6.

Volume 1
Number

Clinical Articles

Anal and perianal abnormalities in prepubertal victims of sexual abuse

David Muram, MD
Memphis, Tennessee

We describe anal and perianal findings in 310 prepubertal children who were determined to be victims of sexual abuse; 206 (66%) had perinea that appeared normal. Abnormal findings were present in 104 children (34%): anal gapping in 61 children; skin tags in 44; rectal tears in 33; sphincter tears in 15; human papillomavirus lesions in 4; perineal scarring in 2; and bite marks in 1. Normal-appearing perianal and anal regions were noted in 150 of 175 children (85%) who denied anal assault, and in 11 of 70 (16%) who described such assault. In comparison, anal and perianal abnormalities were observed in 59 of the 70 children (84%) who gave a clear history of anal assault, but in only 25 of 175 (15%) who denied such abuse. Failure to document perianal abnormalities in almost two thirds of the patients demonstrates the limitations of the medical evaluation in validating allegations of sexual abuse. (Am J Obstet Gynecol 1989;161:278-81.)

Key words: Children, sexual abuse, anus, perianal abnormalities

Child sexual abuse is a common and serious problem that affects children regardless of their age, sex, socioeconomic class, or geographic location.[1, 2] Anal assaults comprise a significant proportion of these attacks.[2, 3] Although genital injuries are often recognized as possible signs of abuse,[4, 5] anal and perianal injuries are sometimes dismissed by physicians as being associated with common bowel disorders (e.g., constipation or diarrhea).[6-8] This article describes the anal and perianal findings in a large group of prepubertal children who were determined to be victims of sexual abuse by their history and by the local investigative teams of Child Protective Services, a branch of the Tennessee Department of Human Services.

Material and methods

The demographics of Shelby County, Tennessee, and the referral patterns to the Pediatric Gynecology Clinic have been described in previous articles.[2, 4] Between Jan. 1, 1986, and April 30, 1988, the Tennessee Department of Human Services referred 310 prepubertal children between the ages of 1 and 10 (163 white and 147 black; 41 boys and 269 girls) who were determined by their history and the ensuing investigation by the Tennessee Department of Human Services to be victims of sexual abuse. All patients in this study group were examined in an office setting by the same examiner; this allowed consistent and uniform data collection. All children in the study group were prepubertal, as confirmed by the medical examination. For the evaluation of the perianal region, the children were placed in one of three positions: frog-legged supine, "knee-chest" position, or across the parent's lap, simulating the "knee-chest" position. The glutei were separated so that the anus and perianal area could be fully inspected. In addition to the unaided examination, the perianal area was also inspected either through a Zeiss or Codman colposcope under ×16 magnification. The area was inspected under regular illumination and through a green filter that better demonstrates vascular patterns. No solutions or dyes were applied to enhance visualization. The examiner recorded changes in skin color, texture, and all other lesions or abnormalities.

The various perianal abnormalities observed in the study population were defined as follows:

1. Inflammation—redness, swelling, tenderness of the perianal tissues

From the Section of Pediatric Gynecology, Department of Obstetrics and Gynecology, University of Tennessee.
Received for publication July 29, 1988; revised November 22, 1988; accepted March 6, 1989.
Reprint requests: David Muram, MD, Department of Obstetrics and Gynecology, University of Tennessee, 853 Jefferson Ave., Memphis, TN 38103.

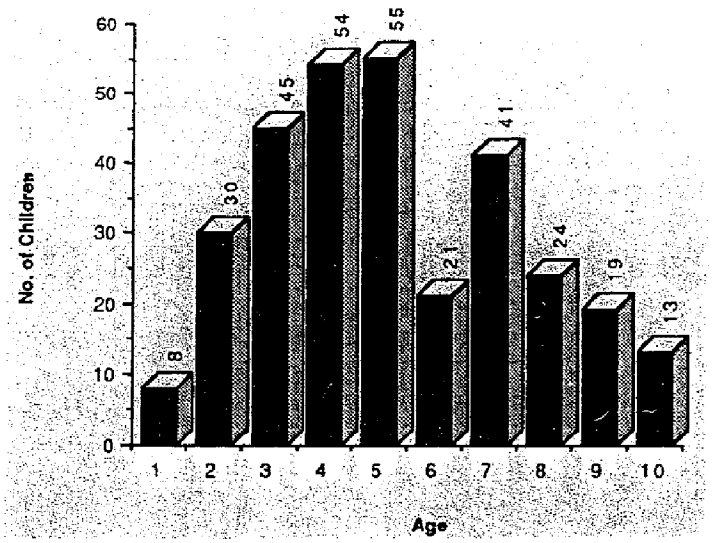


Fig. 1. Age distribution of the study group.

2. Rash—perianal skin eruption
3. Ulceration—loss of the superficial layer of the skin or mucosal surface
4. Skin tag—excess of perianal skin raised near the mucocutaneous junction that could not be eliminated by stretching nearby tissues
5. Fissure—a deep linear cleft or ulcer at the mucocutaneous line of the anus
6. Anal gapping—relaxation of the anal sphincter to a diameter ≥1 cm when the glutei were separated

The genital abnormalities were classified into one of three categories, as have been previously described in detail[4]:

1. *Category 1.* Normal-appearing genitalia
2. *Category 2.* Nonspecific findings—abnormalities of the genitalia that could have been caused by sexual abuse but also are often observed in patients who are not victims of sexual abuse (e.g., inflammation and scratching)
3. *Category 3.* Specific findings—the presence of one or more abnormalities strongly suggesting sexual abuse.

The allegations

Many children described a complex abusive situation in which repetitive sexual acts were performed over a variable time period. In some instances, it was difficult to evaluate the progression of the abusive relationship, the time span over which the abuse occurred, and the number of attacks. In 175 of the 310 children (56%), the abusive relationship affected other areas of the victim's body and did not involve the anal area (e.g., oral–genital contact). In another 65 children (21%), it was impossible to ascertain from the child's description if anal assault occurred. In only 70 instances (23%) did victims clearly describe an assault involving the anal area. Some were combined with genital assault (n = 47), anal coitus alone (n = 18), or digital manipulation of the anal area (n = 5).

Results

Age distribution. The mean age of the children in the study group was 5.2 years (range, 1 to 10 years). A difference in age distribution by racial group was noted; black children were older (mean age, 5.7 years) than white children (mean age, 4.8 years). The age distribution for the entire study group is shown in Fig. 1.

Findings. Two hundred and six children (66%) had normal-appearing perinea. Abnormal findings were present in 104 children (34%): anal gapping was found in 61 children, either as an isolated finding (n = 12), or in association with other findings. Skin tags were found in 44, either as an isolated finding (n = 21), or in association with other findings. Rectal tears were seen either as an isolated finding (n = 12), or in combination with other findings (n = 21). Sphincter tears were observed as an isolated finding (n = 1), or with anal gapping, rectal tears, or skin tags (n = 14). In four patients, perineal human papillomavirus lesions were seen; in two patients, perineal scarring was noted in association with perianal skin tags. One girl had bite marks on the perianal area. The findings are listed in Table I.

Table I. Perianal and anal findings in prepubertal children ($N = 310$) who were victims of sexual abuse

	No. of patients
No abnormalities	206 (66%)
Skin tags	21
Anal gapping, rectal tears	18
Anal gapping	12
Rectal tears	12
Anal gapping, rectal tears, skin tags	7
Anal gapping, skin tags	6
Perianal warts	4
Skin tags, rectal tears	3
Rectal tears, sphincter tears	3
Anal gapping, sphincter tears, rectal tears, skin tags	3
Anal gapping, sphincter tears	3
Skin tags, perineal scarring	2
Anal gapping, sphincter tears, rectal tears	2
Redness, irritation	1
Redness, irritation, rectal tears	1
Sphincter tears	1
Sphincter tears, skin tags	1
Skin tags, redness, irritation	1
Bite marks	1
Anal gapping, sphincter tears, rectal tears, perineal scarring	1
Anal gapping, rectal tears, proctoepisiotomy	1
TOTAL	104 (34%)

Normal-appearing anal and perianal regions were noted in 150 of 175 children (86%) who denied anal assault and in 11 of 70 (16%) who described anal assault. In comparison, anal and perianal abnormalities were observed in 57 of the 70 children (81%) who gave a clear history of anal assault but in only 23 of 175 (13%) who denied such abuse.

The anal and genital abnormalities among the children in this study group were correlated. Of the 310 patients, 125 children were found to have normal-appearing genitalia. Seventy-one patients had category 2 findings. Abnormalities suggestive of abuse were found in 114 (38%) patients. When the various genital abnormalities were compared with the presence or absence of perianal findings, children who had anal abnormalities were more likely to have normal genital examination (Table II). However, inclusion of genital findings increased the sensitivity of the medical evaluation. A combination of anal and genital abnormalities was seen in 53 (17%) patients, and either genital or anal abnormalities were found in an additional 182 (59%) patients. Only 75 (24%) patients had no abnormality of the genital or perianal regions. Even when only genital abnormalities highly suggestive of abuse were included (category 3), both anal and genital abnormalities were seen in 28 (9%) patients and either genital or anal abnormalities were found in an additional 159 (51%) patients.

Table II. Correlation between perianal and anal findings and genital abnormalities

	No. of patients		
Genital abnormalities	*Category 1*	*Category 2*	*Category 3*
Anal abnormalities present ($n = 104$)	51	22	27
Anal abnormalities absent ($n = 206$)	74	47	85

$\chi^2 = 6.314$, $p = 0.043$.

Comment

Anal abuse is a common form of sexual assault against children, particularly boys.[4-6] Although the genital abnormalities suggestive of sexual abuse have been described, there is no consensus regarding which perianal or anal abnormalities are the result of sexual abuse and which have other causes (e.g., constipation with passage of large, hard stools). Such determination may not be easy because the anal sphincter and anal canal allow some room for dilatation. A tear of the anal mucosa or sphincter rarely occurs after a digital assault. Penetration by a larger object may result in some degree of injury and may vary from a mere swelling of the anal verge to gross tearing of the sphincter. In the period immediately after penetration, sphincter laxity, swelling, and small mucosal tears of the anal verge may be observed. The swelling subsides and the mucosal tears heal within days; occasionally skin tags form. The anal sphincter regains function if it was not severed. Repeated acts of anal penetration over a prolonged period cause the anal sphincter to become loose, forming an enlarged opening.[3] The diagnosis of venereal disease affecting the anal canal is often delayed or even missed. When a child is infected with *Neisseria gonorrhoeae,* genital infection is associated with vaginal discharge and often the child is brought for medical care. Anal infection is often asymptomatic. Other disorders may cause perianal abnormalities similar to the ones observed in this series. Perianal abnormalities are often observed in children with Crohn's disease or Hirschsprung's disease. The anal canal gapes when the buttocks are gently drawn apart in children with significant constipation. This is a normal anorectal reflex initiated by the distended rectum. Usually stool may be seen in the anal canal. Minor small fissures may be seen after defecation for 2 to 3 weeks. Reddening of the perianal area may be found in children with fecal soiling.[7] Unfortunately, children who were abused often suffer from functional constipation and a damaged anal sphincter often causes fecal soiling.

Although many patients in this study group had normal-appearing perianal regions, the absence of physical findings is easily explained. Many victims of

anal assault do not sustain significant physical injuries because the anal sphincter and anal canal are capable of dilatation. Penetration, even by an adult penis, may occur without significant injury. The pain that follows anal assault may cause spasm of the anal sphincter and result in functional constipation, thus providing an explanation of the child's complaints of pain and rectal bleeding. Most children do not immediately disclose incidents of sexual abuse. Many victims do not have an examination for weeks, months, or even years after the abuse occurred. By then the injuries often have healed completely and the physical examination reveals few, if any, abnormalities.

Although we were able to detect a large number of children with anal and perianal abnormalities, it is difficult to conclude from this study which of these findings are diagnostic of anal abuse. The operating procedures of the clinic identify the patients as probable victims of sexual abuse at the time of registration; this may possibly cause bias by the examiner. More controlled studies are required to identify the specific findings indicative of anal assault. The association of other abnormalities (e.g., signs of neglect, genital injuries, etc.) should raise suspicion by the examiner that the patient is a victim of abuse. However, abnormal findings should not be interpreted in isolation. The findings of the medical examination must be correlated with other methods of validation such as a history from the child. To conclude from the findings of the medical examination alone that a child is a victim of abuse may cause enormous harm to the child and the family.[10]

As expected, children who were able to describe anal assault in detail were more likely to have perianal abnormalities. Memory of anal assault may suggest that the child experienced a more intense pain and thereby was more likely to have been injured. Fifty-nine of the 70 children (84%) who described anal assault had abnormalities on physical examination. In contrast, the examination was reported as normal in most instances when the child denied that anal assault had occurred. Observation of other abnormalities, particularly genital tract injuries, increases the sensitivity of the medical evaluation of child victims of abuse.

In this study group children who had normal results of the genital examination were more likely to have anal abnormalities. It is tempting to speculate that children who were primarily victims of anal assault were less likely to suffer a genital assault and thereby had a normal genital examination. I believe that this erroneous conclusion is caused by the inclusion of a significant number of male victims in this series. Only one male patient had genital abnormalities. All the remaining male patients had normal genital examinations, but a significant number of these had anal abnormalities, accounting for the erroneous impression.

"The etiology of most perianal fissures, irritation, and skin tags is often not evident, but may be trauma secondary to overzealous cleaning, constipation with passage of large hard stools, scratching induced by irritation from *Enterobius vermicularis* or eczema, or other perianal conditions."[11] Although the possibility of sexual abuse is not mentioned in this well-accepted textbook, child sexual abuse should be considered a potential cause of perianal injury. With the increasing number of children who are reported as victims, physicians who treat young patients must become proficient in the evaluation of sexual abuse. When abnormalities suggestive of perianal injury are detected, the physician should gently inquire about the possibility of sexual abuse. If such history can be obtained, further investigation is required. Some states have laws that require that all incidents of child sexual abuse be reported to a designated agency,[2] and many medical centers have developed multidisciplinary units for the evaluation of child victims of abuse.[12] Physicians may choose to refer patients whom they think have been sexually abused to these multidisciplinary units for further evaluation.

In summary, this study has documented that children who complained of anal assault are more likely to have some abnormality of the perianal region. Although these abnormalities are not always the result of sexual abuse, I suggest that when perianal abnormalities are detected, further evaluation may be required to protect a potential child-victim from further abuse. Such abnormalities could be considered as corroborating findings to a child's complaint of sexual assault.

REFERENCES

1. Kemp CE. Sexual abuse, another hidden pediatric problem. Pediatrics 1978;62:382-9.
2. Muram D, Weatherford T. Child sexual abuse in Shelby County, Tennessee: two years of experience. Adolesc Pediatr Gynecol 1988;2:114-8.
3. Hobbs CJ, Wynne JM. Child sexual abuse—an increasing rate of diagnosis. Lancet 1987;2:837-41.
4. Muram D. Child sexual abuse—genital findings in prepubertal girls. I. The unaided medical examination. Am J Obstet Gynecol 1989;160:328-33.
5. Emans SJ, Woods E, Flagg N, Freeman A. Genital findings in sexually abused, symptomatic, and asymptomatic girls. Pediatrics 1987;79:778-85.
6. Hobbs CJ, Wynne JM. Buggery in childhood—a common syndrome of child abuse. Lancet 1986;2:792-6.
7. Clayden G. Anal appearances and child sexual abuse. Lancet 1987;1:620-1.
8. Roberts REI. Examination of the anus in suspected child sexual abuse. Lancet 1986;2:1100.
9. Paul DM. The medical examination in sexual offenses against children. Med Sci Law 1977;17:251.
10. Dyer C. First High Court judgment on sex abuse in Cleveland. Br Med J 1987;295:382-3.
11. Shandling B. Diseases of anus, rectum, and colon. *In:* Behrman RE, Vaughan VC, eds. Nelson textbook of pediatrics. 13th ed. Philadelphia: WB Saunders, 1987: 813-5.
12. Muram D, Rivara FP, Buxton BH. Management of sexual abuse in pre-pubertal girls. Pediatr Adolesc Gynecol 1984;2:191-6.

7.

Child Abuse & Neglect, Vol. 17, pp. 91–110, 1993
Printed in the U.S.A.

0145-2134/93 $6.00 + .00

MEDICAL DIAGNOSIS OF THE SEXUALLY ABUSED CHILD

JAN BAYS

Child Abuse Response and Evaluation Services Program, Emanuel Hospital, Portland, OR

DAVID CHADWICK

Center for Child Protection, Children's Hospital, San Diego, CA

Abstract—This article reviews what has been learned in the last two decades about the medical diagnosis of child sexual abuse. Studies indicate that a normal physical exam is common in sexual abuse victims, that healing of injuries due to abuse is rapid and sometimes complete, that a minority of victims seen for abuse are boys, that nonsexual transmission of sexually transmitted diseases is rare, and that congenital and acquired conditions may mimic physical findings caused by sexual abuse. The article summarizes clinical research on physical findings in nonabused children, abused children, and abused children with independent confirmation of abuse. A classification of physical findings is proposed along a continuum of certainty that sexual abuse has occurred. The child's history is essential in the accurate diagnosis of most cases of sexual abuse.

Key Words—Child sexual abuse, medical diagnosis.

INTRODUCTION

THE STATE OF the art of evaluating children for suspected sexual abuse is relatively new. Studies of physical findings in abused and nonabused children have begun to appear with regularity in peer-reviewed journals in the last decade. There was no subject heading for child abuse in the *Index Medicus* until 1965. The first article on child sexual abuse was listed in 1973; in 1987 child sexual abuse appeared as a separate heading with 113 citations. A 1977 edition of Emans and Goldstein's textbook of *Pediatric and Adolescent Gynecology* had four pages discussing rape, while the 1990 edition devotes a 30-page chapter to child sexual abuse (Emans & Goldstein, 1990).

Only recently have physicians been trained to perform detailed examinations of children's genitalia for possible sexual abuse. A survey of 129 physicians, primarily pediatricians and family practitioners, revealed that only 77% routinely checked children's genitalia over half the time. When asked to label anatomic parts on a picture of the genitalia of a 6-year-old girl, only 59% correctly identified the hymen, 78% the urethral opening, and 89% the clitoris. Less than 40% felt that chlamydial vaginal infection was reportable as due to abuse (Ladson, Johnson, & Doty, 1987).

This article will review what has been learned in the last two decades about the medical diagnosis of child sexual abuse. First, is child sexual abuse a medical diagnosis?

Received for publication July 15, 1991; final revision received April 27, 1992; accepted May 18, 1992.

Reprint requests should be addressed to Jan Bays, MD, Child Abuse Response and Evaluation Services Program, Emanuel Hospital, 2801 N. Gantenbein Street, Portland, OR 97227.

Taber's medical dictionary (1985) defines diagnosis as "1. The term denoting the name of the disease or syndrome a person has or is believed to have. 2. The use of scientific and skillful methods to establish the cause and nature of a person's illness. This is done by evaluating the history of the disease process; the signs and symptoms present; laboratory data; special tests such as X-ray pictures and electrocardiograms. The value of establishing a diagnosis is to provide a logical basis for treatment and prognosis."

There are those who argue that sexual abuse is not a diagnosis. The author of a recent legal article (Coleman, 1989, p. 5), states that sexual abuse is an "event" rather than a diagnosis and that "finding of sexual molest is a *legal*—not a *medical* conclusion." A textbook of pediatric gynecology (Huffman, Dewhurst, & Capraro 1981, p. 220) warns, "The physician *does not make a diagnosis of sexual molestation or rape* and does not express any opinion to the victim, her family or other persons as regards the alleged assault."

There are those who argue there is considerable precedent to support child sexual abuse as a medical diagnosis. Physical abuse can be diagnosed from a history (particularly a history at variance with the child's injuries or developmental age) and from characteristic physical findings and/or X-rays. Back injury, angina pectoris, occupational exposure to toxins, or recurring gall bladder pain are in one sense events, but also medical diagnoses. The cause and nature of the patient's illness can be concluded from the patient's medical history, signs, symptoms, and laboratory tests.

In medical practice, sometimes physical findings alone make the diagnosis and dictate treatment, as with an unconscious patient who has suffered trauma in a motor vehicle accident. In other cases the physical exam and laboratory tests are normal, and the diagnosis is made solely upon the historical information, as with a patient who describes a classic anginal attack involving radiation of pain down the left arm to the left fifth finger, but who has a normal exam, cardiac enzymes and nonspecific findings on EKG. Usually medical diagnoses are based upon a combination of history and physical findings.

The diagnosis of child sexual abuse is also based upon the patent's history, the physical examination and, when appropriate, laboratory tests. At times the physical findings alone are sufficient to make the diagnosis. An example would be an 8-year-old with primary syphilis, or a child with fresh vaginal injuries and no history of accidental trauma (Paradise, 1990). In other cases the physical exam and laboratory tests are normal and the diagnosis is made upon the history alone. An example would be a 5-year-old boy with a normal genital and anal exam who describes details of anal sodomy and mutual masturbation to ejaculation by his father.

Most often the diagnosis is made through a combination of history and physical, as with a 7-year-old girl who describes finger penetration of her vagina on multiple occasions, and whose physical exam shows a 15mm vaginal opening with healed injuries of the hymen. In many cases the differential diagnosis includes sexual abuse but a definitive diagnosis cannot be made because critical pieces of information are missing. An example would be a preverbal child with genital warts.

A normal physical exam is common in child sexual abuse. Even when the offender has confessed to penetration, the examination may be normal (Kerns & Ritter, 1992a; Muram, 1989b). Thus examiners must use historical as well as physical information to reach a diagnosis. Paradise (1990) has summarized data from 12 studies of reported medical findings in children who were allegedly sexually abused. Tables, 1, 2, and 3 expand that summary to include 21 studies. Normal examinations were reported in 26% to 73% of girls (mean 50%) and 17% to 82% (mean 53%) of boys. Findings diagnostic of sexual abuse, for example, the presence of genital trauma, sexually transmitted diseases or sperm, were found only in 3% to 16% of child victims.

Table 1. Reported Medical Findings in Allegedly Sexually Abused Girls

Investigator (Publication/Year)	Adams (1988)	Claytor (1989)	Dube (1988)	Emans (1987)	Enos (1986)	Hobbs (1989)	Muram (1989)	Orr (1979)	Pokorny (1988)	Robinson (1971)	Tiexiera (1981)
Number of children	116	688	437	119	132	243	130	86	148	94	450
Age (years)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

Table 1. Reported Medical Findings in Allegedly Sexually Abused Girls

Investigator (Publication/Year)	Adams (1988)	Claytor (1989)	Dube (1988)	Emans (1987)	Enos (1986)	Hobbs (1989)	Muram (1989)	Orr (1979)	Pokorny (1988)	Robinson (1971)	Tiexiera (1981)
Number of children	116	688	437	119	132	243	130	86	148	94	450
Age (years)	≤16	≤13	≤12	≤14	≤13	≤15	≤10	≤15	≤11	24 age 3–9	33 ≤10
										70 aged 11–42	100 ≤14
											350 ≤18
Findings (% of patients)											
Normal examination	51%	36%	73%	63%	58%	42%	29%	65%	55%	—	26%
Genital erythema	—	—	17%	34%	—	58%	12%	17%	—	—	—
"Penetration"[a]	25%	59%	2.5%	37%	15%	58%	31%	13%	45%	8.5%	62%
Other genital trauma[b]	13%	—	4%	9%	10%	11%	20%	3.5%	—	3%	—
STD's	3%	—	2.7%	3%	—	3%	2%	6%	7%	—	—
Anal findings	13%s	14%	—	6%t	—	25%	—	—	—	—	—
	8%d			2%f							
	2%+										
Sperm/acid phos	—	—	0.04%	—	18%	—	—	2.4%	—	—	—
Pregnancy	—	—	0.02%	—	—	—	—	—	—	—	—
Extra-genital injury	—	—	5.5%	—	—	18%	—	—	—	28.7%	—

Note. " includes hymenal opening >1 cm, hymen clefts, hymen attenuation or remnants, hymen tears, hymen scars, vaginal bleeding and laceration, hymen not intact, and "significant" posterior hymen bumps.
[b] Includes abrasions, contusions, marked edema, ecchymoses, bite marks.
s = anal scars, t = anal tags, d = anal dilation, f = anal fissure, + = other anal findings.

