

Shaken Baby Syndrome: A Comprehensive Review of Manifestation, Diagnosis, Management and Prevention

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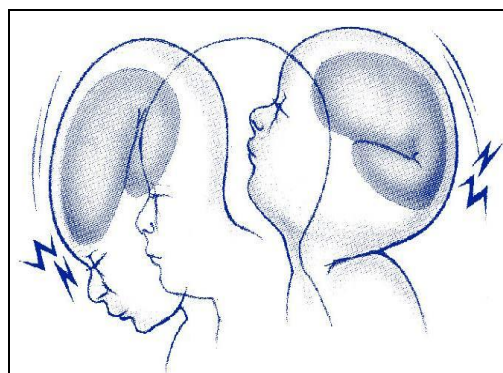
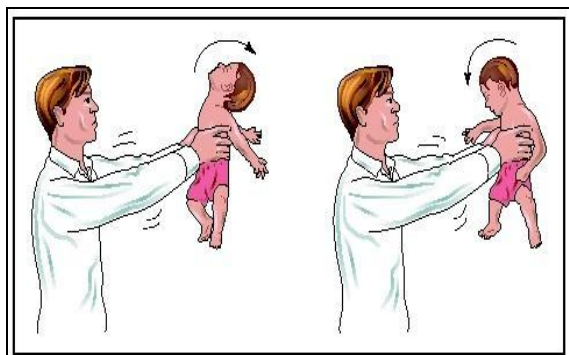
Abstract : Shaken baby syndrome (SBS) is the most common cause of death or serious neurological injury resulting in lifelong disability among infant and young child (< 5 years of age) .SBS is preventable. This article outlines the comprehensive review of manifestation, diagnosis, management and prevention.

Keywords: Shaken baby syndrome, diagnosis, prevention

I. Introduction

Shaken Baby Syndrome is a form of child abuse. **SBS is not just a crime—it is a public health issue.** SBS resulting in head injury is a foremost cause of child abuse death in the United States. A British neurosurgeon, Guthkelch first described shaking as the cause of subdural hemorrhage in infants. Nearly all victims of SBS suffer serious health consequences and at least one of every four babies who are violently shaken dies from this form of child ill-management¹

Shaken baby syndrome is defined as vigorous manual shaking of an infant who is being held by the extremities or shoulders, leading to whiplash-induced intracranial and intraocular bleeding with no external signs of head trauma. Shaken baby syndrome should be suspected in infants with a wide spectrum of clinical signs and symptoms. The classic findings of SBS are retinal hemorrhages, usually bilateral, and intracranial injury. One third of the victims of SBS survive with few or no sequelae, one third suffer permanent injury, and one third die. Parental behaviors, environmental factors, and child characteristics all may contribute to a shaking event². Common triggers are frustration or stress when the child is crying. Unfortunately, the shaking may have the desired effect, although at first the baby cries more, he or she may stop crying as the brain is damaged.



Approximately 60% of identified victims of shaking injury are male, and children of families who live at or below the poverty level are at an increased risk for these injuries as well as any type of child abuse. It is estimated that the perpetrators in 65% to 90% of cases are males — usually either the baby's father. Normal interaction with a child, like bouncing the baby on a knee, will not cause these injuries. It's important to never shake a baby under any circumstances.³

II. Definition

Shaken baby syndrome — also known as abusive head trauma, shaken impact syndrome, inflicted head injury, Battered Child Syndrome, Shaking Injury, Whiplash-shaking injury or whiplash shake syndrome — is a serious brain injury resulting from forcefully shaking an infant or toddler. Shaken baby syndrome destroys a child's brain cells and prevents his or her brain from getting enough oxygen. Shaken baby syndrome is a form of child abuse that can result in permanent brain damage or death.

