



# Child Maltreatment

---

**Kristin Garton Crichton, DO, MPH**  
*Assistant Clinical Professor*  
*Nationwide Children's Hospital*  
*The Ohio State University Wexner Medical Center*

**MedNet21**  
Center for Continuing Medical Education

 **THE OHIO STATE UNIVERSITY**  
WEXNER MEDICAL CENTER

## Objectives

- Review the epidemiology of child maltreatment
- Describe the patterns of injury and clinical presentations associated with different types of child abuse
- Review differential diagnosis and recommended assessment for different types of child abuse

## Child Abuse

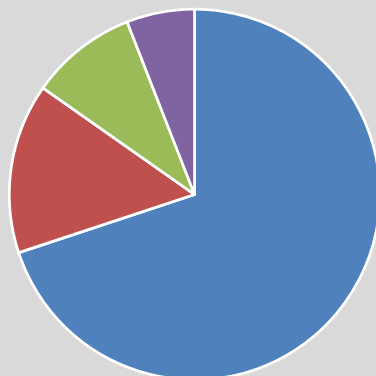
- "Any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse or exploitation"; or
- "An act or failure to act which presents an imminent risk of serious harm." - The Federal Child Abuse Prevention and Treatment Act (CAPTA)
- Four major types of maltreatment include:
  - Neglect
  - Physical abuse
  - Sexual Abuse
  - Emotional Abuse

## 2021 U.S. Data

- 4 million referrals of child abuse and neglect, involving 7 million children
  - ~ 3 million children received investigative response
  - ~ 600,000 victims
- Rate of victimization = 8.1 per 1000 children
  - Ohio rate – 9.3 per 1000 children
  - 24,267 child victims

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2023). *Child Maltreatment 2021*.

## Child Maltreatment by Type



Ohio:

- 40% neglect
- 39% physical abuse
- 15% sexual abuse

■ Neglect   ■ Physical Abuse   ■ Sexual Abuse   ■ Psychological

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2023). *Child Maltreatment 2021*.

~ 5 kids die each day in the U.S. as a result of child abuse and neglect

Similar rate to pediatric cancer

## Child Maltreatment Data

- Child abuse a leading cause of head injury in children < 1 year old
- Homicide is the leading cause of injury related deaths in children < 4 years
- Serious traumatic injuries in children, particularly fatal cases, are rarely accidental unless there is a clear explanation given for the event

## Child Abuse

### Risk Factors

- Individual level
  - Child's disability
  - Parental depression
  - Substance use disorder
- Familial level
  - Domestic violence
  - Single parent homes
- Community/Society levels
  - Dangerous neighborhoods
  - Lack of recreational facilities
  - Poverty

### Protective Factors

- Nurturing and attachment
- Knowledge of parenting and of child and youth development
- Parental resilience
- Social connections
- Concrete supports for parents
- Social and emotional competence of children

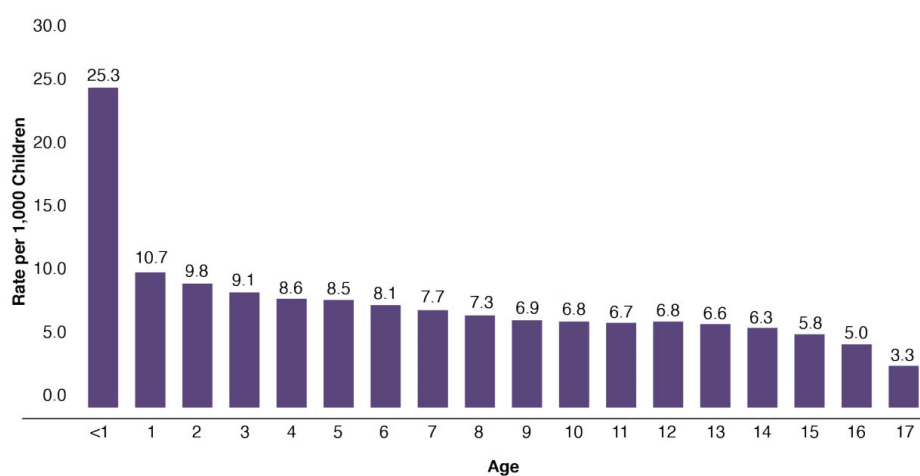
## Corporal Punishment

- U.S. Law:
  - Should be limited to buttocks and occur over clothing
  - Any injury beyond transient redness is considered abuse
  - Objects other than the hand have potential for serious harm
  - Acts of serious violence should be seen as abusive even if no injury ensues because there is significant risk of harm
- Ohio Law:
  - The major legal test is whether the parent's actions constituted "proper and reasonable parental discipline."