Table 2. Reported Medical Findings in Allegedly Sexually Abused Boys

Investigator (Publication Year)	Adams (1988)	Claytor (1989)	Dube (1988)	Ellerstein (1980)	Enos (1986)	Farber (1984)	Hobbs (1989)	Reinhart (1987)	Spencer (1986)
Number of children	24	256	74	16	30	81	94	189	140
Age (years)	≤16	≤13	≤12	≤16	≤12	≤18	≤15	≤17	≤17
Findings (% of patients)									
Normal examination	59%	66%	82%	50%	60%	65%	17%	66%	32%
Anogenital findings	41%	34%	16%	44%	—	35%	83%	33%	68%
STD's	4%	—	1%	—	—	—	4%	<1%	5%
Sperm/acid phos/ Wood's lamps +	—	—	—	6%	17%	—	—	—	—
Extragenital injury	—	—	5.5%	19%	—	—	30%	—	5%

Table 3. Reported Medical Findings in Allegedly Sexually Abused Children (Studies Reporting Data for Combined Sexes)

Investigator (Publication Year)	Cupoli (1988)	DeJong (1982)	Marshall (1988)	Rimza (1982)	Shah (1982)	Tilleli (1980)
Number of children:						
Girls	940	344	164	268	750	113
Boys	119	72	31	43	93	17
Age (years)	≤16	≤16	≤18	≤17	≤18	≤16
Findings (% of patients)						
Normal examination	72%	76%	71%	23%	92%	66%
Anogenital findings[a]	28%	24%	29%	46%	8%	33%
STD's	2.5%	3.1%	4%	9.1%	—	2.3%
Semen/acid phos	—	—	—	5%	—	—
Pregnancy	—	1.2%	—	2%	—	—
Extra genital injury	—	7.7%	—	16%	—	3%

[a] Includes abrasions, erythema, lacerations, edema, bleeding, lax rectal tone, dilated vaginal vault.

The wide range of percentage of positive findings may be due to several factors. Higher rates of physical findings occurred in earlier studies when only the most severe cases came to light. As public awareness of child sexual abuse has increased, more children are being brought for examination early in the course of abuse or when no abuse has occurred, and the frequency of positive findings has dropped. Criteria for what constitutes physical evidence of molestation has also changed in the last 20 years as information from clinical studies on abused and nonabused children has been compiled and disseminated.

There are several reasons for lack of physical findings in sexually abused children. (a) Delay in seeking a medical examination decreases the likelihood of positive findings. Rimza & Niggemann (1982) report that 36% of children examined within 24 hours of penetrating sexual assault had evidence of genital trauma but only 13% had such evidence when seen after 24 hours. Muram (1989b) found that irritation and inflammation of the genitalia, found in 21 of 31 child victims seen within one week of sexual assault, were not seen at all in victims after a delay of a week or more.

(b) Semen or evidence of ejaculate are unlikely to be found during examination of sexually abused children, particularly if the child has washed, urinated or defecated and more than 72 hours have elapsed since the assault. (DeJong & Finkel, 1990; Paradise, 1990; Tipton, 1989).

(c) When injuries do occur, healing can be rapid, as documented below. With the onset of puberty, evidence of injury can be obscured by changes in hymen tissue due to estrogen effect (McCann, Voris, & Simon, 1992).

(d) Many types of sexual molestation such as fondling, "French kissing," oral sodomy, and cunnilingus, do not leave physical findings.

(e) Because rape is defined as penetration, however slight, of the vulval cleft, rape can occur without ejaculation or damage to tissues like the hymen (Camps, 1968, p. 424, 426).

(f) Groth and Burgess (1977) reported that 34% of rapists of adult women had erectile or ejaculatory dysfunction. Pedophiles may suffer similar dysfunction, decreasing the chance their abusive activity will leave evidence behind.

(g) The anal sphincter allows routine passage of stools larger than the diameter of a penis without damage.

(h) Hymen tissue is elastic (Huffman, Dewhurst, & Capraro, 1981; Mahran & Saleh, 1964; Pokorny, 1987; Teixeira, 1981) and full penetration by a finger or penis, particularly in an older child, may cause no visible trauma or simply enlarge the hymenal opening. (Emans, 1988; Enos, Conrath, & Byer, 1986; Herman-Giddens & Frothingham, 1987; Pokorny, 1987; Tipton, 1989).

When injuries do occur as a result of sexual abuse, healing is rapid and often complete. Teixeira (1981) examined 500 patients for sexual abuse. Of these, 6.6% (33) were below the age of 10, 20% (102) were below 14 years, and 70.8% (354) were between 14 and 18 years. He found healing of single, incomplete hymenal ruptures as early as 9 days while extensive ruptures took up to 24 days. He documented complete healing "to integrity" by 9 days in two patients. Teixeira refers to nine other studies indicating that hymenal healing occurs in 6 to 30 days.

Finkel (1989) followed seven children with acute genital and anal trauma until their injuries healed. Two had sustained accidental trauma and five had been molested. Six children healed with no residual by gross visualization or colposcopy by 7 to 13 days. One child had scarring evident at 3.5 months after injury. This 19-month-old had sustained more severe injuries than the other children, including multiple lacerations of the hymen, a deep penetrating wound of the posterior fourchette and a stellate laceration of the vaginal wall following penile vaginal penetration.

McCann (1988) and coworkers (McCann, Voris, & Simon, 1992) have also documented rapid, and, at times, virtually complete healing of acute anal and genital injuries from sexual abuse. Both authors of this article have followed children with acute genital or anal injuries who healed completely. Berkowitz, Elvik, & Logan (1987) described a 5-year-old girl who sustained tears, scars, and distortion of the hymen, and laceration of the perianal body due to sexual abuse. At examination 7 months later, the hymen was replaced by scar tissue stimulating a congenital imperforate hymen. If there is a delay of days or weeks before the child is examined evidence of injury may be minimal or absent.

There are conditions that may mimic findings caused by sexual abuse. In the process of diagnosing a patient, the physician formulates a differential diagnosis to "determine which one of two or more diseases or conditions a patient is suffering from, by systematically comparing and contrasting their clinical findings" (Dorland, 1988). This process also occurs in the diagnosis of sexual abuse.

A number of factors may produce a history suggestive of child sexual abuse. Clinicians may have to sort through histories given by adults who have misinterpreted normal masturbation or sexual play between children, by parents engaged in custody disputes, by parents who were themselves abused, or by delusional psychotic parents. Normal, age-appropriate sexual exploration must be differentiated from sexual activity initiated by a youthful offender. It is important to ask about family routines for bathing, dressing, and sleeping, if nudity or pornography is commonplace at home, if adults and children sleep in a "family bed," or if a child has witnessed adult sexual activity live or on TV.

A variety of dermatologic, congenital, traumatic and infectious conditions may mimic physical findings caused by sexual abuse (Bays & Jenny, 1990). The most common dermatologic condition confused with trauma from sexual assault is lichen sclerosis. It manifests as alarming subepidermal hemorrhages of the genital or anal area following minor trauma such as wiping after toileting. Congenital hemangiomas, streptoccal infections, straddle injuries, and urethral caruncles or prolapse (Johnson, 1991) are a few conditions that produce physical findings that often raise questions about sexual abuse.

Congenital vaginal and anal findings "may also cause the examiner some bewilderment" (McCann, 1990, p. 875). These include periurethral bands, intravaginal ridges, anterior midline perianal skin folds, perineal grooves, diastasis ani, or smooth, wedge-shaped areas in the midline of the anal verge (McCann, 1990), and anatomic variations of the bulbocavernosus muscle (Muram & Rau, 1991). A recent study indicates that 25% of newborns have a white line or "linea vestibularis" in the posterior vestibule. This previously described structure could be confused with scars produced by sexual abuse (Kellogg & Parra, 1991). Examiners

should be familiar with such conditions as the consequences of a mistaken diagnosis of abuse can be serious for the child, family, and suspected perpetrator.

Anal changes that might raise questions of sexual abuse can be the result of other medical conditions. These include Crohn's disease, hemolytic uremic syndromes, postmortem anal dilation, neurogenic patulous anus, lichen sclerosis, and chronic constipation (Bays & Jenny, 1990).

Fissures and anal dilation are found in constipated and also in sexually abused children. British studies indicate 6% to 26% of constipated children have anal fissures, and 15% to 18% have anal dilation. Anal dilation and other perianal signs were associated with fecal loading (Agnarsson, Warde, McCarthy & Evans, 1990). In a study of sexually abused children, a higher percentage had anal dilation (42%) and fissures (53%) (Hobbs & Wynne, 1989).

An American study of 171 children referred for gastrointestinal complaints, however, revealed anal or perianal abnormalities in only eight children (less than 5%). Only one of 30 children referred for constipation had an anal fissure. No child had anal dilation or distortion of the anal opening. The authors suggest that when perianal abnormalities are detected, further evaluation for possible sexual abuse is warranted (Lazar & Muram, 1989).

A minority of victims seen for sexual abuse are boys. In 14 reports of physical findings in children examined for sexual abuse, only 9% to 28% (mean 16%) of victims were boys (see Tables 2 and 3). Research shows, however, that the incidence of sexual abuse among boys (3% to 30%, depending on the study), is half as common to equally as common as abuse of girls (6% to 62%) (Finkelhor, 1986; Spencer & Dunklee, 1986). Studies of pedophiles indicate that more than two thirds of their victims are boys (Abel et al., 1987). A great deal of sexual abuse of boys appears to go undetected and/or unreported.

In the absence of multiple congenital anomalies, all girls are born with hymens. In two studies (Jenny, Kuhns, & Arakawa, 1987; Mor & Merlob, 1988) a total of 26,199 newborn girls were examined; all had hymens. The highest possible frequency of congenital absence of the hymen would be less than .01%, the lowest, zero. Even with total vaginal genesis, hymenal remnants are found (Rock & Azziz, 1987). There is no documented case of an infant girl born without a hymen.

Normal hymens have different configurations. Pokorny and Kozinetz (1988) studied hymen configuration in 265 prepubertal girls, and reviewed hymen descriptions by six other authors. They propose three basic hymen types, fimbriated (also called denticular, dentelle, or congenital frilly), circumferential (ring, annular or concentric), and posterior rim (semilunar or crescentic). Redundant hymen tissue may form cuffs, wings, or tags. Rarer hymen types include cribiform, septate, imperforate, and hymens with lateral or high anterior or posterior openings (Herman-Giddens & Frothingham, 1987).

Pokorny found posterior rims in 38.5% of girls under 10 years of age, circumferential hymens in 32.5% and fimbriated hymens in 17.7%. McCann, Wells, Simon, and Voris (1990), examining 114 prepubertal girls selected for nonabuse, divided hymen types into two categories, crescent or concentric. Crescentric hymens were more common than concentric types, particularly in the knee-chest position. A recent study indicates that as girls mature, the appearance of the hymen shifts from predominance of annual or concentric hymens in preschoolers to predominance of crescentric configurations in preadolescents (Kerns, Ritter, & Leong, 1992).

The appearance of the hymen can be altered by trauma or a variety of nontraumatic factors. Striking changes can occur in hymen appearance and configuration with different examining

techniques and positions. An annular hymen can appear crescentric in shape when a child is changed from a supine to a knee-chest position. An abnormal hymenal appearance can change to normal with alteration in patient relaxation, position or examination technique (Bays et el., 1990; McCann et al., 1990). Berkowitz, Elvik, and Logan (1987), observed an annular hymen that was torn during sexual abuse, producing a crescentric hymen. They also report the development of a septate hymen and an imperforate hymen as a result of abuse.

Estrogen alters the appearance and sensitivity of the hymen. Maternal hormones render the hymen thick, pink-white in color and redundant to 2 to 4 years of age. Hymens in latency age girls are thinner, redder, and more sensitive to touch. With the onset of puberty the hymen shows estrogen effect often before other secondary sexual characteristics appear (McCann, 1990). The size of the hymenal opening also changes with different positions and examination techniques (Bays et al., 1990, McCann et al., 1990). Obese girls have been found to have elongated vertical hymen openings but do not differ from nonobese girls in transverse hymental diameters (Kerns & Ritter, 1992b).

Accidents, masturbation and use of tampons are very unlikely to cause injury to the hymen or internal genital structures. There is no evidence that use of tampons causes trauma to the hymen (Dickinson, 1945). "The first myth to be dispelled is that tampons alter hymenal integrity. Distensibility is increased due to slight stretching . . ." (Cowell, 1981, p.260). "Autostimulation will not produce abrasions, lacerations, or contusions, nor does tampon insertion . . . tampons . . . do not disrupt hymenal integrity" (Woodling & Kossoris, 1981, p. 492). Stewart (1990) found no differences in the genital exam of girls who use or do not use tampons.

Normal masturbation in girls is clitoral or labial and does not cause hymenal injury (Hobbs & Wynne, 1987; Huffman, Dewhurst, & Capraro, 1981; Tipton, 1989; Woodling & Kossoris, 1981). Accidents such as straddle injuries commonly cause injury to anterior or lateral structures other than the interior vaginal introitus (Hobbs & Wynne,1987). The pelvic skeleton and overlying labia usually protect the hymen from accidental contusions or abrasions (Enos, Conrath, & Byer, 1986). Paul (1977, p. 255) writes, "Penetrating injuries result from falls onto a pointed object, and it is very rare for the object to penetrate through the hymenal orifice into the vagina. Indeed, in these cases the hymen is usually not torn at all, and penetration occurs at the lateral margins of the labia minora with the wound entering the vagina through its walls rather than through the hymen." Paul describes the possibility that violent stretching injury, as when a child does a sudden split on a slippery surface, can cause midline lacerations of genital structures. However, he warns that these injuries also can be caused during sexual abuse by violent forced abduction of the legs, and Finkel (1989) reports just such a case.

Herman-Giddens and Frothingham (1987, p. 207) write, "We have not seen hymenal trauma caused by legitimate accidents involving the genitalia." Porkorny and Kozinetz (1988) evaluated 13 girls with accidental genital injuries, including falls on fences and bicycles. Only one girl had a hymenal injury. This was the result of a penetrating injury caused by an examining physician's finger accidentally slipping into the 5-year-old child's vagina.

Labbe (1990) described 10 boys with urinary tract infections apparently caused by the boys injecting water into their own urethras while bathing. No genital injuries were described, however. Similarly, no injuries were seen in 38 infants with neurogenic bladder whose parents or caretakers catheterized them every 4 to 6 hours during the day for a mean of 28 months. Fifteen children actively participated in the procedure themselves (Joseph, Bauer, Colodny, Mandell, & Retik, 1989).

Despite the observation that mentally retarded children may masturbate excessively or insert foreign objects into body orifices, there were no genital or anal injuries reported in a study of self-injurious behavior in 97 mentally retarded individuals between 11 months and

21 years old (Hyman, Fisher, Mercugliano, & Cataldo, 1990). There are a few cases of children with hematuria following admitted self-insertion into the urethra of foreign bodies such as a quartz crystal (Putnam & Stein, 1985) or fishing line (Elder & Young, 1986). The authors warn that assault by an adult must be ruled out, and that self-injurious behavior is more common in abused children. Genital or anal injuries, even in, or perhaps especially in, retarded children, should raise the question of sexual abuse.

Anal and genital injuries can occur accidentally. Straddle injuries are usually unilateral, external, anterior, and have an associated history of acute, dramatic injury. A seat belt injury confused with sexual abuse has been described. The injury was external and the hymen was undamaged (Baker, 1986). Children may incur severe genital injuries by falling on sharp, penetrating objects (Huffman, Dewhurst, & Capraro 1981; Unuigbe & Giwa-Osagie, 1988), but there should be a history of acute trauma that all but the youngest infants will readily give.

The size of normal hymenal openings increases with age. Data exists on hymenal openings in abused and nonabused girls.

Cantwell (1983) first reported that an enlarged hymen opening correlated with a history of sexual abuse. She noted a transverse opening of greater than 4 mm, measured with "slight spreading of the labia," in 80% of girls describing sexual abuse. On re-exam, the majority of girls who had been placed in a protective environment for 3 months to 3 years were found to have smaller hymenal openings. In contrast, girls who had been reabused all had larger openings (Cantwell, 1987). Cantwell was unable to find normative data on hymenal openings. Her report stimulated discussion, controversy, and a series of studies providing such data (see Table 4).

Before Cantwell's article, most authors did not mention criteria for hymenal opening size (Robinson, Sherrod, & Malcarney, 1971; Tilleli, Turek, & Jaffe, 1980; Teixeira, 1981; DeJong, Emmett, & Hervada, 1982; Shah, Holloway, & Valkil, 1982). Others have used descriptive terms like "enlarged," "dilated," "spacious," "marital introitus," and "no hymen," (Camps, 1968; Cupoli & Sewell, 1988; Enos, Conrath, & Byer, 1986; Marshall, Puls, & Davidson, 1988; Orr & Prietto, 1979; Rimza & Niggeman, 1982; Woodling & Kossoris, 1981), or stated that an opening which admits a finger is too large (Enos, Conrath, & Byers, 1986). Some set an upper limit of normal for transverse hymenal diameter in prepubertal girls, such as 0.8 cm (Hobbs & Wynne, 1987) or 1.0 cm (Dube & Hebert, 1988; Muram, 1989a). Because earlier studies did not describe examination position and technique clearly, comparisons are difficult to make (see Table 4). If the labia are merely separated ("separation technique") the hymenal opening size will be smaller than if the labia are gently pulled apart ("traction technique").

Huffman, Dewhurst, and Capraro (1981) were the first to state that the hymenal opening increased with age. By 1986, other clinicians were agreeing (Levitt, 1986; Woodling, 1986). Woodling proposed a general "rule of thumb" that after 5 years of age, the normal transhymenal diameter equals the child's age expressed in millimeters. Others adopted his rule (Emans, 1988; Tipton, 1989) and confirmed it in clinical studies (Claytor, Barth, & Shubin, 1989).

Emans was the first to report hymenal diameters in a clinical series (Emans, Woods, Flagg, & Freman, 1987). A group of prepubertal girls referred for possible abuse was compared to a group referred for other genital complaints and a third group with no genital complaints. Hymenal size was significantly greater in the first two groups. Within the abused group, hymenal openings were significantly greater in girls with a history of coitus rather than of fondling only. Two subsequent studies (Adams, Ahmad, & Phillips, 1988; White, Ingram, & Lyna, 1989) confirmed that horizontal hymenal diameter increases with age and with the degree of genital manipulation described.

McCann performed the first study on children carefully selected for nonabuse. "Control" groups in previous studies had been suspect because there had been no means of assuring that abused children were not included, no small problem when as many as 10% to 25% of children are abused before age 18 years. McCann reported hymenal opening size in prepubertal girls using three different exam techniques (McCann et al., 1990). McCann also found, in a recent longitudinal study of healing in three girls age 4 months, 4 years, and 9 years, with genital injuries following a single episode of sexual assault, that the horizontal width of the hymenal opening was not helpful in indicating that abuse had occurred. With the supine labial separation technique, measurements greater than 4mm were obtained in only 4 of 17 separate follow-up examinations over 1- to 3- years' time (McCann, Voris, & Simon, 1992).

While hymenal opening size is not a "test for sexual abuse," it is not clinically irrelevant. An opening that is two standard deviations or more larger than normal is of concern, and a more detailed exam and history are warranted. The size of the hymenal opening can vary with the type of hymen, with vaginal relaxation, exam position, degree of traction on the labia, body habitus, and the time since abuse occurred. If a hymen is injured, the opening size may become smaller with healing, or close off entirely to present the appearance of an imperforate hymen (Berkowitz, Elvik, & Logan, 1987; Woodling, 1986). As girls enter puberty, estrogen alters hymen tissue so that opening size becomes difficult to assess (McCann, Voris & Simon, 1992; Underhill & Dewhurst, 1978).

Paradise (1990) reviewed the limitations of existing studies of hymenal diameters in abused girls. She pointed out that if the sole finding of an enlarged hymenal orifice is used to predict sexual abuse, many unnecessary investigations will be launched, and many abused children with small openings will remain undetected and unprotected. She concluded, "The diagnosis of sexual abuse inevitably rests not on a genital measurement but on descriptive statements made by a child."

Transmission of sexually transmitted diseases outside the perinatal period by nonsexual means is a rare occurrence. When children are found to have sexually transmitted diseases outside the perinatal period, the possibility of nonsexual transmission of sexually transmitted diseases (STDs) is raised, but this question rarely arises when adults are infected. DeJong and Finkel (1990), Neinstein, Goldenring, and Carpenter (1984), and Paradise (1990) have reviewed existing information on nonsexual modes of transmission for specific STDs. When perinatal transmission has been ruled out, gonorrhea or syphilis infections are diagnostic of sexual abuse. Herpes type 2, Chlamydia, Trichomonas, and condyloma infections are extremely likely to be due to abuse, particularly in children out of infancy.

As sexually transmitted diseases have become more common, so has perinatal infection. Chlamydia acquired at birth can persist 2 to 3 years in genital, anal, or pharyngeal sites. Untreated Trichomonas can persist for several months, human papilloma virus can remain latent for up to 8 months of age or longer, and congenital HIV infection may not manifest for months to years. Chlamydia is an obligate intracellular organism, and fomite transmission has never been documented. Fomite transmission may be possible with Trichomonas, but has never been documented. Autoinoculation and fomite transmission may occur with genital warts (Bergeron, Ferenczy, & Richart, 1990; Fleming, Venning, & Evans, 1987; Pacheco, Di Paola, Ribas, Vighi, & Rueda, 1991).

