

Understanding Medical Findings in Child Sexual Abuse: An Update For 2018

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ABSTRACT

When child sexual abuse is suspected, it is important for medical professionals to understand normal as well as abnormal features of the external genital and anal tissues in children. Physicians and other healthcare professionals who rarely perform a detailed examination of these areas may mistakenly interpret normal findings, or findings caused by conditions unrelated to abuse, as signs of injury due to sexual abuse. For this reason, it is important for all medical professionals to have a basic understanding of the appearance of the genital and anal tissues in children. Examples of normal and abnormal genital and anal findings are provided via annotated images. This review presents a research-based summary of how medical findings in children should be interpreted with respect to possible sexual abuse. Resources for obtaining expert review of medical findings are described. *Acad Forensic Pathol.* 2018 8(4): 924-937

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INFORMATION

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INTRODUCTION

Historical Context

Sexual abuse of children is not a new problem, having been described in ancient texts (1-3). The acknowledgement of the problem and an attempt to understand medical findings in sexually abused children was reported in medical literature in the 1800s (4, 5). A detailed discussion of the history of the medical response to child sexual abuse can be found in the chapter by Rich Kaplan MS MD in a medical textbook first published in 2011 (6).

By 1980, physicians started to become aware of the need to recognize both the physical and sexual abuse of children, thanks to the efforts of Henry Kempe MD (7, 8).

Pediatricians who were beginning to examine children with suspected sexual abuse began using a colposcope with a camera attached to obtain magnified images of the genital and anal structures. Initially, there were no studies using the same imaging technology of nonabused children. Between 1989 and 1993, three studies describing genital or anal findings in nonabused children were published. McCann and colleagues described anal findings and genital findings among a group of prepubertal children who were carefully screened and found to have no suspicion of sexual abuse (9, 10). Another study, describing the appearance of the hymen in newborn infants, provided additional important normative data (11). Data from these studies, along with recommendations from the American Academy of Pediatrics (12), were used to develop an approach to classifying ano-genital and laboratory findings in children with suspected sexual abuse (13).

DISCUSSION

Categorizing Medical Findings With Respect to Abuse

The table listing the different categories of physical findings has been revised multiple times since 1992. As additional cross-sectional studies reporting geni-

tal findings in nonabused prepubertal girls (14, 15), and healing of injuries (16-18) have been published, findings have been added or re-classified. **Table 1** is the result of a collaborative process involving a group of physician experts and other health care providers who have met over several years to revise the listing of findings using the best evidence and research data available.

In 2017, a survey was conducted of members of the Ray Helfer Society (www.helfersociety.org), an honorary group of physicians who specialize in the evaluation and care of abused children, to determine the level of agreement with the interpretation of medical and laboratory findings with respect to sexual abuse that was published in 2016 (19). The results of the survey (20) indicated agreement levels between 79% and 100% with the listing of medical or laboratory findings as: 1) findings documented in newborns or commonly seen in nonabused children, 2) findings commonly caused by medical conditions other than trauma or sexual contact, 3) conditions mistaken for abuse, 4) findings with no expert consensus regarding the degree of significance with respect to abuse, and 5) findings caused by trauma and/or sexual contact. **Table 1** is reproduced from the article by Adams, Kellogg and Farst, mentioned above (20).

Signs of Injury Caused by Sexual Abuse/Assault

Physicians who are not familiar with the appearance of the genital and anal tissues in nonabused children often expect to find signs of injury if a child has reported what sounds like penetration of the vagina or anus. However, most children who are evaluated for suspected sexual abuse will not have signs of injury or infection (21). Minor injuries heal rapidly and if the child is not examined within days of the assault the examination findings will likely be normal. Another reason for a lack of injury in prepubertal children is that the type of abuse (e.g., touching, fondling, oral genital contact) does not cause injury.

Young girls do not really have a concept of what “in” means, with respect to their external genitalia. This misunderstanding was partially explained in a recent

Table 1: 2018 Approach to Interpretation of Medical Findings in Suspected Child Sexual Abuse (20)

Section 1: Physical Findings	
A. Findings Documented in Newborns or Commonly Seen in Nonabused Children (<i>These findings are normal and are unrelated to a child's disclosure of sexual abuse</i>)	
1.	Normal variations in the appearance of the hymen
a.	Annular: hymenal tissue present all around the vaginal opening including at the 12 o'clock location
b.	Crescentic hymen: hymenal tissue is absent at some point above the 3 to 9 o'clock location
c.	Imperforate hymen: hymen with no opening
d.	Micro-perforate hymen: hymen with one or more small openings
e.	Septate hymen: hymen with one or more septae across the opening
f.	Redundant hymen: hymen with multiple flaps, folding over each other
g.	Hymen with a tag of tissue on the rim
h.	Hymen with mounds or bumps on the rim at any location
i.	Any notch or cleft in the hymen, regardless of depth, above the 3 o'clock or 9 o'clock location
j.	Any notch or cleft in the hymen, at or below the 3 o'clock or 9 o'clock location that does not extend nearly to the base of the hymen
k.	Smooth posterior rim of hymen that appears to be relatively narrow along the entire rim; may give the appearance of an "enlarged" hymen opening
2.	Periurethral or vestibular band(s)
3.	Intravaginal ridge(s) or column(s)
4.	External ridge on the hymen
5.	Diastasis ani (smooth area)
6.	Perianal skin tag(s)
7.	Hyperpigmentation of the skin of the labia minora or perianal tissues in children of color
8.	Dilation of the urethral opening
9.	Normal midline anatomic features
a.	Groove in the fossa, seen in early adolescence
b.	Failure of midline fusion (also called perineal groove)
c.	Median raphe (has been mistaken for a scar)
d.	Linea vestibularis (midline avascular area)
10.	Visualization of the pectinate/dentate line at the juncture of the anoderm and rectal mucosa, seen when the anus is fully dilated
11.	Partial dilation of the external anal sphincter, with the internal sphincter closed, causing visualization of some of the anal mucosa beyond the pectinate line, which may be mistaken for anal laceration(s)

