



## Physical Abuse Case Review

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### Skeletal Survey Indications

- Indications include but not limited to children <2 years old with any suspicious injury, including:
  - bruises or other skin injuries in non-ambulatory infants
  - oral injuries in non-ambulatory infants
  - injuries not consistent with the history provided*\*may consider SS in children 2-5 in special circumstances\**
- The American College of Radiology outlines that a complete skeletal survey includes 21 images of the skeleton
- Repeat skeletal survey 14 days later
  - Evaluate for routine healing
  - Signs of healing may draw attention to a healing fracture that was previously subtle and missed on initial skeletal survey in the acute phase



Christian CW. The evaluation of suspected child physical abuse. *Pediatrics*. 2015; 135(5): e1337-e1354.  
Flaherty EG, Perez-Rossello JM, Levine MA, Hennrikus WL. Evaluating children with fractures for child physical abuse. *Pediatrics*. 2014; 133: 477-489.

**COMPLETE SKELETAL SURVEY TABLE**

<b>APPENDICULAR SKELETON</b>
Humeri (AP)
Forearms (AP)
Hands (PA)
Femurs (AP)
Lower legs (AP)
Feet (AP)

<b>AXIAL SKELETON</b>
Thorax (AP, lateral, right and left obliques), to include sternum, ribs, thoracic and upper lumbar spine
Abdomen, to include the pelvis (AP)
Lumbosacral spine (lateral)
Skull (frontal and lateral), to include cervical spine (if not completely visualized on lateral skull)



American College of Radiology. ACR practice guidelines for skeletal surveys in children. 2011. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Skeletal-Survey.pdf>. Accessed on December 23, 2019.

**Those that don't bruise...**

- ...rarely bruise
- It is extremely rare for non-mobile infants to have bruises

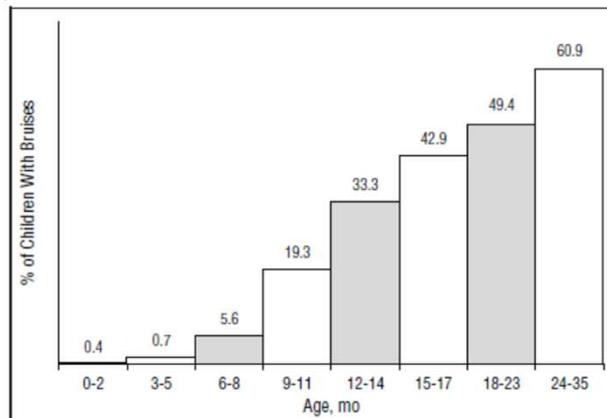


Figure 1. Percentage of children with bruises by age (N=930).

## TEN-4 FACESp BRUISING RULE

### TEN-4:

ANY bruising of the

- **T**ORSO
- **E**ARS
- or
- **N**ECK

in a child younger than 4

OR

ANY bruising, **ANYWHERE**, on a child 4 months of age or younger



Pierce et al. Bruising Characteristics Discriminating Physical Child Abuse From Accidental Trauma. *Pediatrics*. December 2009.

## TEN-4 FACESp Bruising Rule

### • FACES-p:

- Frenulum
  - Bright red blood from the mouth of infants
  - maxillary, mandibular, or sublingual
- Angle of the jaw
- Cheek (buccal)
- Eyelids (black eye)
- Subconjunctival hemorrhage



## Patterned Marks

- Take on the form/shape of the implement used:
  - Slap/finger/grasp marks
  - Bite marks
  - Belt marks
  - Loop marks
  - Ligature marks



## Patterned marks



Loop mark



Bite mark



Cigarette burn



## What is a sentinel injury?

### Box 1

#### Definition of sentinel injuries

- Minor injuries, such as a bruise or intraoral injury (excluding skin abrasions)
- Precruising infant
- Visible or detectable to a caregiver
- Poorly explained and unexpected

## Sentinel Injuries

- These injuries are subtle, minor injuries that may not require any medical care
- Occur in pre-cruising, non-mobile children
  - Therefore the infant cannot sustain these injuries accidentally on their own.



## Types of Sentinel Injuries

- **Bruising** is the most common type of sentinel injury, followed by oral injury
  - Superficial abrasions are actually somewhat common accidental injuries in infants
- **Head and face** are most common locations of sentinel injuries
- Other sentinel injuries include:
  - **Subconjunctival hemorrhages**
  - **Frenulum injuries**



Petska HW and Sheets LK. Sentinel injuries: Subtle findings of physical abuse. Pediatric Clinics North America. 2014 Oct;61(5):923-35.

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## Missed Abuse and Sentinel Injuries

- Retrospective case-control study of 401 infants less 12 months of age evaluated for abuse by a hospital-based, interdisciplinary protective services team
- **27.5% of patients with injuries diagnostic of physical abuse had a history of previous minor injury, as described by the parents**
  - Minor injuries described as bruising, intraoral injury
- None of the non-abused infants had parental report of a previous cutaneous or oral injury

Sheets SK et al. Sentinel injuries in infants evaluated for child physical abuse. Pediatrics. 2013;131:701-707.

Petska HW and Sheets LK. Sentinel injuries: Subtle findings of physical abuse. Pediatric Clinics North America. 2014 Oct;61(5):923-35.



**Box 2**  
**Summary of key findings**

- A sentinel injury preceded severe abuse in 27.5% of cases
- A history of a sentinel injury is rare in infants evaluated for maltreatment and found to not be abused
- All sentinel injuries were observed by a parent
- Forty-two percent of the sentinel injuries were known to a medical provider but the infants were not protected from further harm
- Recognition of and appropriate response to sentinel injuries could prevent many cases of child physical abuse

*Adapted from Sheets LK, Leach ME, Koszewski IJ, et al. Sentinel injuries in infants evaluated for child physical abuse. Pediatrics 2013;131:701–7.*



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## Assessing Plausibility of Fractures

- **NOTE:** Almost any type of injury can be inflicted or accidental.
- We must consider all information, including history provided, injury type, specificity, location, age/development of the child, psychosocial information, and medical history to determine the plausibility that an injury is either abusive or accidental.



## Always consider age, development, and history

- 3 month old presenting with leg swelling

