# Medical Evidence and Expert Testimony in Child Sexual Abuse

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## ABSTRACT

Expert medical testimony in child sexual abuse cases can be critical to the outcome of a legal case. This article will review the development of the medical knowledge and clinical expertise in child sexual abuse. Since the passage of mandatory child abuse reporting laws, the forensic medical examination of a child for evidence of sexual abuse has become standard. Until recently, many myths regarding female genital anatomy existed but were based primarily on dogma and lack of empirical research. Over the past 25 years, many research studies and accumulating clinical evidence have expanded medical knowledge and debunked old myths. Physical evidence, even in cases of alleged genital or anal penetration is rare. Sexually transmitted infections are also uncommon and often require medical interpretation as to their significance in a prepubertal child. Specialized medical knowledge, training, and clinical expertise have developed in order to evaluate children presenting with allegations of sexual abuse. Such medical expertise provides invaluable service to courts. We review criteria for evaluating such expertise in light of current medical practice.


## INTRODUCTION

Judges are frequently asked to render decisions in cases involving allegations of child sexual abuse where medical evidence is presented. Judges are the triers of fact in bench trials, and most juvenile and family court hearings are such proceedings. Judges also have a responsibility as "gatekeepers" in admission of the testimony of "experts" who render medical opinions. This article will review a historical perspective of child sexual abuse and current medical literature, and address medical expertise and expert testimony as they relate to evidence presented in child and adolescent sexual abuse cases.

### Historical Perspective

In order to place the medical evidence in perspective and to interpret testimony from various medical experts, it is important to understand the evolution of the medical field of child abuse as it relates to child sexual abuse.

The medical community's recognition and understanding of child abuse has come full circle. In the 1850s, a French pathologist, Ambroise Tardieu, published several treatises on physical abuse of children and sexual injuries resulting from rape. His description of various forms of child abuse was exceedingly accurate, even by today's standards. Dr. Tardieu's writings were largely ignored by the medical community of his time (Labbe, 2005).

The actual prevalence of child sexual abuse was not known until the late 1960s when the reporting of suspected child abuse was mandated in all 50 states. Mandatory reporting of child abuse allegations by certain designated professionals provided a means of measurement of the extent of the problem in society. However, through early microbiological methods and the recognition of venereal transmission of certain bacterial agents, medical historians have provided a window into the scope of the issue. The bacterium *Neisseria Gonorrhea* was discovered in 1879 by Albert Neisser. Because it

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**TABLE 1**
**Sexual/Anatomical Myths (all of the following are false)**

- Girls can be born without a hymen.
- The hymen can be injured through sports, horseback riding, or gymnastics.
- An injured hymen never heals.
- A doctor can always tell if a girl has been vaginally penetrated.
- The hymen is always broken during intercourse (consensual or not).
- Masturbation injures the hymen.
- Anal penetration often leaves scars or laxity of the anus.
- A large vaginal opening indicates sexual penetration.
- Sexual intercourse always tears the hymen.

was isolated from genital infections, the sexual nature of the disease when it appeared in adults was not questioned. However, the medical community had a much more difficult time when preadolescent children were diagnosed with gonorrhea. In the early part of the 20th century, vaginitis in prepubertal girls was mostly caused by gonorrhea and considered "innocent" in origin.

Parallel events in the latter 20th century coincided to lead to medical awareness of the reality of child sexual abuse. In 1978, C. Henry Kempe published "Sexual abuse, Another hidden pediatric problem" (Kempe, 1978). Some physicians took note of this in the context of pediatric gonorrhea. Dr. Suzanne Sgroi argued in 1979 that gonorrheal infections in children were the result of sexual contact (Sgroi, 1979). However, the medical community was slow to accept this premise. A prominent pediatric gynecology textbook published in the early 1980s continued to espouse the concept that gonorrhea could be transmitted in nonsexual ways and stated that gonorrhea "in a premenarchal child may be acquired through voluntary intercourse" (Huffman, Dewhurst, & Capraro, 1981, p. 133). The study of childhood gonorrhea and an acceptance that it was a sexually acquired infection, paralleled the "discovery" of child sexual abuse in America during this period.

