



Exploring the controversy in child abuse pediatrics and false accusations of abuse



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ABSTRACT

There is a controversy in child abuse pediatrics between an established corps of child abuse pediatricians aligned with hospital colleagues and law enforcement, and a multi-specialty challenger group of doctors and other medical professionals working with public interest lawyers. The latter group questions the scientific validity of the core beliefs of child abuse pediatricians and believes that there are a substantial number of false accusations of abuse occurring. An unproven primary hypothesis, crafted around 1975 by a small group of pediatricians with an interest in child abuse, lies at the foundation of child abuse pediatrics. With no scientific study, it was hypothesized that subdural hemorrhage (SDH) and retinal hemorrhage (RH) were diagnostic of shaking abuse. That hypothesis became the so-called “shaken baby syndrome.” Through the period 1975–1985, in a coordinated manner, these child abuse specialists coalesced under the American Academy of Pediatrics and began working with district attorneys and social workers, informing them of the ways in which their hypothesis could be applied to prosecutions of child abuse and life-altering social service interventions. In a legal context, using then-prevailing evidentiary rules which treated scientific expert testimony as valid if it was “generally accepted” in the field, they represented falsely that there was general acceptance of their hypothesis and therefore it was valid science. As the ability to convict based on this unproven prime hypothesis (SDH and RH equals abuse) increased, some defense attorneys were professionally compelled by their own doubts to reach out to experts from other fields with experience with SDH and RH, trauma, and biomechanics, for second opinions. Medical and legal challenges to the established thinking soon emerged, based on both old and new evidenced-based literature. As the intensity of the controversy increased, the probability of false accusation became more apparent and the need to address the issue more pressing. Since false accusations of child abuse are themselves abusive, efforts to eliminate such false accusations must continue.

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1. Background

There is a controversy in child abuse pediatrics. A relatively small corps of physicians (about 350 board certified child abuse pediatricians) stands in opposition to a challenger group (numbering about 120). These two groups together comprise the medical professionals at the core of the academic disagreements discussed herein. Together they represent the very small number of professionals most familiar with the relevant literature concerning child abuse who are qualified to offer commentary on these issues.

In the United States, around 1975 modern child abuse pediatrics developed around a small group of self-selected pediatricians who had an interest in child abuse and a desire to cultivate this area of pediatrics into a specialty. This group assumed, based on no independent scientific study, that the presence of subdural hemorrhage (SDH) was a diagnostic sign of abusive shaking of a child, commonly called the shaken baby syndrome (SBS). As the number of work-ups for child abuse based on the presence of SDH increased, the common association of SDH and small hemorrhages in the retina, retinal hemorrhage (RH), was noted in the eyes in the patients diagnosed as having been abusively shaken. These RH, an almost constant co-finding with SDH, then generated a second unproven hypothesis: vitreous traction. At that time and since, the child abuse pediatricians chose to disregard existing scientific literature [1–5], some of which dated back to 1900, which accounted for RH in the context of SDH based on increased pressure within the skull known to impact the retinal capillaries, termed “Terson’s Syndrome.” Instead, the new hypothesis posited that shaking produces traction on the retina by the jelly of eye (the vitreous) resulting in torn sub-retinal capillaries that formed small discreet hemorrhages. Vitreous traction was never tested with any scientific methodology and was never proven in animal models. Episodes of repeated forceful abusive shaking caught on nanny-cams, with immediate examination thereafter, had no RH or SDH [6]. Although unproven, this second purported diagnostic finding of shaking abuse was added to SDH, and RH was included in their prime hypothesis: SDH and RH in combination as diagnostic of shaking abuse/SBS.

In spite of the fact that the prime hypothesis had never been scientifically tested, and was never true, it quickly gained traction with prosecutors. The conviction rate in the first decade of its use was >94% [7]; when evidence was presented, with apparent certainty, by authority figures to police, social workers, judges, and/or juries, it was easy to convict caregivers of SBS. With such success (and a lack of defense experts versed in the issues), a powerful wave swept over the country under the rubric of protecting children. The pace of accusing and convicting, using the prime hypothesis, increased. Furthermore, the child abuse community began to tout, completely unscientifically, that the ability to convict in court provided validation of the SBS hypothesis. Within the legal system, this argument worked.

To under-informed or uninformed professionals, the media, and the public, the prime hypothesis and SBS became accepted based, not on science, but by who was promoting it. As prominent authority figures already anointed with titles and powerful positions in academic institutions, child abuse pediatricians were able, unchallenged, to say that SDH and RH was diagnostic of SBS/child abuse and that the presence of these findings proved that “abuse and

only abuse” was the etiology of the findings. Their ideas were accepted on blind faith in the institutions that supported them and their credentials. The child abuse pediatricians soon found a collegial and warm welcome among police, prosecutors, and the social service system, and a marked increase in stature and power within the legal community and over almost all of their medical colleagues, who in key specialties (ophthalmology and radiology), for unknown reasons, became like-minded in their acceptance of the prime hypothesis. These colleagues appear to have done so without any scientifically valid research within their own fields. They accepted the prime hypothesis in much the same way as others, on unwarranted blind faith in the American Academy of Pediatrics (AAP) and their own child abuse colleagues. Efforts to export the American approach to diagnosing and prosecuting child abuse have been successful in England, but have met resistance in other countries who favor more rigorous scientific standards (discussed below).

To be clear, real child abuse and false accusations of child abuse are completely separate medically and have little to do with each other from any legitimate forensic perspective. Those working in the field or in emergency departments see real child abuse and its tragic consequences. Real child abuse is not the issue. Focusing on the increasing number of false accusations of abuse and decreasing and eliminating them is the purpose of this article.

