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

- There are no relevant financial relationships related to this presentation/program
- There is no sponsorship/commercial support of this presentation/program
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- Learners who wish to receive Continuing Education Credit (CME/CLE/CE) must complete and turn in evaluations to successfully complete this program

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**Disclaimer**

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

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## Objectives

- Recognize common skin patterns of physical abuse
  - Bruising and Burns
- Understand common mechanisms of patterned skin injuries
- Understand some common mimics of abuse

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## 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!

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## BRUISES AND SCARS

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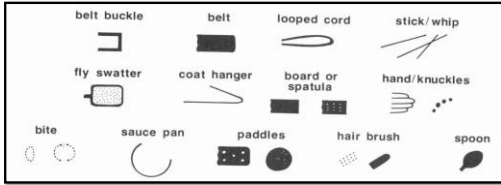
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## Patterns of Bruising/Injury



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

\*Pediatric Clinics of NA, 1990, Vol 37(4), p. 803. Guest Editor – Robert M. Reece

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## Patterned Bruises

Patterns of Bruising by Mechanism of Injury		
Mechanism	Abuse example	Example of Not Abuse
Crush - bruise at site of contact	Bite, pinch, grab 'marks'	Bump into furniture or fall onto knee
High velocity impact - outline of implement	Hand slap, looped cord, hanger	Rare accidents such as a motor belt snapping and striking someone
Pressure changes - petechiae	Hickey, strangulation	'Hickey', cough, vomiting, crying, rare strangulation accidents
Incised wounds (cut) - bruise along edges of wound	Knife wound, fingernail gouge injury	Accidental razor blade cut
Lacerations (torn skin with tissue bridges) - bruise at edges of laceration	Punch to face resulting in a laceration	Fall resulting in laceration
Indirect forces (shearing) - bruise distant to contact	Vertical bruises from bare bottom spanking	Genital bruising from vehicle run over event
Dependent - bruise results in blood settling under the effects of gravity	"Black eye" from bruise on forehead	"Black eye" from bruise on forehead

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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

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## Accidental Crush

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

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## 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

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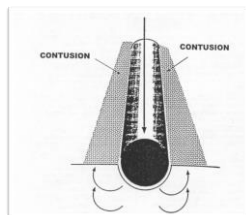
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## Bruises From High Velocity Impact



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## 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

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**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

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**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

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**BURNS**

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## 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

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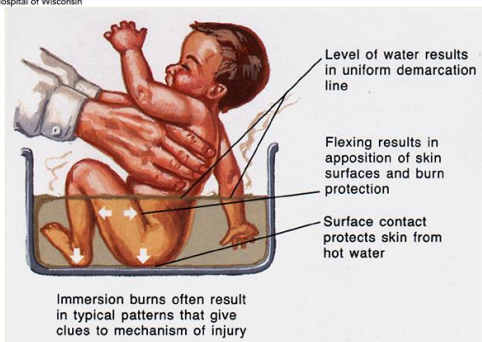
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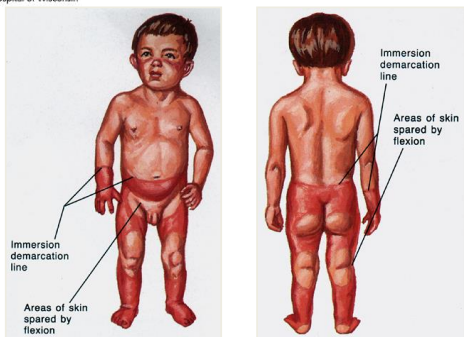
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## Accidental "Pull Down" Burn

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

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## 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

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