

# Early Childhood Brain Development

## **Why should caregivers know about brain development?**

The brain is the part of the body that allows us to feel joy or despair, to respond to others in a loving or angry way, to use reason or to simply react. These capacities don't just magically appear – They result from the interplay between a child's heredity and the experiences they have during childhood.

At birth, the brain is unfinished. The parts of the brain that handle thinking and remembering, as well as emotional and social behavior, are underdeveloped. The fact that the brain matures in the world, rather than the womb, means young children are deeply affected by their early experiences. Their relationships with parents and other important caregivers don't just influence their moods, but actually affect the way children's brains become "wired." Researchers now confirm that the way infants are interacted with and the experiences provided for them have a major impact on the child's emotional development, learning skills and how they function later in life.

## **How does the brain form "connections"?**

At birth, the brain contains about 100 BILLION brain cells that are yet to be connected into functioning networks. By the time a child is three, the brain has formed about one thousand trillion connections between these brain cells. Some of these connections become permanent, while others disappear as the child grows. How does the brain know which connections to keep? Connections that are used repeatedly during the child's early years become the foundation for the brain's organization and function throughout life. In contrast, a connection that is not used results in a lack of development or even the disappearance of these connections. For example, a child who is rarely spoken to or read to in the early years may have difficulty mastering language skills later on. By the same token, a child who is rarely played with may have difficulty with social adjustment as he or she grows.

## **Principles of Brain Development**

- The outside world shapes the brain's wiring.
- The outside world is experienced through the senses – seeing, hearing, smelling, touching, and tasting – enabling the brain to create or modify connections.
- The brain operates on a "use it or lose it" principle.
- Relationships with other people early in life are the major source of development of the emotional and social parts of the brain.

## **What should be done to encourage appropriate brain development?**

As a mother feeds her child, she gazes lovingly into his eyes. A father talks gently to his newborn daughter as he changes her diaper. A caregiver sings a child to sleep. These are the everyday moments, the simple, loving encounters that provide essential emotional nourishment.

Touching, rocking, talking, smiling, and singing all effect brain development. Babies experience relationships through their senses. They read the way you look into their eyes, they see the expressions on our face, they hear you cooing, singing, talking and reading, they feel you holding or rocking them, and they take in your familiar smells. Touch is especially important – holding and stroking stimulates the brain to release important hormones necessary for growth.

### **1. Be warm, loving, and responsive.**

Children who receive warm and responsive caregiving and are securely attached to their caregivers cope with difficult times more easily when they are older. They are more curious, get along better with other children, and perform better in school than children who are less securely attached.

Infants communicate their needs, preferences, and moods to the adults who care for them by the sounds they make, the way they move, their facial expressions and the way they make (or avoid) eye contact. Children become securely attached when caregivers try to read these signals and respond with sensitivity. They begin to trust that when they smile, someone will smile back. That when they are upset, someone will comfort them, and that when they are hungry, someone will feed them.

You might think that a newborn might get spoiled with all this attention, but studies show that newborns who are more quickly and warmly responded to when crying typically learn to cry much less and sleep more at night. A baby expresses his distress by crying. When the caregiver responds with food, warmth, or comfort, the baby tends to be calmed. The stress response systems in the brain are turned off and the infant's brain begins to create networks of brain cells that help the baby soothe himself.

### **2. Talk, read, and sing to the child.**

Infants learn from “conversations” even when they cannot understand what you are saying. When babies hear the same words over and over, the parts of the brain that handle speech and language develop. The time used to change a diaper or feed an infant can be an opportunity to spend some individual time with that child, talking, singing and expanding on their own coos and gurgles.

Read picture books and stories to infants. By 6 months, infants show excitement by widening their eyes and moving their arms and legs when looking at a book with pictures of babies or other familiar objects.

### **3. Establish routines.**

Daily routines associated with pleasurable feelings are reassuring for children. Repeated positive experiences provide for a sense of security. It helps a child learn what to expect from his environment and how to understand the world around him.

### **4. Encourage safe exploration and play.**

Play is an important learning experience. Look around the environment you are providing for infants. Make sure there are enough interesting things for them to look at – not too many, but that there are things for the infant to focus on one at a time. Put infants on the floor in safe areas that encourage them to move about. Keep things in containers that the infant can dump and fill. Adults should encourage exploration, and then also be receptive when the child needs to return to them for security.