As sexual abuse allegations were being investigated more thoroughly by social service and law enforcement agencies, these agencies turned to physicians who began to be presented with children to be examined for physical evidence. Although the understanding of how children disclose or report such abuse was still emerging, and because a child's allegation was all that stood against an adult denial, it seemed that physical evidence of sexual contact, documented by a physician, would be critical evidence in the determination of fact in such cases.

The reality in medicine was much different. A tremendous mythology existed regarding female genitalia, especially the hymen. There was a general lack of understanding about the nature of child sexual abuse among medical professionals, and a marked lack of medical knowledge regarding "normal" anatomy of the prepubertal child. Doctors were asked to evaluate alleged child victims with virtually no training, literature, or research base. They were then expected to render an opinion that had the weight of science, but was in reality based upon myth and dogma. Table 1 lists common "myths" regarding anogenital anatomy and sexual abuse.

Research into the area of anatomic changes resulting from sexual abuse in children, especially girls, began to reshape medical knowledge and launched additional research which served as the early beginnings of a new subspecialty of pediatric medicine. Dr. Hendricka Cantwell examined young girls at a shelter where they were sent when removed from their homes for allegations of abuse or neglect (Cantwell, 1983). When examining their genitalia, she measured the width of the hymenal orifice, comparing this parameter to that of girls who were admitted to the shelter for reasons other than sexual abuse. Girls who allegedly had been sexually abused had, on average, a hymenal orifice greater then

4mm, and those who apparently had not been sexually abused had less than 4mm. The "4mm standard" was born, and was used by pediatricians to "prove" that a girl had been vaginally penetrated. This concept even lingers today. These first researchers were pioneers, and although their early conclusions have subsequently been disproven, it was a first attempt at applying empiricism to a subjective assessment.

The next advance in the field would change the landscape forever. Woodling and Heger adapted a tool of gynecology, the colposcope, and began evaluating children for physical evidence of sexual abuse (Woodling & Heger, 1986). This instrument was initially developed to evaluate the uterine cervix of adult women for abnormalities. A Brazilian physician had suggested it may be used in evaluating injuries resulting from rape in adults (Teixeira, 1981). The colposcope provided an excellent light source and magnification, and could be fitted with a 35mm camera. The colposcope could be focused noninvasively on the external prepubertal genitalia or the anus, resulting in photographs of astonishing quality and detail. However, because prepubertal anogenital anatomy had never before been evaluated in such magnified detail, anatomic findings never seen or described previously became ascribed to be the result of the alleged sexual assault. This was well demonstrated in 1987 in a study by Ladson, Johnson, and Doty (1987). More than one hundred physicians were shown photographs of prepubertal female genitalia and were asked to identify the structures. When shown these magnified images, over 40% of the physicians could not even correctly identify the hymen.

In another study, Jenny and colleagues answered a common clinical and legal question: Could girls be born without hymens? Dr. Jenny relates that this study was born of a defense attorney's question regarding this issue and realized that the medical literature had not rigorously addressed this fact. She examined more than 1,100 newborn girls in a hospital nursery and clearly determined that all females have a hymen at birth (Jenny, Kuhns, & Arakawa, 1987). A concurrent study from Israel evaluated 25,000 newborns and had similar conclusions to the Jenny study (Mor & Merlob, 1988). Sixteen years later and despite strong evidence to the contrary, medical and legal professionals continue to espouse the concept that "girls can be born without a hymen."

If a child truly has no hymenal tissue, and no medical reason to account for this (such as surgery), it is presumed the hymen has been destroyed through traumatic vaginal penetration. Additionally, more data emerged that suggested even the most intrusive forms of sexual abuse may not leave physical sequelae. Muram correlated perpetrator confessions with children's histories. These studies suggested that in cases when the child and perpetrator both reported vaginal penetration, the examination could still be entirely normal, with no findings of genital trauma. This was even true in one case when the child was examined within a few hours of the assault (Muram, 1989). Explanations for this finding include the possibility that the hymen and vagina stretch to accommodate vaginal penetration in some cases or that only partial or "labial" penetration occurred.