When Chlamydia, Trichomonas, genital warts, or HIV infection are diagnosed, even in children younger than 3 years old, an assessment for sexual abuse is indicated, including a behavioral assessment, interview and medical exam with cultures. In one study in which thorough assessments were done, 10 of 11 children who presented with venereal warts after age 1 year, including four children younger than 3 years old, were proven to have been sexually abused (Herman-Giddens, Gutman, & Berson, 1988). When 96 children under the

Table 4. Reported Transverse Hymenal Opening Size in Girls Allegedly Nonabused or Sexually Abused

Investigator Date of Publication	Number & Age of Girls: Exam Techniques	Alleged Nonabuse		Alleged Sexual Abuse	Comments or Other Information
Huffman 1981	Separation	Infants 7–9 years Premenarchial	5 mm 7 mm 10 mm	—	—
Cantwell 1983	95 girls <13 yrs. "Slight spreading of the labia"	—		>4–5 mm	74% of the girls describing abuse had a vaginal opening >4 mm. In follow-up 19/20 girls in a safe environment had smaller openings and 4/4 children newly abused had larger openings.
Paul 1986	—	3–8 mm		3–8 mm	"There is no constant size"
Woodling 1986	—	Infants–2 yrs. 2–5 years 6–9 yrs. 10–puberty	4 mm 5 mm 9 mm 15 mm	—	"Normal transhymenal diameter equals the child's age in mm"
Levitt 1986	—	<5 yrs. <7 yrs.	<5 mm 7–10 mm	—	—
Hobbs 1987	243 girls 0–15 yrs. "Labia gently parted"	—		>8 mm	—
Muram 1989	205 girls 1–10 yrs. "Labia retracted gently downward and outward"	—		>10 mm	—
Dube 1988	437 girls 2 mos–12 yrs.	—		>10 mm	—

Claytor 1989	688 girls 1–12 yrs. "Labia gently spread"	Approximately 1 mm per year of age in girls without evidence of injury	Hymenal opening size did not appear to vary with age in girls with evidence of anogenital injury	"If the opening size exceeded 1 mm per year of age, further examination should be considered prior to ruling out sexual abuse.
Emans 1987	305 girls 1–14 yrs. "Labia retracted gently downward and outward"	2.8 ± 1.5 mm	4.4 ± 1.9 mm	Girls with other vaginal complaints 5.1 ± 2.7 mm
Adams 1988	116 girls 1–16 yrs. "Labia retracted laterally and downward"	—	1–5 yrs. 5.4 ± 3.5 mm 6–9 yrs. 9.7 ± 4.1 mm 10–12 yrs. 11.7 ± 3.9 mm	"The mean hymenal diameter increased according to the degree of manipulation alleged by the child"
White 1989	242 girls 1–12 yrs. "Labia spread without applying tension to hymenal opening"	3 yrs. 1.1 ± 1.3 mm 5 yrs. 1.2 ± 1.2 mm 7 yrs. 0.3 ± 0.5 mm 9 yrs. 2.4 ± 3.6 mm 11 yrs. 1.3 ± 2.1 mm	3 yrs. 2.3 ± 2.9 mm 5 yrs. 3.1 ± 3.2 mm 7 yrs. 6.6 ± 4.0 mm 9 yrs. 5.4 ± 6.4 mm 11 yrs. 9.3 ± 8.3 mm	Controls: 0% had hymenal size > 4 mm Alleged abuse: 94% had hymenal size > 4 mm "At risk of abuse": 5% had hymenal size > 4 mm
Goff 1989	273 girls 0–8 yrs. "Gentle traction with one hand"	3 yrs. 0.6 ± 1.1 mm 5 yrs. 1.8 ± 1.4 mm 7 yrs. 2.5 ± 1.5 mm	—	Maximal size of hymenal opening in this study 3 yrs. 3 mm 5 yrs. 4 mm 7 yrs. 5 mm
McCann 1989	114 girls 10 mos–10 yrs. traction or knee chest	2–4 yrs. 5.2 ± 1.4 mm 5–7 yrs. 5.6 ± 1.8 mm 8 yrs.–Tanner II = 7.3 ± 1.7 mm	—	"The diameter of the hymenal orifice gradually increases with the age of the child."

age of 13 years who tested positive for HIV were carefully evaluated, 14 (14.6%) were confirmed to have been sexually abused. Three perpetrators knew they were HIV positive and eight perpetrators were aware that the child victim was HIV positive at the time of the assault (Gutman et al., 1991).

There is data on physical findings correlated with other independent indicators of abuse. The criticism has been raised that those who examine children for possible sexual abuse have made lists of subjective or nonspecific physical findings found in those children as providing evidence of sexual abuse. These findings, based solely upon clinician's experience, are "unsupported" and "unaccompanied by corrective feedback." A second generation of examiners has then "passed along the same alleged 'indicators' of molest." (Coleman, 1989, p. 6; Coleman & Clancy, 1990, p. 20).

Is this criticism valid? To a degree, it is. Of 55 articles reviewed on the medical evaluation of sexually abused children (see Tables 1, 2, 3, 4 and references), 36 were clinical studies and the remainder were descriptive, or summaries based on the studies of others. Most of the clinical studies were of children presenting for possible abuse, with no independent confirmation of abuse. Only a few studies report physical findings with criteria for confirmation of actual abuse.

Muram (1989a) reported findings in 205 girls between 1 and 16 years old whose abuse was confirmed by confession of the perpetrator, by an independent witness, by psychological evaluation, or by the child's detailed history. Muram found definitive or specific evidence of abuse in 46%. Findings were correlated to the type of abuse that occurred. Sixteen percent of girls reporting digital assault and 86% of girls reporting genital-genital contact had definitive or specific findings. Adams, Ahmed, and Phillips (1988) also found that physical findings correlated with the type of abuse described. In their series of 140 children, 39% of children described fondling, 74% with alleged penile-vaginal penetration and 57% with a history of penile-rectal penetration had positive physical findings.

Muram (1989b) reported cases in which the perpetrator had confessed or pled no contest to sexual abuse. The examination showed findings "specific" to sexual abuse (see Muram's classification below) in 45% of 31 victims who were girls between the ages of 1 and 17 years. In 18 cases the offender admitted vaginal penetration. Seven of these girls (39%) had either normal or nonspecific exams.

DeJong and Rose (1989) reviewed 39 cases of child sexual abuse with penetration of body orifices "proven" legally by felony conviction of the perpetrator. Physical evidence including genital or anal injuries, sexually transmitted diseases, pregnancy or semen, was present in only 23% (9 of 39). In 13 cases in which the offender pled guilty there was no physical evidence. Interestingly, the rate of conviction was higher in cases in which there was no physical evidence (69%) compared to those in which there was physical evidence (94%). Arguments over details of physical evidence may distract from the most important element in child sexual abuse cases, the history.

Kerns and Ritter (1992a) reviewed 83 cases of child sexual abuse in which the perpetrator had confessed at the time of the medical examination. Normal genital examinations were found in 60% of all confession cases, in 62% of children with perpetrator confessions of digital-vaginal penetration, and in 18% of children with perpetrator confessions of penile-vaginal penetration.

Hobbs and Wynne (1987) evaluated 337 children whose abuse was confirmed by confession, presence of sexually transmitted diseases, witnesses, gross trauma to the genitalia or anus, or a "clear spontaneous history of abuse" by the child. Fifty-eight percent of girls had physical findings relevant to the history of abuse. Thirty-one percent of girls age 0–5 years, 46% of girls age 6 to puberty and 66% of postpubertal girls had findings of scars of the posterior

fourchette, dilation of the hymenal opening or tears in the hymen. Four percent of girls age 0–5 years, 1% of girls age 5 to puberty and 8.5% of postpubertal girls had sexually transmitted diseases. Of 143 children with anal signs of abuse, 53% had tears, 42% had reflex dilation, and 8% had scars.

In another study of findings in 35 child victims of anal sodomy, half had abuse confirmed by confession of the perpetrator. All of these had fissures and abnormal anal dilation (Hobbs & Wynne, 1986). A higher percentage of abnormal anal findings are reported in English studies than in those from America. It is not clear presently whether this is due to differences in examination technique, to differences in severity and frequency of anal abuse in the two countries, and/or to differences in public and professional recognition and awareness of abuse.

Other studies have compared genital findings in children referred for abuse with those in children presumed not to have been abused. Emans et al., (1987), examined 305 girls divided into three groups by history. Thirty-nine percent had a history of sexual abuse, 42% had a routine health exam, and 19% were seen for vaginal complaints. Hymenal transections or tears, condyloma and abrasions were found exclusively in girls with a history of abuse. Hymen tears were specific to girls reporting vaginal penetration with pain or bleeding. Scars, friability of the fourchette, synechiae, attenuated hymens, and bumps on the lower half of the hymenal ring were more often seen in girls with a history of abuse than those presenting for routine exams.

Pokorny and Kozinetz (1988) compared girls seen for alleged sexual abuse with those seen for other complaints. The abused groups had significantly more breaks and mounds of the posterior hymen.

Some normative data exists on physical findings in nonabused children. A careful study of physical findings in children selected for nonabuse was done by McCann and colleagues (McCann, Voris, Simon, & Wells, 1989; McCann et al., 1990). Many findings previously described in sexually abused children were found to be common in nonabused children. Perianal findings included erythema (found in 41%), increased pigmentation (30%), and anal skin tags in the midline (11%). Also common were venous engorgement after two minutes in the knee-chest position (52%) and some dilation of the anus (49%). In girls, common findings were erythema of the vestibule (56%), posterior fourchette midline avascular areas (26%), and urethral dilation with labial traction (15%).

Infrequent findings in children selected for nonabuse included anal skin tags and scars outside the midline (0% and 1%), anal dilation greater than 20mm without the presence of stool in the ampulla (1.2%), irregularity of the completely dilated anal orifice (3%), venous dilation at the beginning of the examination (7%) and prominence of the anal verge (3%). No child had abrasions, hematoma, fissures or hemorrhoids. Uncommon findings in girls included posterior fourchette friability (4.7%), anterior hymenal clefts (1.2%), angular configuration of the hymen edge (9%), notches of the hymen (6%), and less than 10% of the introitus covered by hymen (6%).

There is a spectrum of physical findings produced by molestation. Some physical findings are quite specific for abuse, while other findings are nonspecific. Edema of the introitus, a nonspecific finding, becomes a specific finding when a child gives a clear history of recent attempted penile penetration with accompanying pain and subsequent dysuria. The types of physical findings/evidence produced by molestation vary with type of abuse, objects or body parts used, age of the child, amount of force applied, use of lubricants, number of episodes of abuse, and time elapsed before the physical exam. Woodling, (1986) has organized physical findings taking some of these variables into account.

Clinicians report certain types and locations of hymenal injuries are commonly seen after abuse, including attenuation, mounds and notches, particularly of the posterior hymen. As McCann (1990, p. 875) has observed, "One finding receiving more attention is the width of the hymenal membrane at its midline attachment along the posterior rim of the introitus. During actual or attempted penetration, it is this portion of the hymen that is most likely to be damaged. A narrow or attenuated hymen at this 6 o'clock location. . . is usually indicative of an injury to this membrane. The additional finding of mounds (bumps), projections, or notches on the edge of the hymen and the exposure of intravaginal ridges further strengthens the possibility that abuse has occurred." When McCann, Voris, and Simon (1992) followed three girls with healing injuries due to a single episode of assault, they found that a narrow hymenal rim at the point of injury was a persistent finding. The original injuries all occurred along the posterior or lateral hymenal rim, between 5 and 9 o'clock.

Teixeira (1981) found that in rape victims, the hymen ruptured most commonly at the 5 to 7 o'clock position. Of 500 patients he examined for sexual offenses, 310 had hymenal ruptures and 193 or 62% had ruptures in this area. He also observed that "ectopic (vulvar) coitus is indicated by lesions at the fourchette as well as by the so-called partial ruptures. This is related to penile impact without penetration."

The experience of Herman-Giddens and Frothingham (1987) is similar. "Hymenal tears and fissures from attempted forced penetration generally occur between the 3 o'clock and 9 o'clock positions and may extend across the vestibule and fourchette."

Similarly,when women were examined for microtrauma following consensual intercourse, evidence of trauma was again found posteriorly, on the hymen, introitus, vagina and posterior fourchette (Norvell, Benrubi, & Thompson, 1984).

Pokorny and Kozinetz (1988) compared findings in girls seen for abuse and for other gyencologic problems. They found that certain hymenal changes were seen in abuse, including remnants, breaks (perpendicular disruptions of hymen from 3 to 9 o'clock), low posterior rims (attenuation), and bumps (mounds) between 3 and 9 o'clock. They caution examiners not to confuse bumps with normal configurations, such as the scallops on the edge of fimbriated hymens or the symmetric wings or flaps seen on posterior rim hymens.

The authors recorded a rare observation, an accidental injury to the hymen which occurred under medical supervision. A 5-year-old child had a break in the hymen at 7 o'clock caused when a physician who was attempting a rectal exam accidentally penetrated the vagina with his finger.

Emans et al. (1987) found that bumps on the lower half of the hymen were seen in molested children more often than in children examined for other reasons. Bumps and clefts at 12 o'clock did not seem to be clinically significant. Studies of newborns indicate that anterior hymenal clefts are common, but posterior clefts are not seen, another indication that posterior clefts are acquired (Berenson, Heger, & Andrews, 1991).

Further support for this principal is provided by a study analyzing hymenal findings in 1,069 girls examined for possible abuse. The prevalence of anterior concavities in the hymen did not change with age, indicating that they are a congenital, persistent anatomical feature. Posterior or lateral concavities in the hymen, and narrowing of the hymen increased in frequency with age, consistent with features that are acquired (Kerns, Ritter, & Leong, 1992).

Attempts have been made to classify physical findings in sexual abuse exams. The term "reasonable medical certainty" is popular among attorneys and is often used in court, but rarely defined. Chadwick (1990) has suggested that the term means certain enough to treat the patient, given the specific treatment that is available, and the consideration of risks of the intervention. Diseases such as the common cold are often incompletely and tentatively diagnosed. This uncertainty is tolerated because it rarely has bad consequences. Careful and

certain diagnoses are made of diseases such as cancer, because of the serious consequences not only of the disease if left untreated but also its treatment with metabolic poisons. Child sexual abuse and its effects are serious conditions with poor outcomes for affected children. The interventions available for child sexual abuse are difficult and often harmful to someone if not the child. For these reasons it may be appropriate to accompany the diagnosis of sexual abuse with an expression of certainty. Several attempts have been made at such a classification.

The National Child Sexual Abuse Summit Meeting in 1985, as reported by Tipton (1989) reached a consensus that the following physical findings "are strongly indicative of sexual abuse and should be legally admissible evidence of that fact, beyond reasonable doubt."

1. Clear-cut hymenal damage or disruption consisting of tears, fresh or old; scars, significant distortion of the normal shape, and/or hymenal bruising.
2. Injuries in the region of the posterior fourchette consisting of lacerations or the scars of healed lacerations, bruises, and healing abraded areas often accompanied by a growth of new blood vessels called neovascularization.
3. An anus that dilates to greater than 15 mm transverse diameter with very gentle buttock traction with the child in knee-chest prone position, or an anus that demonstrates large scars in the absence of a history of medical or surgical disease affecting the anorectal region which could produce the scars.

Muram (1989a) has proposed the following classification of physical findings.

1. Normal appearing genitalia.
2. Nonspecific findings—Abnormalities of the genitalia that could have been caused by sexual abuse but also are often seen in girls who are not victims of sexual abuse (e.g., inflammation and scratching). These findings may be the sequelae of poor hygiene or nonspecific infection. Included in this category are redness of the external genitalia, increased vascular pattern of the vestibular and labial mucosa, presence of purulent discharge from the vagina, small skin fissures or lacerations in the area of the posterior fourchette, and agglutination of the labia minora.
3. Specific findings—The presence of one or more abnormalities strongly suggesting sexual abuse. Such findings include recent or healed lacerations of the hymen and vaginal mucosa, an enlarged hymenal opening of >1 cm, proctoepisiotomy (a laceration of the vaginal mucosa extending through the rectovaginal septum to involve the rectal mucosa), and indentations in the skin indicating teeth (bite) marks. This category also includes patients with laboratory confirmation of a venereal disease.
4. Definitive findings—any presence of sperm.

After reviewing the results of 36 clinical studies and 19 other papers on the medical evaluation of children for possible abuse, we propose the following classifications and precautions.

Findings specific/diagnostic of sexual abuse even in the absence of a history of abuse.

1. Presence of semen, sperm, or acid phosphatase.
2. Pregnancy.
3. Fresh genital or anal injuries (lacerations, abrasions, contusions, transections, avulsions, hematomas, ecchymoses, petechiae, and bite marks) in the absence of an adequate accidental explanation.
4. Positive test or culture for syphilis or gonorrhea (not perinatally acquired).
5. HIV infection (if not acquired perinatally or through intravenous routes).
6. A markedly enlarged hymenal opening for age with associated findings of hymen disruption, including absent hymen, hymenal remnants, healed transections or scars, in the absence of an adequate accidental or surgical explanation.

Emans and Goldstein (1990) and DeJong and Finkel (1990) describe tests for semen and their limitations. If syphilis, gonorrhea or Chlamydia are found in infants, perinatal transmission should be ruled out. False positive tests for sexually transmitted diseases do occur. A positive nontreponemal test (RPR or VDRL) for syphilis should be confirmed by a treponemal test (FTA). A positive culture for gonorrhea should be verified by at least two of three confirmatory tests. The specimen may be frozen for later testing, if necessary. Positive findings on an indirect test for Chlamydia (DFA or EIA) should be confirmed by culture.

A positive ELISA test for HIV infection should be confirmed by Western blot. Other sources of HIV infection should be explored.

Findings consistent with sexual abuse: History and other investigation may be important in diagnosing abuse.

1. Genital or anal Trichomonas, Chlamydia, Condyloma acuminata, or Herpes II, if not perinatally acquired.
2. Disruptions of hymen tissue including posterior or lateral angular concavities (also termed clefts or notches), transections, absence, decrease in amount, and scars.
3. Anal scars outside the midline.
4. Anal skin tags outside the midline.
5. Anal dilation > 15-20mm without stool in the ampulla.
6. Irregularity of the anal orifice after complete dilation.
7. Marked dilation of the hymenal opening, persisting in different exam positions.

Findings sometimes seen following sexual abuse but also other causes: History and other investigation is important in diagnosing abuse.

1. Bacterial vaginosis.
2. Extensive labial adhesions in girls several years out of diapers, with no other cause of labial chafing or denudation.
3. Posterior fourchette friability.
4. Repeated anal dilation < 15mm.
5. Edema of the perianal tissues.
6. Shortening or eversion of the anal canal.
7. Perianal fissures.
8. Thickened perianal skin and reduction of skin folds.
9. Penile erection maintained during examination in prepubertal boys.

Findings unlikely to be due to abuse.

1. Candida albicans dermatitis.
2. Small labial adhesions, or more extensive labial adhesions in girls still in diapers.
3. Erythema of the vestibule.
4. Periurethral bands.
5. Lymphoid follicles on the fossa navicularis.
6. Midline avascular areas of the fossa navicularis or posterior fourchette.
7. Urethral dilation with labial traction.
8. Small hymenal mounds, projections or septal remnants with otherwise normal hymenal anatomy.
9. Concavities of the hymen that are anterior, and/or smooth, curved and shallow.
10. Intravaginal ridges and rugae behind a normal hymen.
11. Imperforate hymen.
12. Perianal erythema.
13. Perianal increased pigmentation.
14. Perianal v
15. Skin tags/
16. Smooth ar
17. Single epis
18. Flattening

Above all, clini
tion of a child fc
medical experts s
soning in the abse
to reduce the diag
ignore the compl

PR

The Internatio
Services, 1980) co
(child maltreatme
codes apply to sex
(injury to genitali
the definition and
sexual abuse.

Research is ne
longitudinal studi
physical findings
perpetrator; (c) he
and duration of p

Abel, G. G., Becker, J.
Self-reported sex cri
Adams, J. A., Ahmad,
sexual abuse examin
Agnarsson, U., Warde
Archives of Disease
Baker, R. (1986). Seat
Bays, J., Chewning, M
during examination
Bays, J., & Jenny, C. (1
of Diseases of Childr
Berenson, A., Heger, A
Bergeron, C., Ferenczy
Journal of Obstetrics
Berkowitz, C. D., Elvik
trauma of sexual abu
Camps, F. E. (Ed.). (19
Cantwell, H. B. (1983)
Neglect, 7, 171–176.
Cantwell, H. B. (1987).
Abuse & Neglect, 11,
Chadwick, D. L. (1990)
955–970.
Claytor, R. N., Barth, K
injury. *Clinical Pedi*

14. Perianal venous engorgement after 2 minutes in the knee-chest position.
15. Skin tags/folds anterior to the anus in the midline.
16. Smooth areas in the midline anterior and posterior to the anus.
17. Single episode of anal dilation < 15-20mm or anal dilation with stool in the ampulla.
18. Flattening of the anal verge and rugae during anal dilation.

Above all, clinicians should remember that the physical exam is only a part of the evaluation of a child for possible abuse. DeJong and Rose (1990, p. 806) have observed, ". . . medical experts should not be forced to exclude sound clinical observation and clinical reasoning in the absence of a reliable gold standard [for the diagnosis for sexual abuse]. Attempts to reduce the diagnosis of physical or child sexual abuse to a simple checklist, formula, or test ignore the complexity of the medical, psychological, social and legal issues involved."

PROPOSALS FOR FUTURE RESEARCH AND ACTION

The International Classification of Diseases (ICD) (U.S. Department of Health & Human Services, 1980) contains codes which describe both the injuring events (assault) and the effects (child maltreatment syndrome) which are found in physically abused children. Several ICD codes apply to sexually abused children, 995.5 (child maltreatment), 959.9 (rape), and 959.1 (injury to genitalia or anus). We propose that new editions of the ICD be expanded to include the definition and description of physical and psychological conditions resulting from child sexual abuse.

Research is needed to clarify: (a) Physical findings in nonabused children, particularly longitudinal studies to document physical changes in structures like the hymen over time; (b) physical findings correlated with independent indicators of abuse, such as confession by a perpetrator; (c) healing of single and multiple episodes of genital and anal trauma; (d) rates and duration of persistent carriage of perinatally acquired STD's.

REFERENCES

Abel, G. G., Becker, J. V., Mittelman, M. S., Cunningham-Rahtner, J.L, Rouleau, J. L., & Murphy, W. D. (1987). Self-reported sex crimes of nonincarcerated paraphiliacs. *Journal of Interpersonal Violence*, 2, 3–25.

Adams, J. A., Ahmad, M., & Phillips, P. (1988). Anogenital findings and hymenal diameter in children referred for sexual abuse examination. *Adolescent and Pediatric Gynecology*, **1**, 123-127.

Agnarsson, U., Warde, C., McCarthy, G., & Evans, N. (1990). Perianal appearances associated with constipation. *Archives of Disease in Childhood*, **65**, 1231–1234.

Baker, R. (1986). Seat belt injury masquerading as sexual abuse. *Pediatrics*, 77, 435.

Bays, J., Chewning, M., Keltner, L., Sewell, R., Steinberg, M., & Thomas, P. (1990). Changes in hymenal anatomy during examination of prepubertal girls for possible sexual abuse. *Adolescent and Pediatric Gynecology*, 3, 42–46.

Bays, J., & Jenny, C. (1990). Genital and anal conditions confused with child sexual abuse trauma. *American Journal of Diseases of Children*, **144**, 1319–1322.

Berenson, A., Heger, A., & Andrews, S. (1991). Appearance of the hymen in newborns. *Pediatrics*, **87**, 458–465.

Bergeron, C., Ferenczy, A., & Richart, R. (1990). Underwear: contamination by human papillomaviruses. *American Journal of Obstetrics and Gynecology*, **162**, 25–29.

Berkowitz, C. D., Elvik, S. L., & Logan, M. (1987). A simulated "acquired" imperforate hymen following the genital trauma of sexual abuse. *Clinical Pediatrics*, **26**, 307–309.

Camps, F. E. (Ed.). (1968). *Gradwohl's Legal Medicine*. Baltimore, MD: Williams & Wilkins Company.

Cantwell, H. B. (1983). Vaginal inspection as it relates to child sexual abuse in girls under thirteen. *Child Abuse & Neglect*, 7, 171–176.

