular sleep. A postpartum doula can provide much support by caring for the baby while the mother catnaps. It

is at about the 17<sup>th</sup> week since birth that a baby will begin to wake and sleep about the same time each day. Before the 17<sup>th</sup> week, research shows this is not the case.<sup>17</sup> Attempts to institute regular patterns of sleep and being awake are bound to be unsuccessful as the baby's biological clocks seem to need to mature more before they can keep track of the time of day.

By the end of the first year, an infant still sleeps 14-15 hours a day. They usually need two daytime naps and their sleep periods have shifted to the night and waking periods to the day. By about 18 months they are usually taking only one nap. By two years of age, they sleep 50 percent of the time and by ages two to five, then no longer need a nap in the day. Their daily sleep measures about 10 hours until they reach puberty. In very old age, patterns of sleep return to the fragmented patterns throughout the day and night – as when they were newborns. In this way, we can understand the importance and power of sleep from the moments of birth.

## **Childhood Development Stimuli**

### ***Encourage breastfeeding.***

Breast milk is essential for the baby's neural development as it has ingredients that the baby's brain needs, but can't make on its own very well. Taurine in the breastmilk, is an amino acid that is essential for neural development. Breast milk is also high in omega-3 fatty acids that increases cognition.<sup>18</sup>

### ***Talk Your Thoughts***

Know that a baby hears all the sounds around the environment. Encourage parents to speak to their babies as much as they can as this is known to raise their IQ's "Babies who were talked to by their parents had IQ scores 1 ½ times higher than those kids whose parents talked to them the least."<sup>19</sup> Talking thoughts sounds like "Oh, you need a diaper change? Let's get up and go get that diaper. You can look up at the beautiful mobile while I change your diaper and then I can give you a loving massage. Oh, I can see how much you like this!"

The way we say our words stimulates the baby. Parentese is a language that is characterized by high pitched tones and a sing-song voice with long vowels. It is known to help a baby's brain learn. This "language" makes vowels more distinct and the melodic tone helps the baby to separate out sounds into contrasting categories. The high pitched sounds help them to imitate our speech. The "Parentese" language can begin even before the baby is born as they can hear sounds before birth, and then from the moment of birth onwards. There is overwhelming evidence that a lot of talking is like fertilizer for neurons.

Mirror neurons enable the baby to imitate what he sees around him. They are scattered across the brain and help us to understand first hand an action that is observed. In newborns, this can be observed when a mom sticks out her tongue and watches her very young baby try to do the same.



Studies have shown that there is not one gene for temperament, but we also know that it is possible to create a stressed baby when the mother is stressed and producing stress hormones. This is another value of a postpartum doula. Helping the mother to get sleep and relax will likely have a direct effect on her baby's temperament, calming him, and this will deepen their bonding when both are happy. There is a long-term consequence noted in how attentive mothers are with their babies. If bonding is limited and the baby feels insecure from an early age, it has been found that long-term these children are not as happy.

### **Mother/Baby Skin-to-Skin Contact**

The brain is the most important part of a new baby and encouraging as much skin-to-skin contact of a mother and father with their new baby is one of the most important things you can do as a postpartum doula. This skin-to-skin contact actually wires their baby's brain and creates more circuits. It also helps the baby to feel safe. This is more important than most people realize. Feeling safe with skin-to-skin contact helps the baby's body to find stability which sets healthy set points for her heart rate, blood pressure, and oxygen saturation. Then later when the baby is stressed, she will be able to cope better and self-regulate. Separation of the baby from his mother makes him feel unsafe and can be considered a violation of an innate fetal agenda. He may go into a mode of protest and despair and feel insecure. This baby may look inwards and struggle to cope emotionally, and will avoid eye contact.<sup>20</sup>

As a postpartum doula, praise the parents for the vital and wonderful job they are doing in raising their child. This can bring joy to the entire family.

Read more about caring for a premie and also about the neuroscience of Mother/baby skin-to—skin in “Hold Your Premie,” by Jill and Nils Bergman. Kangaroo mother care is skin-to-skin contact of a newborn baby on the parents' chest. It is essential for the premature baby's healthy development. The book summarizes key information on skin-to-skin contact and breastfeeding, essential care that only parents can provide!! It covers everything from the technology of the NICU, to supporting parents' emotional coping.

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## **Application & Understanding**

1. Pick three of the attitudinal reflex postures of special interest to you, that you might see in a normal baby in the first weeks of life outside the womb. Describe each of them. Are they advantageous or disadvantageous to the baby's overall development?
2. What are the most rapid years of a baby's brain development?
3. What are two of the most important developments in a baby's brain during the first year of life?
4. What are some dangers on brain development of allowing a baby to "cry it out" during the first year of life?
5. According to research, how many weeks after birth is a baby able to regulate his/her sleep patterns? How might this be useful information for a new mother and father?
6. What is Taurine? Where is it found? How is it important to the baby?
7. Describe Parantese language and its effect on the baby's brain?

8. Name five things you can do as a postpartum doula to keep the mother from feeling stressed?
9. Name three ways in which skin-to-skin contact helps a baby to develop a healthy mind, body, and spirit.
10. Describe the meaning of violating an innate fetal agenda and its impact on a newborn baby.