If there is a suspected delay in development of a child, contact your administrator, the child's parents and refer the family to local resources such as Early Childhood Intervention.

**By providing consistent and responsive caregiving, you can ensure that a child will have the best opportunity for healthy emotional and social development.**

*Every caregiver has the potential to help shape a young child's future.*



# Shaken Baby Syndrome

## ● What is Shaken Baby Syndrome?

When a baby is vigorously shaken, the head moves back and forth. This sudden whiplash motion can cause bleeding inside the head and increased pressure on the brain, causing the brain to pull apart and resulting in injury to the baby. This is known as Shaken Baby Syndrome, and is one of the leading forms of fatal child abuse. A baby's head and neck are susceptible to head trauma because his or her muscles are not fully developed and the brain tissue is exceptionally fragile. Head trauma is the leading cause of disability among abused infants and children.

Shaken Baby Syndrome occurs most frequently in infants younger than six months old, yet can occur up to the age of three. Often there are no obvious outward signs if inside injury, particularly in the head or behind the eyes. In reality, shaking a baby, if only for a few seconds, can injure the baby for life. These injuries can include brain swelling and damage; cerebral palsy; mental retardation; developmental delays; blindness; hearing loss; paralysis and death. When a child is shaken in anger and frustration, the force is multiplied five or ten times more than it would be if the child had simply tripped and fallen.

## ● How does it happen?

Often frustrated parents or other persons responsible for a child's care feel that shaking a baby is a harmless way to make a child stop crying. The number one reason a baby is shaken is because of inconsolable crying. 25 percent of all babies with Shaken Baby Syndrome die. It is estimated that 25-50 percent of parents and caretakers aren't aware of the effects of shaking a baby.

## ● What can you do to prevent a tragedy?

If you or someone else shakes a baby, either accidentally or on purpose, call 911 or take the child to the emergency room immediately. Bleeding inside the brain can be treated. Immediate medical attention will save your baby many future problems...and possibly the baby's life.

Other Suggestions for Parents			
Never throw or shake a baby	Always provide support for the baby's head and neck	Place the baby in a crib, leave the room for a few minutes	Sit down, close your eyes and count to 20
Take the baby for a stroller ride	Play music, or sing to the baby	Ask a friend to "take over" for a while	Don't pick the baby up until you feel calm
Make sure the baby is fed, burped and dry	Gently rock or walk the baby	Check for discomfort of diaper rash, teething or fever	Call the doctor if you think the baby is sick
Make sure clothing is not too tight	Give the baby a pacifier	Offer a noisy toy or rattle	Hug and cuddle the baby gently

# Physical Consequences of Shaking an Infant or Toddler

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## What Happens:

- The brain rotates within the skull cavity, injuring or destroying brain tissue.
- When shaking occurs, blood vessels feeding the brain can be torn, leading to bleeding around the brain.
- Blood pools within the skull, sometimes creating more pressure within the skull and possibly causing additional brain damage.
- Retinal (back of the eye) bleeding is very common

### Immediate Consequences:

- Breathing may stop or be compromised
- Extreme irritability
- Seizures
- Limp arms and legs or rigidity/posturing
- Decreased level of consciousness
- Vomiting; poor feeding
- Inability to suck or swallow
- Heart may stop
- Death

### Long-Term Consequences:

- Learning disabilities
- Physical disabilities
- Visual disabilities or blindness
- Hearing impairment
- Speech disabilities
- Cerebral Palsy
- Seizures
- Behavior disorders
- Cognitive impairment
- Death

## Why:

- Babies' heads are relatively large and heavy, making up about 25% of their total body weight. Their neck muscles are too weak to support such a disproportionately large head.
- Babies' brains are immature and more easily injured by shaking.
- Babies' blood vessels around the brain are more susceptible to tearing than older children or adults.

## When:

- Often, perpetrators shake an infant or child out of frustration or anger. This most often occurs when the baby won't stop crying. Other triggering events include toilet training difficulties and feeding problems.

# Sudden Infant Death Syndrome

## What is SIDS?

Sudden Infant Death Syndrome (SIDS) is the diagnosis given for the sudden death of an infant, birth to one year of age that remains unexplained after a complete investigation. The investigation includes an autopsy, examination of the death scene, a review of the symptoms or illness the infant had prior to the death, and any other pertinent medical history. Caregivers report hearing no signs of struggle before finding an infant unresponsive. Because most cases of SIDS occur when the baby is sleeping in a crib, SIDS may also be known as crib death. The event may occur wherever the infant is sleeping, not necessarily the crib.

