



F33 Shaken Baby Syndrome: Current Evidence of a Pathological Entity

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After attending this presentation, attendees will recognize recent studies and publications on the proposed mechanism of sudden death associated with the Shaken Baby Syndrome (SBS). The presentation will discuss enhanced dissection techniques for the identification and documentation of neck injuries in suspicious infant deaths.

This presentation will impact the forensic science community by providing documentation of fatal neck injuries in infants suspected of abuse. It will provide insight into the injuries critical in explaining deaths due to SBS.

For the past 30 years, physicians have diagnosed SBS on the basis of the triad of subdural hematoma, retinal hemorrhages, and brain swelling. It is estimated that more than 1,000 infants are diagnosed with SBS in the United States each year. The entity was initially described by Caffey and others as unexplained subdural hemorrhage in infants without observable trauma or impact. Unable to demonstrate an acceptable mechanism of death in cases due to shaking, proponents have argued that the presence of associated trauma to the chest and ribs, lack of scalp impact, along with studies of post-conviction confessions supports shaking as a mechanism of injury.¹

Critics of the existence of SBS point to research using primates and inanimate models that show shaking alone provided insufficient biomechanical force to cause the formation of subdural hemorrhage as well as questioning the veracity of confessions. Defense experts routinely site incidental short-distance falls, resuscitation efforts, or rare medical problems as the cause of the subdural and retinal hemorrhage. Legal experts decry the lack of evidenced-based medicine and argue that until the mechanism of death in SBS is detected, it does not exist.

In 2008, the Wisconsin Court of Appeals supported a request for a new trial for Audrey Edmunds who had been convicted in the death of a 7-month-old child ten years earlier. During the testimony, the original pathologist volunteered that he could no longer support his prior testimony. Following the testimony of numerous experts, the court ruled for a new trial in that “a shift in mainstream medical opinion” had undermined the diagnosis of SBS.²

In 2011, Evan Matshes, a forensic pathologist, published a paper describing an enhanced dissection technique of the cervical spine of infants suspected of abuse. Using a matched control group, Matshes demonstrated the presence of hemorrhage in spinal nerve roots, especially in those responsible for respiration and heart rate. This study confirmed the findings of other forensic pathologists with similar cases. The findings of cervical spinal trauma is an acceptable mechanism to explain death in SBS.³

In addition to Matshes, forensic pathologists in the New York City Office of the Medical Examiner have confirmed other published studies, the presence of subdural hemorrhages, subarachnoid hemorrhage, and optic nerve hemorrhages and brain swelling without evidence of head impact after a thorough postmortem examination. In their study, 10/46 (22%) of infant homicide cases lacked an impact site. Of these, 29% demonstrated spinal nerve hemorrhage. It is argued that whiplash shaking without impact is the cause of death in a subset of infant homicides.⁴

In light of new techniques in the examination of an injured child, prosecutors, judges, and medical experts should evaluate all the existing evidence when deciding whether a child has been fatally shaken, especially when there is no other clinical context to explain what is otherwise a fatal head injury.

References:

1. John Caffey, “The Whiplash Shaken Infant Syndrome: Manual Shaking by the Extremities with Whip-lash Induced Intracranial and Intraocular Bleeding Linked to Residual Permanent Brain Damage and Mental Retardation,” *Pediatrics* 1974, 54, 4: 396-403.
2. *State v. Edmunds*, 598 N.W. 2d 290, 293 (WSI CT App 1999)
3. Evan Mashers, et al., “Shaken Infants Die of Neck Trauma, Not Brain Trauma,” *Acad For Path* 2011 1 (1): 82-91.
4. James Gill, et al., “Fatal Head Injury in Children Younger Than 2 Years in New York City and an Overview of the Shaken Baby Syndrome,” *Arch Path Lab Med*, 2009, 133:619-627.

Shaken Baby Syndrome, Abusive Head Injury, Child Abuse