## Child Maltreatment Victims by Age

### Exhibit 3–D Victims by Age, 2021

*The youngest children are the most vulnerable to maltreatment*

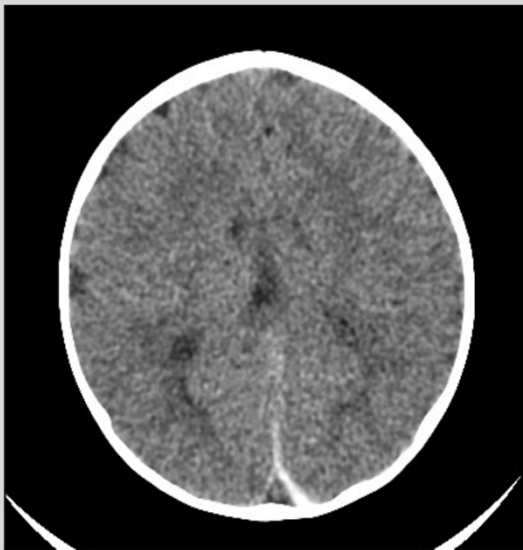


*Based on data from 51 states. See table 3–5.*

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2023). *Child Maltreatment 2021*.

## Case Example

- 2 months of age:
  - Encounter 1: Bruising of arms/legs, subconjunctival hemorrhage
  - Encounter 2: Bruising of the abdomen
- 3 months of age:
  - Encounter 3: Injury to the tip of the tongue
  - Encounter 4:



## Case Example

- 2 months of age:
  - **Encounter 1**: Bruising of arms/legs, subconjunctival hemorrhage
  - **Encounter 2**: Bruising of the abdomen
- 3 months of age:
  - **Encounter 3**: Injury to the tip of the tongue
  - **PREVENT Encounter 4**

## Sentinel Injury

A visible or detectable minor injury in a precruising infant that is poorly explained and, therefore, concerning for physical abuse.

## Missed Abuse

- Reported 54 cases of abusive head injury missed upon the first presentation
  - 28% of these children were re-injured after the missed diagnosis
  - 40% of these children experienced complications related to the missed diagnosis
  - At least four children died what would have been preventable deaths

Jenny et al (1999)

## Missed Abuse

- Multicenter study evaluating children with AHT who had prior opportunities to detect abuse
  - 25% had at least one opportunity to identify abuse in a medical setting
  - 6% had an opportunity to identify abuse through CPS involvement
  - Vomiting and bruising were the most common symptoms

Letson et al (2016)



## Sentinel Injuries

- Retrospective case-control study of 401 infants
- Compared sentinel injuries in children with “definite” abuse vs “intermediate concerns” vs controls
- Sentinel injury: an injury, suspicious for abuse, reported to have been visible to at least 1 parent before the events leading to the current admission

Sheets et al (2013)

## Sentinel Injuries

- Of the 200 infants who were definitely abused, 55 (27.5%) had a sentinel injury (or injuries)
  - 80% bruise
  - 11% intraoral injury
  - 7% had a fracture
- None of the 101 non-abused infants (controls) had a previous sentinel injury ( $p < .001$ )

Sheets et al (2013)

## Sentinel Injuries

- Sentinel injuries occurred in early infancy:
  - 66% at <3 months of age
  - 95% at or before the age of 7 months
- Medical providers were reportedly aware of the sentinel injury in *nearly half* of cases

Sheets et al (2013)

