

# “Shaken Baby Syndrome”: Do Confessions by Alleged Perpetrators Validate the Concept?

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Jan E. Leestma, M.D., M.M.

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## ABSTRACT

The concept that a certain constellation of findings develops immediately after a baby is shaken, with no impact to the head, is based solely on confessions or admissions by alleged perpetrators. The reliability of confessions in the setting of interrogation by law-enforcement officials is questionable. A review of the literature reveals very few cases of admissions of “pure” shaking. Methodologic flaws preclude any definitive conclusions about causation from these cases.

## The Origins of the “Shaken Baby Syndrome”

The “shaken baby syndrome” (SBS) is embedded in the collective minds of the public, law enforcement, prosecuting attorneys, child-protection personnel, and physicians.

The concept was largely derived from the papers of Caffey,<sup>1,5</sup> a radiologist specializing in pediatric cases. He had for years suggested that the multiple limb fractures he observed in babies were the result of abuse. It was not until Kempe and his associates at the University of Colorado Medical Center in Denver published their seminal article in 1962<sup>6</sup> that the theories of Caffey and others began to gain acceptance.

A sensational case of a child-care nurse who admitted to shaking and killing three babies in her care attracted Caffey’s<sup>5</sup> attention, and he apparently thought that her admission explained what he had been seeing for years but had been unable to explain. Caffey now theorized that multiple fractures of the lower extremities and other bones as well as subdural hemorrhages in apparently abused babies were caused by the flailing legs and a head flopping back and forth with shaking. This mechanism, without any scientific evidence to support it, made intuitive sense to him and others,<sup>7,8</sup> and thus was born “whiplash-shaking” and later the “shaken baby” syndrome.

SBS has been embraced by the American Academy of Pediatrics<sup>9</sup> and other organizations. They support the concept that manual shaking of a baby causes a “constellation” of rapidly evolving processes (subdural hemorrhages, retinal hemorrhages, brain swelling, metaphyseal long-bone fractures, respiratory failure, and often death) in the apparent absence of signs of external injury, and that these things collectively cannot occur in any other context than abuse.

Conservatively, more than 100 case reports and small series in support of Caffey’s theories have appeared in the literature from the

early 1970s to 2001. A number of them provided perpetrator admissions of shaking that seemed to validate the concept of shaking as a cause of the syndrome. However, a literature that challenges the mechanism of injury, the components of SBS, and even the existence of the syndrome itself has also developed. These challenges are in the form of biomechanical analyses,<sup>10-4</sup> criticism of case-analysis methodology,<sup>15</sup> analysis of admissions of alleged perpetrators,<sup>16</sup> and a consideration of alternate explanations.<sup>1a-1</sup> It is safe to say that there is a deep divide between proponents of the SBS and its critics.

## A Review of the “Confessional” Literature

Several recent studies have attempted to correlate “confessions” of perpetrators with injuries typically found in cases deemed to be SBS. These studies have been regarded by many as strong support for the theory of SBS.<sup>2,2</sup> Of prime concern in these papers, however, is the basic issue of the value of a supposed confession in determining a mechanism for injury.

With any confession or admission, there is the issue of veracity. Accused individuals are well known to fabricate historical information, augment certain aspects of what they might have done, say what they think an interrogator wants to hear, or omit important facts, presumably to give a better impression than might otherwise be the case.<sup>2,4,25</sup>

Furthermore, though it is difficult to fathom why, accused individuals may confess to things they didn’t do. The issue of duress in its many forms in such cases is a valid one.<sup>2</sup> One scenario in alleged SBS cases is that an interrogator (policeman, child-abuse professional, or child-protection professional) may employ subterfuge to secure an admission of shaking. Deceit is not uncommon, as when the interrogator may communicate to the accused that “if you could tell us exactly what happened and if you shook the baby, we could do something for the baby and maybe save its life.” There are, of course, no specific treatments in such cases other than those already being given to the baby, and this type of suggestion is disingenuous at best.

There may be other instances in which the results of interrogations and supposed statements by an accused are not what the accused said at all. Thus it is virtually impossible to determine what in an admission or confession is true and complete, false, fabricated, or tainted. To base an injury causation study on such information does not meet the accepted standards of analysis or interpretation because of insoluble issues of bias. This does not say that admissions/confessions are useless, only that validity and helpfulness depend on the context and the use being made of the information.

In a recent report of Biron and Shelton,<sup>2</sup> the authors concluded that shaking alone can produce serious neurological impairment or death. They based their study on 52 cases collected in Queensland, Australia, over a 10-year period (1993-2003). The population analyzed was defined as those children under the age of 2 years who were judged to be homicides or assaults. A team of child-protection personnel, pediatricians, welfare, and law-enforcement professionals evaluated the cases. Transcripts and tape-recorded interviews with witnesses and perpetrators were reviewed, as were autopsy reports when they were available.

The authors classified those babies as having been injured by “shake-only” by the presence of subdural and/or subarachnoid hemorrhage, retinal hemorrhages, and absence of medical (skull or scalp) injury or witness evidence of impact. The remaining cases were classified as “impact only,” as determined by skull or scalp injury, perpetrator or witness evidence of an impact without associated shaking, and the absence of retinal hemorrhages. “Shake-impact” cases were identified if they had combinations of the above. Cases with insufficient evidence were called “indeterminate.” Twenty of 52 babies died.