Table 1: Continued

B. Findings Commonly Caused by Medical Conditions Other Than Trauma or Sexual Contact <i>(These findings require that a differential diagnosis be considered, as each may have several different causes)</i>	
12.	Erythema of the anal or genital tissues
13.	Increased vascularity of the vestibule or hymen
14.	Labial adhesion
15.	Friability of the posterior fourchette
16.	Vaginal discharge that is not associated with a sexually transmitted infection
17.	Anal fissures
18.	Venous congestion or pooling in the perianal area
19.	Anal dilation in children with predisposing conditions, such as current symptoms or history of constipation and/or encopresis, or children who are sedated, under anesthesia or with impaired neuromuscular tone for other reasons, such as postmortem
C. Findings Due to Other Conditions, Which Can Be Mistaken for Abuse	
20.	Urethral prolapse
21.	Lichen sclerosus et atrophicus
22.	Vulvar ulcer(s), such as aphthous ulcers or those seen in Behcet Disease
23.	Erythema, inflammation, and fissuring of the perianal or vulvar tissues due to infections with bacteria, fungus, viruses, parasites, or other infections that are not sexually transmitted
24.	Rectal prolapse
25.	Red/purple discoloration of the genital structures (including the hymen) from lividity postmortem, if confirmed by histological analysis
D. No Expert Consensus Regarding Degree of Significance <i>(These physical findings have been associated with a history of sexual abuse in some studies, but at present, there is no expert consensus as to how much weight they should be given, with respect to abuse. Findings 27 and 28 should be confirmed using additional examination positions and/or techniques, to ensure they are not normal variants [findings 1 i or 1 j], or a finding of residual traumatic injury [finding 37])</i>	
26.	Complete anal dilation with relaxation of the internal as well as external anal sphincter, in the absence of other predisposing factors such as constipation, encopresis, sedation, anesthesia, or other neuromuscular conditions
27.	Notch or cleft in the hymen rim, at or below the 3 o'clock or 9 o'clock location, which extends nearly to the base of the hymen, but is not a complete transection. This is a very rare finding that should be interpreted with caution unless an acute injury was documented at the same location
28.	Complete cleft/suspected transection to the base of the hymen at the 3 o'clock or 9 o'clock location
E. Findings Caused by Trauma <i>(These findings are highly suggestive of abuse, even in the absence of a disclosure from the child, unless the child and/or caretaker provides a timely and plausible description of accidental straddle, crush or impalement injury, or past surgical intervention)</i>	
Acute trauma to genital/anal tissues	
29.	Acute laceration(s) or bruising of labia, penis, scrotum, or perineum
30.	Acute laceration of the posterior fourchette or vestibule, not involving the hymen
31.	Bruising, petechiae, or abrasions on the hymen
32.	Acute laceration of the hymen, of any depth, partial or complete
33.	Vaginal laceration
34.	Perianal bruising or perianal laceration(s) with exposure of tissues below the dermis

Table 1: Continued

Residual (healing) injuries to the genital or anal tissues	
35.	Perianal scar (a very rare finding that is difficult to diagnose unless an acute injury was previously documented at the same location)
36.	Scar of the posterior fourchette or fossa (a very rare finding that is difficult to diagnose unless an acute injury was previously documented at the same location)
37.	Healed hymenal transection/complete hymen cleft – a defect in the hymen below the 3 o'clock or 9 o'clock location that extends to or through the base of the hymen, with no hymenal tissue discernable at that location
38.	Signs of female genital mutilation (FGM) or cutting, such as loss of part or all of the prepuce (clitoral hood), clitoris, labia minora, or labia majora, or a vertical linear scar adjacent to the clitoris (Type 4 FGM)
Section 2: Infections	
A. Infections Not Related to Sexual Contact	
39.	Vaginitis caused by fungal infections such as <i>Candida albicans</i> , or bacterial infections transmitted by nonsexual means, such as <i>Streptococcus</i> Type A or Type B, <i>Staphylococcus sp.</i> , <i>Escherichia coli</i> , <i>Shigella</i> , or other Gram-negative organisms
40.	Genital ulcers caused by viral infections such as Epstein Barr Virus
B. Infections That Can Be Spread By Nonsexual as Well as Sexual Transmission (<i>Interpretation of these infections may require additional information, such as mother's gynecologic history [human papillomavirus or HPV], or presence of lesions elsewhere on the body [Molluscum], which might clarify the likelihood of sexual transmission. After complete assessment, a report to Child Protective Services may be indicated in some cases. Photographs or video recordings of these findings should be taken, then evaluated and confirmed by an expert in sexual abuse evaluation to ensure accurate diagnosis</i>)	
41.	<i>Molluscum contagiosum</i> in the genital or anal area. In young children, transmission is most likely nonsexual. Transmission from intimate skin-to-skin contact in the adolescent population has been described
42.	Condyloma acuminatum (HPV) in the genital or anal area. Warts appearing for the first time after age five years may be more likely to have been transmitted by sexual contact
43.	Herpes Simplex Type 1 or 2 infections in the oral, genital, or anal area
C. Infections Caused By Sexual Contact, If Confirmed By Appropriate Testing, and Perinatal Transmission Has Been Ruled Out	
44.	Genital, rectal, or pharyngeal <i>Neisseria gonorrhea</i> infection
45.	Syphilis
46.	Genital or rectal <i>Chlamydia trachomatis</i> infection
47.	<i>Trichomonas vaginalis</i> infection
48.	HIV, if transmission by blood or contaminated needles has been ruled out
Section 3: Findings Diagnostic of Sexual Contact	
49.	Pregnancy
50.	Semen identified in forensic specimens taken directly from a child's body

