Patterned Injuries: Common Patterns of Injury and What They Mean

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Disclosure Information for:
Casey Brown, MD
Patterned Injuries: Common Patterns of Injury and What They Mean

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Disclaimer

• Image-heavy presentation
• Some images may be disturbing
• The handout is short due removal of images
Objectives

• Recognize common skin patterns of physical abuse
  – Bruising and Burns

• Understand common mechanisms of patterned skin injuries

• Understand some common mimics of abuse

When Is a Bruise Suspicious for Abuse?

• Pattern - bruise that has a recognizable shape or pattern and/or

• Location - bruise in unusual location
  – anywhere on a young infant
  – in protected locations such as: ear, hand, neck, buttocks, inner thighs and/or

• Age of Child: a bruise on an infant who is not yet cruising (infants under 6 mo)

• Often important or “severe” bruises can be very subtle and easily missed!

BRUISES AND SCARS
Patterns of Bruising/Injury

- Common patterns of bruising or scarring
- Bites deserve special attention


Patterned Bruises

Patterns of Bruising by Mechanism of Injury

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Abuse example</th>
<th>Example of Not Abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crush - bruise at site of contact</td>
<td>Bite, pinch, grab/marks</td>
<td>Bump into furniture or fall onto</td>
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<tr>
<td>high velocity impact - outline of</td>
<td>Hand slap, looped cord, hangar</td>
<td>Rare accidents such as a motor</td>
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<td>implement</td>
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<td>belt snapping and striking someone</td>
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<td>Pressure changes - petechiae</td>
<td>Hickory, strangulation</td>
<td>&quot;Hickey&quot;, cough, vomiting, crying,</td>
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<td></td>
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<td>rare strangulation accidents</td>
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<td>Incised wounds (cut) - bruise</td>
<td>Knife wound, fingernail gouge</td>
<td>Accidental razor blade cut</td>
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<td>at edges of wound</td>
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<td>Lacerations (from skin with</td>
<td>Punch to face resulting in a</td>
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<tr>
<td>bruise bridges) - bruise at edges of</td>
<td>laceration</td>
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<td>laceration</td>
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<tr>
<td>Indirect forces (shearing) - bruise</td>
<td>Vertical bruises from bare</td>
<td>Genital bruising from vehicle run</td>
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<tr>
<td>distant to contact</td>
<td>bottom skating</td>
<td>over event</td>
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<tr>
<td>Dependent - bruise results in</td>
<td>&quot;Black eye&quot; from bruise on forehead</td>
<td>&quot;Black eye&quot; from bruise on forehead</td>
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<td>blood settling under the effects of</td>
<td></td>
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<tr>
<td>gravity</td>
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Crush Injury - Bites

- Should be seen ASAP if they are “fresh”
- DNA evidence can be collected
- Can determine adult from child bites based on size
  - Adult bite > 3 cm inter-canine
  - Child bite < 3 cm inter-canine

*Children’s Hospital of Wisconsin
Accidental Crush

- We see these all the time!
- Majority of accidental bruises
- Bites by children
- Hit shin on stairs
- Fall and hit knee

High Velocity Injuries

- Common abusive patterns: slap injuries, looped cord injuries, linear injuries
- Mechanism: velocity of impact breaks blood vessels around the edges causing an outline of the object (hand, belt, cord)
- These injuries indicate high force

Bruises From High Velocity Impact
**Petechiae - Pinpoint Bruises**

- **Causes**
  - Mechanical trauma: Blunt impact, or “rubbing,” or crush against a patterned surface
  - Pressure changes
    - Suction
    - Increased venous pressure
    - Removal of epidermis - burns and abrasions

- **Significance?**
  - Clue to mechanism of injury
  - Tend to resolve more quickly than larger, deeper bruises, but no science to accurately date petechiae

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**Incised wound (cut)**

- Sharp object cuts the skin

- Can see bruising around the edges

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**Shear bruising - distant to site of impact**

- Unique pattern indicates severe forces

- Represents crimping or shearing injury
Looks Can Be Deceiving

- Blue Nevi - “mongolian spots” - birthmarks that can look like bruising
- Nevus Simplex - birthmark can occur around nares, back of neck, forehead and eyelids
- Marker/paint

Bruise?

- 11 yo F - found on physical exam during a check up.
- No disclosure
- Still there one week later, looked exactly the same

Phytophotodermatitis - a chemical reaction between the sun and usually citrus

BURNS
Immersion Burns

• Burns that do not fit with the history
  – Fell into tub and wash splashing around with symmetric burns
• Absence of splash burns in “accidental scalds”
• Symmetric
  – Each foot is equally and symmetrically burned
• Involving hands, feet or buttocks/genital areas
  – Areas that are protected and covered
  – Often targeted in abusive burns: diapering/toileting accidents, potty training
Accidental “Pull Down" Burn

- Irregular margins
- Non-uniform depth
- Fluid flows to dependent regions
- Accidental or abusive
- Accident: child usually looking up

Contact Burns

- When accidental, burn is usually smaller and of irregular depth. Edges are less sharply demarcated if object or child were moving.

- When inflicted, child held against object and get deeper, more uniform burn, often with sharp edges

- Often, inflicted burns are in less exposed areas

Contact Information

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References

- The National Center on Addiction and Substance Abuse (CASA) at Columbia University. No safe haven: Children of substance-abusing parents. New York; NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University; 1999b.
5/18/2017

References

• Stirling, John. What Do We Know About the Impact of Child Neglect? University of Wisconsin School of Medicine and Public Health, Monona Terrace Community and Convention Center, Madison, WI. 15 February 2013. Conference Presentation.


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