Cantwell, H. B. (1987). Update on vaginal inspection as it relates to child sexual abuse in girls under thirteen. *Child Abuse & Neglect*, **11**, 545–546.

Chadwick, D. L. (1990). Preparation for court testimony in child abuse cases. *Pediatrics Clinics of North America*, **37**, 955–970.

Claytor, R. N., Barth, K. L., & Shubin, C. I. (1989). Evaluating child sexual abuse: observations regarding ano-genital injury. *Clinical Pediatrics*, 28, 419–422.

Coleman, L. (1989). Medical examination for sexual abuse: have we been mislead? *The Champion*, **XIII**, 5–16.
Coleman, L., & Clancy, P. E. (1990). False allegations of child sexual abuse: why is it happening? What can we do? *Criminal Justice*, **5**, 14–47.
Cowell, C. A. (1981). The gynecological examination in infants, children, and young adolescents. *Pediatric Clinics of North America*, **28**, 247–266.
Cupoli, J. M., & Sewell, P. M. (1988). One thousand fifty-nine children with a chief complaint of sexual abuse. *Child Abuse & Neglect*, **12**, 151–162.
DeJong, A. R., Emmett, G. A., Hervada, A.R. (1982). Sexual abuse of children. *American Journal of Diseases of Children*, **136**, 129–134.
DeJong, A. R., & Finkel, M. A. (1990). Sexual abuse of children. *Current Problems in Pediatrics*, **XX**, 490–567.
DeJong, A. R., & Rose, M. (1989). Legal proof of child sexual abuse in the absence of physical evicence. *American Journal of Diseases of Children*, **143**, 422.
DeJong, A. R., & Rose, M. (1990). Child abuse. In reply. (letter to the editor) *Pediatrics*, **86**, 805–806.
Dickinson, R.L. (1945). Tampons as menstrual guards. *Journal of the American Medical Association*, **128**, 490–494.
Dorland's Illustrated Medical Dictionary (27th ed.). (1988). Philadelphia, PA: W. B. Saunders Company.
Dube, R. & Hebert, M. (1988). Sexual abuse of children under 12 years of age: a review of 51 cases. *Child Abuse & Neglect*, **12**, 321–330.
Elder, J. S., & Young, L.W. (1986). Radiologic case of the month; calcified vesical foreign body. *American Journal of Diseases of Children*, **140**, 55–56.
Ellerstein, N. S., & Canavan, J. W. (1980). Sexual abuse of boys. *American Journal of Diseases of Children*, **134**, 255–257.
Emans, S. J. H., & Goldstein, D. P. (1977). *Pediatric and adolescent gynecology*, (1st ed.). Boston, MA: Little, Brown, & Company.
Emans, S. J. (1988). Evaluation of sexually abused child and adolescent. *Adolescent and Pediatric Gynecology*, **1**, 157–163.
Emans, S. J., & Goldstein, D. P. (1990). *Pediatric and adolescent gynecology*, (3rd ed.). Boston, MA: Little, Brown & Company.
Emans, S. J., Woods, E. R., Flagg, N. T., & Freeman, A. (1987). Genital findings in sexually abused, symptomatic and asymtomatic girls. *Pediatrics*, **79**, 778–785.
Enos, W. F., Conrath, T. B., & Byer, J. C. (1986). Forensic evaluation of the sexually abused child. *Pediatrics*, **78**, 385–398.
Farber, E. D., Showers, J., Johnson, C. F., Joseph, J.A., & Oshins, L. (1984). The sexual abuse of children: a comparison of male and female vicitims. *Journal of Clinical Child Psychology*, **13**, 294–297.
Finkel, M.A. (1989). Anogenital trauma in sexually abused children. *Pediatrics*, **84**, 317–322.
Finkelhor, D. (1986). *A source book on child sexual abuse*. Beverly Hills, CA: Sage Publications.
Fleming, K.A., Venning, V., & Evans, M. (1987). DNA typing of genital warts and diagnosis of sexual abuse of children. *Lancet*, **11**, 454.
Goff, C. W., Burke, K. R., Rickenback, C. & Buebendorf, D. P. (1989). Vaginal opening measurement in prepubertal girls. *American Journal of Diseases of Children*, **143**, 1366–1368.
Groth, A. N., & Burgess, A. W. (1977). Sexual dysfunction during rape. *New England Journal of Medicine*, **297**, 764–766.
Gutman, L.T., St. Claire, K. K., Weedy, C., Herman-Giddens, M.E., Lane, B.A., Niemeyer, J.G., & McKinney, R.E (1991). Human immunodeficiency virus transmission by child sexual abuse. *American Journal of Diseases of Children*, **145**, 137–141.
Herman-Giddens, M. E., & Frothingham, T. E. (1987). Prepubertal female genitalia; examination for evidence of sexual abuse. *Pediatrics*, **80**, 203–208.
Herman-Giddens, M. E., Gutman, L. T., Berson, N. L., & the Duke Child Protection Team. (1988). Association of coexisting vaginal infections and multiple abusers in female children with genital warts. *Sexually Transmitted Diseases*, **15**, 63–67.
Hobbs, C. J., & Wynne, J. M (1986). Buggery in childhood-a common syndrome of child abuse. *Lancet*, **11**, 792–796.
Hobbs, C. J., & Wynne, J. M. (1987). Child sexual abuse - an increasing rate of diagnosis. *Lancet*, **II**, 837–841.
Hobbs, C. J., & Wynne, J. M. (1989). Sexual abuse of English boys and girls: the importance of anal examination. *Child Abuse & Neglect*, **13**, 195–210.
Huffman, J. W., Dewhurst, C. J., & Capraro, V. J. (1981). *The gynecology of childhood and adolescence* (2nd ed.). Philadelphia, PA; W. B. Saunders.
Hyman, S. L., Fisher, W., Mercugliano, & Cataldo, M. F. (1990). Children with self injurious behavior. *Pediatrics*, **85**, 437–441.
Jenny, C., Kuhns, M. L. D., & Arakawa, F. (1987). Hymens in newborn female infants. *Pediatrics*, **80**, 399–400.
Johnson, C. F. (1991). Prolapse of the urethra: confusion of clinical and anatomic characteristics with sexual abuse. *Pediatrics*, **87**, 722–725.
Joseph, D. B., Bauer, S. B., Colodny, A. H., Mandell, J., & Retik, A. B. (1989). Clean, intermittent catheterization of infants with neurogenic bladder. *Pediatrics*, **84**, 78–82.
Kellogg, N. D. & Parra, J. M. (1991). Linea vestibularis: a previously undescribed normal genital structure in female neonates. *Pediatrics*, **87**, 926–929.
Kerns, D. L., & Ritter, M. L. (1992a). Medical findings in child sexual abuse cases with perpetrator confessions. (Abstract) *American Journal of Diseases of Children*, **146**, 494.

Kerns, D. L. & Ritter, M. L. (1992b). Body weight and hymenal opening size in prepubertal suspected sexual abuse victims. (Abstract) *American Journal of Diseases of Children*, **146**, 473.
Kerns, D. L., Ritter, M. L. & Leong, T. (1992). Age-specific trends for selected hymenal findings in suspected child abuse victims. *American Journal of Diseases in Children*, **146**, 461.
Labbe, J. (1990). Self-induced urinary tract infection in school-age boys. *Pediatrics*, **86**, 703–706.
Ladson, S., Johnson, C. F., Doty, R. E. (1987). Do physicians recognize sexual abuse? *American Journal of Diseases of Children*, **141**, 411–415.
Lazar, L. F., & Muram, D. (1989). The prevalence of perianal and anal abnormalities in a pediatric population referred for gastrointestinal complaints. *Adolescent and Pediatric Gynecology*, **2**, 37–39.
Levitt, C. J. (1986). Sexual abuse in children: A compassionate yet thorough approach to evaluation. *Postgraduate Medicine*, **80**, 201–215.
Mahran, M., & Saleh, A. M. (1964). The microscopic anatomy of the hymen. *Anatomic Record*, **149**, 313–318.
McCann, J. (1988, January). Patterns of healing in cases of sexual abuse. Paper presented at symposium Health Sciences Response to Child Maltreatment, San Diego, CA.
McCann, J., (1990). Use of the colposcope in childhood sexual abuse examinations. *Pediatric Clinics of North America*, **37**, 863–880.
McCann, J., Voris, J., & Simon, M., (1992). Genital injuries resulting from sexual abuse: a longitudinal study. *Pediatrics*, **89**, 307–317.
McCann, J., Voris, J., Simon, M., & Wells, R., (1989) Perianal findings in prepubertal children selected for nonabuse: A descriptive study. *Child Abuse & Neglect*, **13**, 179–193.
McCann, J., Wells, R., Simon, M., & Vorris, J. (1990). Genital findings in prepubertal girls selected for nonabuse: A descriptive study. *Pediatrics*, **86**, 428–439.
Marshall, W. N., Puls, T., & Davidson, C. (1988). New child abuse spectrum in an era of increased awareness. *American Journal of Diseases of Children*, **142**, 664–667.
Mor, N., & Merlob, P. (1988). Congenital absence of the hymen only a rumor? *Pediatrics*, **82**, 679.
Muram, D. (1989a). Child sexual abuse-genital tract findings in prepubertal girls. *American Journal of Obstetrics and Gynecology*, **160**, 328–333.
Muram, D. (1989b). Child sexual abuse: relationship between sexual acts and genital findings. *Child Abuse & Neglect*, **13**, 211–216.
Muram, D., & Rau, F. J. (1991). Anatomic variations of the bulbocavernosus muscle. *Adolescent and Pediatric Gyncology*, **4**, 85–86.
Neinstein, L.S., Goldenring, J., & Carpenter, S. (1984). Nonsexual transmission of sexually transmitted diseases: an infrequent occurrence. *Pediatrics*, **74**, 67–76.
Norvell, M. K., Benrubi, G. I., & Thompson, R. J. (1984). Investigation of microtrauma after sexual intercourse. *Journal of Reproductive Medicine*, **29**, 269–271.
Orr, D. P., & Prietto, S. V. (1979). Emergency management of sexually abused children. *American Journal of Diseases of Children*, **13**, 628–631.
Pacheco, B. P., Di Paola, G., Ribas, J. M., Vighi, S., & Rueda, N. G., (1991). Vulvar infection caused by human papilloma virus in children and adolescents without sexual contact. *Adolescent and Pediatric Gynecology*, **4**, 136–142.
Paradise, J. E. (1990). The medical evaluation of the sexually abused child. *Pediatric Clinics of North America*, **37**, 839–862.
Paul, D. M. (1977). The medical examination in sexual offenses against children. *Medicine Science and the Law*, **17**, 251–258.
Pokorny, S. (1987). Configuration of the prepubertal hymen. *American Journal of Obstetrics and Gynecology*, **157**, 950–956.
Pokorny, S. F., & Kozinetz, C. A. (1988). Configuration and other anatomic details of the prepubertal hymen. *Adolescent and Pediatric Gynecology*, **1**, 97–103.
Putnam, N., & Stein, M. (1985). Self inflicted injuries in childhood: a review and a diagnostic approach. *Clinical Pediatrics*, **24**, 514–518.
Reinhart, M. A. (1987). Sexually abused boys. *Child Abuse & Neglect*, **11**, 229–235.
Rimza, M. E. & Niggemann, E. H. (1982). Medical evaluation of sexually abused children: a review of 311 cases. *Pediatrics*, **69**, 8–14.
Robinson, H. A., Sherrod, D. B., & Malcarney, C. N. (1971). Review of child molestation and alleged rape cases. *American Journal of Obstetrics and Gynecology*, **110**, 405–406.
Rock, J. A., & Azziz, R. (1987). Genital anomalies in childhood. *Clinical Obstetrics and Gynecology*, **30**, 682–696.
Shah, C. P., Holloway, C. P., & Valkil, D. V. (1982). Sexual abuse of children. *Annals of Emergency Medicine*, **11**, 18–23.
Spencer, M.J., & Dunklee, P. (1986). Sexual abuse of boys. *Pediatrics*, **78**, 133–137.
Stewart, D. (1990, January). Tampon use and physical findings in sexually abused adolescents. Paper presented at the fourth annual meeting of the North American Society for Pediatric and Adolescent Gynecology, Costa Mesa, CA.
Teixeira, W. R. G. (1981). Hymenal colposcopic examination in sexual offenses. *American Journal of Forensic Medicine and Pathology*, **3**, 209–214.
Thomas, C. L. (Ed.). (1985). *Taber's Cyclopedic Medical Dictionary*. Philadelphia, PA: F.A. Davis Company.
Tilleli, J. A., Turek, D., & Jaffe, A. C. (1980). Sexual abuse of children: clinical findings and implications for management. *New England Journal of Medicine*, **302**, 319–323.

Tipton, A. C. (1989). Child sexual abuse: physical examination techniques and interpretation of findings. *Adolescent and Pediatric Gynecology*, **2**, 10–25.
Underhill, R. A., & Dewhurst, J. (1978). The doctor cannot always tell: Medial examination of the "intact" hymen. *Lancet*, **I**, 375–376.
Unuigbe, J. A. & Giwa-Osagie, A. W. (1988). Pediatric and adolescent gynecological disorders in Benin City, Nigeria. *Adolescent and Pediatric Gynecology*, **1**, 257–261.
U. S. Department of Health and Human Services (1980). The International Classification of Diseases. 9th Revision Clinical Modification, 2nd edition. DHHS Publication 80-1260.
White, S. T., Ingram, D. L., & Lyna, P. R. (1989). Vaginal introital diameter in the evaluation of sexual abuse. *Child Abuse & Neglect*, **123**, 217–224.
Woodling, B. A. (1986). Sexual abuse and the child. *Emergency Medical Services*, **15**, 17–25.
Woodling, B. A., & Kossoris, P.D. (1981). Sexual misuse: Rape, molestation and incest. *Pediatric Clinics of North America*, **28**, 481–499.

Résumé—Cet article revoit les enseignements des deux dernières décades sur le diagnostic médical de l'enfant sexuellement abusé. Les études montrent que l'examen physique des victimes d'abus sexuel est fréquemment normal, que la cicatrisation des lésions dûes à l'abus est rapide et parfois complète, qu'une minorité de victimes sont des garçons, que la transmission non sexuelle de maladies sexuellement transmissibles est rare et que des états congénitaux et acquis peuvent mimer les signes physiques causés par l'abus sexuel. Cet article résume la recherche clinique sur les signes physiques chez les enfants non abusés, chez les enfants abusés et chez les enfants abusés avec confirmation indépendante de l'abus. Une classification des signes physiques est proposée permettant une certitude croissante que l'abus physique a bien eu lieu. L'histoire de l'enfant est essentielle pour poser un diagnostic précis dans la plupart des cas d'abus sexuel.

Resumen—Este artículo revisa lo que se conoce en las últimas dos décadas sobre el diagnóstico médico del abuso sexual a los niños. Los estudios indican que un examen físico normal es común en víctimas de abuso sexual, que la cicatrización de las heridas ocasionadas por el abuso es rápido y algunas veces completo, que una minoría de las víctimas examinadas son muchachos, que la transmisión de enfermedades que no son sexualmente transmisibles es rara, y que condiciones congénitas y adquiridas pueden falsear los hallazgos físicos ocasionados por el abuso sexual. El artículo resume la investigación clínica sobre hallazgos físicos en niños no-abusados, niños abusados, y niños abusados con una confirmacion independiente de abuso. Se propone una clasificación de los hallazgos físicos sobre el continuum de la certeza de que ha ocurrido el abuso sexual.

8.

1071-

Child Abuse & Neglect, Vol. 13, pp. 165–166, 1989
Printed in the U.S.A.

0145-2134/89 $3.00 + .00

EDITORIAL

THE MORE WE LEARN, THE LESS WE KNOW "WITH REASONABLE MEDICAL CERTAINTY"?

IN THE PAST twelve years of this Journal, there have been many occasions when we have chosen to have a special issue. Past volumes have included the topics of Sexual Abuse (7:2), Infant Mental Health (8:2), C. Henry Kempe Memorial Research Issue (9:2), Outcomes (10:3), and the Steele Festschrift issue (11:3). The need for a special medical issue was decided at the 1987 editorial board meeting in Denver, and Kim Oates agreed to be the special editor. Much of the work of soliciting, reviewing, and editing has been his.

In reading this medical issue, those working in the field may be struck, as I was, at a number of things:

1. There is a marked variability of medical findings in children examined for sexual abuse in different parts of the world. To the *careful* reader of these, and previous, papers that have described the physical findings of sexually abused children, this variability is not surprising. To the less careful, it may come as a shock since many have thought that there was a fairly high degree of specificity in the "hymenal diameter," "synechiae," "scars at six o'clock," and other findings, based on published reports in the literature. These papers are not comparable since they use different populations of children (abused, nonabused), examined by different physicians using different techniques, in different parts of the world (Denver, Fresno, Raleigh, Leeds).
2. The reaction of professionals working in the field to new findings is also noteworthy. Some U.S. reviewers of the Hobbs and Wynne article in this issue, for example, said that their observations could not possibly be true because the numbers of children with positive physical findings were so much higher than those of children seen in their practices. Further, reviewers cautioned that publication of this paper would lead to widespread difficulty in the prosecution of sexual abuse cases in the U.S. because attorneys and courts would use the paper improperly.

We cannot reject papers because uninformed, uncritical, or even unscrupulous individuals misquote, misinterpret, or misuse the literature. My own personal observations of the problem of sexual abuse in the United States and the United Kingdom last summer lead me to think that the rate of positive physical findings in the two countries is probably inversely related to the significant differences in public and professional awareness. The very high awareness in the U.S. brings children to physicians very early, and before many physical findings exist. In the U.K., I had the impression that Hobbs, Wynne, and others were seeing the "battered children" of sexual abuse.

There may, of course, be other explanations as well. One hopes that we will soon have cross-cultural and other sociologic data to help us understand this panoply of findings. In the meantime, all those working in the field would be wise to gather their own data for their own populations, and be cautious in how they interpret these and other papers. The medical diagnosis of sexual abuse usually cannot be made on the basis of physical findings alone. With the exception of acquired gonorrhea or syphilis, or the presence of forensic evidence of sperm

Child Abuse & Negle
Printed in the U.S.A

or semen, there are no pathognomonic findings for sexual abuse. Critical to this diagnosis is a child's history. A hymenal diameter of > 4 mm alone, reflex anal dilation alone, or a scar at six o'clock alone is not diagnostic of sexual abuse. Observing these findings should make one want to know more, and should lead to a multidisciplinary investigation if the history is positive. Courts can then decide whether there is enough information available to reach a level of certainty to enable to civilly protect a child, and/or enough to permit the criminal prosecution.

"Reasonable Medical Certainty"

The term "reasonable medical certainty" is one used in U.S. courts when physicians are asked for their expert medical opinions. The data presented in this issue of the Journal may modify some of these opinions in coming months. Future studies will probably modify them again. That is neither new nor surprising. The more we learn, the less we know "with reasonable medical certainty"? As we continue to learn from research findings, we will continue to know more—not less. We may, however, be asked to do less with what we know in court.

Richard D. Krugman, M.D.
Editor in Chief

THE PREV
plinary task
contribute t
on the medi
has always
early papers
alerted colle
cated studie
condition w
cians, even i
pediatrician
and workin
this issue w
clarify some
Some of the
Another i
readers. It is
lawyers, nu
groups need
The pape
Child Synd
sexual abus
is a more re
the legal im
ings, are no
are importa
confirmato
children, or
of abuse wh
have long-t
abuse or fro
of professio
action is of
longer-term
Despite t
ber that ph
lems which
continue to
commitme

9.

AMERICAN ACADEMY OF PEDIATRICS

Committee on Child Abuse and Neglect

Guidelines for the Evaluation of Sexual Abuse of Children: Subject Review

ABSTRACT. **This statement serves to update guidelines for the evaluation of child sexual abuse first published in 1991. The role of the physician is outlined with respect to obtaining a history, physical examination, and appropriate laboratory data and in determining the need to report sexual abuse.**

ABBREVIATIONS. AAP, American Academy of Pediatrics; STDs, sexually transmitted diseases; HIV, human immunodeficiency virus.

Few areas of pediatrics have expanded so rapidly in clinical importance in recent years as that of sexual abuse of children. What Kempe called a "hidden pediatric problem"[1] in 1977 is certainly less hidden at present. In 1996, more than 3 million children were reported as having been abused to child protective service agencies in the United States, and almost 1 million children were confirmed by child protective service agencies as victims of child maltreatment.[2] According to a 1996 survey, physical abuse represented 23% of confirmed cases, sexual abuse 9%, neglect 60%, emotional maltreatment 4%, and other forms of maltreatment 5%.[2] Other studies have suggested that approximately 1% of children experience some form of sexual abuse each year, resulting in the sexual victimization of 12% to 25% of girls and 8% to 10% of boys by age 18.[3] Children may be sexually abused by family members or nonfamily members and are more frequently abused by males. Boys may be victimized nearly as often as girls, but may not be as likely to disclose the abuse. Adolescents are perpetrators in at least 20% of reported cases; women may be perpetrators, but only a small minority of sexual abuse allegations involve women. The child care setting, an otherwise uncommon setting for abuse, may be the site for women offenders. Pediatricians may encounter sexually abused children in their practices and may be asked by parents and other professionals for consultation. These guidelines are intended for use by all health professionals caring for children. In addition, specific guidelines published by the American Academy of Pediatrics (AAP) for the evaluation of sexual assault of the adolescent by age group should be used.[5]

This statement has been approved by the Council on Child and Adolescent Health.

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

Because pediatricians have trusted relationships with patients and families, they are often able to provide essential support and gain information that may not be readily available to others involved in the investigation, evaluation, or treatment processes. However, some pediatricians may not feel adequately prepared at present to perform a medical evaluation of a sexually abused child without obstructing the collection of essential evidence. Pediatricians need to be knowledgeable about the available resources in the community, including consultants with special expertise in evaluating or treating sexually abused children.

DEFINITION

Sexual abuse occurs when a child is engaged in sexual activities that the child cannot comprehend, for which the child is developmentally unprepared and cannot give consent, and/or that violate the law or social taboos of society. The sexual activities may include all forms of oral-genital, genital, or anal contact by or to the child, or nontouching abuses, such as exhibitionism, voyeurism, or using the child in the production of pornography.[1] Sexual abuse includes a spectrum of activities ranging from rape to physically less intrusive sexual abuse.

Sexual abuse can be differentiated from "sexual play" by determining whether there is a developmental asymmetry among the participants and by assessing the coercive nature of the behavior.[6] Thus, when young children at the same developmental stage are looking at or touching each other's genitalia because of mutual interest, without coercion or intrusion of the body, this is considered normal (ie, nonabusive) behavior. However, a 6-year-old who tries to coerce a 3-year-old to engage in anal intercourse is displaying abnormal behavior, and the health and child protective systems should be contacted although the incident may not be legally considered an assault. Children or adolescents who exhibit inappropriate sexual behavior may be reacting to their own victimization.

PRESENTATION

Sexually abused children are seen by pediatricians in a variety of circumstances: 1) They may be seen for a routine physical examination or for care of a medical illness, behavioral condition, or physical finding that would include child sexual abuse as part of the differential diagnosis. 2) They have been or are thought to have been sexually abused and are brought by a parent to the pediatrician for evalua-

tion. 3) They are brought to the pediatrician by social service or law enforcement professionals for a medical evaluation for possible sexual abuse as part of an investigation. 4) They are brought to an emergency department after a suspected episode of sexual abuse for evaluation, evidence collection, and crisis management.