study (22) in which a social worker at intake routinely asked girls one question: "When you wipe after you go pee, do you wipe on the inside or outside of your (private part, or whatever word the child uses for her external genitalia)?" Of the 533 children in the study who answered the question, 41% said "inside," 35% said "outside," and 23% said "both." The girls were obviously not wiping inside the vaginal canal, but more girls under age 12 years (69%) answered

"inside" or "both," than girls age 13 or over (55%). With pubertal development, the adolescent girls had a clearer idea of "inside," so more reported that the wiping was on the "outside" of the external genitalia.

Signs of acute trauma, such as bruising, abrasions, and lacerations are rare in children who are examined for possible sexual abuse, as few are examined within 72 hours of the assault. The study by Smith et al. found

that for children under 12 years of age, acute genital injuries were seen in 14.2% of children examined within 72 hours of the abuse, and injuries were found in only 4.5% of children examined more than 72 hours following the abuse (21). After the onset of puberty, the hymen becomes thicker and able to stretch without tearing during intercourse. This was shown definitively in a study by Kellogg et al., who reviewed the appearance of the hymen in adolescent girls who were pregnant (23). Only two of 36 girls had genital findings indicative of previous vaginal penetration. These results are important to understand since the lack of physical findings of intercourse should never be used to discount a young woman's disclosure of being sexually assaulted.

Findings That May Be Mistaken for Signs of Abuse

The most common medical findings that are mistaken for signs of sexual abuse include: redness of the genital or anal tissues (many causes); the appearance of a "dilated" hymen, urethra, or anal opening felt by caretakers to be "too big"; a concern for an "absent" hymen due to a relatively narrow posterior rim of hymen when labial traction is applied in a well-relaxed child; mistaking the presence of labial adhesions as "scars" in the genital area; mistaking the irregular appearance of the Pectinate line as scars or tears of the anus; and mistaking the blue coloration around the anus caused by venous congestion for anal bruising.

Examples are shown in the accompanying photographs, which were taken with a camera attached to a colposcope for magnification, or with a camera with a macro lens. **Image 1** is a photograph of a child with an annular hymen, meaning there is hymen tissue surrounding the entire circumference of the hymen opening. **Image 2** shows a child with a crescentic hymen. In this case, there is no visible hymen tissue from 9 to 3 o'clock superiorly. These are the two most common variations in hymen appearance in prepubertal girls.

Image 3 is a photograph of the anal area of a 5-year-old girl who is examined lying on her back. The internal and external anal sphincters are both closed, showing the typical pattern of folds or wrinkles in the

perianal skin. **Image 4** is a photograph of the same child about one minute into the examination. The external anal sphincter is partially relaxed and the anus is dilated. Part of the rectal mucosa is visible, which shows as bright red in color in the color photo. An anal column is seen at the 5 o'clock location and anal crypts are seen at 4 and 6 o'clock. It is important not to mistake the anal crypts for lacerations.

Image 5 is a photograph of a 9-year-old girl who was referred to a specialty center for "no hymen." The hymen is not visible in this photograph because the labial adhesions caused the labia minora to fuse superior and inferior to the vaginal vestibule.

Other, more rare conditions such as the congenital failure of midline fusion, or perineal groove, hemangiomas of the hymen or labia, urethral prolapse, lichen sclerosus, and lesions in the genital or anal area caused by conditions such as Crohn Disease or Behcet Disease can also be confused with signs of sexual contact or trauma. Examples of these findings are shown in Chapters 2, 8 and 10 in the textbook mentioned earlier (6).

Is This Finding Normal or Abnormal and Caused by Abuse?

For physicians who are not familiar with the detailed appearance of the genital and anal tissues in children, distinguishing normal from abnormal findings can be difficult. There is a tendency to conclude that an unusual finding must be a result of abuse. In an online survey of medical professionals who examine children for suspected sexual abuse, findings on genital and anal photographs were more likely to be incorrectly attributed to sexual abuse among those who examined fewer than five children per month (24).

The finding of marked, immediate anal dilation in the absence of other predisposing factors is a rare finding in both abused and nonabused children (9, 25, 26). Anal dilation can be caused by stool being present in the rectal vault, chronic constipation, encopresis, sedation, anesthesia, neuromuscular conditions, and can be seen at autopsy (27). No consensus currently

