

Pediatric Non-Accidental Trauma

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Objectives

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

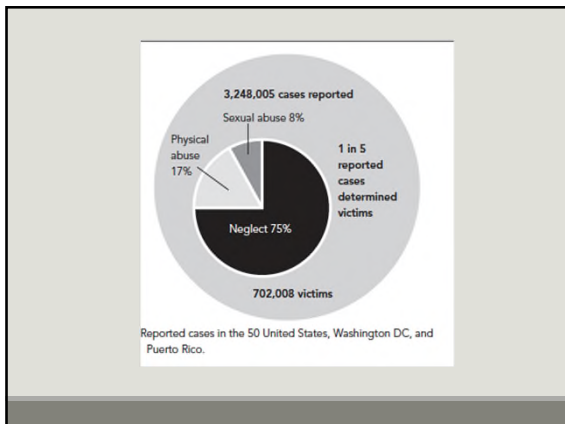
Scope of the Problem

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

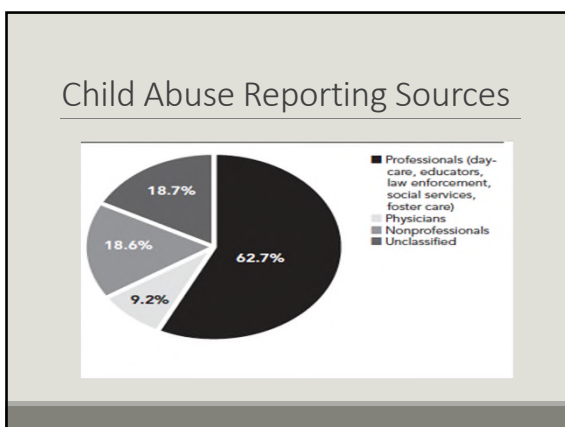
- 17% of adults report childhood physical abuse



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



What Makes it So Hard?



Pediatric injuries are usually accidental

Rarely any witnesses

Symptoms of abuse can be non-specific

- Frequently diagnosed with: colic, GERD, gastroenteritis
- Children may not localize fractures
- Only change may be subtle behavioral difference

Biases are universal

- White victims from intact families most frequently missed

We are trained to trust parents

The conversation is difficult

Potential Risk Factors





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	

Screening Red Flags



History	Physical Exam
Vague, changing, inconsistent with development of child	Pre-ambulatory infant
Denial of trauma with obvious injury	Multiple organ systems
Unexplained or delay in seeking care	Different stages of healing
Different histories from multiple witnesses	Patterned injuries
	Non-bony prominences

Overview of Injuries




1. Bruising
2. Burns
3. Other Concerning Physical Findings
4. Fractures
5. Head Injury
6. Abdominal and Visceral Injuries

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!!!

Normal Bruising



Concerning Bruising



Concerning Location

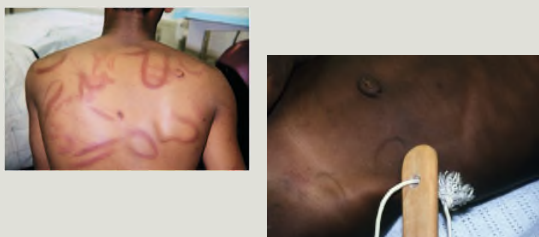




Ligature Marks



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



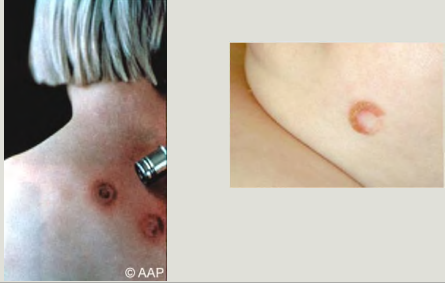
Curling Iron Burn



Submersion Injury




Patterned Burns



The left photograph shows a child's neck with several distinct, circular, reddish-brown burns. The right photograph shows a close-up of a single, circular, reddish-brown burn on a child's shoulder. A copyright notice '© AAP' is visible in the bottom left corner of the left image.


Concerning Physical Findings

- Bite Marks
- Frenulum Tears



The photograph shows a young child's face, with a white gauze pad covering the lower lip and chin area. The child is holding a light-colored teddy bear. A copyright notice '© AAP' is visible in the bottom left corner of the image.

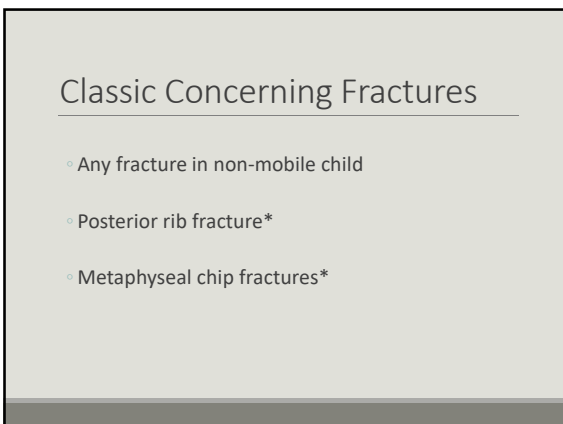
Bite Marks

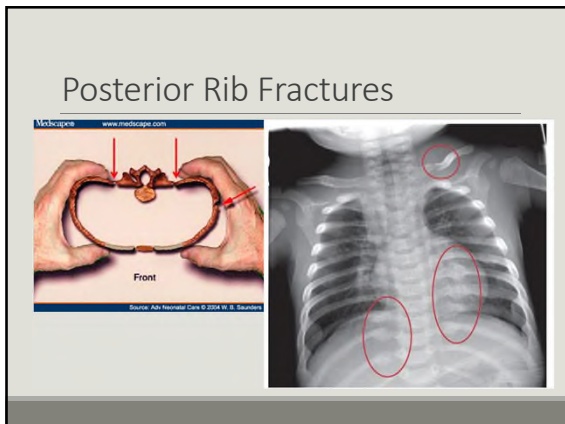


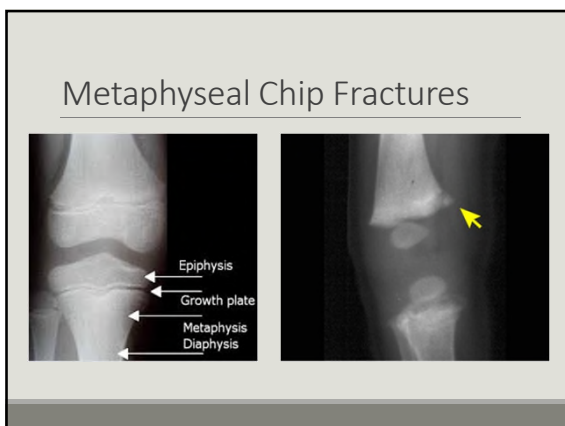
The left photograph shows a bite mark on a child's torso, with a ruler placed next to it for scale. The right photograph shows multiple bite marks on a child's torso. A copyright notice '© AAP' is visible in the bottom left corner of the left image.











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