The diagnosis of sexual abuse and the protection of the child from further harm depends in part on the pediatrician's willingness to consider abuse as a possibility. Sexual abuse presents in many ways,[7] and because children who are sexually abused generally are coerced into secrecy, a high level of suspicion may be required to recognize the problem. The presenting symptoms may be so general (eg, sleep disturbances, abdominal pain, enuresis, encopresis, or phobias) that caution must be exercised when the pediatrician considers sexual abuse, because the symptoms may indicate physical or emotional abuse or other nonabuse-related stressors. Among the more specific signs and symptoms of sexual abuse are rectal or genital bleeding, sexually transmitted diseases, and developmentally unusual sexual behavior.[8] Pediatricians evaluating children who have these signs and symptoms should at least consider the possibility of abuse and, therefore, should make a report to child welfare personnel if no other diagnosis is apparent to explain the findings.

Pediatricians who suspect sexual abuse has occurred or is a possibility are urged to inform the parents of their concerns in a calm, nonaccusatory manner. The individual accompanying the child may have no knowledge of, or involvement in, the sexual abuse of the child. A complete history, including behavioral symptoms and associated signs of sexual abuse, should be sought. The primary responsibility of the pediatrician is the protection of the child, sometimes requiring a delay in informing the parent(s) while a report is made and an expedited investigation by law enforcement and/or child protective services can be conducted.

TAKING A HISTORY/INTERVIEWING THE CHILD

In many states, the suspicion of child sexual abuse as a possible diagnosis requires a report both to the appropriate law enforcement and child protective services agencies. All physicians need to know their state law requirements and where and when to file a written report. The diagnosis of sexual abuse has civil (protective) and criminal ramifications. Investigative interviews should be conducted by the designated agency or individual in the community to minimize repetitive questioning of the child. This does not preclude physicians asking relevant questions to obtain a detailed pediatric history and to obtain a review of systems. The courts have allowed physicians to testify regarding specific details of the child's statements obtained in the course of taking a medical history to provide a diagnosis and treatment. Occasionally, children spontaneously describe their abuse and indicate who abused them. When asking young children about abuse, the use of line drawings,[9] dolls,[10] or other aids[11] are generally used only by professionals trained in interviewing young children. The American Academy of Child and Adolescent Psychiatry and American Professional Society on the Abuse of Children have published guidelines for interviewing sexually abused children.[12,13] Children may also describe their abuse during the course of the physical examination. It is desirable for those conducting the interview to use nonleading questions; avoid showing strong emotions such as shock or disbelief; and maintain a "tell me more" or "and then what happened" approach. If possible, the child should be interviewed alone. Written notes in the medical record or audiotape or videotape should be used to document the questions asked and the child's responses. Most expert interviewers do not interview children younger than 3 years.

A behavioral history may reveal events or behaviors relevant to sexual abuse, even in the absence of a clear history of abuse in the child.[7] The parent(s) may be defensive or unwilling to accept the possibility of sexual abuse, which does not necessarily negate the need for investigation.

When children are brought for evaluation by protective personnel, little or no history may be available other than that provided by the child. The pediatrician should try to obtain an appropriate history in all cases before performing a medical examination. The child may spontaneously give additional information during the physical examination, particularly as the mouth, genitalia, and anus are examined. History taking should focus on whether the symptoms are explained by sexual abuse, physical abuse to the genital area, or other medical conditions.[14]

PHYSICAL EXAMINATION

The physical examination of sexually abused children should not result in additional emotional trauma. The examination should be explained to the child before it is performed. It is advisable to have a chaperone present—a supportive adult not suspected of involvement in the abuse.[15] Children may be anxious about giving a history, being examined, or having procedures performed. Time must be allotted to relieve the child's anxiety.

When the alleged sexual abuse has occurred within 72 hours, or there is bleeding or acute injury, the examination should be performed immediately. In this situation, protocols for child sexual assault victims should be followed to secure biological trace evidence such as epithelial cells, semen, and blood, as well as to maintain a "chain of evidence." When more than 72 hours has passed and no acute injuries are present, an emergency examination usually is not necessary. An evaluation therefore should be scheduled at the earliest convenient time for the child, physician, and investigative team.[5]

The child should have a thorough pediatric examination, including brief assessments of developmental, behavioral, mental, and emotional status. Special attention should be paid to the growth parameters and sexual development of the child. In the rare instance when the child is unable to cooperate and the examination must be performed because of the likelihood of trauma, infection, and/or the need to collect forensic samples, consideration should be

given to using sedation with careful monitoring. Instruments that magnify and illuminate the genital and rectal areas should be used.[16,17] Signs of trauma should be carefully documented by detailed diagrams illustrating the findings or photographically. Specific attention should be given to the areas involved in sexual activity—the mouth, breasts, genitals, perineal region, buttocks, and anus. Any abnormalities should be noted.

In female children, the genital examination should include inspection of the medial aspects of the thighs, labia majora and minora, clitoris, urethra, periurethral tissue, hymen, hymenal opening, fossa navicularis, and posterior fourchette.

Various methods for visualizing the hymenal opening in prepubertal children have been described. Many factors will influence the size of the orifice and the exposure of the hymen and its internal structures. These include the degree of relaxation of the child, the amount of traction (gentle, moderate) on the labia majora, and the position of the child (supine, lateral, or knee to chest).[17,18] The technique used is less important than maximizing the view and recording the method and results (see below for discussion of significance of findings). Speculum or digital examinations should not be performed on the prepubertal child.

In male children, the thighs, penis, and scrotum should be examined for bruises, scars, chafing, bite marks, and discharge.

In both sexes, the anus can be examined in the supine, lateral, or knee to chest position. As with the vaginal examination, the child's position may influence the appearance of anatomy. The presence of bruises around the anus, scars, anal tears (especially those that extend into the surrounding perianal skin), and anal dilation are important to note. Laxity of the sphincter, if present, should be noted, but digital examination is not usually necessary (see below for discussion of significance of findings). Note the child's behavior during the examination, and ask the child to demonstrate any events that may have occurred to the areas of the body being examined. Care should be taken not to suggest answers to the questions.

LABORATORY DATA

Forensic studies should be performed when the examination occurs within 72 hours of acute sexual assault or sexual abuse. The yield of positive cultures is very low in asymptomatic prepubertal children, especially those whose history indicates fondling only.[19] The examiner should consider the following factors when deciding whether to obtain cultures and perform serologic tests for sexually transmitted diseases (STDs): the possibility of oral, genital, or rectal contact; the local incidence of STDs; and whether the child is symptomatic. The Centers for Disease Control and Prevention and the AAP also provide recommendations on laboratory evaluation.[20,21] The implications of the diagnosis of an STD for the reporting of child sexual abuse are listed in Table 1. Pregnancy prevention guidelines have been published by the AAP.[5]

TABLE 1. Implications of Commonly Encountered Sexually Transmitted Diseases (STDs) for the Diagnosis and Reporting of Sexual Abuse of Infants and Prepubertal Children

STD Confirmed	Sexual Abuse	Suggested Action
Gonorrhea*	Diagnostic†	Report‡
Syphilis*	Diagnostic	Report
HIV§	Diagnostic	Report
*Chlamydia**	Diagnostic†	Report
Trichomonas vaginalis	Highly suspicious	Report
Condylomata acuminata* (anogenital warts)	Suspicious	Report
Herpes (genital location)	Suspicious	Report‖
Bacterial vaginosis	Inconclusive	Medical follow-up

* If not perinatally acquired.
† Use definitive diagnostic methods such as culture or DNA probes.
‡ To agency mandated in community to receive reports of suspected sexual abuse.
§ If not perinatally or transfusion acquired.
‖ Unless there is a clear history of autoinoculation. Herpes 1 and 2 are difficult to differentiate by current techniques.

DIAGNOSTIC CONSIDERATIONS

The diagnosis of child sexual abuse often can be made based on a child's history. Physical examination alone is infrequently diagnostic in the absence of a history and/or specific laboratory findings. Physical findings are often absent even when the perpetrator admits to penetration of the child's genitalia.[22–24] Many types of abuse leave no physical evidence, and mucosal injuries often heal rapidly.[25–27] Occasionally, a child presents with clear evidence of anogenital trauma without an adequate history. Abused children may deny abuse. Findings that are concerning, but in isolation are not diagnostic of sexual abuse include: 1) abrasions or bruising of the inner thighs and genitalia; 2) scarring or tears of the labia minora; and 3) enlargement of the hymenal opening. Findings that are more concerning include: 1) scarring, tears, or distortion of the hymen; 2) a decreased amount of or absent hymenal tissue; 3) scarring of the fossa navicularis; 4) injury to or scarring of the posterior fourchette; and 5) anal lacerations.[18,26–28] The physician, the multidisciplinary team evaluating the child, and the courts must establish a level of certainty about whether a child has been sexually abused. Table 2 provides suggested guidelines for making the decision to report sexual abuse of children based on currently available information. The presence of semen, sperm, or acid phosphatase; a positive culture for gonorrhea; or a positive serologic test for syphilis or human immunodeficiency virus (HIV) infection makes the diagnosis of sexual abuse a medical certainty, even in the absence of a positive history, when congenital forms of gonorrhea, syphilis, and congenital or transfusion-acquired HIV (as well as needle sharing) are excluded.

Other physical signs or laboratory findings that are suspicious for sexual abuse require a complete history from the child and caregivers. If the child does not disclose abuse, the physician may wish to observe the child closely to monitor changes in behavior or physical findings. If the history is positive, a report should be made to the agency authorized to receive reports of sexual abuse.

TABLE 2. Guidelines for Making the Decision to Report Sexual Abuse of Children

Data Available			Response	
History	Physical Examination	Laboratory Findings	Level of Concern About Sexual Abuse	Report Decision
None	Normal	None	None	No report
Behavioral changes†	Normal	None	Variable depending upon behavior	Possible report*; follow closely (possible mental health referral)
None	Nonspecific findings	None	Low (worry)	Possible report*; follow closely
Nonspecific history by child or history by parent only	Nonspecific findings	None	Intermediate	Possible report*; follow closely
None	Specific findings‡	None	High	Report
Clear statement	Normal	None	High	Report
Clear statement	Specific findings	None	High	Report
None	Normal, nonspecific or specific findings	Positive culture for gonorrhea; positive serologic test for HIV; syphilis; presence of semen, sperm acid phosphatase	Very high	Report
Behavior changes	Nonspecific findings	Other sexually transmitted diseases	High	Report

* A report may or may not be indicated. The decision to report should be based on discussion with local or regional experts and/or child protective services agencies.
† Some behavioral changes are nonspecific, and others are more worrisome.[7]
‡ Other reasons for findings ruled out.[13]

The differential diagnosis of genital trauma also includes accidental injury and physical abuse. This differentiation may be difficult and may require a careful history and multidisciplinary approach. Because many congenital malformations and infections or other causes of anal-genital abnormalities may be confused with abuse, familiarity with these other causes is important.[14,18]

Physicians should be aware that child sexual abuse often occurs in the context of other family problems including physical abuse, emotional maltreatment, substance abuse, and family violence. If these problems are suspected, referral for a more comprehensive evaluation is imperative. In difficult cases, pediatricians may find consultation with a regional child abuse specialist or assessment center helpful.

After the examination, the physician should provide appropriate feedback and reassurance to the child and family.

RECORDS

Because the likelihood of civil or criminal court action is high, detailed records, drawings, and/or photographs should be kept. The submission of written reports to county agencies and law enforcement departments is encouraged. Physicians required to testify in court are better prepared and may feel more comfortable if their records are complete and accurate. The more detailed the reports and the more explicit the physician's opinion, the less likely the physician may need to testify in civil court proceedings. Testimony will be likely, however, in criminal court, where records alone are not a substitute for a personal appearance. In general, the ability to protect a child may often depend on the quality of the physician's records.[28]

TREATMENT

All children who have been sexually abused should be evaluated by the pediatrician or mental health provider to assess the need for treatment and to measure the level of parental support. Unfortunately, treatment services for sexually abused children are not universally available. The need for treatment varies depending on the type of sexual molestation (whether the perpetrator is a family member or nonfamily member), the duration of the molestation, and the age and symptoms of the child. Poor prognostic signs include more intrusive forms of abuse, more violent assaults, longer periods of sexual molestation, and closer relationship of the perpetrator to the victim. The parents of the victim may also need treatment and support to cope with the emotional trauma of their child's abuse.

LEGAL ISSUES

The legal issues confronting pediatricians in evaluating sexually abused children include mandatory reporting with penalties for failure to report; involvement in the civil, juvenile, or family court systems; involvement in divorce or custody proceedings in divorce courts; and involvement in criminal prosecution of defendants in criminal court. In addition, there are medical liability risks for pediatricians who fail to diagnose abuse or who misdiagnose other conditions as abuse.

All pediatricians in the United States are required under the laws of each state to report suspected as well as known cases of child sexual abuse. These guidelines do not suggest that a pediatrician who evaluates a child with an isolated behavioral finding (nightmares, enuresis, phobias, etc) or an isolated physical finding (erythema or an abrasion of the

labia or traumatic separation of labial adhesions) is obligated to report these cases as suspicious. If additional historical, physical, or laboratory findings suggestive of sexual abuse are present, the physician may have an increased level of suspicion and should report the case. Pediatricians are encouraged to discuss cases with their local or regional child abuse consultants and their local child protective services agency. In this way, agencies may be protected from being overburdened with high numbers of vague reports, and physicians may be protected from potential prosecution for failure to report.

Increasing numbers of cases of alleged sexual abuse involve parents who are in the process of separation or divorce and who allege that their child is being sexually abused by the other parent during custodial visits. Although these cases are generally more difficult and time-consuming for the pediatrician, the child protective services system, and law enforcement agencies, they should not be dismissed because a custody dispute exists. Allegations of abuse that occur in the context of divorce proceedings should either be reported to the child protective services agency or followed closely. A juvenile court proceeding may ensue to determine if the child needs protection. The pediatrician should act as an advocate for the child in these situations and encourage the appointment of a guardian ad litem by the court to represent the child's best interests. The American Bar Association indicates that the majority of divorces do not involve custody disputes, and relatively few custody disputes involve allegations of sexual abuse.[28]

In both criminal and civil proceedings, physicians must testify to their findings "to a reasonable degree of medical certainty."[27] For many physicians, this level of certainty may be a focus of concern because in criminal trials the pediatrician's testimony is part of the information used to ascertain the guilt or innocence of an alleged abuser.

Pediatricians may find themselves involved in civil malpractice litigation. The failure of a physician to recognize and diagnose sexual abuse in a timely manner may lead to a liability suit if a child has been brought repeatedly to the physician and/or a flagrant case has been misdiagnosed. The possibility of a suit being filed against a physician for an alleged "false report" exists; however, to our knowledge there has been no successful "false report" suit against a physician as of this writing. Statutes generally provide immunity as long as the report is done in good faith.

Civil litigation suits may be filed by parents against individuals or against institutions in which their child may have been sexually abused. The physician may be asked to testify in these cases. In civil litigation cases, the legal standard of proof in almost all states is "a preponderance of the evidence."

CONCLUSION

The evaluation of sexually abused children is increasingly a part of general pediatric practice. Pediatricians are part of a multidisciplinary approach to prevent, investigate, and treat the problem and need to be competent in the basic skills of history taking, physical examination, selection of laboratory tests, and differential diagnosis. An expanding clinical consultation network is available to assist the primary care physician with the assessment of difficult cases.[29]

REFERENCES

1. Kempe CH. Sexual abuse, another hidden pediatric problem: the 1977 C. Anderson Aldrich lecture. *Pediatrics.* 1978;62:382–389
2. Wang CT, Daro D. *Current Trends in Child Abuse Reporting and Fatalities: The Results of the 1996 Annual Fifty State Survey.* Chicago, IL: National Committee to Prevent Child Abuse; 1997
3. Finkelhor D. *Sourcebook on Child Sexual Abuse.* Beverly Hills, CA: Sage Publications; 1986
4. Finkelhor D, Williams LM. *Nursery Crimes: Sexual Abuse in Day Care.* Newbury Park, CA: Sage Publications; 1988
5. American Academy of Pediatrics, Committee on Adolescence. Sexual assault and the adolescent. *Pediatrics.* 1994;94:761–765
6. Yates A. Differentiating hypererotic states in the evaluation of sexual abuse. *J Am Acad Child Adolesc Psychiatry.* 1991;30:792
7. Krugman RD. Recognition of sexual abuse in children. *Pediatr Rev.* 1986;8:25–30
8. Friedrich WN, Grambsch P. Child sexual behavior inventory: normative and clinical comparisons. *Psychol Assess.* 1992;4:303–311
9. Hibbard RA, Roghmann K, Hoekelman RA. Genitalia in children's drawings: an association with sexual abuse. *Pediatrics.* 1987;79:129–137
10. American Professional Society on the Abuse of Children. *Use of Anatomical Dolls in Child Sexual Abuse Assessments.* Chicago, IL: American Professional Society on the Abuse of Children; 1995
11. Jones DPH, McQuiston M. *Interviewing the Sexually Abused Child.* 2nd ed. Denver, CO: C. Henry Kempe National Center for the Prevention and Treatment of Child Abuse and Neglect; 1986
12. American Academy of Child and Adolescent Psychiatry. Practice parameters for the forensic evaluation of children and adolescents who may have been physically or sexually abused. *J Am Acad Child Adolesc Psychiatry.* 1997;36:423–442
13. American Professional Society on the Abuse of Children. *Guidelines for Psychosocial Evaluation of Suspected Sexual Abuse in Young Children.* Chicago, IL: American Professional Society on the Abuse of Children; 1990
14. Bays J, Jenny C. Genital and anal conditions confused with child sexual abuse trauma. *Am J Dis Child.* 1990;144:1319–1322
15. American Academy of Pediatrics, Committee on Practice and Ambulatory Medicine. The use of chaperones during the physical examination of the pediatric patient. *Pediatrics.* 1996;98:1202
16. Jones JG, Lawson L, Rickert CP. Use of optical glass binocular magnifiers in the examination of sexually abused children. *Adolesc Pediatr Gynecol.* 1990;3:146–148
17. Bays J, Chadwick D. Medical diagnosis of the sexually abused child. *Child Abuse Negl.* 1993;17:91–110
18. Heger A, Emans SJ, et al. *Evaluation of the Sexually Abused Child: A*

Medical Textbook and Photographic Atlas. New York, NY: Oxford University Press; 1992

19. Siegel RM, Schubert CJ, Meyers PA, Shapiro RA. The prevalence of sexually transmitted diseases in children and adolescents evaluated for sexual abuse in Cincinnati: rationale for limited STD testing in prepubertal girls. *Pediatrics*. 1995;96:1090–1094
20. Centers for Disease Control and Prevention. 1998 sexually transmitted diseases treatment guidelines. *Morbid Mortal Wkly Rep*. 1998;47(No. RR-1):1–116
21. American Academy of Pediatrics. Sexually transmitted diseases. In: Peter G, ed. *1997 Red Book: Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997: 108–116
22. Muram D. Child sexual abuse: relationship between sexual acts and genital findings. *Child Abuse Negl*. 1989;13:211–216
23. Kerns DL, Ritter ML. Medical findings in child sexual abuse cases with perpetrator confessions. *Am J Dis Child*. 1992;146:494
24. Adams JA, Harper K, Knudson S, Revilla J. Examination findings in legally confirmed child sexual abuse: it's normal to be normal. *Pediatrics*. 1994;94:310–317
25. Finkel MA. Anogenital trauma in sexually abused children. *Pediatrics*. 1989;84:317–322
26. McCann J, Voris J, Simon M. Genital injuries resulting from sexual abuse: a longitudinal study. *Pediatrics*. 1992;89:307–317
27. McCann J, Voris J. Perianal injuries resulting from sexual abuse: a longitudinal study. *Pediatrics*. 1993;91:390–397
28. Nicholson EB, Bulkley J, eds. *Sexual Abuse Allegations in Custody and Visitation Cases: A Resource Book for Judges and Court Personnel*. Washington, DC: American Bar Association, National Legal Resource Center for Child Advocacy and Protection; 1988
29. American Academy of Pediatrics, Section on Child Abuse and Neglect. *A Guide to References and Resources in Child Abuse and Neglect*. 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997

10.

Child Abuse & Neglect, Vol. 13, pp. 179-193, 1989
Printed in the U.S.A. All rights reserved.

0145-2134/89 $3.00 + .00

PERIANAL FINDINGS IN PREPUBERTAL CHILDREN SELECTED FOR NONABUSE: A DESCRIPTIVE STUDY

JOHN MCCANN, JOAN VORIS, MARY SIMON, AND ROBERT WELLS

Department of Pediatrics, Valley Medical Center, Fresno, CA

Abstract—The results of the perianal portion of a project designed to collect normative data of the anogenital anatomy from a representative sample of prepubertal children is presented. A total of 318 children were examined by three physicians from a child sexual abuse evaluation program. After screening for the onset of puberty and the possibility of undetected abuse, 267 subjects remained. The sample included 161 girls and 106 boys ranging in age from 2 months to 11 years. The perianal findings that were encountered with the greatest frequency included erythema (41%), increased pigmentation (30%), and venous engorgement (52%) after two minutes in the knee-chest position. Wedge-shaped smooth areas in the midline, with or without depressions, were found both anterior and posterior to the anus in 26% of the children. Anal skin tags/folds were discovered anterior to the anus in 11%. In 49% of the children there was some dilatation of the anus which opened and closed intermittently in 62%. Flattening of the anal verge and rugae occurred during dilatation by the midpoint of the examination in 44% and 34%, respectively. Perianal findings that were found infrequently in all subgroups included skin tags/folds (0%) and scars (1%) outside the midline, anal dilatation greater than 20 mm without the presence of stool in the rectal ampulla (1.2%), irregularity of the anal orifice after complete dilatation (3%), and prominence of the anal verge (3%). No abrasions, hematomas, fissures, or hemorrhoids were encountered. Less commonly detected findings within specific subgroups included perianal erythema in girls (32%) as compared to boys (57%), pigmentation in the lighter skinned white children (22%) when compared to black (53%) and Hispanic (58%) children, and venous congestion at the beginning of the examination (7%) when compared to the same findings after four minutes in the knee-chest position (73%). There were no perianal skin tags/folds found in the boys. The relatively high incidence of perianal soft tissue changes that were found in this study, when compared to the frequency of similar observations in children suspected of having been sexually abused, reemphasizes the caution medical examiners must exercise in rendering an opinion as to the significance of medical findings.

Key Words—Sexual abuse, Childhood sexual abuse, Prepubertal anogenital findings, Perianal physical findings.

See also Editorials, Commentaries, and pp. 195-224.

INTRODUCTION

WITH THE DRAMATIC INCREASE in the number of reported cases of child sexual abuse, the necessity for medical examiners to have normative data regarding the anatomical findings of the anogenital region has become crucial. The need is particularly great for the perianal portion of the examination where findings associated with anal abuse continue to increase in number and now include the commonly found skin changes of erythema (Hobbs & Wynne, 1986; Hobbs & Wynne, 1987; Marshal, Puls, & Davidson, 1988; Reinhart, 1987; Spencer

This project was supported in part by grants from the Medical Research Committee, Valley Medical Center and from the Office of Child Abuse Prevention (OCAP), State Department of Social Services, Sacramento, CA.

Preliminary data from this study was presented during the Health Science Response to Child Maltreatment Conference, San Diego, CA, January 21, 1988.

