Pediatric Non-Accidental Trauma

KATHARINE C LONG, MD

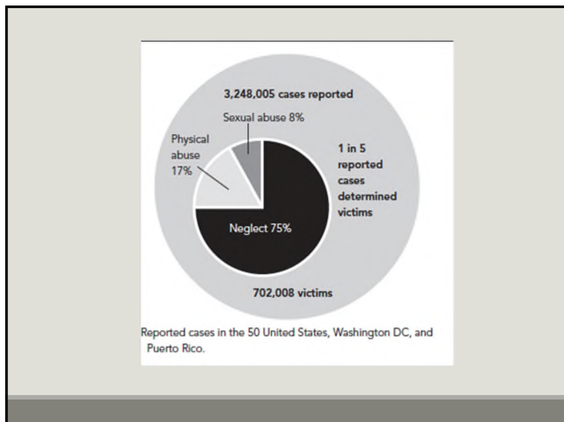
Objectives

- Review epidemiology of child physical abuse
- Describe the challenges of recognizing and screening for non-accidental trauma
- Discuss identification of common injury patterns

Scope of the Problem

3.2M reports of child maltreatment to CPS/year
- 702,000 substantiated victims of physical abuse
- 1580 pediatric deaths

CPS numbers likely underestimate true incidence
- 17% of adults report childhood physical abuse

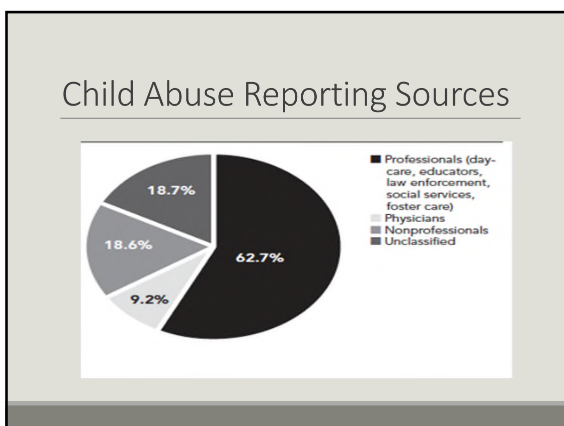


Missed Opportunities

We routinely miss opportunities to diagnose NAT

- Sentinel injuries common on retrospective review
- Injuries often missed by multiple providers
- 1 in 5 children with abusive fractures sees at least one physician before diagnosis of NAT

Child Abuse Reporting Sources



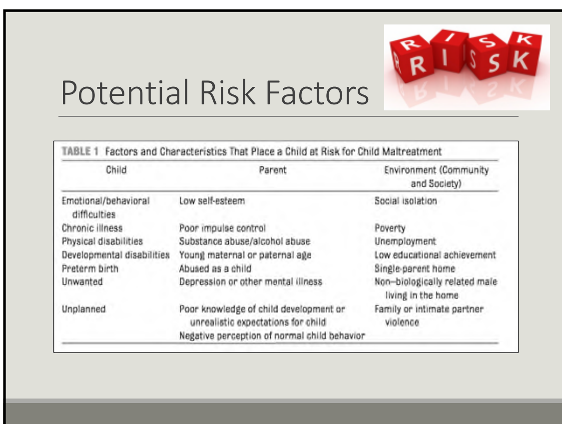
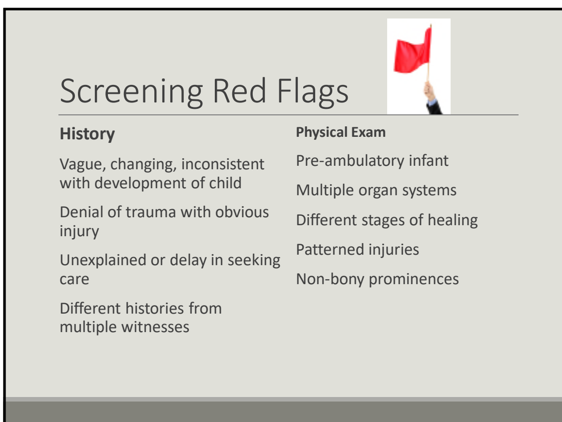