III. Causes

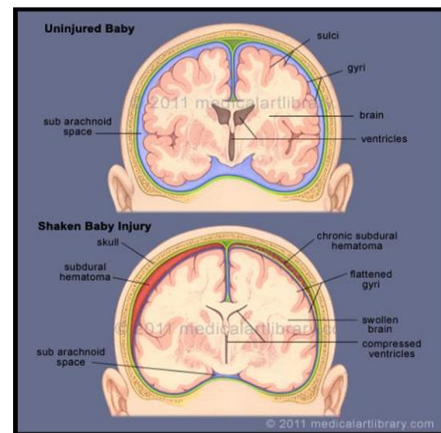
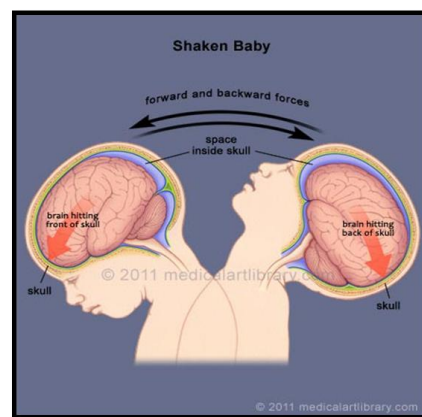
Shaking or throwing a child
Slamming a child against an object
Causes uncomfortable forward, backward and twisting head movement
Brain tissue, blood vessels & nerves tear

a. Reason for getting injured

Heavy large heads
Weak neck muscles that do not hold up the head well
Delicate blood vessels in their brain

III. Symptoms

It varies according to age, how often they are abused, how long they were abused, how long they are abused each time & how much force was used.



Babies suffering lesser damage from SBS may exhibit some of the following: ^{4,5}

- Change in sleeping pattern or inability to be awakened
- Vomiting
- Convulsions or seizures
- Irritability
- Uncontrollable crying
- Inability to be consoled
- Inability to nurse or eat

In more severe cases of SBS, babies may exhibit the following: ^{6,7}

- Unresponsiveness
- Loss of consciousness
- Breathing problems (irregular breathing or not breathing)
- No pulse

Potential consequence of Shaken Baby Syndrome

SBS often causes irreversible damage. In the worst cases, children die due to their injuries. Children who survive may have:

- partial or total blindness
- hearing loss
- seizures
- developmental delays
- impaired intellect
- Severe motor dysfunction (muscle weakness or paralysis)
- speech and learning difficulties
- problems with memory and attention
- severe mental retardation

- cerebral palsy
- Spasticity (a condition in which certain muscles are continuously contracted—this contraction causes stiffness or tightness of the muscles and may interfere with movement, speech, and manner of walking)

Even in milder cases, in which babies look normal immediately after the shaking, they may eventually develop one or more of these problems. Sometimes the first sign of a problem isn't noticed until the child enters the school system and exhibits behavioral problems or learning difficulties. But by that time, it's more difficult to link these problems to a shaking incident from several years before.⁸

IV. Diagnosis

Many cases of SBS are brought in for medical care as "silent injuries." Health care providers may be alerted to a possible sbs injury by *any* of the following:

Any infant or young child who presents with a history that is not plausible or consistent with the presenting signs and symptoms, The presence of a new adult partner in the home, a history of delay in seeking medical attention, a previous history or suspicion of abuse, The absence of a primary caregiver at the onset of injury or illness, Physical evidence of multiple injuries at varying stages of healing, or Unexplained changes in neurologic status, unexplained shock, and/or cardiovascular collapse. There are a number of diagnostic tools that health care providers can use to assess the possibility of SBS in injured babies. In addition to a thorough history and physical exam, including ophthalmologic examination, physicians may use computerized tomography, magnetic resonance imaging, skeletal surveys, and other medical tests to diagnose SBS.⁹

If shaken baby syndrome *is* suspected, doctors may look for:

- Hemorrhages in the retinas of the eyes
- Skull fractures, Swelling of the brain & Subdural hematomas (blood collections pressing on the surface of the brain)
- Rib and long bone (bones in the arms and legs) fractures
- Bruises around the head, neck, or chest
- Review child's previous history
- Physical examination and blood tests
- X-ray, CT-scan, MRI
- Lumbar puncture to check the spinal fluid for signs of meningitis

V. Management

- Hospitalization
- Admitted in ICU for close monitoring
- Oxygen therapy may be given to help the child breathe
- Medications are given to help ease brain swelling
- Cooling mattress to help reduce body temperature & reduce temperature too
- Depending on the severity of injury and bleeding child may require a surgery.
- Symptomatic management like seizure medicine.
- Physical therapy can be given
- Counseling for both parents and children.
- Long term problems of Shaken Baby syndrome.
- Brain and vision problems remain forever.
- Seizures which are sudden bursts of abnormal electrical activity in the brain.
- Muscle stiffness (spasticity) that results in stiff awkward movements.
- Intellectual disabilities like learning to talk or being able to care for him/her in the future.
- Blindness or trouble seeing.
- Physical or emotional growth delays.
- Learning or behavioral problems that may not appear until child starts schooling.