2. Clinical and pathological observations

2.1. Subdural hemorrhage (SDH)

SDH is bleeding around the brain from physical or metabolic damage to the capillary layer of the outer covering of the brain: the dura. SDH has been known since the beginning of medicine to have many different etiologies. In modern times, birth-related trauma and complications, central nervous system (CNS) infections [8], and accidents are the most common causes of SDH [9]. Other more rare problems surfaced from time to time as well [10]. In 1975 however, it was decided, again without any basis, that other causes of SDH such as those mentioned above could be disregarded or dismissed without a meaningful differential diagnosis or work-up, in favor of the newly crafted prime hypothesis. The child abuse pediatricians promoted in a forensic framework that SDH and RH, in the absence of major trauma (commonly referred to by the child abuse pediatricians as equivalent of a 40 mph car crash or a two-story fall), could **only** be caused by human shaking and are therefore diagnostic of shaking abuse/SBS. As noted above, this hypothesis was never tested, and both then and now exceeds the limits of science. It remains unproven by any valid scientific methodology and, in fact, is believed to be false by many informed professionals; some willing to speak up and others, not.

2.2. Retinal hemorrhage (RH)

What was known (and disregarded) in 1975 was that SDH (one of many causes of increased pressure in the head), predictably causes RH when a threshold degree of increased pressure is present. In the restricted space of the head of babies, or any patient with SDH, the blood and inflammation associated with SDH causes

increased intracranial pressure (ICP). It was later established that increased ICP raised intraocular pressure as well [11]. This occurs via hydraulic transmission of pressure via the fluid around the brain (the cerebrospinal fluid) throughout the CNS and down the optic nerve sheath; the sheath being a contiguous extension of the dura around the brain. When the pressures reach levels higher than the low baseline intravascular pressures in the veins and capillaries of the CNS (brain, spine and eyes) the capillaries are compressed due to the increased external pressure being greater than the intra-capillary pressure. Under these conditions, flow through the capillaries and low pressure veins decreases or can stop.

It is this lack of oxygen from the decreased flow through the capillary beds that results in damaged capillaries in the eye, brain, and dura [3]; under these conditions the single-cell-layer-thin capillary walls break down and leak, causing hemorrhages. The severity of the oxygen deprivation, as noted in cases studies regarding ophthalmologic forensic pathology [12], determines the extent and volume of the hemorrhage and anatomic disruption; not the degree of shaking.

3. Early child abuse pediatrics

In about 1975, the first child abuse specialists began an impassioned effort to establish the prime hypothesis as diagnostic of abuse. They sought to establish a field of child abuse pediatrics based almost exclusively on the prime hypothesis and to establish the legal bona fides of the core crafters of the prime hypothesis. This group of self-designated child abuse “specialists” convinced the AAP to set up the Committee on Child Abuse and Neglect (COCAN) with themselves as key members of that committee.

The child abuse pediatrician became the linchpin in a successful child abuse prosecution; in so doing they took on the conflicting roles of health care provider, investigator, medical expert, accuser, key prosecution witness, promoter of the prime hypothesis, and defender of their own past medical decision making regarding abuse. Without their testimony regarding the prime hypothesis there could be no convictions. When caregivers provided other etiologies of the finding, which undermined the prime hypothesis, they would state or imply that these individuals were liars [13].

In a short time, they added new, also flawed ideas. Examples are: the notion that short falls cannot cause serious injuries; something known to not be true [see below]. Or abusive shaking jostles limbs to causes long bone proximal and distal, chip and bucket handle fractures: something that is biomechanically implausible, clinically and pathologically inconsistent with real fractures, and disregards that these findings are conventional vitamin D deficiency/infantile rickets findings, an evolving epidemic in the newborn population [10]. The new ideas, actually new unproven hypotheses, were equally likely to be accepted by legal professionals eager to improve conviction rates. This is exactly what happened.

As the number of cases of SDH and RH, more correctly referred to as retino-subdural hemorrhage of infancy [14], increased for reasons that would not be known for 30 years (discussed below), the number of accused caregivers increased as well. As these flawed principles spread among children’s hospitals from the core group to other like-minded pediatricians, the number of self-proclaimed child abuse specialists also increased. The hypothesis gained a pseudo-scientific patina, and when delivered by authoritative figures in a continuing education paradigm, became regarded as unquestioned medical teaching. The prime hypothesis was advanced in large scale conferences, primarily directed at law enforcement and social services, with thousands of participants. The general body of medicine had no specific knowledge of the pathophysiology of child abuse, or of the findings in the context of child abuse. Many of the other doctors in that era, and even

now, in spite of having seen SDH and RH in their practices in other contexts for their entire careers, were averse to participating in the legal system and readily deferred to the newly minted child abuse “specialists.”

4. Forensic issues

For about the first ten years (1975–1985), the child abuse pediatricians effectively operated under the medical radar, outside of the body of medicine, and subject to no independent scrutiny; the ability to get convictions was honed into an effective child abuse prosecution system. The momentum and cloak of moral authority generated in that period still hinders meaningful evaluation of the prime hypothesis, advocated by many as appropriate, that could be done under the auspices of established and objective scientific bodies, to resolve the crisis of false accusations.

