

Bruising in Infancy: When is it an Emergency?

CME EDUCATIONAL OBJECTIVES

1. Identify the evaluation of a bruised infant as an urgent clinical situation.
2. Name at least three medical conditions that can mimic abusive bruising in infancy.
3. State the need for further medical evaluation and reporting to child protective services when encountering an infant with unexplained bruising.

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doi: 10.3928/00904481-20100922-09

William was 4 months old when he presented with his mother to the outpatient pediatric clinic with a chief complaint of "fussiness." Physical

exam revealed a 1.5-cm triangular bruise on his right medial thigh and two, faint, apparently healing abrasions on his trunk in the left mid-axillary line. His mother was unaware of any recent trauma and had first noted these findings during a bath 24 hours before the visit. The evaluating pediatric resident reviewed the record and found that at William's 2-month well-child visit, a 0.5-cm bruise had been noted on his ear; at that previous visit, his mother reported that, while in his father's care, William rolled off a sofa and struck his ear on an adjacent baby swing.

In response to the multiple episodes of bruising in an infant not yet rolling over, skeletal survey was obtained and revealed 12 healing rib fractures (lateral and posterior) and multiple classic metaphyseal lesions (corner fractures) of the lower extremities. Child abuse and trauma surgery teams were consulted and judged his presentation diagnostic for inflicted injury. His mother then reported that she had just left a

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domestic violence relationship and feared that the father had been harming William while she was working. Head computerized tomography (CT), lab studies (CBC, AST, ALT, amylase, lipase, and bag U/A), and dilated retinal exam were negative. William was admitted for overnight observation to the trauma surgery service.

A child protective services (CPS) report was made, and CPS took temporary physical custody of William while an investigation began. The outpatient attending physician on the case had also been attending at the 2-month visit and noted that the prior ear bruise had been very minor. He asked, "How do I know when it is an emergency?"

Infants presenting with bruises require immediate and thorough evaluation. Those experiencing physical abuse often suffer repeated episodes of escalating trauma.¹⁻³ Early diagnosis of this potentially fatal condition can lead to the cure of a protective environment. Unfortunately, the lack of accurate history and varied subtle presentations can make these infants difficult to diagnose; many presenting with signs or symptoms of physical abuse are not immediately diagnosed and return later with serious or fatal injuries.³⁻⁵ Jenny et al.³ noted that in 20 of 54 missed cases of abusive head trauma, facial or head bruising had been noted, but attributed to accidental

injury. There is growing awareness of the need for clinicians to respond vigorously to even small suspicious injuries in infants, as these "minor" injuries may portend major morbidity.^{3,6,7}

It is also possible for infants to present with bruises after accidental trauma, usually after they become independently mobile;⁸⁻¹⁰ accurate diagnosis is important for them so that unnecessary CPS involvement can be avoided. Still, other infants present with bruising as the first manifestation of a bleeding disorder or with other conditions that mimic abuse;^{6,11-13} they too require prompt accurate diagnosis. This review focuses on what is known about distinguishing abusive bruises in infants from those resulting from accidental injury or other medical causes. It will provide a practical approach to evaluation, documentation, and reporting of the infant with bruising.

DISTINGUISHING ABUSE FROM ACCIDENT

Several studies have demonstrated that bruising in non-mobile infants screened at well-child care is very rare^{9,14-17} and that the likelihood of encountering one or more bruises increases as motor development progresses (see Sidebar 1, page 652). Sugar et al.⁹ noted that "Those who don't cruise rarely bruise" and found bruises in only 2 out of 366 (0.6%) of infants younger than 6 months and 8 out of 473 (1.7%) of infants younger than 9 months. In a systematic review, Maguire et al.¹⁰ estimated the prevalence of bruising in the non-mobile, non-abused infant to be less than 1%, increasing to 17% of crawlers/cruisers and 53% of walkers. Accidental bruises in mobile infants are likely to be small (< 15 mm)^{15,16} and distributed over bony prominences on the front of the body.^{9,15,16} The anterior knee/lower leg and the forehead are the most common sites of accidental injury.^{9,15}

