

Basics of Physical Abuse: Inflicted Bruising

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Objectives

- Recall the risk factors for physical abuse
- Be familiar with the mechanisms of bruising
- Recall the characteristics of bruising that raise concerns for abuse
- Be familiar with the differential diagnosis of bruising in young children

Risk Factors for Physical Abuse

- Domestic violence
- Caregiver mental health issues
- Drugs and alcohol
- Poverty
- High stress at home
- Nonrelated caregiver in home
- Child prematurity
- Child disability

Some Basic Facts

- Bruising is most frequent manifestation of physical abuse
- High incidence of NAT when seen in nonmobile infants
- Infant vs adult skin
 - Infant skin has
 - higher water content; absorbs/loses water faster
 - thinner stratum corneum and papillary dermis
 - fat with higher melting point: freezes more easily
 - more susceptible to UV damage

Why don't bruises all look the same?

- Differences in
 - Force and duration of impact
 - Characteristics in impacting object/surface
 - Amount of bleeding
 - Age and health status of individual
 - Medications, status of coagulation and immune systems
 - Skin color
 - Prior injury (scarring, residual hemorrhage)



Variations in Bruise Appearance

- Location
 - Depth
 - Deep bruising with vague outlines, no pattern
 - Very superficial bruises with discrete outlines (esp if high velocity)
 - Tissue characteristics
 - Loose tissue of penis, globe
 - Pinna of ear
 - Vascularization of tissue
 - presence of underlying bone
 - Movement
 - Gravity
 - Tissue planes define paths of blood diffusion



Mechanisms of Bruising

- Blunt force impact
- Direct pressure
- Increased venous pressure (petechiae)
- Suction
- ?Hypoxia

Pattered Bruising









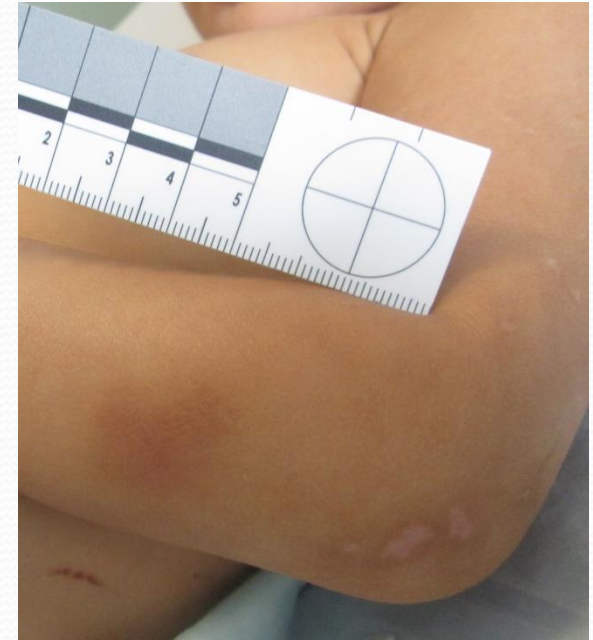


Pressure Bruises

- Strangulation:
 - Ligature
 - Manual
- Grip marks



How old are
these injuries?



Estimating the age of a bruise is UNRELIABLE.

- Too much individual variation
- Colors come and go
- Colors depend on depth of injury, location, size, etc
- May never have 'old' colors
- We are terrible at estimating the age of bruises!



**How do you know if a bruise
is accidental or inflicted?**

If you speak with the caregiver...

- Be nonjudgmental, nonthreatening
- Ask open-ended questions that invite narrative
- Obtain
 - Details of trauma event (who, what, when, where...)
 - Characteristics of impacting object/surface
 - Child's reaction to event
 - When/how caregiver noted bruising
- Consider cultural background
- Prior injuries to child

Ask yourself...

- Is there any history of trauma offered to explain the injury?
- Is it compatible with child's developmental abilities?
- Is the mechanism of the injury consistent with the history of the event?
- Are the forces implied by the event consistent with those needed to cause the injury?

Ask yourself

- Does the history of the trauma event change over time or between caregivers?
- Does the child give a different explanation than the caregiver?
- Is there any prior history of suspicious or significant injuries for this child or a sibling?



Talking to the child

- Be nonthreatening and nonaccusatory
- Ask open-ended questions
 - “Can you tell me about this bruise on your face?”
- Avoid yes/no or 2-option questions
- Avoid leading questions (introducing information not provided by child
 - “Daddy hurt you there, didn’t he?”
- Ask only the questions you need to decide whether to report

Talking to the child

- Ask developmentally appropriate questions
- Young children are not able to estimate
 - Number of episodes
 - Exact dates of events
 - You can use reference points (holidays, birthdays)
- Young children are concrete
 - If you get a strange answer, consider how you asked the question
- Avoid multiple questions combined into one

Talking to the child

- Reassure child they are not in trouble for talking to you
- Do not make promises you cannot keep
 - “I’ll protect you so this never happens again!”
- Ask if they are in pain, are uncomfortable, or if they are not feeling well
- Seek medical attention appropriately

**Inflicted Skin Injuries:
How can you distinguish an
abusive injury from an
accidental one?**

Accident vs. Abuse

- Multiple injuries



Accident vs. Abuse

- Pattern injuries
- Multiple injuries
- Location of injury



Where do kids normally bruise?