Soon, adjunct entities within law enforcement and lay people (all equally incapable of evaluating the validity of what they were being told about SDH, RH and SBS by the child abuse authorities), assisted in building what is effectively a massive child abuse “establishment.” Because each participant in child abuse prosecution is inherently invested in past decisions based on the prime hypothesis, diligent efforts have been made to maintain the status quo of the last 40 years. With thousands of individuals in jail based on testimony grounded on the prime hypothesis, a conflict of interest of monumental magnitude exists. Failure to integrate new science allows the perpetuation of false accusations based on allegiance to the status quo, which now account for a very high percentage of all contested prosecutions of abuse. It also allows for the avoidance of dealing with the legal and psychological impact of tens of thousands of misdiagnoses of abuse by the establishment child abuse pediatricians over four decades.

5. The challengers

Through the 1980s, as the number of cases increased and the convictions mounted, the improbability of abuse by many of those accused became more apparent to the attorneys defending them. Some of these defendants, seemingly decent, loving caregivers, did not fit the profile of abusers by any stretch of the imagination. In this context, the defense attorneys, unlike their district attorney (DA) counterparts, became more suspicious of the allegations leveled against their clients, and began to search for second opinions from specialists, in other relevant fields, who had experience with the findings used in the prime hypothesis.

Meaningful challenges to the core principle of child abuse pediatrics began in 1985 with biomechanical challenges. Shaking forces could be measured: forces in accidental household falls, a common cause of SDH and RH, were also studied. Household falls/accidents were a common history given by caregivers presenting with babies that had retino-subdural hemorrhage of infancy, and these histories were being dismissed out of hand by the establishment doctors, in favor of abuse, without biomechanical analysis. For the first time objective data from physics demonstrated that the prime hypothesis was likely invalid.

5.1. Lack of objective evidence and presumptions of guilt

In essentially every case of shaking abuse, there are consistently no outside objective witnesses to any abuse or other events related to the abuse. The caregiver is assumed by the child abuse pediatricians to (1) have “snapped” under the speculative stress of common child care occurrences (often with zero evidence of prior such behavior), (2) then shook the baby in an abusive way, and (3) in the absence of a confession, was declared, or inferred to be,

a liar who was concocting a story to try to cover acts of abuse [13,15].

In spite of no real evidence of “snapping” occurring among experienced or loving caregivers in the social science literature, and in spite of studies showing how improbable it is [16], the concept of snapping and shaking, integral to almost all accusations of child abuse, continued to go unquestioned by authorities, even those who normally demonstrated better informed investigative instincts (e.g. the police). Social histories of defendants who were exemplary for love and caring were considered irrelevant; “anyone can snap” was the rationale. The probability of a previously loving caregiver snapping, however, was well under 1 in 10,000; a probability from a legal or medical perspective, without objective witness evidence, which must be regarded as essentially zero. When witnesses were present during the speculative acts of abuse and reported they saw no abuse, their observations were dismissed as well, and they too were directly or indirectly accused of lying and conspiracy to conceal abuse. In cases where falls were witnessed, the child abuse specialists invented and promoted the notion of the virtual absolute insufficiency of witnessed household falls to cause serious injury [13,17]. They pronounced that only 40 mph car crashes and 2 story falls could cause SDH and RH, an astonishingly incorrect statement [18,19].

Such words and the concepts, distributed through the AAP more like talking points rather than proven science (since they were false), emerged to publicly discredit any history of a household accidental falls or other more probable causes as the etiology of the prime findings (SDH and RH).

The child abuse pediatricians have convinced the authorities that they, the child abuse specialists, should just be believed and charges filed. The legal system, under these circumstances, becomes the tool converting a child abuse pediatrician’s beliefs into convictions.

5.2. Studies disproving SBS

As old new and old research was being brought forward by the challengers to the establishment showing the insufficiency of shaking to cause retino-subdural hemorrhage in infancy, the crafters of the original theory, instead of evaluating the new research, doubled down on their past thinking. They took an aggressive and decidedly non-scientific defensive posture to any challenges to the prime hypothesis. Their out of hand dismissal of short falls and accidents as an etiology raised doubts; biomechanical analysis of short falls and head impacts had begun.

When the biomechanics became involved, the first scientific testing was done. The biomechanics already knew that a tiny percentage of all short falls caused serious injuries [19]. They knew intuitively that no human could recreate the forces of a 40 mph car crash or second story fall; they soon proved by experimentation that the notion that a human shaking a child can produce forces equivalent to a 40 mph car crash or a second story fall was nonsense. Biomechanical testing shows that human shaking, at its strongest, generates 1/60th of the force (~10 g or 10 times the force of gravity) of a 40 mph car crash (which generates ~600 g or 600 times the force of gravity). Studies, stating such were published [19,20] and efforts to immediately discredit the generally unassailable biophysics began by the child abuse pediatric establishment, primarily by saying the laws of physics did not apply to humans. (There is also irony in the contradictory reliance on biomechanics and biophysics used in other safety initiatives advanced by the AAP, e.g., helmets and car seat design.)

Soon other doctors with specialized experience with the findings (e.g., radiology, emergency medicine, forensic pathology) became involved. Research emerged which rendered the prime hypothesis and many other aspects of child abuse pediatrics

suspect and likely invalid; the basis on which abuse had been diagnosed for decades (the prime hypothesis and SBS) began to be no longer regarded as viable.

6. False confessions of shaking

By 1985 the predictable high conviction rate used to validate abuse, was augmented by supposed large numbers of “confessions of shaking.” Many parents trained in first-aid, preparing for a new baby, where taught to determine if a child was unconscious and needed cardiopulmonary resuscitation (CPR), with these precise “CPR for infants” instructions from the National Institute of Health (NIH):

“Check for alertness. Shake or tap the infant gently. See if the infant moves or makes a noise”...CPR guidelines published by the NIH at <https://www.nlm.nih.gov/medlineplus/ency/article/000011.htm>.