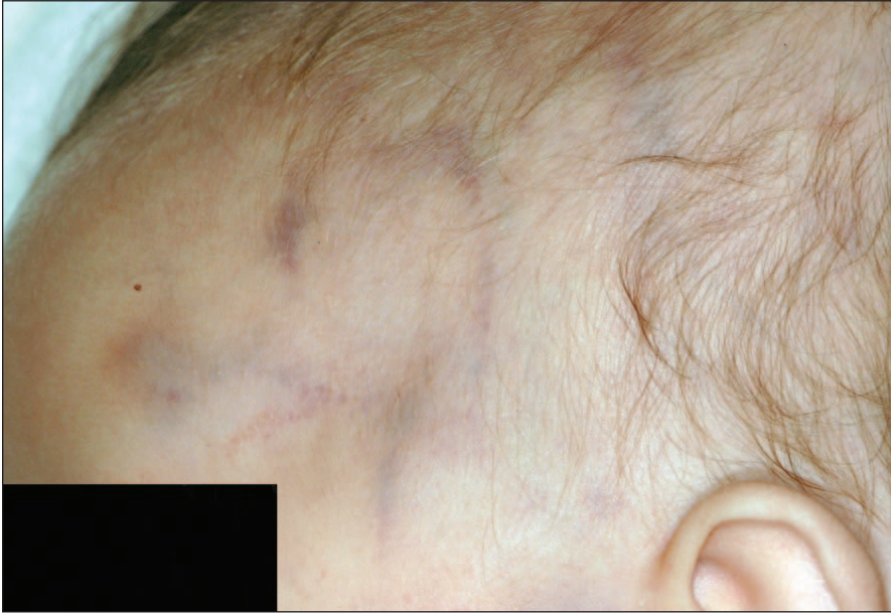


Figure 1. This 3-month-old presented with unexplained bruising to scalp, face, chest, and abdomen. Note linear elements within this area of scalp bruising.



Figure 2. Bruises on the cheek of a 2-year-old in a typical slap mark distribution. Caregiver first reported that the child fell. Later caregiver admitted slapping child in the face.

In studies of abused infants and children, the most common sites of bruising are the head and face;¹⁸⁻²¹ other commonly injured areas include the ears, trunk, and buttocks.^{20,22} Maguire et al.¹⁰ noted that in contrast to those with accidental injury, abused infants,

and children may have bruises on any part of the body. Sites of injury often include “soft” areas away from bony prominences and inflicted injuries sometimes have a recognizable pattern. Patterned injuries may demonstrate the shape (often a partial negative imprint

or outline) of the hand or implement used in the assault.^{23,24}

In infants, the characteristic, roughly parallel lines of bruising associated with a slap mark (negative imprint of fingers) may not be oriented in the typical diagonal distribution from mouth to ear, but may also be seen on the head and face in other orientations, presumably because infants are in varied positions at the time of their assaults. These linear bruises are often mistaken for “scratches” because of their pattern, but close inspection will usually reveal that the skin is not abraded (see Figure 1 and Figure 2). Well-defined grab patterns may be observed on infant extremities after they are squeezed by an adult hand (see Figure 3, page 649). Still other recognizable patterned injuries reflect anatomic vulnerabilities of specific body areas during direct blows, such as vertical linear bruising adjacent to the gluteal cleft and bruising along the rim of the ear pinna (see Figure 4, page 649).²⁵ Facial petechiae and subconjunctival hemorrhage may be observed after significant compression of the neck or chest (see Figures 5 and 6, page 650).²⁶ It must be noted that most bruising seen in infant abuse is not patterned and that it is more often the location and distribution of bruises, along with consideration of the developmental level and event history, that creates suspicion for inflicted injury (see Figure 7, page 650; Figure 8 and Figure 9, page 651).