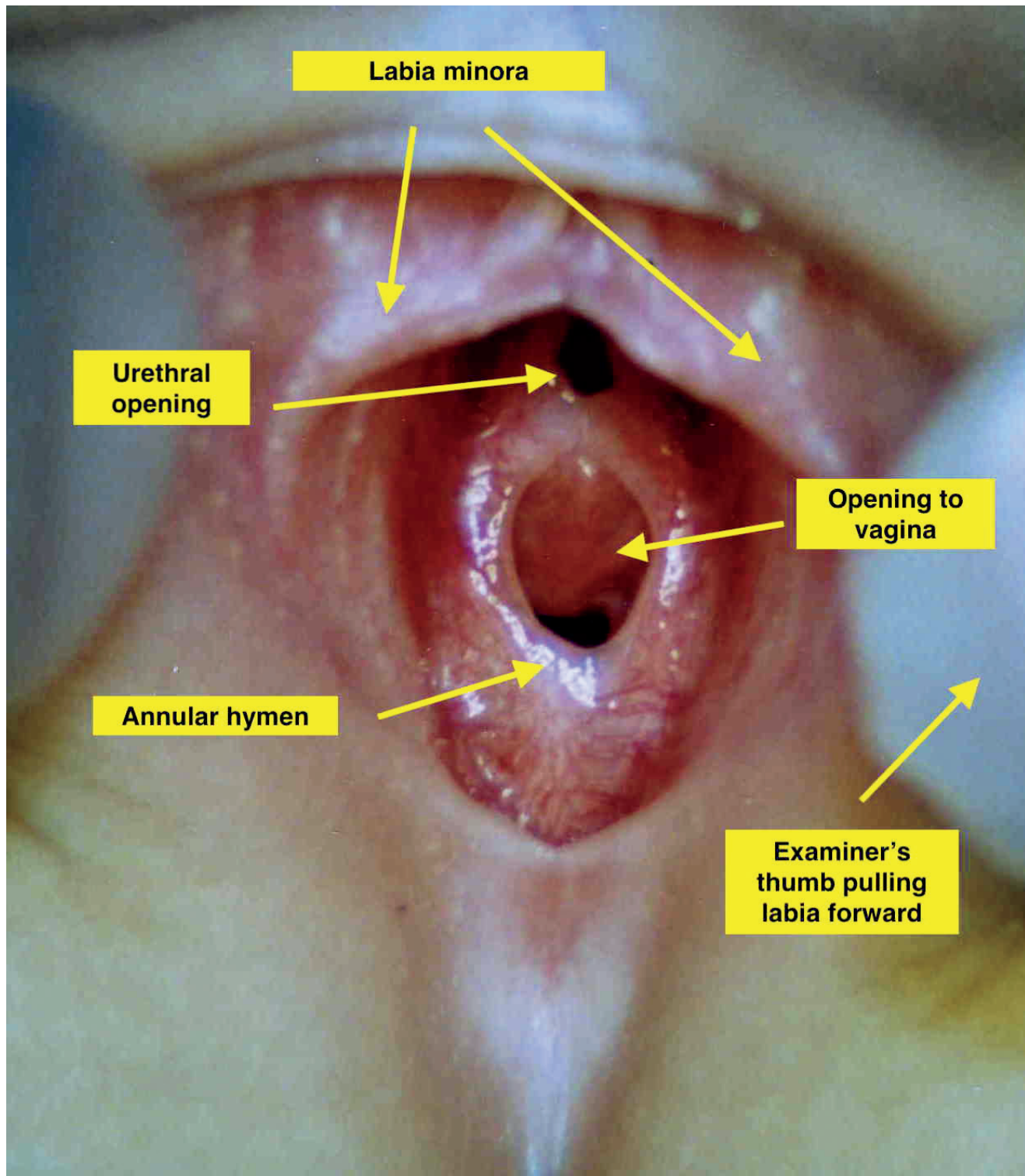


Image 1: The details of the external genitalia of a young girl is shown in this magnified image, taken with a camera attached to a colposcope. The examiner is gently grasping the labia majora and pulling forward slightly, to clearly show the normal, annular hymen.