These resuscitative shakes, commonly reported during apparent life threatening events that generate medical encounters and abuse evaluations, became the most common “confession of shaking.” When later measured by biomechanics, these resuscitative “shakes” were found to generate forces so low that they were less than those seen in many common child care situations (e.g., in play and normal consoling behaviors). These forces were measured at about 1/100th to 1/30th (1–3 g) of the minimal force known to cause intracranial injury (~100 g).

However, in emotionally charged circumstances, when shaking was mentioned in any context at all (bouncing, picking up and putting down, consoling behaviors, rocking, resuscitation, etc.), the statements were considered by the child abuse pediatricians, police, and DA to be confessions of abusive shaking [21]. These false “confessions”, in the most unscientific of ways, then began to serve as further supposed validation for the unproven prime hypothesis. Ease of conviction and then false “confessions” of shaking were both being offered as scientific proof, and are still being promoted as validation of the prime hypothesis by the pediatricians exerting control of child abuse pediatrics through AAP and COCAN.

7. Pediatric child abuse literature

In large part, the controversy continues to be fueled by the constant flow of child abuse literature specifically designed to be used in court to counter specific testimony by challengers disputing some aspect of the prime hypothesis. Published false statements in the child abuse literature about the relevance and/or irrelevance of alternative etiologies to abuse are quickly and widely disseminated with the cooperation of like-minded doctors/editors of journals relevant to abuse. This is accomplished by publishing methodologically flawed studies (discussed below) and then refusing to publish valid critiques.

The consistent use of data collected from hospital databases of children who, previously and remotely were diagnosed as abused, with a high percentage likely to have been misdiagnosed as abused, is a constant component of the flawed methodology. The approach yields the lowest grade studies [22], the “observational study.” In this class of study, the archetype of the child abuse research, the investigator can only note (observe) the diagnoses made by others on the study subjects; the author(s) play no role in making the diagnosis to the study subjects; nor is any scientifically valid methodology applied to validate the observations of others: did abuse really occur or was it a false accusation using the prime hypothesis or other flawed construct to diagnose abuse? This makes observational studies extremely vulnerable to methodological problems, false conclusions, and in the case of child abuse

research, circular logic. If SDH and RH are widely misused to diagnose abuse then only circular logic can lead to the conclusion that their presence proves abuse. It is problematic as well, that even when legal conclusions are “not guilty”, hospital records maintain the case as abuse, and the legal conclusions and their implications are not documented in the records being used to gather “abused” subjects. Any real validation of abuse is impossible in these observational studies, because abuse was assumed to be present at the outset based on the prime hypothesis. Such a flawed methodology leads, of course, to unreliable output. Yet that output can be repeated in court over and over, in a convincing fashion, to persuade individuals unversed in the analysis of scientific literature that the prime hypothesis and/or other unproven hypotheses are true.

Recently the criteria for assuming actual abuse has occurred (true or not) according to the AAP in such studies, was defined in a study by Cowley et al. [23], published 7-25-15 in *Pediatrics* the journal of the AAP, which stated at page 298 in Table 1.

Quality standards for confirmation of abusive injury. Only Studies Ranked 1 or 2 included. . . [in which 1 and 2 were]

- 1. Abuse confirmed at case conference or civil, family or criminal court proceedings, admitted by perpetrator, or independently witnessed.**
 - 2. Abuse confirmed by stated criteria, including multidisciplinary assessment.**
-

Regarding the criteria the following information is relevant:

1. The case conferences are populated by the multispecialty teams in children’s hospitals. The teams are comprised and led by the very child abuse pediatricians who crafted the prime hypothesis or, if younger, through training, have come to believe it. These are the very establishment doctors who are being challenged, continue to rely on the prime hypothesis to misdiagnose abuse, and are deeply invested in maintaining the status quo.
2. The assumption that abuse by a child’s caregiver must be real because they have been convicted of abuse in court, a place where abuse of authority regularly trumps genuine scientific discourse, is not justified or accurate.
3. False confessions (admissions by perpetrators) are well documented as common [21], and often coerced or fabricated.
4. Multidisciplinary assessments in children’s hospitals are impacted by “Groupthink” [24], a dysfunctional group dynamic identified by Irving Janis at Yale in 1972. Within an institution, like-minded participants, members of a multidisciplinary child abuse program, are selected because they agree with each other. When Groupthink is operative, the desire for conformity leads to dysfunctional decision making. Consensus trumps critical evaluation of alternative ideas. A sense of invulnerability, active suppression of dissent both inside and outside the group using “mind guards” (self-appointed members who shield the group from dissenting information and outside input), augment isolation. The rationalizing of warnings that might challenge the group’s assumptions, the use of loyalty, and the punishing of disloyalty, all prevent alternative thinking. The group functions with an unquestioned sense of morality, belief in invulnerability, inflated certainty, and illusions of unanimity among group members where silence is viewed as agreement. Underrating of opponents; stereotyping those who oppose to the group as weak, evil, biased, spiteful, impotent, or stupid, can lead to dehumanizing actions being taken against opponents. Confirmation bias results. Decisions made in such a multi-disciplinary framework need further scrutiny.

As one can see the criteria to accept that a correct diagnosis of abuse was reached in these observational studies are as flawed as the studies themselves. The journals that consistently publish these flawed studies are some of those most widely read in pediatrics and most focused on child abuse. One could argue that these journals are also invested in validating past editorial decisions, supporting the past practices of child abuse pediatricians and like-minded colleagues, and defending the core “knowledge” of modern child abuse pediatrics, right or wrong.