Intra-oral injuries have been reported in many physically abused infants and children, the most common of which being injuries to the lips (see Figure 10 and Figure 11, page 652).²⁷ A series by Naidoo et al.²¹ reported intra-oral injury in 11% of a retrospective case series of 300 abused infants and children; they noted the high rate of trauma to facial structures overlying the mouth and raised concern that some intra-oral injuries may have

gone undetected. Intra-oral injuries may present with oronasal bleeding or coffee-ground emesis or may be found during examination for other concerns. They may be initially undetected by examining clinicians because of locations (such as labial or lingual frenulae or the floor of the mouth) that are not routinely inspected on exam. When visualized, they are sometimes confused with infection because healing traumatic injuries in the mouth can have a similar surface appearance to healing ulcerations of other cause. Torn labial frenulum has been confirmed by caregiver confession in some fatal abuse cases to have resulted from an inflicted blow to the mouth.²⁸ In mobile infants and children, a torn labial frenulum can also result accidentally from a fall against a hard surface. This injury has not been shown to be specific for abuse²⁷ and must be evaluated in light of the developmental level and the history provided. Deeper injuries (to palate, floor of mouth, and posterior pharynx) reflect intrusive mechanisms of injury.

DIFFERENTIAL DIAGNOSIS

There are many other conditions that may be confused with inflicted bruises (see Sidebar 2, page 652).^{12,13,29} These should be considered early in the evaluation of an infant with apparent bruising.

MEDICAL EVALUATION

History

In infants with inflicted injuries, the history may be absent or incomplete. Often, the caregiver presenting for care is unaware of the trauma event(s) and may present with appropriate concern. Sometimes, a history of very minor trauma is provided, such as a short fall from a sofa or bed. To evaluate whether the history provided explains the injury observed, details should be sought



Figure 3. This 3-month-old presented with patterned bruises to forearms consistent with negative imprint of a hand; caregiver acknowledged squeezing her arms with his hands.

about any trauma event to include timing, details of the event, observers present, the infant's immediate clinical response, and when injury was first noted by the caregiver. It is important to note the developmental level of the infant, which adults provide care and whether any other children have had unsupervised access to the infant. If multiple caregivers are present at the visit, consider obtaining history from them separately.

History should be documented in detail, including who provided which information. In cases of absent history, the clinician must take care not to provide potentially plausible explanations in response to caregiver questions about what might have caused the injury observed; the clinician should simply respond that he or she does not know what happened and that is why a detailed history is being sought.

Past medical history should include whether vitamin K was administered after birth, diet, medications, any previous episodes of bruising or bleeding, and response to previous surgeries (such as circumcision). Full review



Figure 4. This 18-month-old presented with multiple inflicted injuries to head and neck. Photo shows bruising along the posterior rim of ear pinna, which was seen bilaterally.

of systems should be performed (to include symptoms of malabsorption or liver or kidney disease) and if the caregiver was questioned about any intercurrent symptoms of illness. History of exposure to chemicals or plant substances should be sought. Fam-