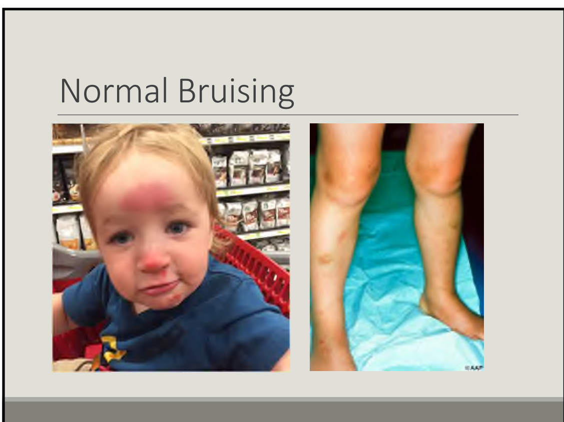
TABLE 1 Factors and Characteristics That Place a Child at Risk for Child Maltreatment

Child	Parent	Environment (Community and Society)
Emotional/behavioral difficulties	Low self-esteem	Social isolation
Chronic illness	Poor impulse control	Poverty
Physical disabilities	Substance abuse/alcohol abuse	Unemployment
Developmental disabilities	Young maternal or paternal age	Low educational achievement
Preterm birth	Abused as a child	Single-parent home
Unwanted	Depression or other mental illness	Non–biologically related male living in the home
Unplanned	Poor knowledge of child development or unrealistic expectations for child	Family or intimate partner violence
	Negative perception of normal child behavior	

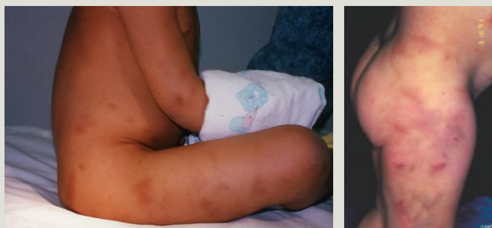


Bruising

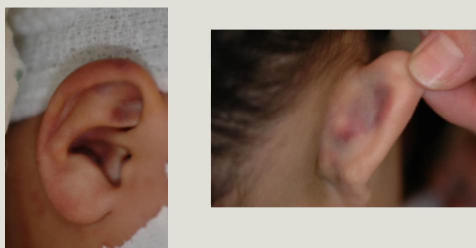
- Most common sign of child physical abuse
- Location of bruising
  - Common: bony prominence and front of body
  - Suspect: back, abdomen, forearm, hands, chest, genitals
- Mobile vs Non-mobile child
- Few vs Multiple
- No way to accurately "date" bruises!!!