Peer reviewers, working with these editors, collectively have abdicated their primary responsibility to assure only scientifically valid evidence-based research is published. Instead they bring scientifically flawed observational studies to the fore [25]: literature that often seems designed more to assist in court presentations to get convictions [26], than to advance science. Instead of contributing to scientific accuracy and the elimination of false accusations of abuse, this literature instead seems intended to obfuscate emerging science. Emerging science, if openly discussed and more widely accepted, could permanently alter the landscape in child abuse pediatrics and disrupt the established ideas of the old and new promoters of modern child abuse pediatrics, virtually all children’s hospitals, the AAP, and the entire child abuse “establishment.” Instead, the body of literature in child abuse pediatrics, cited by Justice Ginsberg in a published Supreme Court dissent as methodologically flawed [27], continues to be defended on the basis of its volume and the repetition of the prime hypothesis.

Any objective science which undermines current child abuse pediatric thinking is diligently monitored as it is released and systematically attacked through committees and publications, operating in concert with the AAP, by child abuse pediatricians who specialize in such biased criticism [28,29].

8. Evolving science

After 1985, the challengers persisted, got more organized, and became aware of published legal decisions reversing convictions of abuse, primarily based on acknowledging the emergence of new science. Those deeply impacted by seeing the injustice of loving non-abusive caregivers being convicted of child abuse with false science, also become involved in studying the relevant science applicable to child abuse pediatrics, doing so from a multispecialty perspective [30,31]. Legal scholars studied and published important legal decisions [32] and white papers [33,34] integrating the law and science into persuasive arguments against the validity of the prime hypothesis. The reliance on evidence based medicine, and the integration of old and new peer-reviewed science [35], soon made it clear the prime hypothesis was false. The challengers and other professionals discovered other medical problems, relatively common and well known, that could produce the findings which were being used to misdiagnose abuse. Over time, even the establishment pediatricians acknowledged that the findings occur in multiple other entities and included it in their writings [36].

The challengers, medical professions from difference specialties (emergency medicine, radiology, forensic pathology, neuropathology, ophthalmology, biomechanics, neurosurgery, neurology, orthopedics, pediatrics, and endocrinology), brought specialty knowledge to the issues that extended beyond the scope of the core curriculum of child abuse pediatrics or the training of the old and new child abuse pediatricians.

The new science was ground-breaking. Examples include neuro-pathologic studies of brain anatomy and behavior with medical problems and trauma that emerged from the challengers [37,38]. The new science, though, was immediately attacked by distorting the findings, attacking the integrity of the authors, or dismissing plausible explanations as too rare to be worthy of

consideration. Shaking, back then, was being alleged in almost all cases where retino-subdural hemorrhage of infancy was present and effectively that has not changed over 40 years.

Furthermore, other contributing nonabuse etiologies for the findings, like vitamin D deficiency infantile rickets, were not identified for decades to come. Other established etiologies for cases of retino-subdural hemorrhage of infancy were documented as far back as 1953 [39] and included birth trauma, accidental injury, CNS infections, cerebral thrombosis, prematurity, and twin gestations. These are still not being included in meaningful differential diagnoses, and have not been appreciated as contributing to the increased number of abuse diagnoses.

As the challengers continued to find existing science that undermined the establishment and new science evolved that did the same, the controversy expanded as well. Unfortunately, it often did so in a decidedly nonscientific framework. New terms and new hypothesis about the clinical and pathologic findings emerged that were in short order shown to be invalid indicators of abuse and abandoned [40]; each move provoked by an effort to buttress the prime hypothesis and to blunt criticism. New terminology was put into use that was more vague and more prejudicial [41]. SBS became shaken impact, acceleration/deceleration, rotational injury, non-accidental trauma and/or abusive head trauma. These terms are imprecise, ill-defined, not supported by biomechanical analysis, unquantified, and prejudicial in that they imply intent and mechanism. They were touted to provide more “clarity in the courtroom” [41] when, in fact, they did exactly the opposite, allowing any amalgamation (often referred to as a ‘constellation’) of non-diagnostic findings to be called definitive evidence of abuse.

Another approach was the “rarity argument”, used when an event known to occur only in small numbers occurs. Events that are rare, by definition, will predictably occur in at some rate each year, yet the rarity argument is couched in such a way that each occurrence can be dismissed as implausible because it is rare. Making such an argument is a cognitive and logical error [17]. Mischaracterizing or dismissing known medical problems that occur at small but predictable rates, yielding a predictable number of cases, is not justified merely just because they are infrequent. For example, short falls as a cause of serious injury or death have been, and still are being, disregarded as a possible etiology of SDH, RH, and fractures ascribed to abuse. However, rarity obviously connotes that cases that are rare will occur, and at a constant rate, and if dismissed as implausible because they are rare, then each rare case of the rare event, when seen, will be misdiagnosed. Furthermore, if the population is large enough, the rare event will occur in high absolute numbers leading to multiple misdiagnoses. For example, in the United States with a birth rate of 4 million babies a year, using the 1 in 2 million fatality figure as the frequency of death from household falls [17], accepted by the child abuse community, when applied to say 8 million vulnerable infants, 1–2 years old and other children, predicts that, at a minimum, there will be 4 deaths a day or 1460 deaths from falls a year. There will be many more with clinically significant injury from household falls that will seek medical care. These numbers should not be disregarded with only approximately 3000–4000 child abuse prosecutions per year in the United States [33,42], many with caregivers describing histories of short falls.