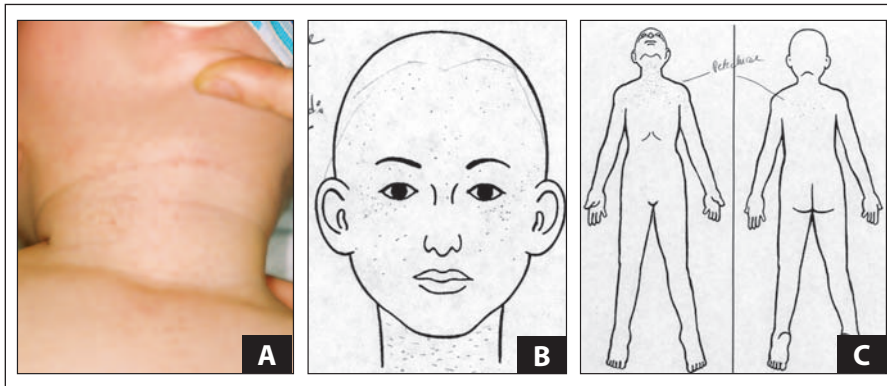


Figure 5 A-C. A: This 5-month-old presented with diffuse petechiae on upper chest, neck, and head. Caregiver acknowledged squeezing his torso against caregiver's chest to make him stop crying. B and C: Body diagrams drawn in this case illustrate how to document findings in the medical record; all diagrams should be signed and dated.

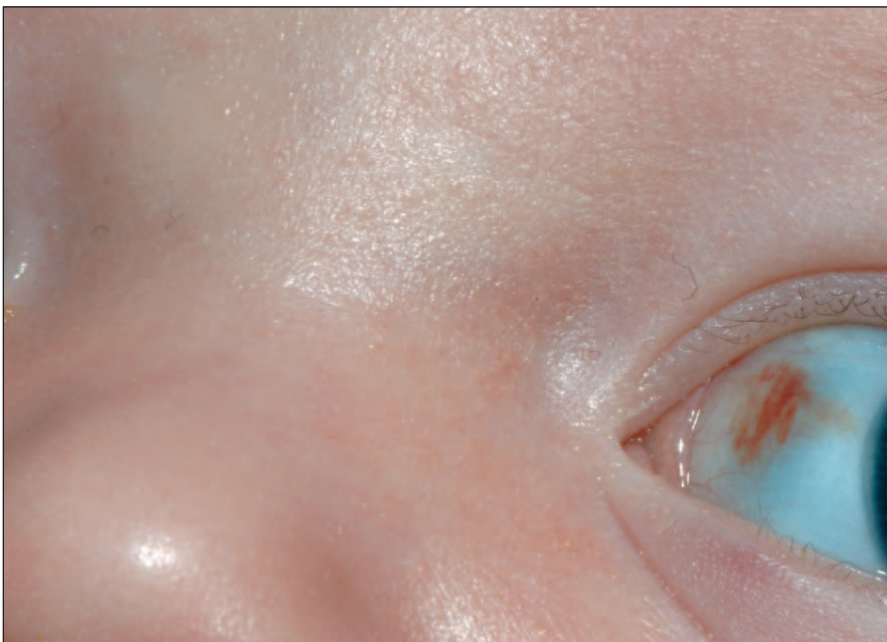


Figure 6. This 6-week-old presented with irritability and was under evaluation to rule out sepsis when subconjunctival hemorrhages (one of which is pictured here) and bloody LP were noted. Head CT revealed subarachnoid and subdural hematomas and brain contusions, and skeletal survey revealed multiple rib fractures. Caregiver acknowledged inflicting injuries, including squeezing the infant's torso on multiple occasions.

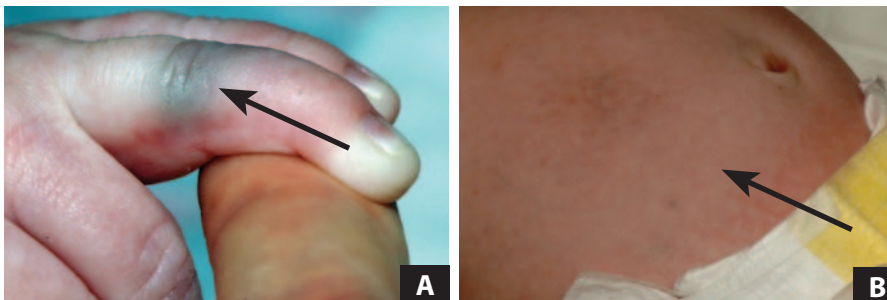


Figure 7 A-B. A: This 8-week-old presented with unexplained bruises to her finger and B, abdomen. Primary care provider had noted two prior episodes of facial bruising, which parents had attributed to her hitting herself in the crib. Skeletal survey showed multiple rib fractures.