## Recurrent Abuse

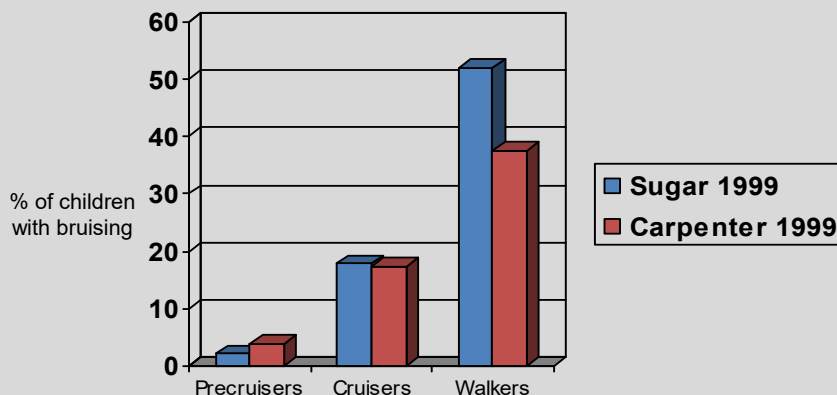
*While we may sometimes consider child abuse as the result of an otherwise emotionally healthy caregiver momentarily losing control, the reality is that many children are raised in environments where they are **repeatedly** exposed to potential harm.*

## Bruising

- Bruises are the most common type of injury in abused children
- Bruises are the most common type of injury in non-abused children

## Bruising & Development

- Sugar (1999)
  - Precruisers: 2.2%
  - Cruisers: 17.8%
  - Walkers: 51.9%
- Carpenter (1999)
  - Sitting: 3.9%
  - Crawling: 17.3%
  - Walking: 37.5%



## Bruising in young infants

- Data from 146 children < 6 months with apparently isolated bruising were collected
  - Skeletal surveys
  - Neuroimaging (head CT or MRI)
  - Screening for abdominal trauma (AST/ALT or imaging)
- Estimate of likelihood of abuse

Harper et al (2014)

## Bruising in young infants

- 146 children < 6 months old with apparently isolated bruising
  - Skeletal surveys identified injury in 23.3%
  - Neuroimaging identified injury in 27.4%
  - Abdominal injury was identified in 2.7%
- Overall, 50% had at least one additional serious injury identified by diagnostic testing
- 50% had a high perceived likelihood of abuse
- No bleeding disorders were identified

Harper et al (2014)

## Bruising in young infants

- Bruising in young infants should prompt concerns of physical abuse
- A routine approach to the evaluation of these infants should include:
  - Thorough physical examination
  - Skeletal survey
  - Neuroimaging
  - Screening for abdominal injury

Harper et al (2014)

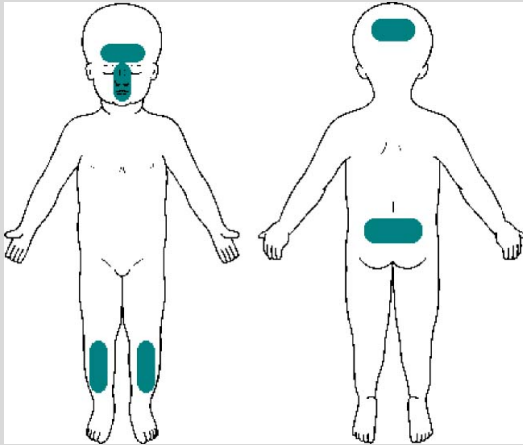
## Red Flag Histories for Infants with Bruising

- “He laid on something”
- “She must have fallen against the side of the crib”
- “His brother probably did it”
- “She hits herself in the face”
- “A toy fell on him”