The 1990s was the era of explosive research. Several studies demonstrated that hymenal diameter was not a reliable indicator of abuse (McCann, Voris, Simon, & Wells, 1990; Berenson, 1994; Berenson, Heger, Hayes, Bailey, & Emans, 1992). McCann's studies of anal and genital anatomy in nonabused girls and boys demonstrated that many previous anatomic findings being reported were found in nonabused children and therefore could not be considered to be the sequelae of sexual abuse (McCann, Voris, Simon, & Wells, 1989; McCann, Wells, Simon, & Voris, 1990). Berenson confirmed McCann's studies through her tracking of the normal development of the hymen from birth through childhood. Her studies of infant girls described tremendous variation of hymenal findings. She also proved that the female hymen went through natural developmental changes from birth through adolescence (Berenson, 1995; Berenson & Grady, 2002).

As methodologies improved, research defining normal anatomy of nonabused children to abused children emerged. Case studies of children with fresh genital injuries clearly resulting from sexual assault allowed understanding of the healing process (McCann, Voris, & Simon, 1992). Severe injuries usually result in scarring of the tissue in sometimes obvious ways. However, if minor tears or superficial injuries occur, the genital and hymenal tissues appear to heal without scarring or residua. Most child sexual abuse, being intrafamilial, was not of the type that led to severe injury. Physicians interested in child sexual abuse came together with

their colposcopic pictures, case histories, and newly published papers. During this decade, common terminology and clearer definitions of "normal" anatomy began to evolve. The development of a "Classification System" based upon studies and case reports has been an attempt to bring some organization to the process (Adams, 2001). The most experienced clinicians who had interviewed and examined thousands of children in the context of sexual abuse allegations almost uniformly began to advocate a position that most girls would have completely normal genital examinations despite a clear history of genital contact or even penetration. Anal anatomy in girls and boys was also nearly always normal. Acute and residual injuries to the penis were also very rare and rarely reported.

Another important area of research was how physicians' experience in examining children affected their analyses of physical findings. Several studies were published that compared experienced with less experienced examiners. In one study, a less experienced examiner would "change" his or her opinion of a finding if the history or the nature of sexual contact changed (Paradise, Winter, Finkel, Berenson, & Beiser, 1999). Lack of experience in child sexual abuse cases would result in "over-interpretation" of a normal anatomic finding (i.e. misinterpreting a normal variant as the result of abuse). More experienced examiners understood the concept that a normal examination could be consistent with the diagnosis of sexual abuse in the face of a reliable history from the child.

Makoroff and colleagues studied the ability of pediatric emergency department physicians to assess genital findings in cases where sexual assault was alleged (Makoroff, Brauley, Brandner, Myers, & Shapiro, 2002). The emergency department physicians' findings were compared to those on follow-up examination by a "trained child abuse pediatrician." Forty percent of the time, the emergency department physician was wrong in his or her determination of evidence of sexual abuse. This was not a new concept. In 1978, a study showed that sexually abused children who presented to an emergency department were found to receive less than adequate medical care than children who presented with ear infections (Orr, 1978). Twenty-seven years later, despite better recognition of sexual abuse, improved training, and many published studies, abused children are still not receiving adequate care in our emergency departments when seen exclusively by emergency department physicians.

## Current Findings

Current literature now supports the fact that the majority of male and female children and adolescents who give a history of sexual abuse have no evidence of anal or genital injury on physical examination. Three possible reasons for this are:

- Many children do not disclose a history of sexual abuse until months or years following the abuse. Because of the time delay, if genital or anal injuries were sustained, they may have healed.
- Most types of child sexual abuse do not involve a great amount of physical force by the perpetrator. Therefore the acts, although abusive, may not damage the genital or anal tissues.
- The genital and anal tissues may not injure readily with physical contact. If they are injured, studies have demonstrated that they can heal completely with little or no sign of previous trauma.