ily history should include presence or absence of consanguinity and first-degree relatives with unusual bruising or bleeding, such as problems with menorrhagia, epistaxis, or excessive bleeding with childbirth or surgery.¹³

PHYSICAL EXAMINATION

Any bruise on an infant should prompt full vital signs and a complete general physical examination. Fontanelles should be palpated and head circumference measured. During skin exam, care should be taken to observe the scalp, ears, behind the ears, neck folds, genital and anal areas, and palms and soles of hands and feet. Oral cavity exam should include visualization of the interior surfaces of the lips, labial and lingual frenulae, the floor of the mouth, and the buccal mucosa, in addition to the palate and posterior pharynx. Abdominal exam should include assessment for hepatosplenomegaly. Skeleton should be palpated to evaluate for any focal tenderness, crepitation, or deformity.

Drawing a diagram of any skin findings observed, with notes on size and color of lesions can serve as documentation (see Figure 5 for examples of diagrams). Photographs should also be taken and a size standard included adjacent to the area of interest in at least one of the images. If the evaluating clinician is not able to take high-quality photographs, a child abuse pediatrician and/or investigators (police or CPS) should be engaged to take photographs in a timely fashion.

TRIAGE DECISIONS

If the cause of bruising remains unclear after history and physical examination are complete, a triage decision must be made regarding the setting for further evaluation. If it is not possible to get immediate lab and X-ray results in the outpatient setting and/or the stability of the infant is in question, im-

mediate referral to a pediatric emergency department may be appropriate. Early involvement of a trauma surgeon may be indicated. Consultation with a child abuse specialist or pediatric emergency physician can help to guide triage decisions. Often, there is concern about whether a caregiver will proceed as directed to the ED for further evaluation and/or the extent of injury to the infant remains unclear. In these situations, a clinician may call 911 for ambulance transport from the outpatient office to the emergency department to ensure completion of needed evaluation and treatment.

It is important to note that many infants with serious inflicted injuries, such as fractures, intracranial, or intra-abdominal injury, have no cutaneous findings on exam.^{20,30,31} If there are other reasons to suspect inflicted injury in an infant, the absence of cutaneous findings is not reassuring and thorough evaluation should be completed.

Laboratory Evaluation

Laboratory testing varies by situation, and there is no single accepted standard for initial screening for bleeding disorder. Initial lab evaluation of the infant with unexplained bruising may reasonably include CBC with platelet count and blood smear, PT, aPTT, thrombin time, and fibrinogen,³² with the understanding that this screen cannot rule out all disorders of hemostasis. If initial screening tests are abnormal, or if past medical or family history suggest the possibility of a bleeding disorder, further evaluation may be warranted;³² consultation with a pediatric hematologist can help to guide the evaluation. In cases in which there are patterned bruises and/or the presence of other unexplained injuries (fractures) that are highly specific for inflicted injury, more extensive bleeding disorder evaluation may be unwarranted. It must be remembered that



Figure 8. This 5-day-old had patterned scalp/facial bruising consistent with a slap mark and the leg bruising pictured here. There was no trauma history. Evaluation for bleeding disorder was negative.



Figure 9. This 1-month-old presented with a limp arm and this chest bruise. Skeletal survey revealed a humeral fracture.

bleeding disorders and physical abuse are not mutually exclusive¹¹ and can occur together. The infant with unexplained bruising also needs immediate evaluation for trauma, and additional laboratory evaluation for trauma may include liver transaminases,^{33,34} amylase, lipase, and urinalysis.

Skeletal survey should be obtained in any child younger than 2 years for whom there is suspicion of physical

abuse for any reason.³⁵ Intracranial imaging should be considered because many physically abused infants have occult head injury.^{36,37} Rubin et al.³⁶ have recommended intracranial imaging, even if neurological exam is normal in infants under evaluation for physical abuse if they have any of the following risk factors: facial injury, rib fractures, multiple fractures, or younger than 6 months. Head imaging is best

SIDEBAR 1.