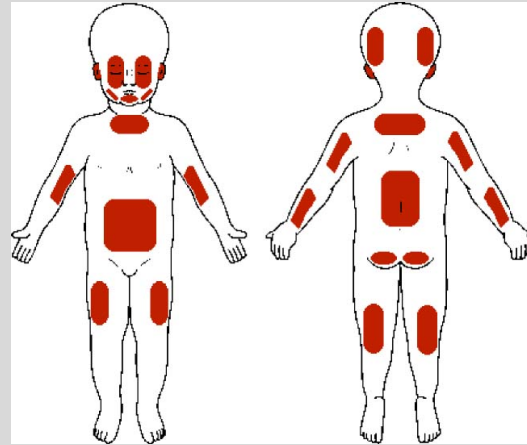


## Bruising and location

### Accidental



### Non-accidental



## Bruising and Location

### Accidental

Forehead  
Vertex of chin  
Elbows  
Knees/Shins

### Non-accidental

Ears  
Neck  
Abdominal wall  
Buttocks and anus  
Genitalia

## Bruising and Location: Pinna bruising

- Bruising of the pinna is rarely the result of accidental injury
- Should prompt evaluation for intracranial injury



## Bruising and Location: Pinna bruising

- Blows to the side of the head can cause petechiae to occur on the external ear
- Pulling or pinching the top of the ear leaves bruises on the helix or behind the pinna



## Patterned Bruising to the Buttocks

- Given the convexity of the surface of the buttocks, a site of shear injury is created between impacted and nonimpacted tissue
- As a result, there is often a distinct line of vertical bruising/petechiae seen
- May be associated with more diffuse gluteal contusions



## Patterned Bruising Inflicted by Hand

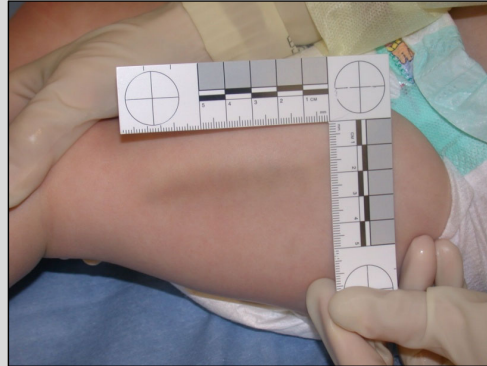
- Impact of the hand forces blood into nearby capillaries causing them to rupture
- Result is an outline of the fingers/hand





## Inflexible Objects

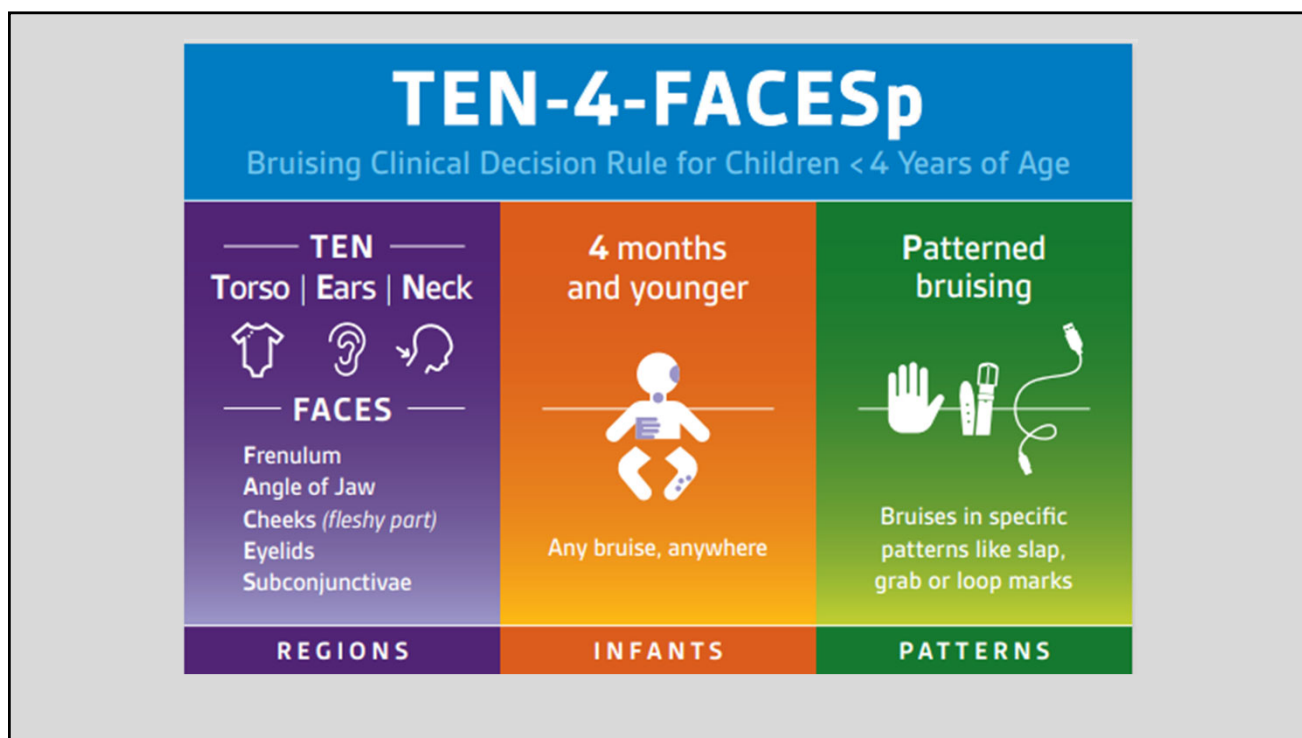
- May produce short linear bruises (e.g. club, stick, pipe)
- Bruising reflects impact in one plane and should not follow the curvature of the affected region
- May lead to larger ecchymoses that have no definable pattern