Recently, studies looking at larger samples of patients have highlighted the fact that the number of abnormal examination findings in young children and teenagers who give a history of sexual abuse is very low. Berenson examined preadolescent girls who gave a history of sexual abuse that included genital penetration and compared them with girls who were carefully screened for abuse and found not to have been abused. Only 4% of girls alleging penetration had abnormal genital examinations (Berenson et al., 2000). This study also demonstrated very clearly that many findings on genital examination that may have been previously felt to be the result of abuse, were seen equally in abused and nonabused girls. In 2002, Heger and her colleagues demonstrated that in 2,384 boys and girls who were being evaluated for possible sexual abuse, over 96% had normal examinations (Heger, Ticson, Velasquez, & Bernier, 2002). The article makes the statement that "medical, legal, and social professionals rely too heavily on the medical examination." Finally, Kellogg examined 36 pregnant adolescents. Only 6% (2/36) had definite findings of penetrating genital injury on physical examination (Kellogg, Parra, & Menard, 1998).

It is important that all medical as well as nonmedi-

**TABLE 2**
**Significance of Sexually Transmitted Infections**

| Infection | Significance in Relation to Sexual Contact |
|---|---|
| Gonorrhea | Definitive* |
| Chlamydia | Definitive* |
| Syphilis | Definitive* |
| Trichomonas Vaginalis | Very likely* |
| Human Immunodeficiency Virus | Definitive if other risk factors ruled out* |
| Herpes Simplex type 2 | Possible* |
| Human Papilloma Virus (genital warts) | Possible |
| Bacterial Vaginosis | Inconclusive |

* Infection can be transmitted from mother to infant during birth or prior. Sexual contact can be presumed if perinatal transmission is eliminated.

cal professionals involved in a child sexual abuse case understand that a child's credible history of sexual abuse should not be discounted because the child has a normal genital examination. The diagnosis of sexual abuse is rarely made on the basis of the physical examination findings alone.

## What is Evidence?

Several studies have documented the presence of injury due to sexual abuse in children and adolescents (McCann, 1998; McCann, Voris, & Simon, 1992; McCann et al., 1989). These studies document that fresh or acute injuries can heal completely, or if they are severe, may result in scarring of the hymen or anus. Follow-up examinations demonstrate how such injuries may heal. An understanding of the healing process is important when children present weeks to years after the assault. If a child is seen within the first three days after a sexual assault, injury to the genitals or anus may be seen. This may include bruises, abrasions, small lacerations, and tears. Most of these injuries heal completely without scarring. Deeper penetrating injuries of the hymen usually lead to defects in the integrity of the hymen that may only be apparent with specialized examination techniques. Anal tears also usually heal without scarring, unless the tear is deep and extensive. Such injuries often require surgical repair. Anal scars are rare, and some experts suggest that unless the examiner has observed the injury heal into a scar, extreme caution should be observed when interpreting a finding near the anus as a "scar." Penile injuries may consist of bruises, abrasions, and suction marks. These injuries also heal without residual scarring.

Forensic evidence (semen, DNA, and trace evidence), may be found in children if collected soon after an assault. A study by Christian et al. (2000) found that such evidence was not found on or in children's bodies more than 12 hours following an assault. Most evidence was found on bed linens and clothing. These authors advocated careful crime scene collections in cases of pediatric sexual assault.

## Sexually Transmitted Infections as Evidence

Sexually transmitted infections (STIs) can be transmitted during sexual abuse. When a sexually transmitted infection is diagnosed in a child, sexual abuse must be considered and evaluated. An STI may be the first indication that abuse has occurred. However, like physical evidence, STIs are rare in sexually abused prepubertal children. Some STIs have a much stronger link to sexual abuse. For example, most experts agree that infections from *Neisseria gonorrhoeae, Chlamydia trachomatis*, Syphilis and Human Immunodeficiency Virus are primarily transmitted by sexual contact, and that a determination of sexual abuse should most likely be made whenever these infections are diagnosed when perinatal transmission and rare non-sexual transmission have

been excluded. However, there is widespread disagreement over the probability of non-sexual transmission of *Condyloma acuminata* (genital warts) and Herpes Simplex Virus. A recent study by Sinclair et al. suggests that many genital warts seen in young children (under the age of 13) are a result of non-sexual transmission (Sinclair, Woods, Kirse, & Sinal, 2005). This uncertainty concerning transmission creates difficulties for those who investigate abuse allegations and for those who are mandated to protect the child. When there is such an infection but there is neither physical sign of abuse nor any history of abuse, investigators must assess the potential risk to the child while recognizing that medical opinion may vary. Table 2 lists the most commonly encountered organisms along with the likelihood of sexual transmission.