The high frequency of birth trauma and complications [9] based in part on the re-emergence of an epidemic of vitamin D deficiency [10,43] and its complications and the predictable occurrence of a significant number of CNS infections [8]; all which produce the same findings (SDH and RH), are being dismissed as alternative diagnoses to abuse because they are supposedly rare and not worthy of inclusion in a meaningful differential diagnosis. This is improper and leads to false accusations of abuse.

Other disease entities, some that occur by the millions per year for some of the categories of alternative etiologies (i.e. vitamin D

deficiency manifesting as infantile rickets), are also dismissed out of hand as invalid etiologies without scientific basis.

Abuse of authority, calling for the disregard of any and all challenge to pediatric dogma [44], no matter the content of the challenge [45] has become a widely used tactic as well. Challengers have been subjected to relentless and organized ad hominem (personal) attacks [46]. Efforts to open scientific dialogue have consistently been rejected. The rise of a “law and order” mentality in the 1980s (lasting into the present) has further deterred any impulse on the part of law enforcement, governmental agencies, or neutral scientific bodies, such as the National Institute of Health or the National Science Foundation, to explore the issues involved.

Generally, the “establishment’s” response to any challenges has been reflexive rejection of any science that undermined their codified fund of knowledge, their past decisions, and their prior misdiagnoses. Any notion of disabusing themselves of past thinking and decisions, or any acceptance of new science to explain findings that conflicted with prior decisions represents a grave conflict of interest for the current establishment, a group still populated by many of the early self-designated specialists. Undoing the American version of modern child abuse pediatrics, with tens of thousands in jail after false convictions based on the prime hypothesis, is a daunting task, although more enlightened legal systems in Canada [47] and Sweden [48] have stepped up to the challenge. Sweden stands out after a governmental task force, populated with most prominent of medical professionals in Sweden, and the Swedish Supreme Court has declared that it can be concluded that, “in general terms, the scientific evidence for the diagnosis of violent shaking has turned out to be uncertain” and of no legal value. In the United States, various courts [27,32] have made it clear that uncertainty, doubt, and insufficiency of scientific evidence as to most aspects of child abuse pediatrics, describes the current state of things. Recently a Federal judge, in a published decision said “a claim of SBS is more an article of faith than a proposition of science.” [32]

9. Evidentiary standards

Evidentiary standards define what can be represented as expert opinion in court testimony.

At first, the prime hypothesis was just assumed to be true. That appears based on the presumptions of scientific integrity by those who espoused it. The logical and scientific necessity of using a valid scientific methodology to prove that it is true, before being allowed to say it is true, however, was not met. In court, the issue of scientific proof was pushed to the side as irrelevant. Courts allowed the new child abuse specialists to repeat the prime hypothesis *carte blanche* to juries and dependency court judges: people without tools to dispute or analyze what they were being told. The notion that doctors, often acting in concert and all misdiagnosing abuse, their institutions, and the AAP could all be wrong, was unfathomable. The child abuse pediatricians have been able to benefit from this misplaced trust to say what they please and to expect that whatever it said, will be given weight and believed, scientifically warranted or not.

Furthermore, the evidence rules evolving in that time frame, referred to as Kelly-Frye or the generally accepted standard [49], were absolutely insufficient to be used in child abuse medicine. The set-up allowed the child abuse specialists to represent that there was “general acceptance” in the larger body of medicine regarding their ideas about abuse to allow judges to formally validate this new “science” (the prime hypothesis) and their “expert” opinions in court. While general acceptance, the essence of Kelly-Frye, is modestly applicable to some general areas of medicine, it was misrepresentation to the courts that a hundred or so child abuse pediatricians of that era, with similar motivations and

thinking, the new child abuse “specialists,” were, or represented the “general body of medicine.”

Later evidence rules (Daubert [50]) required research via a scientific methodology to reach valid scientific conclusions before any expert testimony about the conclusions could be presented. Daubert analysis, which is only now being applied more widely, would reveal that no valid scientific methodology was ever used, or could prove that the prime hypothesis was valid.

To this day methodological scientific analysis in child abuse research is relegated to “not necessary” by the current corps of child abuse professionals. With this latitude, the number of misdiagnoses of abuse has increased. The large number of false confessions of shaking [21], continued high conviction rates, the volume of flawed literature to support the prime hypothesis, and the misuse of “general acceptance”, remain the primary arguments that the entire field is valid; arguments that continue to drive this tragedy of false accusations and convictions forward.

10. Conclusion

Any objective and uninvested professional party exerting a modest effort to study the issues on their own will see that the challengers’ introduction of alternative etiologies, the use of common sense thinking, probability analyses, exposure of a methodologically flawed body of scientific literature, and a commitment to justice, light a path from the nightmare of false accusations of abuse to greater accuracy and precision in diagnosing abuse, presumably our collective goal.

Over time, there has been sufficient evidence presented by the challengers that demonstrates the false certainty of misdiagnosed abuse; the tension between the “establishment” and the challengers has never been higher. The collapse of the “establishment’s” ability to convict innocent caregivers of abuse using non-evidenced-based pronouncements of guilt may represent the only means available at this time to resolve this crisis of false accusations. The satanic ritual abuse and multi-victim, multi-perpetrator cases of alleged abuse of the late 80s and early 90s, advanced by many of the same pediatricians working in child abuse today, stopped being filed only after the DAs could no longer attain convictions. In the profound absence of professional dialogue, the invalidity of the current situation may need to be proven in court before the tragedy of false accusations of abuse can end. Since the misdiagnosis of child abuse is a form of abuse caused by a physician (iatrogenic abuse), and most often results in the destruction of innocent families, the incarceration of innocent caregivers, and the separation of children from parents, this form of iatrogenic abuse must be stopped.