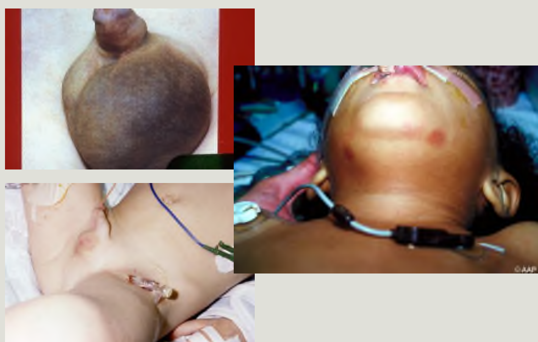


Concerning Bruising

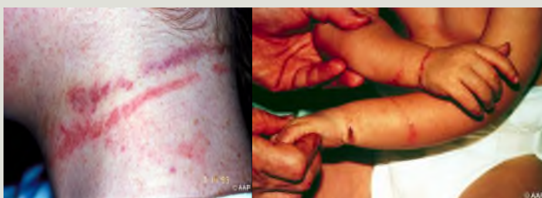


Concerning Location

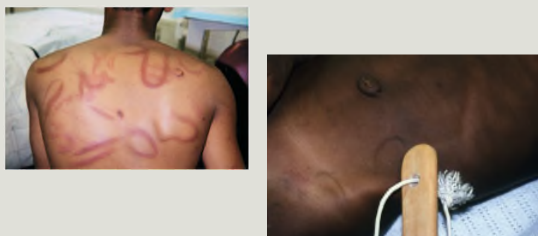




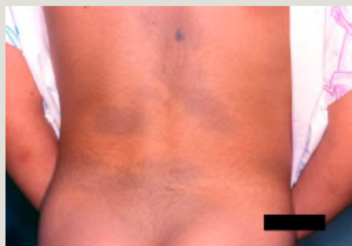
Ligature Marks



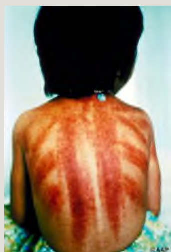
Patterned Bruising



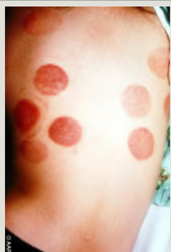
Mimicry: Grey Spots



Mimicry: Coining



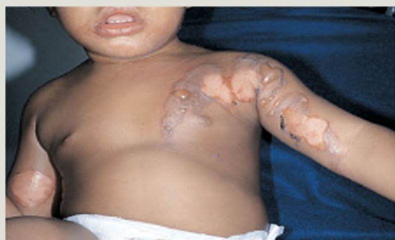
Mimicry: Cupping



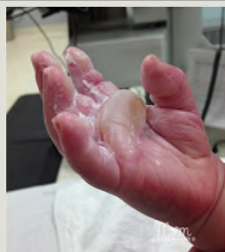
Burns

- Submersion injury most common abusive scald injury
- Common
  - Irregular margins
  - Upper body
- Suspect
  - Symmetrical, clear margins
  - Extremities, buttocks or perineum