The authors concluded that of the 52 cases, 13 were “shaken-only” (five deaths), 3 had head “impact only” (one death), and 25 had evidence of both “shaking and impact” (ten deaths), with 11 cases judged “indeterminate” as to cause (four deaths). In five of the 13 “shaken-only” cases recorded, perpetrator confessions were obtained; these five cases and two more were presented in detail.

The authors cited a number of papers that have questioned, from various perspectives including biomechanics, the validity of the concept of SBS but appear not to have been sufficiently impressed to take these criticisms to heart before making their conclusions. The authors did not cite an important paper by Donohoe,<sup>1,5</sup> which discussed in detail methodological issues in studies like theirs and basically concluded that the existing literature on SBS does not meet sufficiently rigorous standards to conclude that shaking alone causes intracranial injury.

The Biron and Shelton paper<sup>2</sup> has many serious flaws that include selection bias, observer bias, lack of controls, failure to evaluate causal possibilities beyond shaking, and circular reasoning, to name a few. The assertion that retinal hemorrhages are a discriminator for shaking has been challenged in the literature for years, as have other selection criteria.<sup>1,3,14,16,21</sup>

The paper is little different from most of the literature based on case series that try to support the concepts of SBS in that the principles and methods of science were not adhered to and the data presented do not justify the conclusions reached.<sup>27,28</sup> These same problems apply to most of the literature that makes use of confessions as a justification that shaking alone causes intracranial injuries.<sup>23</sup>

Another recent case analysis,<sup>1,6</sup> encompassing more than 30 years of published case reports of presumably abused babies, approached the admissions issue from another perspective. Plunkett found 54 instances, in 324 cases with individual case data, of an admission by someone that he had shaken the injured baby in some fashion. In the 270 remaining cases, no record of any admission was reported.

The study found that the reported information in admissions varied widely in the amount of precise information provided and in the context of the shaking: for example, attempts to revive, shaking after a violent event such as strangulation/smothering or throwing the baby to the floor had occurred, and incidental shaking or bouncing during play. It was found that in 11 cases shaking had apparently occurred without evidence of impact. In 12 cases, only shaking was admitted, but head impact was found nonetheless. In 18 cases, admissions of shaking were documented, but there was no information, pro or con, about head impact injury, so these cases could not be analyzed.

An additional 13 cases, those of Hadley et al.,<sup>9</sup> in which admissions of shaking may have occurred, were not included in the analysis because of ambiguous statements in the article regarding what constituted an admission of shaking, or even whether it occurred at all.

It is significant that in the 11 shaken and possibly not head-impacted babies, all but three survived, thus one cannot be sure that no head impact had occurred in the eight survivors. In the three who died, apparently none had head impacts at autopsy. Thus, these may be the only cases that might qualify as “pure” and might have sustained their injuries by shaking alone. It should be obvious that with a case population this small, few robust conclusions about causality can be reached.

### Time of Onset of Symptoms and Signs

A common theme that emerges from the “confessional” literature<sup>2,21</sup> is the alleged immediacy of the appearance of symptoms after a reported shaking episode as reported by the perpetrator. A common allegation of some child-abuse experts is that all or virtually all shaken babies become ill immediately after having been shaken.<sup>9,3</sup> Therefore, the individual present when the child decompensates is responsible. The published case literature does not support this contention.

In the Leestma study,<sup>1,6</sup> of the 11 babies who might qualify as “pure” shaken babies only four had information about a possible interval between shaking and the appearance of symptoms. None of these babies showed immediate symptoms and were reported to have developed symptoms a day or more after shaking. Considering all 54 admitted shaken babies, only 12 case reports gave information about the time of onset of the symptoms. Only two cases showed immediate symptoms, and all the rest showed delays from hours to days or longer after the supposed shaking episode. One should bear in mind that most of these babies had impact injuries to the head. Even in this circumstance, where an obvious head impact occurred, symptoms did not always appear immediately. Others have also reported these observations.<sup>3,1,3,2</sup>

### Differential Diagnosis

It should be apparent that from virtually every perspective many flaws exist in the theory that shaking is causative. No case studies have ever been undertaken to probe even a partial list of

possible confounding variables/phenomena, such as the presence of intracranial cysts or fluid collections, hydrocephalus, congenital and inherited diseases, infection, coagulation disorders and venous thrombosis, recent immunizations, medications, birth-related brain injuries, or recent or remote head trauma. Until and unless these and probably many more factors are evaluated, it is inappropriate to select one mechanism only and ignore the rest of the potential causes.

## Conclusions

The confessions or admissions of a perpetrator are at best tenuous support for the shaking mechanism for infantile head injury. A critical appraisal of any literature that proposes a causal mechanism of shaking for brain injury must include an evaluation of case selection methodology, population or sample size, possible case control issues, data analysis methods, and whether the conclusions reached are justified by the data presented.<sup>2 8</sup>

Another vital issue, often overlooked, is a critical evaluation of literature cited. Unless the reader is very well informed on the issues and is intimately familiar with the literature, this component of an informed appraisal of an article almost never gets done, and the reader may accept the conclusions uncritically.

**Jan E. Leestma, M.D., M.M.**, is board certified in anatomic and neuropathology, and is a consultant in neuropathology at Children's Memorial Hospital of Northwestern University Medical Center, Chicago.

**Potential Conflict of Interest:** Dr. Leestma has been engaged to provide expert testimony in various criminal and civil cases, including some involving alleged SBS. Contact: jleestma@aol.com.

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