Received for publication December 9, 1988; final revision received February 9, 1988; accepted February 14, 1988.

Reprint requests may be sent to John McCann, M.D., Department of Pediatrics, Valley Medical Center, 445 S. Cedar Avenue, Fresno, CA 93702.

& Dunklee, 1986) and increased pigmentation (Adams, Ahmad, & Phillip, 1988; Herman-Giddens & Frothingham, 1987; Spencer & Dunklee, 1986). Unquestionably, forced anal intercourse can result in abrasions, lacerations, and hematomas (Ellerstein & Canavan, 1980; Marshal et al., 1988; Reinhart, 1987). However, the significance of the findings associated with the nonviolent and ongoing form of sexual abuse is less certain (Reinhart, 1987; Spencer & Dunklee, 1986). In addition to erythema and increased pigmentation, recent reports in the medical literature have identified venous congestion (Hobbs & Wynne, 1986; Hobbs & Wynne, 1987; Paul, 1986; Spencer & Dunklee, 1986); thickened rugae (Hobbs & Wynne, 1986; Herman-Giddens & Frothingham, 1987; Marshall et al., 1988; Muram, 1988; Paul, 1986); anal laxity (Adams et al., 1988; Herman-Giddens & Frothingham, 1987; Hobbs & Wynne, 1986; Hobbs & Wynne, 1987; Muram, 1988; Paul, 1986; Spencer & Dunklee, 1986); fissures (Emans, Woods, Flagg, & Freeman, 1987; Herman-Giddens & Frothingham, 1987; Hobbs & Wynne, 1986; Paul, 1986; Spencer & Dunklee, 1986); scars (Adams et al., 1988; Herman-Giddens & Frothingham, 1987; Hobbs & Wynne, 1987; Paul, 1986; Spencer & Dunklee, 1986); and tags (Emans et al., 1987; Herman-Giddens & Frothingham, 1987; Spencer & Dunklee, 1986) as occurring with increased frequency in the sexually abused child. Unfortunately, neither these studies nor commonly used textbooks (Behrman & Vaughan, 1987; Nesselrod, 1964; Silverman & Roy, 1983) provide data as to the frequency of these findings in the nonabused child. As a response to this need, the following study was begun.

METHOD

Procedure

Following approval by the hospital's Human Subjects Review Committee, parents with prepubertal children were recruited from a central California community for a project designed to determine the anogenital anatomical standards of normal for both males and females. Between April 1984 and June 1988, three faculty physicians from the childhood sexual abuse evaluation team of a county-sponsored teaching hospital provided free well-child care, school, sports, and camp examinations for those families willing to participate in the study. Notices for these "research project" examinations were posted in the local schools, day care centers, churches, physicians' offices, and in the local newspaper. The nature of the study was unspecified in the announcement; however, upon calling for an appointment, the parents were informed that the purpose of the study was to establish anatomical standards of normal that could be used for comparison purposes in childhood sexual abuse cases.

At the time of the examination, a project nurse provided the family with a more specific description of the study's methodology before obtaining informed consents for both the examination and the colposcopic photographs. While the children were out of the room, the nurse reviewed the general health questionnaire completed by the parents and conducted a detailed structured interview that included physical, behavioral, and emotional symptoms (SIPBES). The children were prepared for the examination by another nurse who recorded their height and weight, checked their blood pressure, and tested their vision and hearing. They were encouraged to look through the eye piece of the colposcope and a doll was used to explain the procedures to be employed during the examination. The children were not interviewed.

The perianal portion of the examination was performed with the children in the knee-chest position. This consisted of placing the child in a kneeling position with the chest resting on the examination table in a swaybacked posture. Gentle lateral traction of the buttocks was applied in order to separate the gluteal cleft and enable the examiner to better visualize the anus. Care was taken to avoid placing tension on the perianal tissues. The technique used to maintain the child in a state of relaxation consisted of having the child count, perform mathe-

matical problems or describe a pleasant experience in great detail. In the spring of 1986, approximately the midpoint of the project, a colposcope with its magnifying lenses and 35 mm camera was introduced into the study.

Subject Selection

The data were analyzed through the use of the BMDP biomedical statistical package (Dixon et al., 1981) and subjected to a quantitative review in which the findings were scrutinized for possible trends that might indicate the presence of undetected sexual abuse. Based upon information in the literature (Adams et al., 1988; Behrman & Vaughan, 1987; Canavan, 1981; Dixon et al., 1981; Ellerstein & Canavan, 1980; Emans et al., 1987; Gorsch, 1955; Herman-Giddens & Frothingham, 1987; Hobbs & Wynne, 1986; Hobbs & Wynne, 1987; Hollinshead & Rosse, 1985; Huffman, Dewhurst, & Caprano, 1978; Jones, 1982; Kempe, 1978; Krugman, 1986; Marshal et al., 1988; Muram, 1988; Nesselrod, 1964; Parks, Porter, & Melzak, 1962; Pascoe, 1979; Pascoe & Duterte, 1987; Paul, 1986; Reinhart, 1987; Silverman & Roy, 1983; Spencer & Dunklee, 1986), a screening method using three independent data sources was developed and consisted of (1) the children's physical, behavioral, and emotional symptoms (SIPBES) as obtained from the parents during the structured interview; (2) the examiners' opinion of normal versus abnormal (or questionable) based on reports of anatomical changes associated with sexual abuse (Adams et al., 1988; Ellerstein & Canavan, 1980; Emans et al., 1987; Herman-Giddens & Frothingham, 1987; Hobbs & Wynne, 1986, 1987; Marshall et al., 1988; Muram, 1988; Paul, 1986; Reinhart, 1987; Spencer & Dunklee, 1986); and (3) an unusually high incidence of other physical findings that were not used in the determination of normality.

The questions used in the SIPBES to generate the first independent data source were obtained from information in the literature on children's responses to sexual abuse (Canavan, 1981; Jones, 1982; Kempe, 1978; Pascoe, 1979; Pascoe & Duterte, 1987). Twenty-eight of the questions about physical symptoms dealt primarily with the gastrointestinal and genitourinary system. The presence of enuresis, encopresis, dysuria, urinary tract infections, vaginal bleeding, vaginal discharge, rectal pain, rectal bleeding, constipation, recurrent diarrhea, and genital injuries were some of the subjects covered. Eighteen questions focused on developmentally sensitive aspects of behavioral and emotional responses that were age related. These included the presence of headaches, stomachaches, nightmares, fears, difficulty sleeping, difficulty concentrating, moodiness, crying easily, overly mature behavior, withdrawal, change in school performance, unusual self-consciousness about one's body, refusal to undress for physical education, fear of showers/restrooms, truancy, cessation in participation in sports or school activities, acting out behaviors and other sudden emotional and behavioral changes. Six questions specifically asked about the child's interest in sex or sexual matters. The interviewers inquired as to the child's knowledge of sex, curiosity about private parts, the acting out of sexual fantasies during play, masturbation, self-penetration, and seductiveness. Finally, parents were asked if they had ever suspected that their child might have been sexually molested.

The examiner's ratings of abnormality, which was used as the second independent data source, were based upon the presence of marked erythema; marked thickening of the folds (rugae) of the anal sphincter; an irregularity of the anal orifice during dilatation; and the presence of hemorrhoids, hematomas, abrasions, fissures, or scars. The physical findings that did not differentiate between the normal, abnormal or questionable subjects were identified by Discriminant Function Analysis and used as the third independent data source. These findings included perianal pigmentation, venous congestion, venous pooling, perianal skin tags/folds, smooth areas with or without depressions, anal dilatation with or without stool in the ampulla, and the occurrence of intermittent opening or closing of the anal sphincters.

Figure 1. Perianal erythema in a 6 year old White female in knee-chest position. Note arrow, well defined anal folds/rugae. Coccyx at top of photograph when taken in knee-chest position. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 2. Perianal pigmentation in 3 year old Hispanic male. Note smooth area with a dimple/depression in midline posterior to anus. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 3. Venous engorgement in a 6 year old Hispanic female after remaining in knee-chest position for 2 minutes. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 4. Prominent anal verge in 3 year old White female in the knee-chest position. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 5. Typical appearance of anus in 6 year old White male in the knee-chest position. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 6. Smooth area with dimple/depression (arrow) anterior to the anus in a 9 year old White female. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 7. Perianal skin tag/fold (arrow) in the midline anterior (ventral) to the anus in a 4 year old Hispanic female. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 8. Anal dilatation with stool present in the rectal ampulla after 2 minutes in knee-chest position. Same 6 year old White male as seen in Fig. 5. Note flattening of anal sphincter skin fold and symmetrical configuration of the orifice. Colposcopic photograph in knee-chest position, magnification × 5.

Figure 9. Anal dilatation without the presence of stool in the rectal ampulla in 4 year old White female. Note normal prominent pectinate line (arrow) and flattened skin folds. Colposcopic photograph in knee-chest position, magnification × 5.

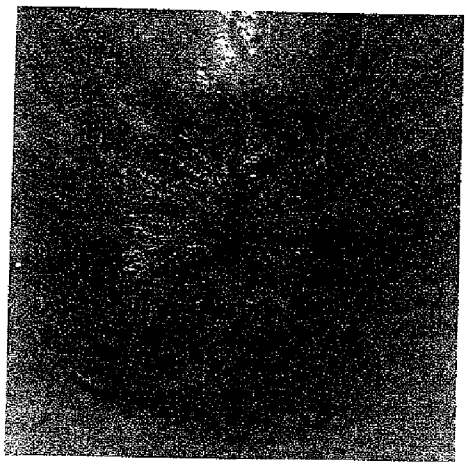


FIG. 1

FIG. 2

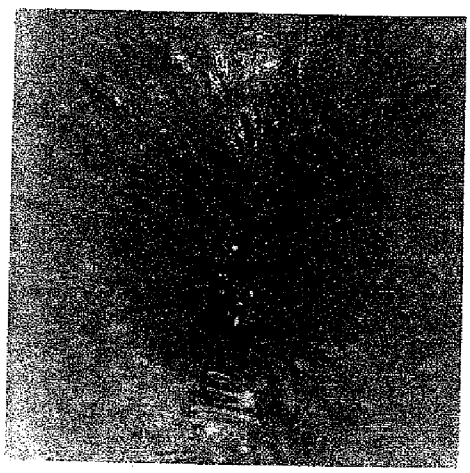


FIG. 3

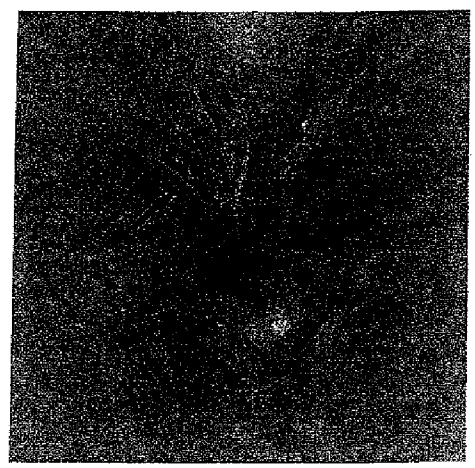


FIG. 4

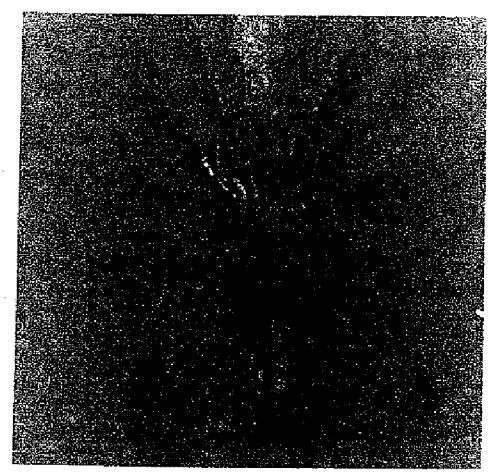


FIG. 5

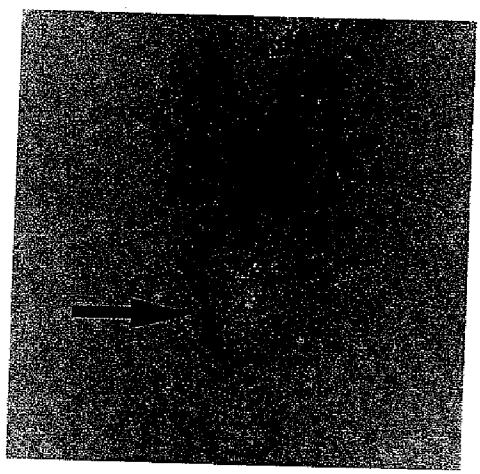


FIG. 6

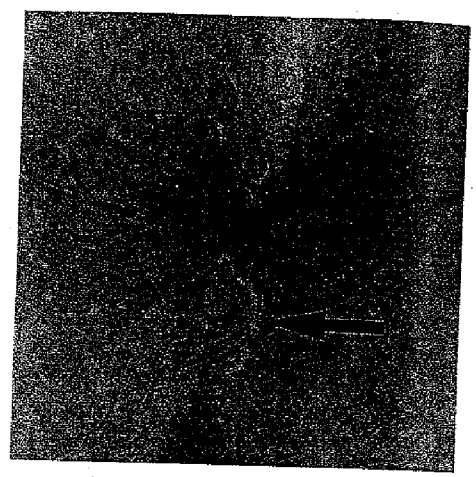


FIG. 7

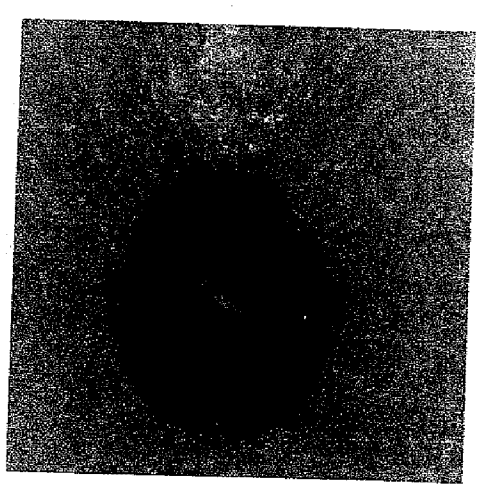


FIG. 8

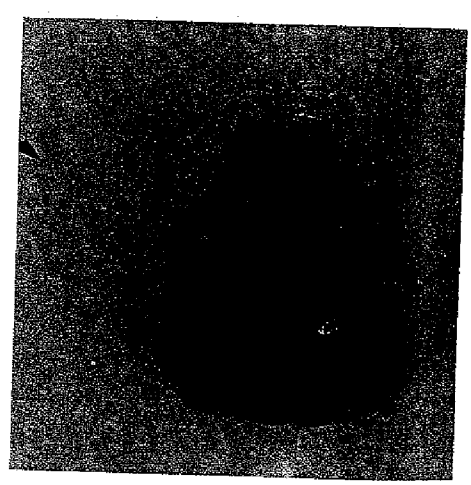


FIG. 9

A mean and standard deviation was then computed for age and sex for the information from the SIPBES and for the physical findings not used in the determination of abnormal or questionable rating. A child who received a score that was two standard deviations or more above the mean on either of these scales received an abnormal rating. A subject who received abnormal ratings for any two of the three independent data sources was removed from the study.

Physical Examination Variables

The perianal portion of the physical examination contained soft tissue observations, quantitation as to the degree of the findings, and the sequence in which these soft tissue changes appeared. The soft tissue findings noted were the presence of erythema (Figure 1) and increased pigmentation (Figure 2), by the degrees of minimal, moderate, or great with their width indicated in millimeters. The existence of venous congestion (Figure 3), the configuration of the anal verge (Figure 4) and anal sphincter skin folds/rugae (Figure 5) were recorded at beginning, midpoint, and end of the knee-chest part of the examination. The presence and location of smooth areas (Figures 2 & 6), dimples/depressions (Figure 6), fissures, scars and tags/folds (Figure 7) were also registered. The finding "smooth area" (Figures 2 & 6) referred to a zone of smooth tissue that was located either on or adjacent to the anal verge. This tissue, which was frequently wedge-shaped, appeared to be normal in color and texture except for the absence of skin folds (rugae) in this area overlying the anal sphincter. Dimples/depressions (Figure 6) consisted of small, midline depressions located in or just beyond the anal verge. When found posterior to the anus, this depression was frequently situated between the verge and the mound formed by the underlying tip of the coccyx.

The following data regarding the anal orifice was also entered into the chart: (1) the appearance of anal dilatation (Figure 8); (2) the time at which the dilatation first occurred; (3) the time when the dilatation reached its maximum size; (4) the vertical and horizontal diameters of the orifice during dilatation; (5) the categorization of the orifice as being round, oval, or irregular; and (6) whether the dilatation was persistent or intermittent. The examiners sought to ascertain if stool was present in the rectal ampulla during dilatation (Figure 9) in the second half of the study. Anal dilatation was considered to have occurred only when both the internal and external sphincters opened.

Prior to the outset of the project, the examiners practiced estimating sizes through the use of flash cards until they were able to consistently come within one millimeter of the test card results. After the introduction of the colposcope with its camera, measurements were obtained directly from the photographs using a specially calibrated measuring device. This device consisted of a photograph of a metric scale taken at the same focal length from the camera as the child. Due to the very narrow depth of field at the highest magnification, this measuring device proved to be accurate to within 1/100 of a millimeter.

Upon completion of the project, the results from the noncolposcopic and the colposcopic portions of the study were compared. Through the use of analysis of variance, it was determined that the only significant differences in findings occurred in the larger percentage of children with erythema noted on the colposcopic photographs (52%) as compared to the noncolposcopic group (33%), and the number of children identified as having anal skin tags/folds during the examination without the colposcope (17/111) as found on the photographic review (1/61). Based upon the results of this evaluation, the remainder of the findings from the two samples were combined for purposes of analysis.

The various time intervals, including the total length of the perianal observation, were recorded by either the nurse or the examiner using a stopwatch or the second hand of a wrist watch. The mean time period for the perianal observation was 3 minutes and 59 seconds with a range of 15 seconds to 8 minutes.

Subjects

A total of 318 children were recruited for the study. Thirty-two subjects were removed from the sample because they were at or beyond Tanner Stage II of secondary sexual development for either breast tissue or pubic hair. Ten children were dropped from the project after their parents indicated they were suspicious that their child might have been molested, and two children with severe neuromuscular impairment were not included in the final analysis due to their pervasive disabilities. An additional seven children were eliminated on the basis of having received two of three indicators of abnormality during the screening for cases of possible undetected abuse. The remaining 267 children were considered to be relatively risk free and became the final study sample.

The study sample consisted of 161 girls and 106 boys ranging in age from 2 months to 11 years with a mean age of 5 years and 7 months. The ethnicity of the children was 65% white, 23% Hispanic, 7% black, 3% Asian, and 2% other. They came from homes in which 85% of the parents were married for the first time; 9% of the mothers had remarried after a divorce; and 6% of the mothers were single. In regard to parents' education, 96% of the mothers and 91% of the fathers had completed high school, while 34% of the mothers and 42% of the fathers had graduated from college. The combined income of the family exceeded $25,000 per year for 64% of the participants.

For purposes of analysis, the children were divided into four age groups. Group I consisted of 12 infants from birth through 1 year, 11 months of age, who, despite their small numbers, were included for the sake of completeness. Group II contained 104 preschool-aged children from 2 years through 4 years, 11 months. Group III included 94 early school-aged children from 5 years through 7 years, 11 months; and Group IV was made up of 57 preadolescent children from 8 years to Tanner State II of secondary sexual development for either breast or public hair. Of the study sample, 39% of the children were above the 75th percentile of the Iowa growth grid in weight, and 30% were above the same percentile in height.

RESULTS

A summary of the perianal findings for the study sample is presented in Table 1. Using analysis of variance, the data was examined for differences by age, race, and sex. With the exception of a race effect on pigmentation, a discrepancy in the amount of erythema by sex, and the finding of anal skin tags/folds only in girls, there were no other significant age, race, or sex differences. The number of infants proved to be too small for statistical analysis.

Perianal erythema (Figure 1) was found in 40.5% of the children. The mean radius of the erythema as measured from the interior edge of the anal verge to the outer border of the color change was 1.5 centimeters with a maximum width of 3 centimeters. Although there was an increase in frequency of erythema in the infant age group, the small number of subjects in this cell prevented the finding from reaching statistical significance. There was a significant difference in the percentage of males (57%) with perianal erythema as compared to the females (32%) ($\chi^2 = 12.3, p < .01$).

Increased perianal pigmentation (Figure 2) was found in 29.5% of the sample. Of the children with this finding, the degree of pigmentation recorded was minimal in 84%, moderate in 13.6%, and great in 2.2%. The mean radius of the pigmentation was 1.6 cm with the maximum width being 4 cm. An analysis of variance revealed a significant difference between the races for the presence of increased pigmentation. Of the white children, 22% had this finding as compared to 53.3% of the black and 57.6% of the Hispanic children ($F = 11.68, p < .00001$). The black children had the greatest increase in the amount of perianal pigmentation with

Erythem
Pigment
Venous c
Beginn
Midpo
End
Anal dila
Intermitt
Configur
Oval
Round
Irregul
Smooth
Dimple/c
Skin tags
Scars

* The nur
the numt
* Include
** May ir
Note. No

17.6% having a
of the white chil
The onset of
ning, midpoint,
these three obse
gorgement of th
was present in 7
by the end of th
The smooth a
children, were a
In 47% (8 of 17
depression (Figu
(ventral) to the a
Anal skin tags
in the preschool
the tags were lo
races; however,
Perianal scars
lesions were loc
other one was at
were recorded d
or hematomas w
Anal sphincte
diameter of the
with a mean of 1
than 20 mm. Th
presence of stool
orifice and the p

Table 1. Frequency of Perianal Findings for Total Sample

Findings	Number of Subjects Observed*	Subjects With Positive Findings	Percentage With Positive Findings
Erythema	168	68	41%
Pigmentation	251	74	30%
Venous congestion			
Beginning	113	8	7%
Midpoint	113	59	52%
End	113	83	73%
Anal dilatation	267	130	49%
Intermittent anal dilatation	130*	81	62%
Configuration during dilatation			
Oval	94	84	89%
Round	94	8	9%
Irregular	94	2	2%
Smooth area	81	21	26%
Dimple/depression	81	15	18%
Skin tags	164	18	11%
Scars	240	4**	2%

* The number of observed subjects varied due to missing data as a result of changes over time in the number of variables assessed.
* Includes only those subjects whose anus dilated.
** May include "smooth area" on anal verge, no photographs available to recheck findings.
Note. No abrasions, hematomas, fissures, or hemorrhoids were discovered in the 267 subjects.

17.6% having a moderate to marked degree as compared to 5.1% for the Hispanic and 2.5% of the white children.

The onset of venous congestion (Figure 3) of the perianal tissues was recorded at the beginning, midpoint, and end of the knee-chest portion of the examination. When the results of these three observations were analyzed, a linear increase in the number of children with engorgement of these vessels over the course of the examination was found. Venous congestion was present in 7% of the subjects initially, in 52% at the midpoint, and in 73% of the children by the end of the examination. No hemorrhoids were found in any of the children.

The smooth areas (Figures 2 & 6) on or near the verge, that were discovered in 26% of the children, were always found in the midline, at either the 6 o'clock or the 12 o'clock positions. In 47% (8 of 17) of the children with this finding, the smooth area was associated with a depression (Figure 6). Midline depressions without a smooth zone were detected anterior (ventral) to the anus in 7 (41%) of the subjects with this finding.