Red Flags of Possible Physical Abuse in Infancy

- Any injury in a non-mobile infant
- Patterned bruising
- Bruising in unusual location(s)
- Lack of credible explanation for injury
- History inconsistent with injury observed
- History inconsistent with developmental level of infant
- Changing history (over time or between caregivers)

SIDEBAR 2.

Conditions that May Be Confused with Abusive Bruising in Infants**Traumatic**

- Accidental bruises
- Cultural practices, such as cupping or coining

Vascular

- Hemangiomas (deep component is often blue)
- Prominent subcutaneous veins

Dermatologic

- Slate-gray patches (Mongolian spots)
- Congenital melanocytic nevi
- Urticaria pigmentosa/mastocytosis
- Erythema nodosum
- Hyperpigmentation following inflammation
- Phytophotodermatitis

Oncologic

- Neuroblastoma presenting with periorbital ecchymosis (raccoon eyes)
- Thrombocytopenia secondary to malignancy, such as leukemia

Hematologic

- Hemorrhagic disease of newborn/vitamin K deficiency
- Hemophilia
- Other inherited bleeding disorders
- Idiopathic thrombocytopenic purpura
- Other acquired bleeding disorders, such as with liver or kidney disease

Other

- Henoch-Schönlein purpura
- Other vasculitis, such as infectious or drug-related
- Heritable connective tissue disorder such as Ehlers-Danlos disease
- Artefactual (from ink or dye)



Figure 10. This 3-month-old presented with unexplained bruising to head and a leg fracture. Close inspection of the mouth revealed this torn labial frenulum.



Figure 11. This 10-month-old presented with extensive unexplained facial bruising, and these healing abrasions were noted on the interior surface of the lower lip.

achieved with CT, magnetic resonance imaging (MRI), or both.³⁵ If intra-abdominal injury is suspected based on clinical or laboratory findings, CT is the imaging modality of choice.³⁵

Ophthalmologic Evaluation

Infants with suspected abusive head trauma should have a dilated retinal exam performed by an ophthalmologist.

REPORTING AND TALKING WITH FAMILIES

All 50 states have laws mandating that health care providers report suspected maltreatment to CPS. There are laws protecting clinicians who make a report in good faith; there are also potential civil or criminal penalties for failure to report. Underreporting of suspicious injuries by clinicians remains a significant problem.^{38,39} Investigators

can gather crucial information that is otherwise unavailable to evaluating physicians. When considering a CPS report, clinicians must remember that they need have only reasonable suspicion of abuse or neglect and that failure to report when an infant presents with “minor” skin or intra-oral injury could result in further injury or death.

In some cases, it is appropriate to discuss the CPS report with the caregiver immediately; in others, it is best to wait until the infant has been transferred to the pediatric emergency department or inpatient ward. Language should be neutral and should focus on the unexplained finding in the infant and laws requiring medical providers to report any unexplained finding in a baby that could be caused by trauma. If there are other conditions for which you are simultaneously evaluating (bleeding disorder), this should be explained. If caregivers become agitated, it is helpful to acknowledge their stress and reiterate that the medical team is making no assumptions but needs to be sure that their infant receives all indicated medical evaluation. If social work evaluation and support is available, this should be offered to the caregiver.

CONCLUSIONS

A detailed history and thorough physical examination should be performed in any infant with bruising. The clinician should then carefully consider whether the history provided plausibly explains the injury observed. The infant with bruises that are developmentally unexpected (non-mobile infant), inconsistent with the history provided, patterned, or in an unusual location needs immediate evaluation for inflicted trauma or underlying disease. This infant should be viewed as a possible trauma patient with uncertain history so appropriate triage decisions are made and serious injury is not overlooked. Careful consideration should

be given to the differential diagnosis, and evaluation should be directed to include or exclude alternate diagnoses. Those for whom an alternate condition is not readily diagnosed should be reported to state CPS for investigation of possible physical abuse. The primary care clinician may not be able to diagnose definitively the cause of every case of infant bruising in the office. In uncertain cases, referral to CPS and a pediatric emergency department or child abuse specialist can facilitate timely accurate diagnosis.