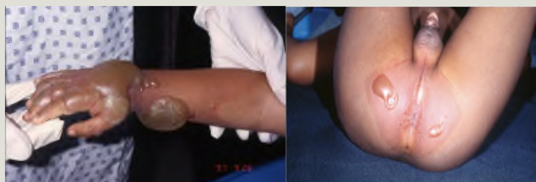
Splash Burns

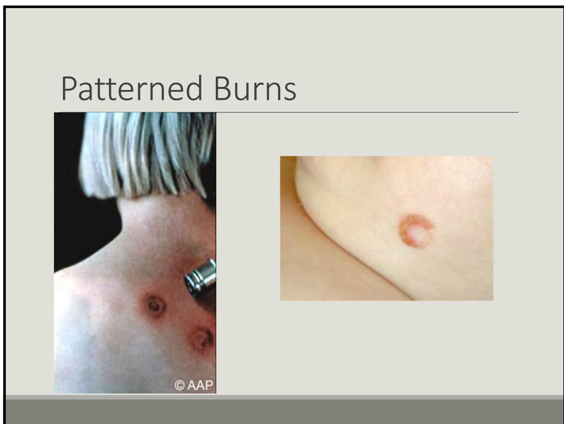


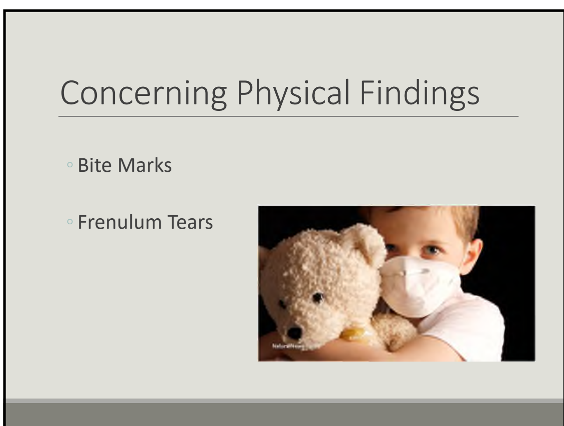
Curling Iron Burn

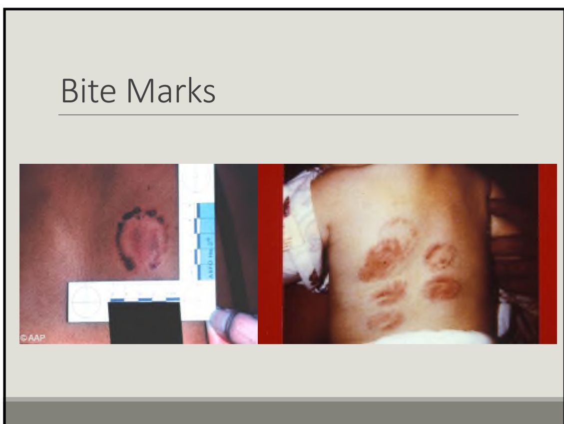


Submersion Injury



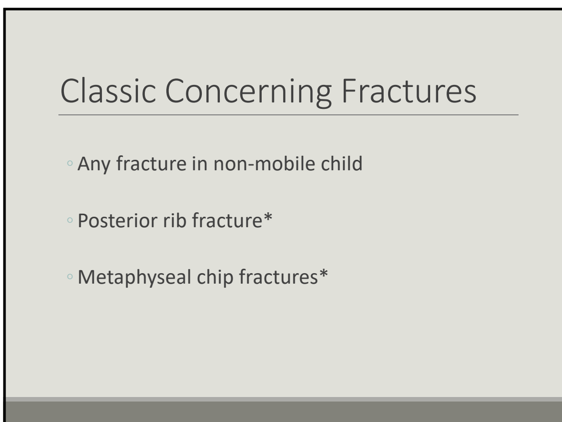

Patterned Burns
© AAP


Concerning Physical Findings
Bite Marks
Frenulum Tears

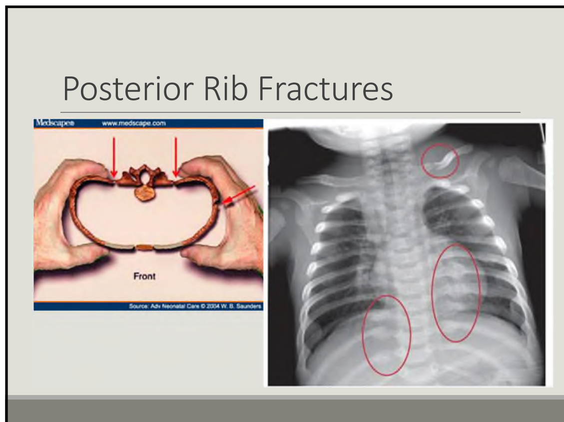

Bite Marks
©AAP

Frenulum Tear

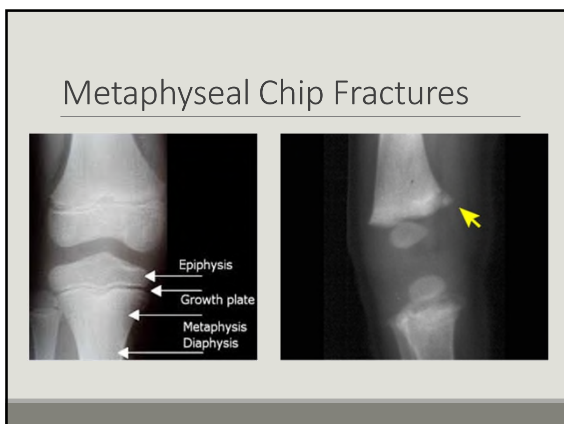
Fractures
Second most common injury in child abuse
1 out of 5 fractures due to abuse missed in ED
History is concerning if:
Lacking In detail or unusual
Inconsistent mechanism with development
Certain key injuries
Skeletal Survey
< 2 yo if concern, 2-5 yo other major injuries


Classic Concerning Fractures
Any fracture in non-mobile child
Posterior rib fracture*
Metaphyseal chip fractures*

Posterior Rib Fractures



Metaphyseal Chip Fractures



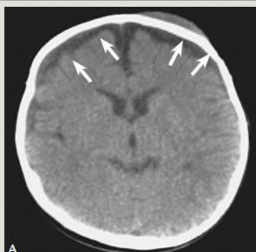
Other Concerning Fractures

- Multiple fractures – especially bilateral
- Fractures of different ages
- Vertebral body fractures
- Complex skull fractures
- Fractures of digits

Head Injury

- Leading cause of death in abused children
- Abusive head trauma most common < 2 yo
  - Peak incident 6 months of age
- Subdural hematoma most common
  - ~ 80% SDH in infant secondary to abuse
  - ~ 33% SDH have associated skull fractures
- 78% AHT patients have retinal hemorrhages
- CT versus MRI

Subdural Hematoma



Abdominal & Visceral Trauma

- Liver most commonly damaged followed by spleen
- Sometimes external trauma visible
- Laboratory evaluation can be helpful
  - AST, ALT, Lipase, Amylase, Urinalysis
- CT Abd/Pelvis with contrast