Anal skin tags/folds (Figure 7) were all found in the midline in the same relative proportion in the preschool, school-aged, and preadolescent children. In all but one of the 18 children, the tags were located anterior to anal orifice. There were no differences found between the races; however, no tags were found in the males ($\chi^2 = 10.2$, $p < .005$).

Perianal scars were found in 4 of the 240 children evaluated for this entity. Three of these lesions were located in the midline at the 12 o'clock position posterior to the rectum. The other one was at the 2 o'clock location using the prone, knee-chest position. All of these lesions were recorded during the noncolposcopic part of the study. No fissures, abrasions, lacerations, or hematomas were found in any of the subjects.

Anal sphincter dilatation occurred in 49% of the children (Figure 8). The anterior-posterior diameter of the orifice, as measured in the midline, varied from less than 0.1 cm to 2.5 cm with a mean of 1.0 cm. In 91% of the subjects with anal dilatation, the A-P diameter was less than 20 mm. The percentage of children with anal dilatation of 20 mm or greater without the presence of stool in the rectal ampulla was 1.2%. The relationship between the size of the anal orifice and the presence of stool in the rectal ampulla is shown in Table 2. The "unable to

Table 2. Comparison of Diameter of Anal Orifice with Presence of Stool in Rectal Ampulla

Vertical Diameter (mm)	Stool in Rectal Ampula			Total Subjects[b]
	Yes	No	UTD[a]	
<5.0	2	4	1	7 (9%)
5.0–9.9	2	4	13	19 (23%)
10.0–14.9	18	8	8	34 (42%)
15.0–19.9	7	6	1	14 (17%)
20.0–24.9	6	1*	0	7 (9%)
>25.0	0	0	0	0 (0%)
Total	35 (44%)	23 (28%)	23 (28%)	81 (100%)

[a] UTD = Unable to detect.
[b] 49 of the 130 children with anal dilitation who were examined in the early part of the study were not included due to the lack of notations regarding the presence/absence of stool in the rectal ampulla.
* Abnormal behavioral and emotional response profile just below criteria used for exclusion. (See page 190 for further comments.)

detect" (UTD) results were due to the examiners' inability to ascertain whether stool was present in the ampulla when the anus dilated momentarily or because the orifice was too small to adequately visualize the interior of the rectum. Stool was seen in 44% of the cases in which dilatation took place (Figure 9). The horizontal diameters of the anal orifice ranged from less than 0.1 cm to 2 cm with a mean of 0.57 cm. Although the horizontal diameters of the anal orifice were smaller than the vertical measurements, the relationship between the two measures showed a high degree of correlation ($r = 0.79, p < .005$).

The time of the initial dilatation of the anus was noted. In those with dilatation, 30% opened within 30 seconds, 55% had their initial dilatation before 2 minutes, and 5% dilated after 4 minutes. None of the anuses that opened after 4 minutes had an orifice greater than 15 mm in the anterior–posterior plane. The mean time to the initial dilatation was 65 seconds while the mean time for the anus to reach maximum dilatation was 2 minutes, 11 seconds. The anus remained open once the sphincters dilated in 38% of the children, while the anus opened and closed intermittently in 62% of the subjects in which dilatation occurred.

The anal orifice had a symmetrical oval configuration in 89% of the children whose anus dilated open. In 9% of the subjects the anus was round in appearance, and in 3% it was irregular; 6 children had minimal asymmetry of their anal orifice as it opened and closed intermittently.

The configuration of the anal verge and anal sphincter skin folds/rugae was analyzed in relationship to the presence or absence of anal dilatation. The data revealed that the loss of the slightly "puckered" anal verge and the flattening or smoothing out of the folds was related to the relaxation of the anal sphincter muscles with subsequent dilatation of the anus (Figure 9). Initially, 81% of the children had an identifiable anal verge. In those children whose anus dilated, this percentage dropped to 37% by the midpoint of the examination ($p < .0001$). In the children in which anal dilatation did not occur, the verge was still present in 70% at the half-way point of the examination. The anal sphincter skin folds showed a similar relationship to anal dilatation. Initially 82% of the children had intermediate (1 to 2 mm) or deep (2 mm or greater) rugal folds. At the midpoint, 48% of the children whose anuses dilated had intermediate-sized folds ($p < .001$) as compared to 76% of the subjects in which dilatation did not take place.

The anal verge was considered to be prominent (Figure 4) in 3% of the children who eventually had some anal dilatation and in 2.6% of those who did not dilate. Absent anal sphincter skin folds/rugae were found initially in 1.6% of the children with anal dilatation while at least shallow (less than 1 mm) rugae were seen in all the children whose anuses did not dilate.

This projec
abused prepu
to the popula
abuse in this
1986). Except
to develop the
normal with t
class and well
concerns abou
The numbe
was somewha
they appeared
groups of chil
their presence
Among the
age groups an
ment was seer
chest position
stool present i
and closing of
with or withou
ing of the ana
of the underly
Conversely,
or greater with
orifice during
findings.
There were
subgroups. In
crease in pigm
of the examina
Many of th
age groups, pe
frequent findi
and black chil
crease outflow
to be produce
is responsible f
the responses
external sphin
opening and cl
tary effort and
ampulla.
The smooth
without depres
nal sphincter r
ment, normall
that is present
This forms the

DISCUSSION

This project was designed to collect normative data of the anogenital anatomy of the non-abused prepubertal children. The ethnic composition of the sample studied was very similar to the populace that resides in this central valley of California. The incidence of child sexual abuse in this community is similar to that found in other regions of the country (Krugman, 1986). Except for being somewhat taller and heavier than their counterparts who were used to develop the Iowa growth grids utilized in this project, the children appeared to be otherwise normal with the usual number of minor complaints. The parents were predominately middle class and well educated. The number of intact families was high, and they had relatively few concerns about their children.

The number and variety of perianal physical findings found in this population of children was somewhat surprising. There were findings that occurred with such a high frequency that they appeared to be variants of normal. Some changes were relatively common only in specific groups of children within the study population, while others were found so infrequently that their presence placed the child two standard deviations or more from the group norm.

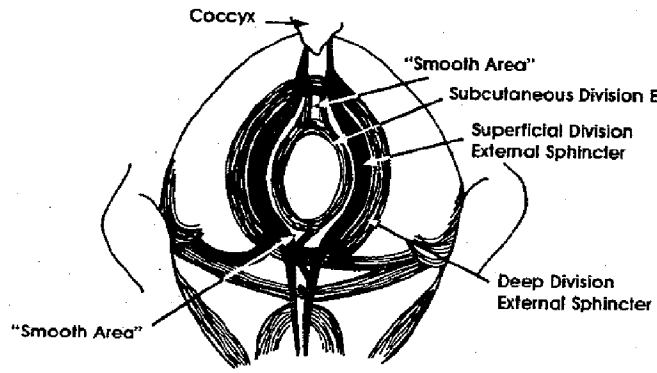
Among the soft tissue changes that were found commonly were perianal erythema in all age groups and an increase in pigmentation in the darker skinned children. Venous engorgement was seen in approximately three-fourths of all the children who remained in the knee-chest position for four minutes or longer. The occurrence of anal dilatation, particularly with stool present in the rectal ampulla, became a familiar finding. Even the intermittent opening and closing of the anal sphincters was not unusual. Midline smooth areas on the verge, either with or without depressions, became commonplace, and the loss of the verge and the flattening of the anal sphincter folds/rugae were soon recognized as being related to the relaxation of the underlying muscle and subsequent dilatation of the anus.

Conversely, perianal skin tags/folds and scars outside the midline, anal dilatation of 20 mm or greater without the presence of stool in the rectal ampulla, marked irregularity of the anal orifice during dilatation, and persistence of a prominent anal verge, all proved to be unusual findings.

There were also a number of perianal findings that were less frequently found within certain subgroups. Included in this category was perianal erythema in girls, moderate to marked increase in pigmentation in a white child, moderate to marked venous congestion at the outset of the examination, and skin tags/folds located posterior to the anus.

Many of the more common findings appear to be easily explained. Although seen in all age groups, perianal erythema was, despite not reaching statistical significance, a particularly frequent finding in the younger child still in diapers. Increased pigmentation in the Hispanic and black children was not unexpected. Venous engorgement was probably related to a decrease outflow of the pelvic venous system. Dilatation of the internal anal sphincter is thought to be produced by distention of the rectum that in turn causes an inhibition of the reflex that is responsible for keeping the anus closed (Parks et al., 1962). This distention further modifies the responses of the anal muscles to stimulation, and the voluntary effort to contract the external sphincter then can be sustained only for a brief period of time. The intermittent opening and closing of the anal sphincters seemed to be related to the inhibition of this voluntary effort and the child's state of relaxation, whether stool was or was not present in the rectal ampulla.

The smooth fan-shaped areas (Figures 2 & 6) in the midline of the verge, either with or without depressions, appear to be a congenital anomaly of the superficial division of the external sphincter muscle fibers. This band of tissue, that is associated with the anococcygeal ligament, normally forms a ring of muscle fibers that encircle the anus and bridge the interval that is present between the converging legs of the superficialis sphincter muscle (Figure 10). This forms the so-called "weak spot" of the anal canal (Hollinshead et al., 1985). Occasionally,



Gorsch, R.V., *Proctologic Anatomy*, Williams and Wilkins, Baltimore, 1955.

Figure 10. Schematic drawing of child in knee-chest position showing common variations in the crossed and uncrossed extensions of the three divisions of the external sphincter in the male. Note location of "smooth area" that occur with and without depressions (arrows). *Note.* From *Protologic Anatomy* by R. V. Gorsch, 1955, Baltimore, MD: Williams & Wilkins. Copyright 1955 by Williams & Wilkins. Reprinted with modifications by permission.

the fibers decussate and form posterior extensions in which there is no annular bridging or "bar" posteriorly (Gorsch, 1955). It is presumed that the absence of this portion of the underlying corrugater cutis ani muscle fibers is responsible for the smooth and oftentimes dimpled or depressed appearance of this area.

In our current state of knowledge, explanations as the cause of the more unusual findings remain more speculative. Is it possible that perianal skin tags/folds found in the midline, anterior to the anus, may be another congenital anomaly? Regrettably, no studies could be found in the medical literature that have examined this possibility. It does appear that the lack of tags/folds in boys was an aberration of the study group since this finding does not fit with the authors' experience.

It is also possible that three of the four scars noted may have been mislabeled and in all likelihood were the defects in the underlying superficial portion of the external anal sphincter that are now thought to be congenital in nature. Unfortunately, all of these scars were recorded early in the study before these smooth areas on the anal verge were recognized, and no colposcopic photographs exist to recheck the original assessment.

Anal dilatation greater than 20 mm with no stool present in the rectal ampulla was unusual. Upon review of the record of the one child in whom this finding occurred, it was discovered that the mother of this 7-year-old white male had been worried about his mood swings and increased irritability since the family had taken in a 17-year-old male boarder six months previously. His emotional and behavioral response profile on the SIPBES was borderline even though it failed to reach the cutoff point for his exclusion from the study.

Marked irregularity of the anal orifice was rare. One of four children with this finding was automatically removed from the study because of a severe limb-girdle neuromuscular disorder. The other three children with this soft tissue change had a moderate degree of irregularity of their orifices as their sphincters intermittently opened and closed.

The persistence of a prominent anal verge appeared to be secondary to increased muscle tone and the child's inability to relax. True muscular hypertrophy of the external anal sphincter was not encountered.

A major concern in a study of this type is the lack of certainty as to whether the sample contains only nonabused children. A multi-method approach was used to either avoid having

sexually abused children in this self-selected population or to eliminate them from the sample. This process began with the advertisement that did not include the examiners' interest in the anogenital region. This was done to avert attracting individuals who had a specific interest in or concern about their child's genitalia. The next component of this self-selection process was the secretaries' explanation of the purpose of the examination at the time the parents called for an appointment. This was instituted so that parents could decline to participate without having to provide an explanation. Although no records were kept, it was estimated that 50% of the callers decided against having their child examined. The third technique, used to reduce the possibility that parents would feel pressured into the examination, consisted of having the nurse emphasize during the structured interview that it was permissible for parents to change their mind at any time. Three parents walked out at the end of the interview, and the parents of five children decided against the anogenital portion of the examination. The final screening method, that utilized information from the SIPBES, the examiner's ratings of normal versus abnormal, and an unusually high incidence of other physical findings, was based upon information in the literature that indicated a possible association between many of these parameters and the likelihood of childhood sexual abuse.

The one screening method not employed was an in-depth interview of the children regarding the possibility of their having been abused. For a variety of practical reasons, it was decided that this went beyond the scope of the project. Despite this, the authors were gratified to note that, with few exceptions, the children whose physical findings were of concern had been removed from the study on the basis of other determinants. One exception was the child whose anus dilated to 20 mm without the presence of stool in the rectal ampulla. As this child demonstrated, the possibility exists that the study sample may contain some children who had been molested but remained undetected. Similarly, children who were not abused may have inadvertently been removed. Unfortunately, there is no information currently available that can be used to compare this multi-method approach in distinguishing abused from non-abused children with the results from a single in-depth interview of the child. The families of children removed from the study because of concern over the possibility of sexual abuse, as well as the one study child with 20 mm anal dilatation without presence of stool, have been evaluated by an experienced multidisciplinary team composed of representatives from the Department of Social Services, law enforcement agencies, and the district attorney's office. Regrettably, the results of the investigation are not available as the information obtained during the evaluation is considered to be confidential under the State of California law.

The choice of the knee-chest position to examine the perianal region was based upon the view it affords of these tissues and from the authors' experience with this method in the examination of the female's genitalia. No attempt was made to compare the perianal findings of this approach with those of other methods.

The introduction of the colposcope with its camera did provide an opportunity to compare the results of the examinations with and without this instrument. Except for an increase in the incidence of erythema noted in the colposcopic photographs and a larger number of skin tags/folds found in the noncolposcopic group, the remainder of the findings were statistically the same. This included the mean vertical and horizontal anal orifice diameters obtained by the two techniques. A major difference between the two approaches was the ability to reexamine the findings on the photographs. Through this method the similarity in the soft tissue changes found in the "smooth area" of the anal verge was noted and reinterpreted in light of new information. The photographs also proved to be invaluable in checking interexaminer reliability.

In addition to comparing the examiner's impressions with the colposcopic photographs, the issue of interexaminer reliability was also addressed through weekly discussions of findings and techniques, periodic retesting with the flash cards to assure continued accuracy in the

estimation of sizes, and by limiting the number of examiners to the three childhood sexual abuse clinic faculty physicians.

Even with the results of this study, many questions remain unanswered. The verification of the findings at other centers, the use of in-depth interviews of the child to help determine if abuse had ever occurred, the inclusion of more infants in a study, the outcome when other techniques are used, the effect of the child's state of relaxation on the physical changes, and a comparison of the findings when an abused population of children is matched against a group of nonabused children are some of the areas that require further investigation.

The relatively high incidence of perianal soft tissue changes found in this study does not imply that these findings cannot be caused by sexual abuse. It only means that other etiologic factors must be considered before the spector of abuse is raised when unexplained perianal findings are encountered. While medical examiners must maintain a high index of suspicion in this era of unremitting sexual abuse, caution must be exercised during the search for the cause of soft tissue changes discovered in the anogenital region of a child. If a reasonable explanation is not forthcoming, a more thorough investigation must be instigated if children are to be protected from further exploitation.

Acknowledgement—The authors thank the many volunteers and nursing personnel who participated in this project; Anamarie Graf, University of California, San Francisco/Fresno Computer Services for assistance in the data analysia; Janice Grebe, developmental anatomist, for help in the identification of anatomical variations; and Ernestina Giraldes for the manuscript preparation.

REFERENCES

Adams, J. A., Ahmad, M., & Phillip, P. (1988). Anogenital findings and hymenal diameter in children referred for sexual abuse examination. *Adolescent Pediatric Gynecology,* **1**, 123-127.

Behrman, R. E., & Vaughan III, V. C. (1987). *Nelson textbook of pediatrics* (13th ed.). Philadelphia, London, Toronto, Montreal, Sydney, Tokyo: W. B. Saunders.

Canavan, J. W. (1981). Sexual child abuse. In N. S. Ellerstein (Ed.), *Child abuse and neglect* (pp. 233-251). New York: John Wiley and Sons.

Dixon, W. J., Brown, M. D., Engelman, L.; Frane, J. W., Hill, M. A., Jennrich, R. I., & Toporek, J. D. (1981). *BMDP statistical software.* Los Angeles: University of California Press.

Ellerstein, N. S., & Canavan, W. (1980). Sexual abuse of boys. *American Journal of Diseases of Children,* **134**, 255-257.

Emans, S. J., Woods, E. R., Flagg, N. T., & Freeman, A. F. (1987). Genital findings in sexually abused, symptomatic, and asymptomatic girls. *Pediatrics,* **79**, 778-785.

Gorsch, R. V. (1955). *Proctologic anatomy* (pp. 56-67). Baltimore: Williams and Wilkins.

Herman-Giddens, M. E., & Frothingham, T. E. (1987). Prepubertal female genitals: Examination for evidence of abuse. *Pediatrics,* **80**, 203-208.

Hobbs, C. J., & Wynne, J. M. (1986, October). Buggery in childhood: A common syndrome of child abuse. *Lancet,* pp. 792-796.

Hobbs, C. J., & Wynne, J. M. (1987, October). Child sexual abuse: An increasing rate of diagnosis. *Lancet,* pp. 837-841.

Hollinshead, W. H., & Rosse, C. (1985). *Textbook of anatomy* (4th ed., pp. 790-792). New York: Harper and Row.

Huffman, J. W., Dewhurst, C. J., & Caprano, V. J. (1978). *The gynecology of childhood and adolescence.* Philadelphia: W. B. Saunders.

Jones, J. G. (1982). Sexual abuse of children. *American Journal of Diseases in Children,* **136**, 142-146.

Kempe, C. H. (1978). Sexual abuse: Another hidden pediatric problem. *Pediatrics,* **62**, 382-389.

Krugman, R. D. (1986). Recognition of sexual abuse in children. *Pediatric Review,* **8**, 25-30.

Marshal, W. N., Puls, T., & Davidson, C. (1988). New child abuse spectrum in an era of increased awareness. *American Journal of Diseases of Children,* **142**, 664-667.

Muram, D. (1988, February). How you can detect and treat child sex abuse. *Contemporary Obstetrics/Gynecology,* pp. 34-48.

Nesselrod, J. P. (1964). *Clinical proctology* (3rd ed.). Philadelphia and London: W. B. Saunders.

Parks, A. G., Porter, N. H., & Melzak, J. (1962). Experimental study of the reflex mechanism controlling the muscles of the pelvic floor. *Diseases of the Colon and Rectum,* **6**, 407-414.

Pascoe, D. J. (1979). Management of sexually abused children. *Pediatric Annals,* **8**, 309-315.

Pascoe, D. J., &
Annals, **10**, 1
Paul, D. M. (19
abuse of child
Reinhart, M. A.
Silverman, A., &
Mosley.
Spencer, M. J., &

Résumé—On a
chez une cohort
rapport avec les
est resté 267 sui
un érythème (4
génupectorale (
dépressions et d
pédiculées de p
ouverture-ferm
plis du sphincte
Des trouvailles
en dehors de la l
(1.2%), une irré
de fissure anale
érythème péri-a
des noires (53%
chez les garçon
trées dans cette
d'avoir été vict
plus grande pr
dessus.

Resumen—Se
datos normativ
total de 318 ni
niños puberale
niñas y 106 ni
aumento de pi
áreas lisas en la
posterior o ant
hallada en 49%
borde anal y lo
cuyos anos se d
fuera de la líne
irregularidad d
anales. Los hall
niñas (32%) en
comparación c
ción (7%), y ca
blando que se
sospechados de
emiten un juici

Pascoe, D. J., & Duterte, B. (1987). The medical diagnosis of sexual abuse in the premenarchal child. *Pediatric Annals*, **10**, 187-190.

Paul, D. M. (1986). What really did happen to Baby Jane? The medical aspects of the investigation of alleged sexual abuse of children. *Medical Science Law*, **26**, 85-102.

Reinhart, M. A. (1987). Sexually abused boys. *Child Abuse & Neglect*, **11**, 229-235.

Silverman, A., & Roy, C. C. (1983). *Pediatric clinical gastroenterology* (3rd ed.). St. Louis, Toronto, London: C. V. Mosley.

Spencer, M. J., & Dunklee, D. (1986). Sexual abuse of boys. *Pediatrics*, **78**, 133-138.

Résumé—On a mis sur pied un projet ayant pour but de récolter des valeurs normatives de l'anatomie ano-génitale chez une cohorte d'enfants pré-pubères. 318 enfants ont été examinés par 3 médecins appartenant à un programme en rapport avec les sévices sexuels. Après avoir filtré les enfants pubères et dépisté la possibilité de sévices non reconnus, il est resté 267 sujets dont 161 filles et 106 garçons, âgés de 2 mois à 11 ans. Les trouvailles péri-anales comprenaient un érythème (41%), une pigmentation augmentée (30%), un engorgement veineux après 2 minutes dans la position génupectorale (52%), des régions lisses sur la ligne médiane de la verge et la région dorsale de l'anus (21%), des dépressions et des petites cavités médianes, soit antérieures ou postérieures au niveau anal (18%) et des petites parties pédiculées de peau situées sur la ligne médiane (11%). Chez 49% des sujets, on a trouvé une dilatation anale, une ouverture-fermeture intermittente des sphincters anaux dans le 62% des cas, un aplatissement du bord anal et des plis du sphincter anal, ceci au milieu de l'examen, chez respectivement 44 et 34% des enfants dont l'anus se dilatait. Des trouvailles non fréquentes dans tous les sous-groupes incluaient des pédicules de peau (0%) et des cicatrices (1%) en dehors de la ligne médiane, une dilatation plus grande que 20 mm sans la présence de selles dans l'ampoule rectale (1.2%), une irrégularité de l'orifice anal pendant la dilatation (3%) et une saillie du rebord anal (3%). On n'a pas trouvé de fissure anale. Parmi les trouvailles moins fréquentes à l'intérieur d'un sous-groupe: 32% des filles présentaient un érythème péri-anal contre 57% chez les garçons, la pigmentation chez les enfants à peau claire (22%) comparée à celle des noires (53%) et des hispaniques (58%); la congestion veineuse au début de l'examen (7%) et les pédicules anaux chez les garçons (0%). Cette incidence relativement fréquente de lésions des tissus mous péri-anaux, tels que rencontrées dans cette étude, a été comparée à la fréquence d'observation similaire chez les enfants qui étaient soupçonnés d'avoir été victimes de sévices sexuels. Elle a renforcé la notion que les examinateurs médicaux doivent exercer la plus grande prudence lorsqu'ils formulent un jugement quant à la signification des trouvailles physiques décrites ci-dessus.