In William’s case, there were multiple red flags leading to suspicion of physical abuse, and a simple skeletal survey proved confirmation. William’s father was arrested; his mother received domestic violence and parenting education, and was reunited with William within 2 months. Clinicians must remain alert for these red flags and keep the possibilities of inflicted injury or a medical mimic of abuse in mind. Remember that even small bruises in an infant may represent a child protection emergency and that in these cases, immediate thorough evaluation can prevent a devastating outcome.

REFERENCES

- O’Neill JA Jr, Meacham WF, Griffin JP, Sawyers JL. Patterns of injury in the battered child syndrome. *J Trauma*. 1973;13(4):332-339.
- Alexander R, Crabbe L, Sato Y, Smith W, Bennett T. Serial abuse in children who are shaken. *Am J Dis Child*. 1990;144(1):58-60.
- Jenny C, Hymel KP, Ritzen A, Reinert SE, Hay TC. Analysis of missed cases of abusive head trauma. *JAMA*. 1999;281(7):621-626.
- King WK, Kiesel EL, Simon HK. Child abuse fatalities: are we missing opportunities for intervention? *Pediatr Emerg Care*. 2006;22(4):211-214.
- Oral R, Yagmur F, Nashelsky M, Turkmen M, Kirby P. Fatal abusive head trauma cases: consequence of medical staff missing milder forms of physical abuse. *Pediatr Emerg Care*. 2008;24(12):816-821.
- Feldman KW. The bruised premobile infant: should you evaluate further? *Pediatr Emerg Care*. 2009;25(1):37-39.
- Pierce MC, Smith S, Kaczor K. Bruising in infants: those with a bruise may be abused. *Pediatr Emerg Care*. 2009;25(12):845-847.
- Wedgwood J. Childhood bruising. *Practitioner*. 1990;234(1490):598-601.
- Sugar NF, Taylor JA, Feldman KW. Puget Sound Pediatric Research Network. Bruises in infants and toddlers: those who don’t bruise rarely bruise. *Arch Pediatr Adolesc Med*. 1999;153(4):399-403.
- Maguire S, Mann MK, Sibert J, Kemp A. Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review. *Arch Dis Child*. 2005;90(2):182-186.
- O’Hare AE, Eden OB. Bleeding disorders and non-accidental injury. *Arch Dis Child*. 1984;59(9):860-864.
- Wheeler DM, Hobbs CJ. Mistakes in diagnosing non-accidental injury: 10 years’ experience. *Br Med J (Clin Res Ed)*. 1988;296(6631):1233-1236.
- Minford AM, Richards EM. Excluding medical and haematological conditions as a cause of bruising in suspected non-accidental injury. *Arch Dis Child Educ Pract Ed*. 2010;95(1):2-8.
- Robertson DM, Barbor P, Hull D. Unusual injury? Recent injury in normal children and children with suspected non-accidental injury. *Br Med J (Clin Res Ed)*. 1982;285(6352):1399-1401.
- Mortimer PE, Freeman M. Are facial bruises in babies ever accidental? *Arch Dis Child*. 1983;58(1):75-76.
- Carpenter RF. The prevalence and distribution of bruising in babies. *Arch Dis Child*. 1999;80(4):363-366.
- Labbe J, Caouette G. Recent skin injuries in normal children. *Pediatrics*. 2001;108(2):271-276.
- Worlock P, Stower M, Barbor P. Patterns of fractures in accidental and non-accidental injury in children: a comparative study. *Br Med J (Clin Res Ed)*. 1986;293(6539):100-102.
- McMahon P, Grossman W, Gaffney M, Stanitski C. Soft-tissue injury as an indication of child abuse. *J Bone Joint Surg Am*. 1995;77(8):1179-1183.
- Atwal GS, Ruttly GN, Carter N, Green MA. Bruising in non-accidental head injured children; a retrospective study of the prevalence, distribution and pathological associations in 24 cases. *Forensic Sci Int*. 1998;96(2-3):215-230.
- Naidoo S. A profile of the oro-facial injuries in child physical abuse at a children’s hospital. *Child Abuse Negl*. 2000;24(4):521-534.
- Pierce MC, Kaczor K, Aldridge S, O’Flynn J, Lorenz DJ. Bruising characteristics discriminating physical child abuse from accidental trauma. *Pediatrics*. 2010;125(1):67-74.
- Ellerstein NS. The cutaneous manifestations of child abuse and neglect. *Am J Dis Child*. 1979;133(9):906-909.
- Johnson CF, Showers J. Injury variables in child abuse. *Child Abuse Negl*. 1985;9(2):207-215.