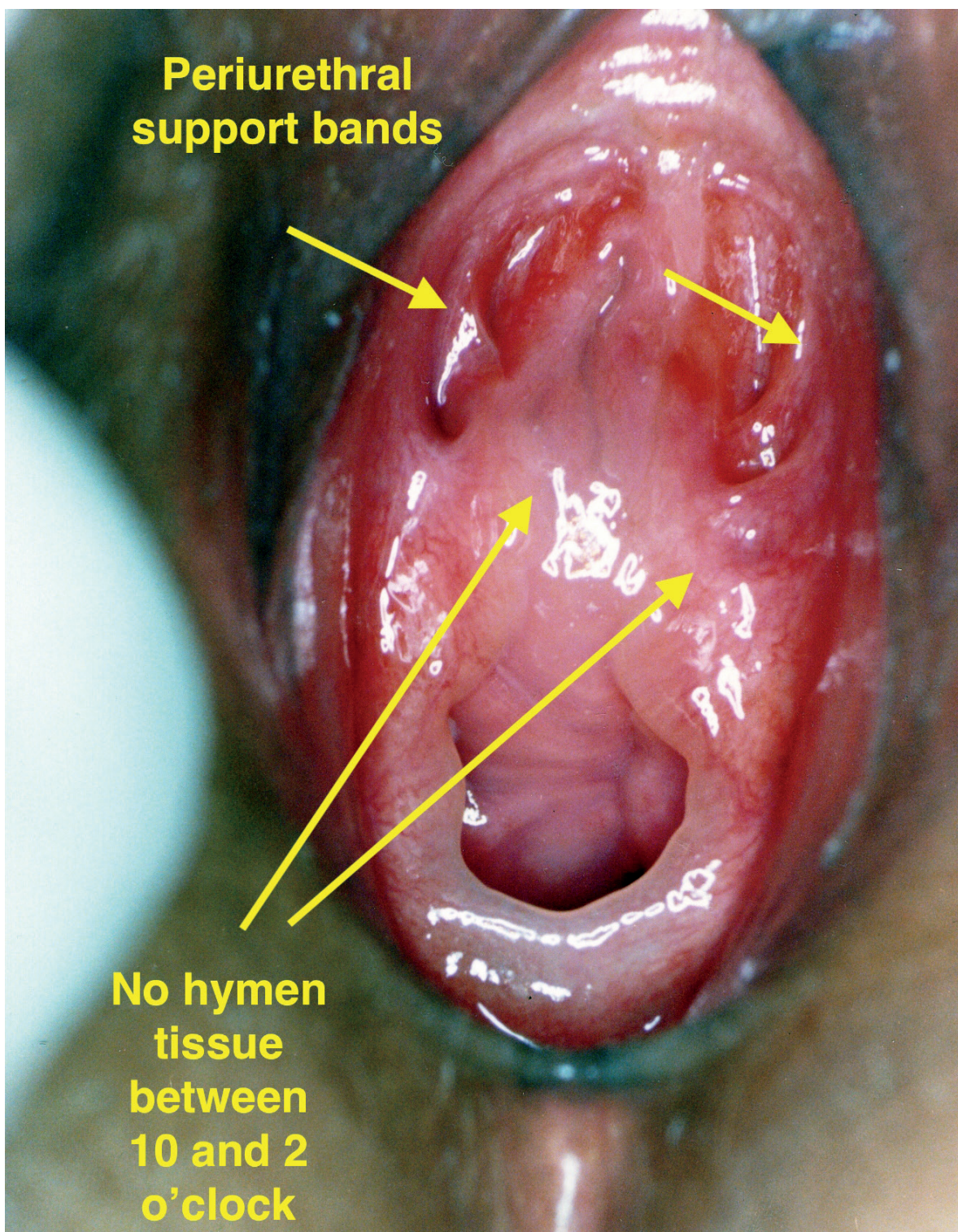


Image 2: This image shows the genital area of an 8-year-old girl who has a crescentic hymen. The hymen attaches at 10 and 2 o'clock, with no hymen tissue between those two locations. There are prominent peri-urethral support bands, which are normal structures.

exists among experts as to how this finding should be interpreted in the a child with no predisposing factors if there is no disclosure of anal penetration, and so this finding is listed as being a “no expert consensus” finding for abuse (see **Table 1**).

For forensic physicians, the postmortem findings most likely to cause confusion are the dilation of the anal opening, the “large” hymen opening in a girl with loss of muscle tone, and a red-purple coloration of the genital tissues, which can be the result of postmortem lividity (28). One study described how dilation of the anus of a child at the time of autopsy was misinterpreted as a sign of sexual abuse (29).

Resources for Outside Expert Review of Findings

Medical providers, including forensic physicians, who rarely examine in detail the external genitalia of nonabused prepubertal girls or the anal tissues of young girls and boys, may be unfamiliar with the wide variation in the normal appearance of these tissues. Physicians or other health care providers who do not routinely perform magnified examinations of children’s genital and anal tissues are advised to develop a procedure to obtain high quality digital images of any physical finding that is thought to be related to sexual abuse. These images can then be shared with an expert in child sexual abuse medical evaluation to obtain a second opinion as to whether or not a concern for sexual abuse should be raised.



Image 3: In this photo, the anal area of a 5-year-old girl is examined while she is lying on her back on the examination table. Both the internal and external anal sphincters are closed, giving the typical appearance of anal folds around the opening. Some increased redness was noted, but this is a common finding unrelated to abuse.

These reviews, if high quality photographs have been taken, can be obtained anonymously through a program called MyCaseReview, sponsored by the Midwest Regional Children's Advocacy Center (www.mrcac.org). Medical providers submit de-identified photographs and case information using a web link, and the case is reviewed by a specialist in child abuse pediatrics. The expert gives an opinion, via the web

link, as to whether he or she agrees with the conclusions of the individual submitting the case.

University affiliated children's hospitals often have specialist pediatricians who are trained to perform the examinations of sexually abused children. These physicians could also be a resource for medical providers in the community and can be contacted for a second