Because of the important legal and social consequences of finding an STI in children, it is important that appropriate testing is performed. Currently, culture diagnosis is the "gold standard" in legal cases and in cases of possible sexual abuse. Microbiology labs handling these specimens must be certain of their results and, when necessary, carry out additional tests to guarantee that no infections are mistakenly reported. Recently, non-culture tests, specifically nucleic acid amplification tests (NAATs), have been introduced and used in the diagnosis of certain sexually transmitted infections, namely *Neisseria gonorrhoeae* and *Chlamydia trachomatis.* NAATs use an amplification method; the tests are very sensitive and can pick up even a small amount of an organism. However, these tests are not yet approved for forensic use in children. They may, however, be used as a screening test if a culture is used to confirm a positive result. Research regarding STIs in children is difficult because of the low overall prevalence of infection in this population. Cooperation between large centers is necessary to obtain the necessary numbers of children for this research. It is important that any test used to diagnose an STI in a child is both very specific and very sensitive. Missing an infection in a child, especially if it is a marker of possible sexual abuse, is a problem because the child could remain in an unsafe environment. However, an erroneous diagnosis of a sexually transmitted infection and sexual abuse could lead to the inappropriate removal of a child and inappropriate prosecution.

## Experts and Expert Testimony

In court proceedings, medical experts are called upon to assist the fact finder (judge or jury) in the interpretation of medical evidence. Judges determine who is qualified to provide such interpretation. The definition of "expert" is generally accepted to be someone who is qualified by evidence of his or her expertise, training, and special knowledge. While it is true that physicians in general are "experts" at the interpretation of human physical and physiological processes, there is wide variation in physicians' knowledge in specific areas. Being board certified in pediatrics does not make a physician a child abuse expert. As noted earlier, a recent study of chief residents in pediatric training programs demonstrated deficiencies in these physicians' ability to identify basic prepubertal genital anatomy (Dubow, Giardino, Christian, & Johnson, 2005). Training, and board certification in Obstetrics and Gynecology does not give a physician the specific knowledge required to evaluate child sexual abuse cases unless the training included curriculum in that area (Muram, Jones, Hostetler, & Crisler, 1996). It would be erroneous for a court to consider the two specialties as equally qualified or to give more weight to an OB-GYN physician thinking he or she is an expert in all aspects of genital anatomy. Specialized training or extensive clinical experience, accompanied by ongoing continuing medical education in the field of child sexual abuse should be prime factors in judicial determination of experts' qualifications.

Chadwick and Krous (1997) point out that responsible and appropriate experts in child abuse and neglect cases should have:

1. General training and experience in the cause of injuries to children;
2. Specific training, education, or experience as to the particular type of case before the court;
3. Memberships in relevant medical and professional societies;
4. Child abuse and neglect conference presentations or at least attendance; and
5. Relevant professional publications.

Those experts whom they consider "irresponsible" tend to:

1. Lack qualifications to support the opinions being offered in court;

2. Offer unique theories of causation of injuries that are contrary to the vast medical literature and the consensus of opinion among those who work with children;
3. Express unique interpretations of the findings unsupported by medical science;
4. Misquote the medical literature or misunderstand the science underlying that literature; and
5. Offer blatantly false statements either about the science or their qualifications (Chadwick & Krous, 1997).

Many courses are given annually throughout the country, and any professional who purports to be an expert in the courtroom should be able to enumerate specific training courses he or she has received. Many experts also serve as lecturers either locally, regionally, or nationally in the field, and such participation should be considered. Any professional not actively engaged in the field seeking to be admitted as an expert should have had recent training. Because medical knowledge changes rapidly, failure of the expert to remain current should be weighed negatively.