## Flexible Objects



- Flexible objects may cause a bruising pattern that follows the curvature of the extremity
- Commonly caused by extension cords, belts, ropes



## Can Bruises be Dated by Color?

- The time it takes for a bruise to appear and resolve depends on:
  - Attachment of tissue injured
  - Thickness of tissue injured
  - Type and depth of injuring force
  - Vascularity of the injured/surrounding tissues
  - Underlying color of the injured person's skin
  - Age of patient
  - Underlying medical condition
- “Assessment of the age of a bruise in children is inaccurate and has no scientific basis”

Maguire Arch Dis Child 2005

## Common Abusive Bruising Mimic

- Congenital dermal melanocytosis
  - AKA- Mongolian Spots



## Bruises

- Differential Diagnosis:
  - Trauma
  - Bleeding disorders
  - Connective tissue disorders
  - Malignancies
  - Vitamin K deficiency
  - Medications
  - Mimics
- The presence of a medical disorder does not preclude abuse
- Work-Up
  - CBC, Coag panel (PT/PTT/INR)
  - Factors VIII & IX
  - Von Willebrand panel with platelet function analysis
  - Screening for occult injuries
    - Neuroimaging < 6m
    - Skeletal survey < 2y
    - Screening labs for abdominal trauma < 5y

## Skeletal survey

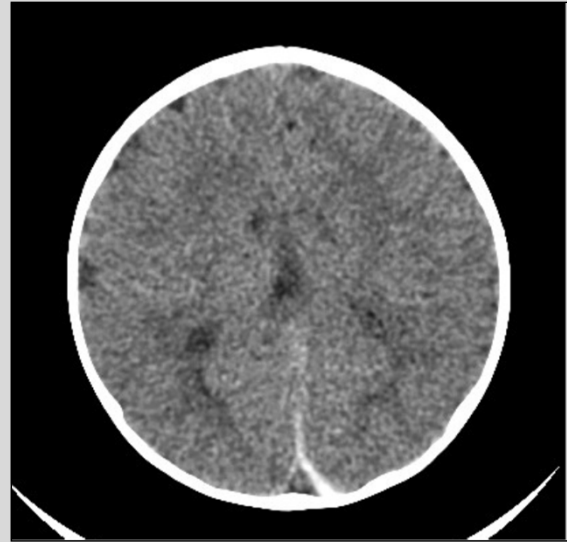
- The skeletal survey is the primary imaging study for suspected child abuse in children younger than 2 years
- Skeletal survey:
  - Must comply with standards developed by the American College of Radiology
  - ~24 separate radiographic exposures
  - “Babygram” not acceptable

## Fractures

- Strongly suggest abuse:
  - Classic metaphyseal lesion
  - Posterior rib fractures
  - Fractures of the scapula
  - Sternum
  - Spinous processes
  - Multiple fractures in various stages of healing
  - Femoral and humeral fractures in non-ambulatory infants
- Most likely accidental:
  - Clavicular
  - Femoral
  - Supracondylar humeral
  - Distal extremity in children older than 2 years