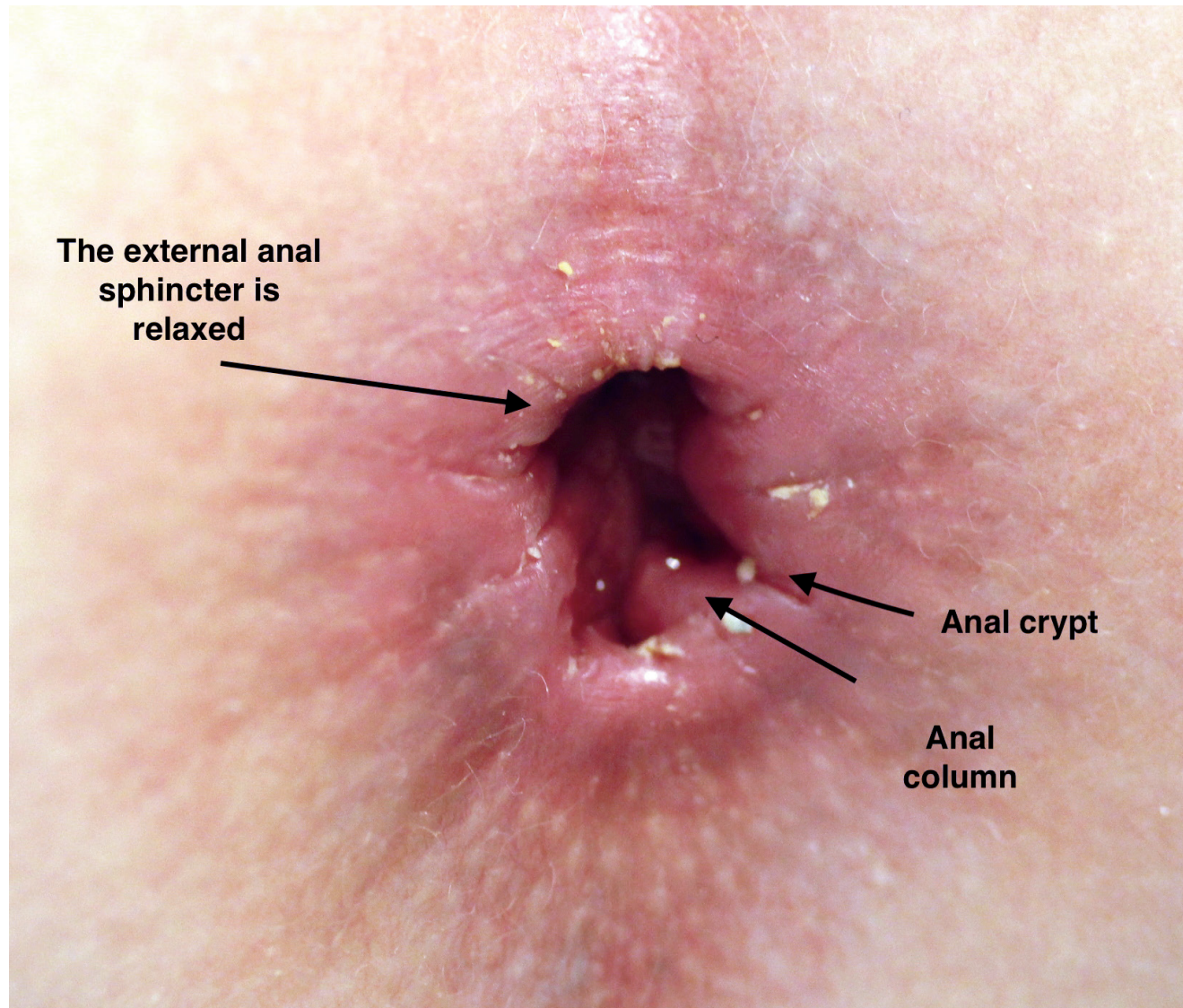


Image 4: This is a photograph of the same child shown in **Figure 3**. The anal opening is seen, and the external sphincter mostly relaxed, allowing a view into the rectum. Note the exposure of an anal column at the 5 o'clock location, and an anal crypt at 4 and 6 o'clock. This exposure of the tissues deep to the external anal sphincter has been mistaken as a sign of trauma, with the anal crypts being incorrectly identified as anal lacerations.

opinion regarding possible signs of sexual abuse in a child who has been examined by a physician without specialty training. No one wants to miss a case of child abuse, but neither should the question of possible abuse be raised unnecessarily.

All physicians who examine children can benefit from a basic, introductory course on how to perform an anogenital examination, and how to recognize both normal and abnormal physical findings in a child in their care. The textbook and atlas, *Medical Response to Child Sexual Abuse* is being updated, and will be available as hard copy or eBook (6). An online course on sexual abuse medical evaluation is also available through the Midwest Regional Children's Advocacy Center (www.mrcac.org).

CONCLUSION

Signs of injury are rare in children who have been sexually abused, unless the assault involved blunt force trauma and the child was examined within 72 hours of the assault. In those cases, signs of injury such as bruising or lacerations of the labia, hymen, posterior fourchette or perineum in girls (see **Image 6**), and bruising or lacerations of the perianal tissues in both girls and boys (see **Image 7**), may be found. Confirmed genital, anal, or pharyngeal infections caused by *N. gonorrhea*, *Chlamydia trachomatis*, HIV, or syphilis are sexually transmitted. Only the recovery of the assailant's bodily fluids in or on a child's body, or pregnancy is conclusive of previous sexual contact.