References

- [1] F.B. Walsh, T.R. Hedges Jr., Optic nerve sheath hemorrhage, *Am. J. Ophthalmol.* 34 (4) (1951) 509–527.
- [2] P.J. Muller, J.H. Deck, Intraocular and optic nerve sheath hemorrhage in cases of sudden intracranial hypertension, *J. Neurosurg.* 41 (2) (1974) 160–166.
- [3] T. Koto, K. Takubo, S. Ishida, H. Shinoda, M. Inoue, K. Tsubota, Y. Okada, E. Ikeda, Hypoxia disrupts the barrier function of neural blood vessels through changes in the expression of claudin-5 in endothelial cells, *Am. J. Pathol.* 170 (4) (2007) 1389–1397.
- [4] P.D.A. Terson, Hemorrhage in the vitreous body during cerebral hemorrhage, *La Clin. Ophthalmol.* 22 (1900) 309–312.
- [5] N. Aoki, H. Masuzawa, Infantile acute subdural hematoma: clinical analysis of 26 cases, *J. Neurosurg.* 61 (2) (1984) 273–280.
- [6] Here is a link to nanny cam video of shaking without injury: <https://www.yousendit.com/download/bXBaanZzck6NE43czHUQw>. Download and open... video starts.
- [7] T. Cross, W. Walsh, M. Simone, L. Jones, Prosecution of child abuse: a meta-analysis of rates of criminal justice decisions, *Trauma Violence Abuse* 4 (2003) 323.
- [8] D.R. Chadwick, Viral meningitis, *Br. Med. Bull.* 10 (75–76) (2006) 1–14.
- [9] S.C. Gabaëff, Investigating the possibility and probability of perinatal subdural hematoma progressing to chronic subdural hematoma, with and without complications, in neonates, and its potential relationship to the misdiagnosis of abusive head trauma, *Leg. Med.* (2013) (ePub).
- [10] L.M. Bodnar et al., High prevalence of vitamin D insufficiency in black and white pregnant women residing in the Northern United States and their neonates, *J. Nutr.* 137 (2007) 447–452.
- [11] M.K. Lashutka, A. Chandra, H.N. Murray, G.S. Phillips, B.C. Hiestand, The relationship of intraocular pressure to intracranial pressure, *Ann. Emerg. Med.* 43 (2004) 585–591.
- [12] P.E. Lantz, J. Carlson, R. Mott, Extensive Hemorrhagic Retinopathy, Perimacular Retinal Fold, Retinoschisis, and Retinal Hemorrhage Progression Associated With a Fatal Spontaneous, Non-Traumatic, Intracranial Hemorrhage in an Infant. (Abstract presented February 21, 2013 at the Am. Acad. Forens. Sci. Annual Meeting, Washington, DC). <<http://www.aafs.org/sites/default/files/ProceedingsWashingtonDC2013.pdf>>.
- [13] D.L. Chadwick, S. Chin, C. Salerno, J. Landsverk, L. Kitchen, Deaths from falls in children: how far is fatal?, *J. Trauma* 31 (10) (1991) 1353–1355 (see page 1355 top of right hand column).
- [14] A.N. Guthkelch, Problems of infant retino-dural hemorrhage with minimal external injury, *Houston J. Health Law Policy* (Epub 11/16/2012).
- [15] S.M. John, P. Kelly, A. Vincent, Patterns of structural head injury in children younger than 3 years: a ten-year review of 519 patients, *J. Trauma Acute Care Surg.* 74 (1) (2013) 276–281.
- [16] J.D. Gray, A. Christy, C.A. Cutler, G. Janet, J.G. Dean, C.H. Kempe, Prediction and prevention of child abuse and neglect, *Child Abuse Negl.* 1 (1) (1977) 45–58.
- [17] D.L. Chadwick, G. Bertocci, E. Castillo, L. Frasier, E. Guenther, K. Hansen, et al., Annual risk of death resulting from short falls among young children: less than 1 in 1 million, *Pediatrics* 121 (6) (2008) 1213–1224.
- [18] I. Root, Head injuries from short distance falls, *Am. J. Foren. Pathol.* 13 (1) (1992).
- [19] A.C. Duhaime, T.A. Gennarelli, L.E. Thibault, et al., The SBS. A clinical, pathological, and biomechanical study, *J. Neurosurg.* 66 (1987) 409–415.
- [20] M.T. Prange, B. Coats, A.C. Duhaime, S.S. Margulies, Anthropomorphic simulations of falls, shakes, and inflicted impacts in infants, *J. Neurosurg.* 99 (2003) 143–150.
- [21] J.E. Leestma, SBS: do confessions by alleged perpetrators validate the concept?, *J. Am. Phys. Surg.* 11 (2006) 14–16.
- [22] G.H. Guyatta et al., GRADE guidelines: 4. Rating the quality of evidenced study limitations (risk of bias), *J. Clin. Epidemiol.* 64 (2011) 407–415. p. 408.
- [23] L.E. Cowley, C.B. Bethan Morris, S.A. Maguire, D.M. Farewell, A.M. Kemp, Validation of prediction tool for abusive head trauma, *Pediatrics* 136 (2) (2015) 292.
- [24] I. Janis, Groupthink: A Psychological Study of Foreign-policy Decisions and Fiascoes, Houghton Mifflin, Boston, 1972.
- [25] M. Donohoe, Evidence-based medicine and shaken baby syndrome: Part I: Literature review, 1966–199, *Am. J. Foren. Med. Pathol.* 24 (2003) 239–242.
- [26] S. Narang, A Daubert analysis of abusive head trauma/shaken baby syndrome, *Houston J. Health Law Policy* 11 (2011) 505–632.
- [27] Supreme Court Justice Ginsberg’s Dissent in Shirley Rae Smith, Cavazos v. Smith, 2011 U.S. Lexis 7603, 2011, WL 511826 (October 31, 2011).
- [28] C.S. Greeley, A wolf in evidence clothing: denialism in child abuse pediatrics, *AAP Grand Rounds* 26 (2011) 24. <http://aapgrandrounds.aapublications.org/cgi/content/full/26/2/24>.
- [29] C.S. Greeley, Letter to the editor and Gabaëff response published in volume 82 XIII, no. 1: February 2012, pgs 82–89, re Gabaëff SC. Challenging the pathophysiologic connection between subdural hematoma, retinal hemorrhage, and shaken baby syndrome, *West. J. Emerg. Med.* 12 (2) (2011) 144–158.
- [30] M. Cohen, I. Scheimberg, Evidence of occurrence of intradural and SDH in the perinatal and neonatal period in the context of hypoxic ischemic encephalopathy. An observational study from two referral institutions in the United Kingdom, *Pediatr. Dev. Pathol.* 12 (2009) 169–176.
- [31] D.S. Greenes, S.A. Schutzman, Infants with isolated skull fracture: what are their clinical characteristics, and do they require hospitalization?, *Ann Emerg. Med.* 30 (3) (1997) 253–259.
- [32] Matthew F. Kennelly, District Judge, In the United States District Court for the Northern District of Illinois Eastern Division, Jennifer Del Prete, Petitioner, vs. Sheryl Thompson, Respondent. Memorandum Opinion and Order, Case No. 10 C 5070 Filed: 01/27/14, p. 1–97 (See Footnote pp. 95–96).
- [33] D. Tuerkheimer, The next innocence project: shaken baby syndrome and the criminal courts, *Wash. Univ. Law Rev.* 87 (1) (2009).
- [34] K. Findley, Examining Shaken Baby Syndrome Convictions in Light of New Medical Scientific Research, *Legal Studies Research Paper Series Paper No. 1210; 37 Okla. City U.L. Rev.*, 2012.
- [35] S. Gabaëff, Challenging the pathophysiologic connection between subdural hematoma, retinal hemorrhage and shaken baby syndrome, *West. J. Emerg. Med.* 12 (2) (2011) 144–158.
- [36] L. Frasier, K. Rauth-Farley, R. Alexander, R. Parrish, Abusive Head Trauma, a Medical, Legal and Forensic Reference, Chapter 14 and 15 authored by Sirotnik called “Medical Disorders that Mimic Abusive Head Trauma” and G. W. Medical Publishing, 2006.