Resumen—Se presentan los resultados de la parte perianal de un proyecto designado con el propósito de obtener datos normativos con respecto a la anatomía anogenital de una muestra representativa de niños prepuberales. Un total de 318 niños fueron examinados por tres médicos del Programa de Abuso Sexual. Después de eliminar a los niños puberales y a aquellos en que existía la posibilidad del abuso, quedaron 267 sujetos. La muestra incluyó 161 niñas y 106 niños de 2 meses a 11 años de edad. Hallazgos perianales frecuentes incluyeron la ericema (41%), el aumento de pigmentación (30%), la congestión venosa después de dos minutos en la posición rodillas-pecho (52%), áreas lisas en la línea media en el borde (margen) y dorsal al ano (21%), hoyuelos o depresiones en la línea media o posterior o anterior al ano (18%), y cabos de piel anales localizados en la línea media (11%). La dilatación anal fué hallada en 49% de los sujetos, el abrirse y cerrarse intermitente de los esfínteres anales en el 62%, el aplanamiento del borde anal y los pliegues de piel anal ocurrieron a la mitad del examen en 44% y 34%, respectivamente, de los niños cuyos anos se dilataron. Hallazgos infrecuentes en todos los subgrupos incluyeron cabos de piel (0%) y cicatrices (1%) fuera de la línea media, dilatación anal mayor de 20 mm con ausencia de excremento en la ampolla rectal (1.2%), irregularidad del orificio anal durante la dilatación (3%), y prominencia del borde anal (3%). No se encontraron fisuras anales. Los hallazgos que ocurrieron menos frecuentemente dentro de un subgrupo fueron el ericema perianal en las niñas (32%) en oposición a la incidencia encontrada en los niños (57%), pigmentatión en los niños blancos (22%) en comparación con los niños hispanos (58%) y los niños negros (53%), congestión venosa al comienzo de la investigación (7%), y cabos anales en los niños (0%). La incidencia relativamente elevada de cambios en el tejido perianal blando que se encontró en esta investigación, comparada con la frecuencia de observaciones similares en los niños sospechados de haber sido abusados sexualmente, recalca el cuidado que debe ser empleado por los médicos cuando emiten un juicio con respecto al significado de sus hallazgos.

11.

Pergamon

Child Abuse & Neglect, Vol. 18, No. 12, pp. 1021–1028, 1994
Printed in the USA. All rights reserved
0145-2134/94 $6.00 + .00

0145-2134(94)00080-8

THE INVESTIGATION OF CHILD SEXUAL ABUSE: AN INTERDISCIPLINARY CONSENSUS STATEMENT

MICHAEL E. LAMB

National Institute of Child Health and Human Development, Bethesda, MD, USA

THIS STATEMENT WAS written by Michael E. Lamb on behalf of the group, and later revised by him in light of the others' comments. The statement represents the consensus of the following professionals:

Arnon Bentovim, Consultant Child Psychiatrist, Hospital for Sick Children, Great Ormond Street, London
Douglas J. Besharov, Resident Scholar, American Enterprise Institute, Washington, DC
Barbara W. Boat, Associate Professor of Psychiatry, University of Cincinnati
Ray Bull, Professor of Psychology, University of Portsmouth, England
Anita Cederström, Assistant Professor of Education, University of Stockholm
Sven-Åke Christiansson, Associate Professor of Psychology, University of Stockholm
Phillip W. Esplin (Co-organizer), Forensic Psychologist, Phoenix, Arizona
Lena Feuk, Children's rights attorney, Stockholm
William N. Friedrich, Professor of Psychology and Psychiatry, Mayo Clinic, Rochester, Minnesota
Gail S. Goodman, Professor of Psychology, University of California at Davis
Irit Hershkowitz, Lecturer, School of Social Work, University of Haifa, Israel
Philip Hwang (Co-organizer), Professor of Psychology, University of Göteborg, Sweden
Charles D. Jamieson, Attorney in private practice, West Palm Beach, Florida
Michael E. Lamb (Co-organizer and Rapporteur), Head, Section on Social and Emotional Development, National Institute of Child Health and Human Development, Bethesda, Maryland
John McCann, Associate Professor of Clinical Pediatrics, University of California, Davis
Willard Mollerstrom, Researcher, Family Advocacy Program Office, San Antonio, Texas
Erik Kreyberg Normann, Chief, Unit on Child Sexual Abuse and Neglect, Åker University Hospital, Oslo
Heikki Sariola, Researcher, Central Union for Child Welfare, Helsinki
Kathleen J. Sternberg (Co-organizer), Research Psychologist, Section on Social and Emotional Development, National Insititute of Child Health and Human Development, Bethesda, Maryland
Udo Undeutsch, Professor of Psychology, University of Cologne, Germany

INTRODUCTION

A GROUP OF experts from Europe, North America, and the Middle East met at a conference center in Satra Bruk, Sweden from September 26–29, 1993 under the joint sponsorship of the

In a joint publication arrangement, this paper also appears in recent issues of the following publications: *Expert Evidence*, *Family Law Quarterly*, and *Journal of Child Sexual Abuse*.

Requests for reprints should be addressed to Michael E. Lamb, Section of Social and Emotional Development, NICHD, 9190 Rockville Pike, Bethesda, MD 20814.

U.S. National Institute of Child Health and Human Development, the Swedish Allmanna Barnhuset Foundation, and the Socialvetenskapliga Forsknings Radet (Swedish Social Science Research Council). The group's mandate was to evaluate existing knowledge regarding the ways in which child sexual abuse allegations could be investigated most productively. This document represents a statement cosigned by 20 of the participants summarizing areas of agreement regarding the current status of knowledge in this area. It concludes with a statement regarding the areas in which further research remains necessary before greater clarity can be achieved. The report is designed to guide state and local officials, professionals, and advocates seeking to investigate child sexual abuse. A preliminary draft of this consensus document was prepared by Michael E. Lamb following the three-day consensus-building conference. The draft was reviewed and revised by all the participants over the ensuing months. This report, revised in accordance with the participants' comments, is the culmination of this consensus-building process.

THE PROBLEM

Although the final section of this article underscores how much remains to be learned about child sexual abuse, the participants agreed that a great deal has already been learned and that the magnitude of the problem makes it necessary and timely to synthesize this knowledge. Over the last two decades, all of the countries represented (Finland, Germany, Israel, Norway, Sweden, the United Kingdom, and the United States), like most of the other Western industrialized nations, have witnessed substantial increases in the number of reported incidents of child sexual maltreatment. It is unclear whether these increases in the number of reported cases reflect real increases in the incidence of child sexual abuse, increasing awareness of the problem, increased willingness to report such recognized incidents to authorities, or a combination of these factors. Whatever the reason, the numbers of reported cases are quite startling. In the United States, for example, the most recent available statistics show nearly a half million reported cases of sexual maltreatment in 1992, compared with 325,000 in 1985. Since there are approximately 70 million U.S. residents under the age of 18, this suggests that approximately .7% of the children in the U.S.A. were reported as victims of sexual abuse in 1992 (.46% in 1985). Approximately 40% of all child abuse reports are substantiated by social welfare authorities.

The incidence of reported cases is lower in most other countries. Recent statistics from the United Kingdom show increases from 3,700 new substantiated cases (.034%) in 1991 to 4,200 new substantiated cases (.037%) in 1992. In Oslo, Norway, 200 of the 91,000 children in the city were reported as victims in 1992, for an incidence rate of .22%. In Israel, there were 1,438 reported cases in 1992, an increase from 1,260 in 1991, with steady annual increases of about 10% over the 7 years that these statistics have been kept.

Evidently, child sexual abuse is an all-too-frequent phenomenon that is both a crime and a form of child maltreatment that may seriously and deleteriously affect children's development. Furthermore, the high rate of nonsubstantiation highlights the difficulty that may arise when attempting to validate allegations. These factors alone underscore the importance of developing reliable and valid means of investigating reports of child sexual maltreatment.

Unfortunately, because of its very nature, child sexual abuse usually occurs in private with no witnesses other than the perpetrator and the victim. Even when confronted with compelling evidence, many perpetrators remain unwilling to admit their misconduct. In the face of their denials, investigators typically must depend on children's accounts or physical and material evidence in order to determine whether or not allegations of sexual maltreatment are valid. Much of the physical evidence available to investigators is obtained from the medical examination of young victims. Considerable progress has been made in the last decade in the evaluation

of genital and perianal injuries. This evidence can help determine whether or not some form of sexual abuse has occurred. Medical evidence is seldom sufficient to identify a specific perpetrator, however, and many forms of sexual abuse do not leave any physical signs. Such information can typically be obtained only from alleged victims and the difficulties of obtaining information from children are considerable. These difficulties have also increased dramatically in the last several years as the number of younger alleged victims has increased.

Considerable controversy has long existed concerning the credibility of child witnesses. Countries whose legal system was derived from the British common law traditionally precluded testimony from young children, particularly those under 7 years of age. Over the last several years, however, procedural changes have taken place such that the testimony of children is now widely admissible unless the court rules that it should be excluded. In most parts of Continental Europe, children under 14 are interviewed outside the court. In Israel, "youth investigators" interview children under 14 years of age, decide whether the children should testify, and may represent and evaluate the children's testimony in court.

Questions concerning the reliability and credibility of children's accounts are often raised in adversarial legal proceedings and these have fostered a highly contentious debate concerning the value and limitations of children's testimony. Unfortunately, this contentiousness has often spread into the relevant scholarly literatures, creating considerable confusion and doubt. As we show in this document, there is actually much greater agreement concerning the value, validity, and reliability of children's evidence than is widely recognized.

A primary purpose of this document is to summarize the relevant empirical data and clear away much of the contention that obscures substantial areas of agreement and consensus concerning both children's testimony and medical findings. Because it represents the consensus of a number of scholars and practitioners from a variety of backgrounds, this document focuses on broad areas of agreement rather than on narrow areas of contention. In order to facilitate our presentation, we have avoided explicit references to the scholarly literature in this document.

Behavioral Indicators

Reports to investigative and child protection authorities are often precipitated by adults' reports of sexualized behaviors on the part of young children. Behaviors that appear to mimic sexual activity and sexualized behaviors such as touching an adult's genitals or breasts are more commonly evinced by children who have been sexually abused than by nonabused children. Such behaviors are also displayed by children who have not been abused, however, and thus their occurrence cannot be used to conclude that sexual abuse has taken place. Instead, this behavior may signal the need for further evaluation using the investigative techniques described below.

As in the case of sexualized play with anatomically detailed dolls (see below), sexualized behavior by young children must be viewed in historical, cultural, and family contexts. Cultures (and families within them) vary widely in their attitudes and behavioral responses to both nudity and sexuality and these differences are known to affect children's behavior. Because we know too little about the meaning of sexualized behavior and the knowledge of sex on the part of children in various cultural and subcultural contexts, it is not yet possible to define developmentally appropriate or inappropriate knowledge and behavior conclusively.

No specific behavioral syndromes characterize victims of sexual abuse. Sexual abuse involves a wide range of possible behaviors that appear to have widely varying effects on its victims. The absence of any sexualized behavior does not confirm that sexual abuse did not take place any more than the presence of sexualized behavior conclusively demonstrates that sexual abuse occurred; rather, both pieces of information affect the level of suspicion concerning the child's possible experiences and should serve to promote careful and nonsuggestive investigation.

As stated earlier, most of the information regarding possible child sexual abuse must be obtained from alleged victims. Despite frequent objections to the reliability and legal admissibility of children's testimony, it is clear that young victims are able to provide reliable and accurate accounts of events they have witnessed or experienced. Furthermore, despite frequent claims that children are uniquely susceptible to external influence, it is clear that when children are encouraged to describe their experiences without manipulation by interviewers, their accounts can be extremely informative and accurate. Such interviewing is difficult, however, and is best conducted by well-trained and experienced interviewers.

The most complete and reliable information can be elicited from children who are interviewed skillfully as soon as possible after the alleged incidents have taken place, although some children may be hesitant to disclose sensitive information. Although central elements of salient events can be remembered for long periods of time, more peripheral details tend to be forgotten when long delays occur. Accounts that contain peripheral details and are logically embedded in a rich context appear to be more likely when the events described have actually been experienced. Peripheral details may often be missing from accounts of repeated abusive incidents, however, and thus the failure to mention peripheral details or embed the account in spatio-temporal context cannot be used to infer that the events did not take place. Furthermore, children's accounts, like those of adults, are at times susceptible to "post-event contamination," in which the report of an incident is distorted by the inclusion of details that were not part of the incident or of the original account. This may raise problems when children are interviewed on multiple occasions by unskilled interviewers (including parents, teachers, and friends) who ask highly suggestive questions that may unwittingly lead children to alter their accounts.

The most reliable and accurate information is obtained from children who are responding to open-ended questions designed to elicit free narrative accounts of events that they have experienced. Most children are capable of providing such accounts of their experiences, but younger children (especially those under 5 years of age) are unlikely to provide lengthy narratives or as much information as older children. Direct or focusing questions are usually needed to access further information and are especially necessary when the alleged victims are young. When direct questions are asked, they should be formulated as nonsuggestively as possible using developmentally and individually appropriate vocabulary and sentence construction, although different interviewing techniques may be needed in certain circumstances. Whenever possible, direct questions should be followed by attempts to elicit free narratives. Repeated, highly leading, or suggestive questions asked in an accusatory manner are ill-advised because they are most likely to promote distortion on the part of the child and may introduce details that are incorporated into and contaminate subsequent accounts. Preschool-aged children and those with developmental and/or communicative disabilities pose special problems and challenges because their cognitive, communicative, and interpretive capacities are less developed. The emotional responses of younger children may also be quite idiosyncratic.

In order to reduce the number of interviews, which may be stressful for young children and may also lead to a change in some aspects of children's accounts, it is desirable to tape record—preferably in video format—all primary investigative interviews. These records permit review of the child's statement by a variety of investigators who would otherwise have to conduct separate interviews. In addition, video recordings allow a careful and dispassionate evaluation of the extent to which the quality of the interview may have distorted the information obtained. A video recording provides a means of evaluating what information, if any, is likely to have been affected by leading or suggestive questions and what aspects of the account seem unaffected by such questions.

ing Dolls and Other Props

Especially when interviewing children under 5 years of age, but also when interviewing der children who are reticent and uncommunicative, additional tools may assist interviewers eliciting information from children. These tools or props include play materials, dolls, man figure drawings, or anatomically detailed dolls, all of which must be used with special re to avoid distracting children from their account or suggesting forms of information that the interviewers may expect or wish to hear. Props such as anatomically detailed dolls are idely used in some countries and the risks and benefits of their use vary depending upon the purposes for which they are employed and the skillfulness and experience of the adults using them.

In the context of investigation, these dolls may be helpful when used early in an interview to determine children's labels for certain body parts. Similarly, puppets or dolls may be used by children as media through which to make verbal statements regarding events they have experienced. These uses are unlikely to pose any serious investigative difficulties, provided the interviewers avoid overly suggestive questions.

Dolls can also be used later in investigative interviews to reenact events children have experienced and for which their expressive vocabulary appears inadequate. Such reenactments impose a burden of interpretation on adult interpreters, however, and thus should be attempted only by skillful and well-trained investigators who avoid nonverbal suggestion just as all interviewers avoid verbally suggestive questions. The potential problem is exacerbated by the fact that some children who have not been abused may initiate sexualized play when they are offered anatomically detailed dolls, although such play is more common in abused children. Nevertheless, the mere appearance of sexualized play with dolls should not ordinarily be used in and of itself to conclude that a child has been sexually abused. Instead, sexualized play with dolls may prompt a skillful interviewer to obtain more information, ideally using nonsuggestive verbal inquiries to supplement and clarify whatever nonverbal information was suggested by the child during his/her play with the props. Because defense attorneys frequently allege that dolls, especially anatomically detailed dolls, have been misused suggestively, we reiterate our recommendation that interviews should be videorecorded whenever possible. Courts and other potential users of investigative interviews should understand that there is no anatomically detailed doll *test* yielding conclusive scores quantifying the probability that a child has been sexually abused.

Medical Examinations

Although many forms of sexual abuse may leave no physical signs on young victims, medical examinations are still indicated in most cases. Over the last 15 years, there have been dramatic changes in the evaluation of medical evidence suggestive of child sexual abuse. Initial claims regarding the conclusiveness of medical exams were unfortunately overstated in light of professional ignorance regarding both normative anogenital development and the effects of trauma on tissues in the anogenital region. Recent and ongoing research designed to provide a clearer understanding of these issues is yielding a firmer and growing database that helps medical examiners better understand the significance of their findings and more correctly interpret unusual ano-genital signs.

Contrary to popular belief, sexual abuse may leave few, if any, physical effects. Fondling, oral copulation, and other forms of sexual molestation that do not cause tissue damage may leave no signs other than a slight amount of redness that rapidly disappears. Likewise, gentle penetration of the rectum, even by relatively large objects, may cause no permanent tissue damage, especially when a lubricant is employed. Thus, signs of trauma or injury are more

likely to be found when the alleged incident appears to have involved forceful penetration of the vaginal or anal areas leading to both pain and bleeding.

When they are appropriate, medical examinations should be performed only by trained and experienced examiners as soon as possible after the alleged incidents. Successful and atraumatic examinations are much more easily accomplished when alleged victims and their families are adequately informed regarding the purposes and noninvasive nature of the examination. Anxiety levels can be decreased and the need for anesthesia or sedation greatly reduced when the anogenital portion of the examination is incorporated into a comprehensive evaluation of a relaxed child.

Professionals in many medical centers throughout the world employ a multimethod anogenital examination procedure, in which magnifying devices are used to visualize the tissues and cameras are used to record the findings. In some centers, both the interview with the child and the anogenital examination are videotaped for subsequent review. Even when such records are available, however, medical examiners need to prepare detailed reports of their findings, written in a form that is comprehensible to nonmedical personnel in the legal and social welfare communities, yet sufficiently detailed to permit independent evaluation by other medical experts.

When vaginal penetration is alleged or suspected, female patients should be examined in more than one position to maximize certainty about the presence or absence of physical signs. Two commonly used methods of examination are performed while the child is lying on her back (supine position), while the other involves turning the child over into a knee-chest (prone) position. The two supine methods of labial separation and labial traction afford an excellent view of the tissues surrounding the vagina. Labial traction is particularly successful in separating the edges of the hymen so that the margins may be seen and the interior of the vagina visualized. The knee-chest position affords a superior view of the hymen, as it stretches out under its own weight, and of the vaginal canal as the anterior wall falls forward. Even the cervix may be visualized about two-thirds of the time during the knee-chest portion of the examination without the need for a speculum.

Penetration of a prepubertal girl's vagina by a penis or other large object usually results in a tear of her hymen and, at times, of the surrounding tissues as well. Recent hymenal tears are usually sharp-edged and *V*-shaped. They are most commonly found on the posterior rim of the hymen between the 3 and 9 o'clock positions, resulting in a narrow rim at the point of injury and exposure of the underlying intravaginal structures. Any bleeding or redness resulting from the abuse usually disappears within 48 hours. The tears themselves heal within 5 to 10 days and the sharp edges of the wounds smooth out and round off over a period of 3 to 6 months. Over time, these injuries become increasingly difficult to detect and may only be evident with multimethod examination, if at all. As a result, the absence of physical signs does not prove that no abuse occurred.

If the child has been penetrated by a skillful perpetrator who has carefully avoided hurting the child or injuring the tissues by gradually stretching the hymen, an examiner may observe only a smooth-edged hymen with a narrow rim. In such cases, there may be no reports of pain. The reduced width of the hymenal rim and exposure of the intravaginal contents may thus represent the only indications that sexual abuse with penetration had occurred. Deformations of the hymen remain visible from the time of penetration until the onset of puberty and may provide the clearest indication that penetration occurred. Such deformations of the posterior hymenal rim do not occur naturally and are unlikely to be caused by any other known trauma, including straddle injuries.

The size of the hymenal orifice is no longer viewed as a reliable indicator of abuse; even children who have received significant hymenal injuries as the result of sexual abuse may have relatively small openings. In fact, the size of the hymenal orifice varies so widely from child to child in both abused and nonabused children that the width of the hymenal rim has replaced the size of the vaginal opening as a marker of sexual molestation.

At the onset of puberty, the hymenal membrane becomes thick and redundant. If molestation has ceased, the width of the hymen increases significantly and thus, without special examination techniques, a previous injury to the hymen may appear to be no more than a fold in the tissues.

Perianal injuries caused by sexual abuse occur relatively infrequently and are more difficult to detect. Although severe physical injuries can result from a violent act of sodomy, it is less clear what tissue changes should be expected following ongoing, relatively gentle penetration of the anal orifice when a lubricant is used. As a result, considerable controversy persists concerning the evaluation of perianal signs (including anal dilation reflexes) in children who may have experienced anal penetration. Other perianal soft tissue damage is similarly difficult to interpret when the history is unclear or the child is very young. As with genital trauma, perianal injuries heal rapidly, leaving little evidence of previous tissue damage.

Even in the absence of physical signs, examiners cannot conclude that anal or vaginal penetration did not take place. Healing is extremely rapid, visible injury is not inevitable, and it is difficult to perform examinations on young children, making it more likely that minor damage will go unrecognized. In addition, children, like adults, are often poor reporters of whether or not penetration has taken place. A child may report sharp pain in either the anal or vaginal area and report that something was placed "in there" when in fact the penetration was attempted rather than achieved.

AREAS IN NEED OF FURTHER INVESTIGATION

In the last decade, researchers have made considerable progress in their efforts to develop and validate the diverse techniques that must be used to investigate child sexual abuse. In this document, we have highlighted those areas of consensus and progress that are often obscured by the disagreements that continue to exist in areas that are the focus of continuing and/or more recent scholarship. In this section, we briefly identify those areas in which controversy persists and where further research is especially necessary.

As noted earlier, considerable ignorance exists concerning developmental, subcultural, and cultural variations in sexual knowledge and sexualized behavior. Certainly, the widespread exposure to soft and hard-core pornography, particularly on video media, appears to have increased many children's knowledge of sexual behavior beyond that recognized by most parents and professionals. As a result, it is often difficult for professionals to attribute "age-inappropriate knowledge" to specific sexual experiences.

Considerable work remains to be conducted on the degrees to which accusatory, suggestive, or leading interviews distort children's accounts. It is also unclear when and which children can be expected to reveal details of sexual abuse in response to open-ended questions and when children may require more intensive interviewing. This ignorance precludes firm conclusions regarding the potential merits of open-ended questions. Likewise, little is known about the most effective strategies for interviewing children with communicative difficulties. It is not yet known how frequently children make false allegations and what circumstances affect the likelihood that these allegations may be offered.

Few systematic attempts have been made to evaluate the amount of detail and the accuracy of information yielded by children in response to different types of questions (open-ended, leading, directive, suggestive, etc.). Considerable controversy now exists concerning *the repressed memory syndrome* (and its corollary *the false memory syndrome*) and the validity of claims offered by alleged victims years after incidents may have taken place. Research on the empirical verification of these memories is only now beginning.

As far as anatomically detailed dolls are concerned, considerably more information is needed regarding the appropriate interpretation of various sexualized behaviors and little is known about the effects of dolls and other props on the quality and richness of children's verbal reports of their abusive experiences. Within the medical community, it is now widely recognized that

physical examinations may not yield conclusive evidence that sexual abuse either did or did not occur. Further research is needed on the immediate physical consequences of specific sexual acts as well as on the developmental changes in these physical signs in the succeeding years. Such research will complement a growing but still inadequate understanding of normative anogenital development and variability, particularly in diverse ethnic and racial subgroups.

In sum, many questions remain concerning the investigation and validation of child maltreatment reports. These questions are currently the focus of considerable research around the world. Our lack of knowledge about these topics should not obscure the remarkable progress that has been made, especially over the last two decades, however. This brief consensus statement summarizes these recent solid gains in our knowledge and understanding, and augurs well for comparable progress in the years ahead.