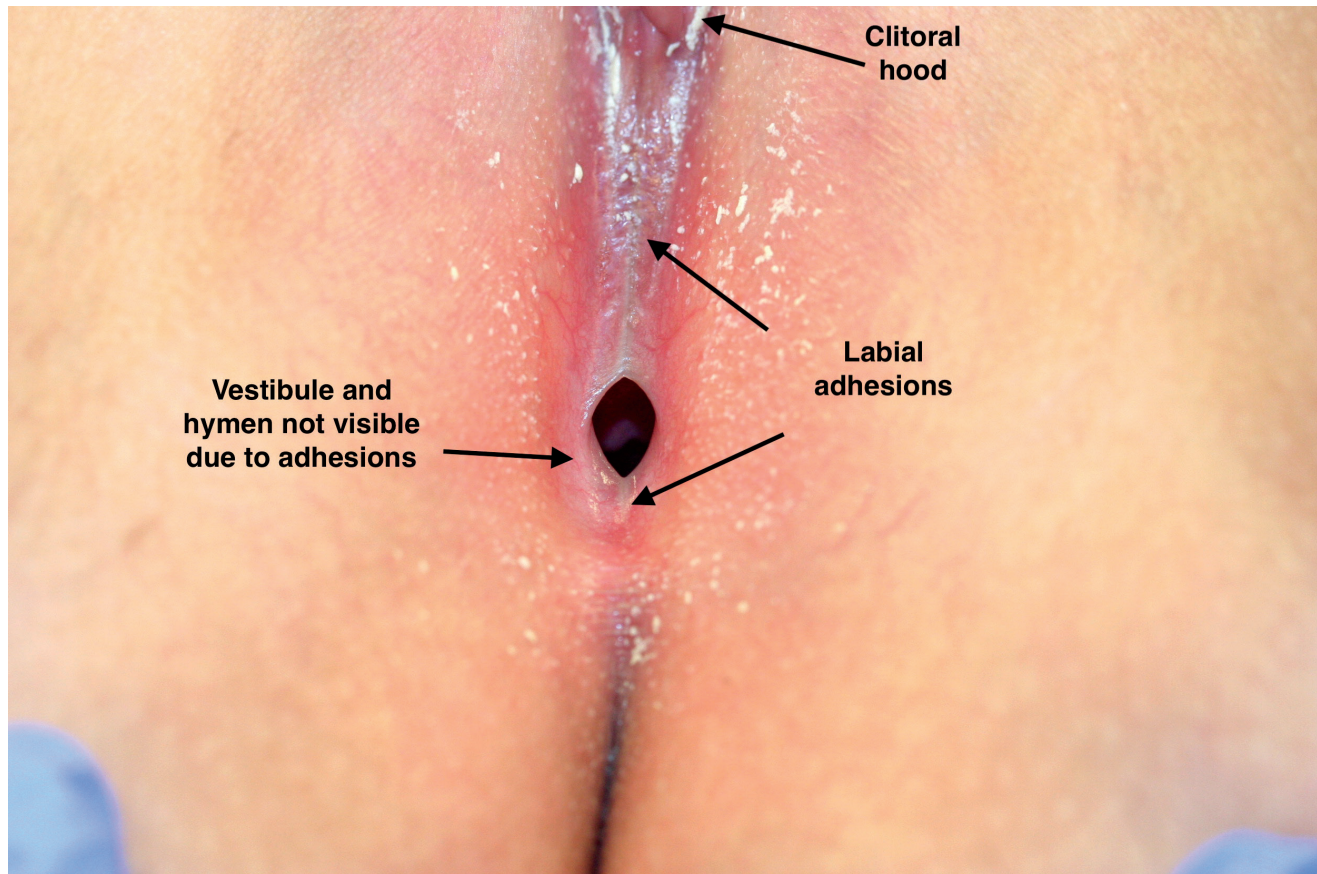


Image 5: This 9-year-old girl was referred to a specialty center for possible sexual abuse due to the initial examiner's conclusion of "no hymen." The child has labial adhesions above and below the opening, but the vestibule and hymen cannot be visualized due to the adhesions.