- >950 kids less than 36 months at well checks
- Infants less than 6 months: 2/366 (0.6%) had bruises (bruise to head)
- Frequency rose fast after 9 months
- 9-11 months: 16% had bruises





**93% all bruises were over
bony prominences**

Where do kids normally bruise?

- 52⁰% walkers had bruises
 - 0.9% had bruises on abdomen or hip
 - 2% on back
 - 1.3% on chest
 - <2% on face (exclude forehead)



Sugar N, Arch Ped Adol Med, 1999.

What about older kids?

- 2040 exams on kids 0-17 years
- All ages: <2% had injuries
 - Chest
 - Abdomen
 - Pelvis
 - Buttocks
 - Chin, ears, neck



- Accidental bruises are *unusual* on:

- Ears
- Soft part of cheek
- Neck
- Trunk
- Buttocks
- Inner thighs/genitals
- Hands/feet



The Rule of TEN-4

- Case-control study of PICU patients with trauma
- Decision rule for predicting NAT
 - Bruising on the Torso, Ear or Neck, if child ≤ 4 yo?
 - Bruising anywhere if child < 4 months old?
 - If either present, is there hx of confirmed accident in public setting that accounts for bruises?
- Sensitivity: 97%; Specificity: 84%

Accident vs Abuse

- Pattern injuries
- Multiple injuries
- Location of injury
- Severity of injuries



Bite marks

- Animal vs human
- Age of human biter
 - Unreliable
 - Variation in jaw size
 - Distortion of tissue



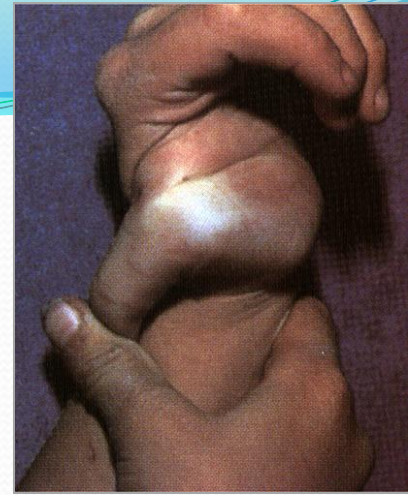
What should you do when you suspect abuse?

- Take steps to protect child
- Follow laws of country
- Follow school policy and procedures for reporting

Medical Evaluation

- More History:
 - Past medical history (bleeding, diseases that mimic bruising or predispose)
 - Past surgical history: any bleeding with procedures?
 - Medications (predispose to bleeding)
 - Prior history of bruising/bleeding (inc sentinel injuries or signs/symptoms of disorders that mimic abuse)
 - Family history bleeding problems
 - Birth history (excessive bruising, bleeding with umbilical stump; circumcision)

Physical Exam



- Look for other injuries (cutaneous, oral, bony, etc)
- Stigmata of diseases that mimic abuse
- Depending on child's age, may do more tests to look for other injuries suspicious for abuse

Photodocumentation

- Digital photos ideal
 - Ruler, color bar
 - Identify patient
 - Wide-view and close-up
 - Multiple angles, including perpendicular

Mimics of Physical Abuse

Cultural Practices

- Cupping
- Spooning
- Coining

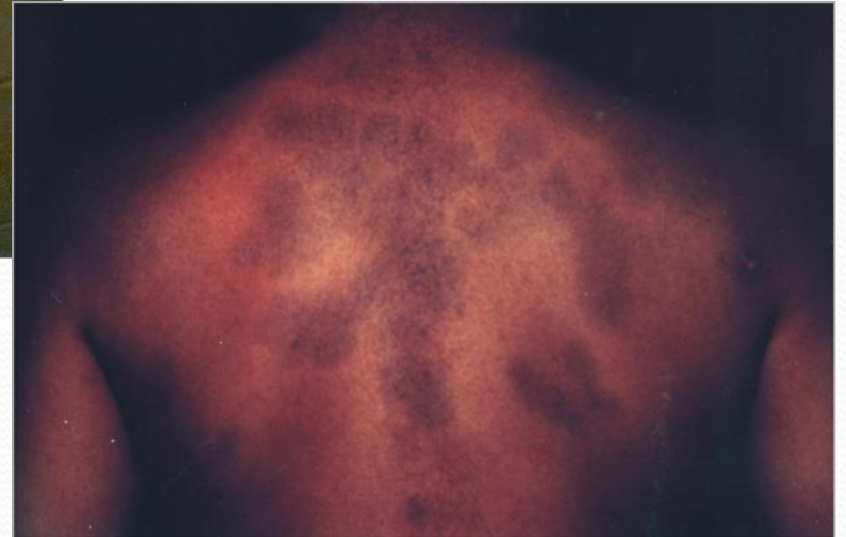


Infectious Processes

- HSP
- Purpura fulminans from systemic infections



Normal Variants



Dermatitis and Dz's Affecting Skin



Hematologic Disorders

- Coagulation disorders
 - Hemolytic uremic syndrome
 - Thrombocytopenia
 - Vitamin K deficiency
 - Hemophilia and other factor deficiencies
 - Platelet fxn disorders
 - VW disease
- Leukemia



Miscellaneous

- Insect bites
- Drug reactions
- Self-inflicted bruising
- Factitious bruising

Conclusions

- Bruising is the most common form of physical abuse
- It can be difficult to distinguish accidental from abusive bruises, especially in active, mobile children
- Information from the caregiver or child about the injury event can help to determine what happened
- You won't always be able to know with certainty before you report to authorities