Other medical professionals such as Nurse Practitioners, Advance Practice Nurses, and Physician's Assistants may be admitted as experts to assist the court. For such professionals, determination of their advanced training in diagnosis and treatment of medical conditions is also important. For example, Sexual Assault Nurse Examiners may have very extensive specific training in the area of child sexual abuse but may not hold an advanced degree (RN only). These professionals have specialized skills in collecting evidence, interviewing victims, and providing initial crisis counseling. They provide a tremendous service to the court. However, their limitation in general training in diagnosis and treatment of medical conditions may not have given them the depth of understanding of the process of differential diagnosis (for example, analysis of alternative diagnostic possibilities for a medical finding).

Knowledge of the literature through reading medical articles and interpreting that literature is also the responsibility of the expert. However, such knowledge alone does not provide a broad perspective into the field of child sexual abuse. Physicians or other medical professionals can become quite knowledgeable in a certain field through in-depth reading of the medical literature, but that would not qualify them to practice or be credentialed in that field. Additionally, no single treatise in the vast medical libraries constitutes complete or exclusive knowledge in the field. Publication of a study or review does not make it authoritative. Peer review of medical literature ultimately occurs at the level of the readership. A published study may not withstand later scrutiny, or it may rise to the level of an important contribution to the field. No single study changes the practice of medicine, nor should a single study be the authoritative treatise that the medical evidence hangs on. Medical expertise and the admissibility of that information should be based upon the manner in which medicine is practiced in the current year. Expert medical testimony can be pivotal in the outcome of a case. Testimony that is soundly based in current medical knowledge, including clinical experience and knowledge of the literature, provides important assistance to the court.

## Documentation and Oversight/Peer Review

The colposcope has been a tool utilized in evaluating sexually abused children for nearly a quarter of a century. With photographic, video, or digital imaging, the ability to provide high quality interpretable images is unquestioned. As early as 1988, strong recommendations were published regarding the need for quality photodocumention (Ricci, 1988). Except under specific circumstances where children or adolescents refuse imaging, every examination should be recorded in some manner. There is no other way to preserve the evidentiary quality of the examination, allow for peer review of examinations, and allow the opposing counsel to obtain their own expert review. Medical professionals must be open to this type of scrutiny if quality examinations and fair analysis of medical findings are to be accomplished. Legal protections should be in place to preserve the confidentiality of these most sensitive images, but that should not prevent quality review of examinations. Adams attempted to evaluate the analysis of images by level of clinical experience (Adams & Wells, 1993). A higher level of experience (i.e. more exams per month and the use of the colposcope) was associated with overall higher agreement between experts.

Every examiner should have a method for oversight and peer review whether onsite or via a secure tele-

medicine program. This is especially true for programs that do not have specialty-trained physicians. Abnormal examinations carry the weight of evidence, and in the minds of juries or judges could provide the proof of a crime that could lead to the separation of families and incarceration of defendants. The risk of a "false positive" cannot be overestimated. Medical practitioners can easily state that a normal examination does not preclude the possibility of sexual abuse, leaving a final determination to other aspects of the investigations. However, clear injury that could only be caused by genital or anal penetration stands nearly alone. A case should not be lost or won because an inexperienced or less knowledgeable medical examiner did not interpret findings in light of current medical literature. For example, a professional may state that the child appeared "too large" or invoked the 4mm rule, notwithstanding the 15 years of studies that have refuted this data. Many terms and descriptions of genital anatomy have come and gone, and only the most current studies should be applied to any case, regardless of the date it was evaluated.

## Conclusion

Child sexual abuse is a relatively new concept in modern medicine, and there has been a great deal of evolving literature written on the subject over the past three decades. Medical assessment of children who may be sexually abused is not just for forensic purposes, i.e. to determine if the child was abused. Medical findings are rare, sexually transmitted infections are rare, but children and families need to be reassured regarding the importance of a normal examination. Judges and courts may also utilize medical expertise during the litigation of a case. Medical experts can be utilized effectively to discuss the significance of a normal examination in light of a compelling history of sexual contact. Important physical findings, or STIs when present, can be explained by the medical expert and provide probative evidence to the court. Such experts should be knowledgeable regarding the current state of the science, and have recent training and clinical experience in order to be able to accurately present this critical information to the courts. Oversight and expert review of cases is essential in order to ensure that medical findings are interpreted in the most accurate manner possible.

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