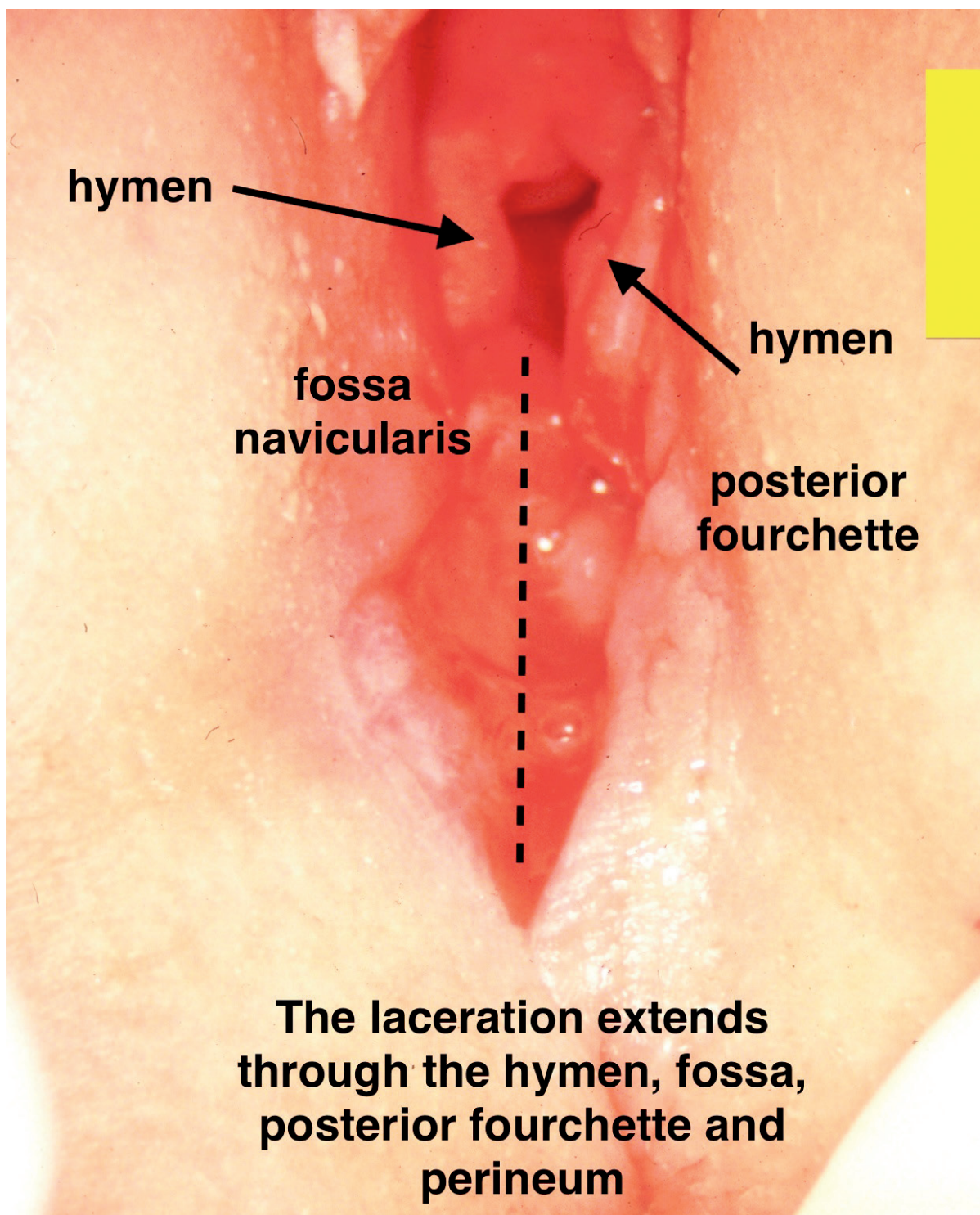


Image 6: This 9-year-old girl was sexually assaulted six days prior to this examination. There is an extensive laceration extending through the hymen, fossa navicularis, posterior fourchette, and perineum. She had bleeding necessitating wearing a sanitary pad for five days.

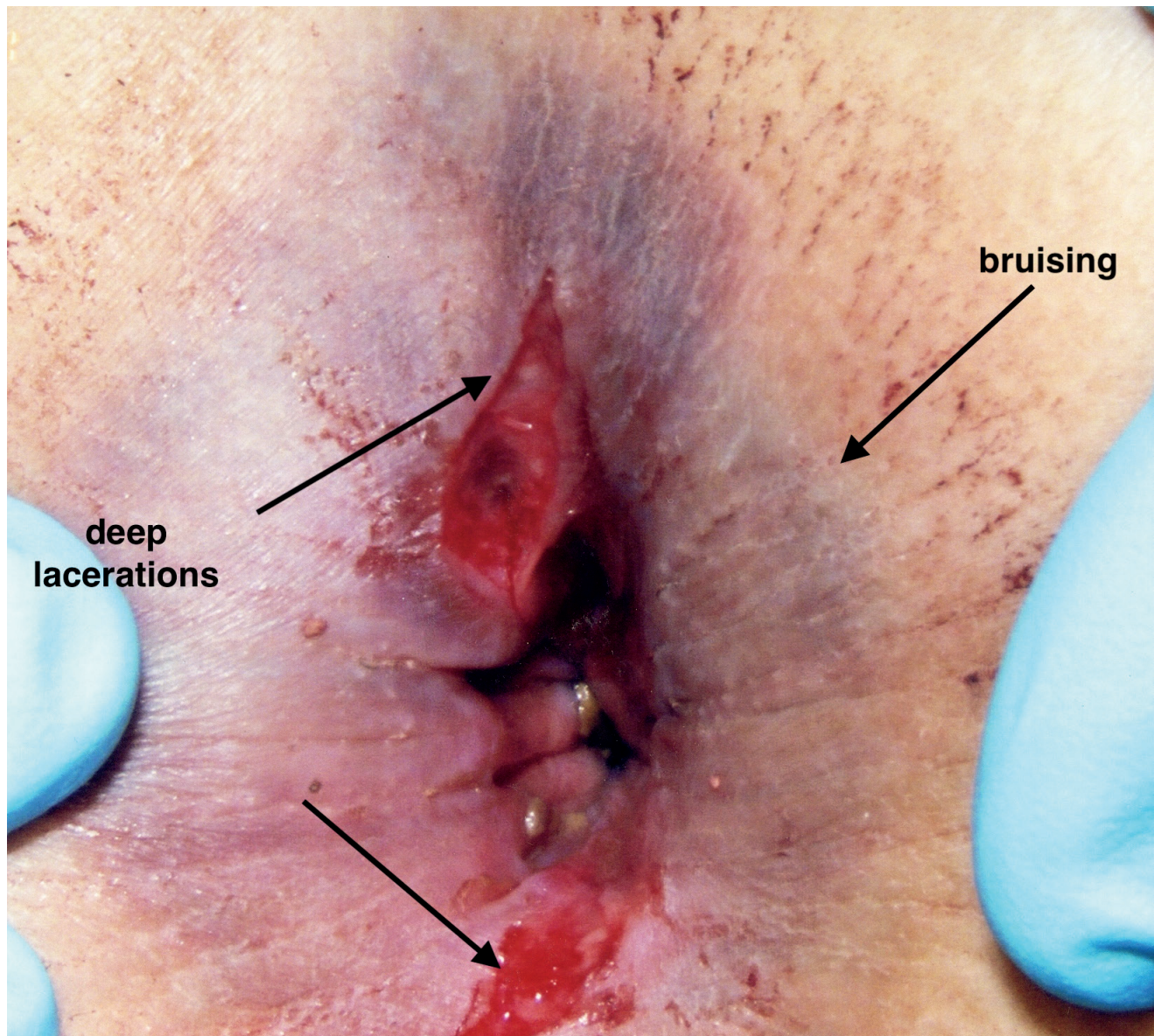


Image 7: This 7-year-old boy was assaulted by a teenage male cousin three days prior, but hadn't told his mother about it until he continued to have pain. There is extensive perianal bruising and two deep lacerations, one at 12 o'clock and one at 6 o'clock. These healed ten days later, leaving only a thin white scar at each location.

For the majority of sexually abused children and adolescents, the medical examination will not reveal any signs of injury or infection. The detail, clarity, and consistency of the child's description of what happened to them is the most important factor in determining if sexual abuse occurred.

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