25. Feldman KW. Patterned abusive bruises of the buttocks and the pinnae. *Pediatrics*. 1992;90(4):633-636.
26. Perrot LJ. Masque ecchymotique. Specific or nonspecific indicator for abuse. *Am J Forensic Med Pathol*. 1989;10(2):95-97.
27. Maguire S, Hunter B, Hunter L, Sibert JR, Mann M, Kemp AM; Welsh Child Protection Systematic Review Group. Diagnosing abuse: a systematic review of torn frenum and other intra-oral injuries. *Arch Dis Child*. 2007;92(12):1113-1117.
28. Tate RJ. Facial injuries associated with the battered child syndrome. *Br J Oral Surg*. 1971;9(1):41-45.
29. AlJasser M, Al-Khenaizan S. Cutaneous mimickers of child abuse: a primer for pediatricians. *Eur J Pediatr*. 2008;167(11):1221-1230.
30. Peters ML, Starling SP, Barnes-Eley ML, Heisler KW. The presence of bruising associated with fractures. *Arch Pediatr Adolesc Med*. 2008;162(9):877-881.
31. Valvano TJ, Binns HJ, Flaherty EG, Leonhardt DE. Does bruising help determine which fractures are caused by abuse? *Child Maltreat*. 2009;14(4):376-381.
32. Khair K, Liesner R. Bruising and bleeding in infants and children--a practical approach. *Br J Haematol*. 2006;133(3):221-231.
33. Coant PN, Kornberg AE, Brody AS, Edwards-Holmes K. Markers for occult liver injury in cases of physical abuse in children. *Pediatrics*. 1992;89(2):274-278.
34. Lindberg D, Makoroff K, Harper N, et al; ULTRA Investigators. Utility of hepatic transaminases to recognize abuse in children. *Pediatrics*. 2009;124(2):509-516.
35. Section on Radiology; American Academy of Pediatrics. Diagnostic imaging of child abuse. *Pediatrics*. 2009;123(5):1430-1435.
36. Rubin DM, Christian CW, Bilaniuk LT, Zazyczny KA, Durbin DR. Occult head injury in high-risk abused children. *Pediatrics*. 2003;111(6 Pt 1):1382-1386.
37. Laskey AL, Holsti M, Runyan DK, Socolar RR. Occult head trauma in young suspected victims of physical abuse. *J Pediatr*. 2004;144(6):719-722.
38. Flaherty EG, Sege RD, Griffith J, et al; PROS network; NMAPedsNet. From suspicion of physical child abuse to reporting: primary care clinician decision-making. *Pediatrics*. 2008;122(3):611-619.
39. Sedlak AJ, Mettenburg J, Basena M, Petta I, McPherson K, Greene A, and Li S. Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): Report to Congress. In: Services USDoHaH, ed. Washington, DC: Administration for Children and Families; 2010.

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