## Neuroimaging

- Head CT or MRI brain can be done to evaluate for intracranial injury
  - Ultrasound is NOT indicated
- Subdural hemorrhage is most common type of injury identified
  - Cerebral edema
  - Hypoxic-ischemic injury



## Abusive Head Trauma

- Mechanism of injury:
  - Acceleration-deceleration forces with or without impact
- Signs/Symptoms:
  - Lethargy, vomiting
  - Changing neurological status or seizures
  - Coma or death
- Other physical exam findings:
  - Retinal hemorrhages
  - Cutaneous injuries present in minority of cases
- Further workup:
  - Bleeding evaluation
  - MRI spine

## Abdominal Trauma

- Young children vulnerable due relatively large abdomens lax musculature
- Clinical manifestations are often subtle and evolve slowly
- Mechanism of injury: Blunt force trauma
- Findings:
  - Lacerations and hematomas of solid organs
  - Rupture of hollow organs and hematomas to bowel walls
  - Intra-abdominal bleeding
  - Bruising of the abdominal wall is unusual
- Work-up: AST/ALT/Lipase (all children < 5 years) → Abdominal CT

## Intraoral Injury: Frenulum Tear

- Potential accidental etiologies:
  - Fall in an ambulatory child
  - Striking face against an object
  - Iatrogenic: intubation
- Potential abusive etiologies:
  - Slap or punch to the mouth
  - Forced feeding
    - Spoon
    - Pacifier
    - Bottle nipple
  - Forced oral sex



## Intraoral Injury: Frenulum Tear

- Differential Diagnosis:
  - Trauma
  - Congenital anomalies
  - Infections
- A tear of the frenula and is the result of trauma
  - Accidental vs. Non-accidental
- Work-Up:
  - Any *non-ambulatory* child with a frenulum tear needs:
    - Skeletal survey
    - Neuroimaging
    - AST/ALT to screen for occult abdominal trauma

**Strategies to improve recognition of abusive injuries**

## Acknowledging Bias

- Disparities exist in assessing for child abuse:
  - AHT missed more often in white children, children of dual-parent homes
  - Minority children had higher rates of evaluation for abuse and reports for suspected abuse
  - Physical abuse considered more often in children with low SES

## Routine Screening

- Approach should be based on injuries identified
- Risk factors are only helpful if they are positive
  - Absence of a risk factor should not negate presence of a suspicious injury
- Minimize reliance on subjective impressions of caregivers



## Standardizing the Approach

- Recommended workup for *any non-ambulatory infant* with a sentinel injury:
  - Full physical examination
    - Photodocumentation of cutaneous findings
  - Neuroimaging (<6 months or head/neck injury)
  - Skeletal survey
  - Screening labs for abdominal trauma: AST/ALT/Lipase
  - Psychosocial assessment
  - Assessment of siblings for concerning injuries

## Mandatory Reporting Laws

- “Reasonable suspicion”
- You do not have to know or possess proof that a child has been maltreated
- As long as a report is made in good faith, the reporter is in no way liable for making the report

## Communicating with Partner Agencies

- Describe all injuries identified on exam and on work up
- Discuss history provided for injuries by caregiver
- Is the injury consistent with the history provided?
  - If not, why not?
- Be very clear about the risk associated with such injuries
- Provide CPS with recommendations regarding any follow up needed and sibling evaluations

## Conclusions

- Cutaneous injuries are the single most common presentation of physical child abuse
- In non-ambulatory infants, the presence of an intra-oral injury or a bruise should prompt concern for additional injury
- Many children are raised in environments where they are repeatedly exposed to potential harm
- Recurrent abuse is associated with increased morbidity and mortality – don't miss the 'sentinel' event as an opportunity to protect the child

## Conclusions

- You can (and should) maintain objectivity and respect for caregivers during evaluation for possible child abuse
- The presence of an underlying medical condition does not negate the possibility that the patient could also be abused
- Mandated reporters (like you) are expected to report “reasonable suspicion” of child maltreatment