SIDS can occur anytime between birth and one year of age, however, 91 % of the deaths occur before the age of 6 months, with the highest concentration between 2 and 4 months. There is an increase incidence in the winter months. It is more common with male children than female. Last year, there were 2,250 deaths from SIDS in the United States. SIDS happens suddenly and silently and in seemingly healthy infants. The death leaves many unanswered questions, causing intense grief for parents and families.

## SIDS is not:

SIDS is not hereditary, contagious, caused by immunizations, choking, suffocation, or apnea. It is not child abuse and not the reason for all unexpected infant deaths.

## What are the risk factors?

- Mother less than 20 years old at the time of her first pregnancy
- Late or no prenatal care
- Premature or low birth weight infant
- Mother smoked during pregnancy (increases risk by three times)
- Smoking in environment after birth (increases risk by two times)
- Mother abused alcohol or drugs during pregnancy
- Infants who are placed to sleep on stomach

## To reduce the risk of SIDS:

- Place infants on their back for sleep. This includes naps. Do not place infants on their stomach to sleep.
- Place baby on a firm tight-fitting mattress in a crib that meets current safety standards.
- Do not place baby on waterbed, sofa, beanbag, soft mattress, foam padding or pillow to sleep
- Use no soft bedding, pillows, sheepskins, stuffed toys or other soft items in the crib.
- Make sure the baby's head remains uncovered during sleep.
- Avoid overheating the baby. The temperature in the room should feel comfortable to an adult. Overdressing the baby should be avoided.
- Keep the baby in a smoke-free environment.
- Breast-feed the baby. Breast-feeding has not been shown to decrease the incidence of SIDS, however it does decrease the incidence of some respiratory infections, which may influence the development of SIDS.
- Give the baby a pacifier when sleeping.

A national “Back to Sleep” campaign was launched by the American Academy of Pediatrics in 1994 to promote placing babies to sleep on their backs, instead of their stomachs. This was based on numerous reports that babies who sleep on their stomachs had increased the likelihood of dying of SIDS. Infants sleeping on their backs have drastically decreased the incidence of SIDS. The U.S. Consumer Product Safety Commission has also warned against soft bedding in the child’s sleeping environment. These soft surfaces may allow a pocket to form around the baby’s face and the air inside the pocket could become exhausted of oxygen.

### **What causes SIDS?**

Most scientists now believe that babies who die of SIDS are born with one or more conditions that make them especially vulnerable to the internal and external stresses that occur in the life of any infant. Currently, many researchers argue that the clue to finding the cause(s) of SIDS lies in a further understanding of the development and functions of the brain and nervous system of SIDS infants.

### **SIDS Deaths in Child Care Settings**

20.4 percent of SIDS deaths occur in a day care setting. Although media and mailings have been largely effective in communicating Back to Sleep information to many child care centers, nonprone positioning and other risk reduction measures are not universally practiced among child care providers.

Over the past 9 years, the Back to Sleep campaign has been extremely effective in helping reduce the number of SIDS deaths. American Academy of Pediatrics cautions, however, that while continuing to emphasize the "importance of infant positioning for sleep as an effective modifiable risk factor for SIDS," it is also important to "focus increased attention on other modifiable environmental factors, to describe complications that may have arisen from modifying risk factors, and to make recommendations about other strategies that may be effective for further reducing the risk of SIDS".

#### **Tips for Caregivers:**

A certain amount of tummy time while the infant is awake and being observed is recommended for motor development of the shoulder. In addition, awake time on the stomach may help prevent flat spots from developing on the back of the baby’s head. Such physical signs are almost always temporary and will disappear after the baby begins to sit up.

If a parent of an infant in childcare is breast-feeding, encourage them to provide bottled breast milk that is clearly labeled with the child’s name for feeding while in childcare.

Check the infant’s sleeping environment frequently to assure sheets are tightly fitted and soft bedding or objects are not in the crib.

If a child in your care is not breathing and is unresponsive: Call 911. Begin CPR and immediately notify the child’s parents.

If a child in your care dies: Do not disturb the scene of death – do not remove anything, if possible. Contact your back-up childcare person to tend to the other children. Be prepared to talk with law enforcement officers, licensing, and other persons that may be involved in the investigation.