VI. The Child's Development and Education

What makes SBS so devastating is that it often involves a total brain injury. For example, a child whose vision is severely impaired won't be able to learn through observation, which decreases the child's overall ability to learn.

The development of language, vision, balance, and motor coordination, all of which occur to varying degrees after birth, are particularly likely to be affected in any child who has SBS. Such impairment can require intensive physical and occupational therapy to help the child acquire skills that would have developed on their own had the brain injury not occurred.

As they get older, kids who were shaken as babies may require special education and continued therapy to help with language development and daily living skills, such as dressing themselves.

Before age 3, a child can receive speech or physical therapy through the Department of Public Health/ Early Intervention. Federal law requires that each state provide these services for children who have developmental disabilities as a result of being abused. Some schools are also increasingly providing information and developmental assessments for kids under the age of 3. Parents can turn to a variety of rehabilitation and other therapists for early intervention services for children after abusive head trauma. Developmental assessments can assist in improving education outcomes as well as the overall well-being of the child. After a child who's been diagnosed with abusive head trauma turns 3, it's the school district's responsibility to provide any needed additional special educational services.^{10, 11}

VII. Prevention Tips

- Never shake a baby.
- Never slap or hit a baby of any age on the face or head.
- Learn about normal child development and behaviors so that your expectations are realistic.
- Learn stress relief and other healthy coping strategies.
- Screen your potential child care providers to find out their child care skills and abilities.
- Take a break when you are feeling overwhelmed.¹²

Abusive head trauma *is* 100% preventable. A key aspect of prevention is increasing awareness of the potential dangers of shaking.¹³

Finding ways to alleviate the parent or caregiver's stress at the critical moments when a baby is crying can significantly reduce the risk to the child. Some hospital-based programs have helped new parents identify and prevent shaking injuries and understand how to respond when infants cry.

The National Center on Shaken Baby Syndrome offers a prevention program, the **Period of Purple Crying**, which seeks to help parents and other caregivers understand crying in normal infants. By defining and describing the sometimes inconsolable infant crying that can sometimes cause stress, anger, and frustration in parents and caregivers, the program hopes to educate and empower people to prevent SBS.¹⁴

Another method that may help is author Dr. Harvey Karp's "five S's":

1. **Shushing** (using "white noise" or rhythmic sounds that mimic the constant whirl of noise in the womb, with things like vacuum cleaners, hair dryers, clothes dryers, a running tub, or a white noise CD)
2. **Side/stomach positioning** (placing the baby on the left side — to help digestion — or on the belly while holding him or her, then putting the sleeping baby in the crib or bassinet on his or her back)
3. **Sucking** (letting the baby breastfeed or bottle-feed, or giving the baby a pacifier or finger to suck on)
4. **Swaddling** (wrapping the baby up snugly in a blanket to help him or her feel more secure)
5. **Swinging gently** (rocking in a chair, using an infant swing, or taking a car ride to help duplicate the constant motion the baby felt in the womb).¹⁵

If a baby in your care won't stop crying, also try the following:

- Make sure the baby's basic needs are met (for example, he or she isn't hungry and doesn't need to be changed).
- Check for signs of illness, like fever or swollen gums.
- Rock or walk with the baby.
- Sing or talk to the baby.
- Offer the baby a pacifier or a noisy toy.
- Take the baby for a ride in a stroller or strapped into a child safety seat in the car.
- Hold the baby close against your body and breathe calmly and slowly.
- Call a friend or relative for support or to take care of the baby while you take a break.
- If nothing else works, put the baby on his or her back in the crib, close the door, and check on the baby in 10 minutes.

- Call your doctor if nothing seems to be helping your infant, in case there is a medical reason for the fussiness.

To prevent potential SBS, parents and caregivers of infants need to learn how to respond to their own stress. It's important to talk to *anyone* caring for your baby about the dangers of shaking and how it can be prevented.¹⁶

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