- [37] J. Mack, W. Squier, J.T. Eastman, Anatomy and development of the meninges: implications for subdural collections and CSF circulation, *Pediatr. Radiol.* 39 (3) (2009) 197–198.
- [38] W. Squier, J. Mack, The neuropathology of infant subdural haemorrhage, *Forensic Sci. Int.* 187 (2009) 6–13.
- [39] A.N. Guthkelch, Subdural effusions in infancy: 24 cases, *Br. Med. J.* 1 (4804) (1953) 233–239.
- [40] W. Squier, I. Scheimberg, C. Smith, Spinal nerve root b-APP staining in infants is not a reliable indicator of trauma, *Foren. Sci. Int.* 212 (1–3) (2011) (05/2011).
- [41] Associated Press, Doctors Recommend New Term for 'SBS', the Boston Globe, April 27, 2009. <http://www.boston.com/news/nation/articles/2009/04/27/doctors_recommend_new_term_for_shaken_baby_syndrome/>.
- [42] R.V. Delany-Shabazz, V. Vieth, The National Center for Prosecution of Child Abuse Office of Juvenile Justice and Delinquency Prevention Fact Sheet, August 2001 #33.
- [43] L. Nield et al., Rickets: not a disease of the past, *Am. Fam. Physician* 74 (4) (2006).
- [44] E. Matshes, Retinal and optic nerve sheath hemorrhages are not pathognomonic of abusive head injury, Proceeding of the American Academy of Forensic Sciences, 2010 February 24, Seattle, WA.
- [45] D. Albert, J.W. Blanchard, B.L. Knox, Ensuring appropriate expert testimony for cases involving the "Shaken Baby", *JAMA* 308 (1) (2012) 39–40.
- [46] P. Strouse, 'Keller & Barnes' after 5 years-still inadmissible as evidence, *Pediatr. Radiol.* (2013) (published online: 29 September 2013).
- [47] S. Cordner, J. Ehsani, L. Bugeja, J. Ibrahim, Pediatric forensic pathology: limits and controversies, Commissioned by the Inquiry into Pediatric Forensic Pathology, Ontario, Canada, November 28, 2007. <<http://www.attorneygeneral.jus.gov.on.ca/inquiries/goudge/report/index.html>>.
- [48] Judgment of the Court of Appeal for Western Sweden of 25 June 2012 in Case B 4560-11.
- [49] The Kelly-Frye evidence standard was stated in its original form in *Frye v. United States* (1923) 293 F.1013, and was adopted by the California Supreme Court in *People v. Kelly* (1976) 17 Cal. 3d 24.
- [50] *Daubert v. Merrell Dow Pharmaceuticals* (92-102), 509 U.S. 579, 1993.