

## Childhood Injuries: Are they accidents, or are they abuse?

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## Forensic Assessment Center Network (FACN)

- Contract between Texas Dept of Family & Protective Services and the University of Texas
- Child Abuse Pediatrics subspecialists at each medical school consult with CPS investigators (and FBSS and CVS workers) on cases with complex medical findings—available for FTF staffings, phone calls, email, dedicated website.
- Dell Children's Hospital's CARE Team is not part of the FACN but provides many of the same services.

## Child Abuse Pediatrics: An Official Subspecialty

- October 2009:
  - The first examination for board certification in Child Abuse Pediatrics took place
  - Open only to pediatricians who are fellowship trained or had practiced at least half time in the field for at least 5 years
- 192 candidates passed the examination and are now board-certified in Child Abuse Pediatrics
  - 15 in Texas
- Next examination: November 2011.
  - After that, only fellowship trained pediatricians will be eligible for board certification

## Case consultation



A 2 year old was 'having a tantrum' and hurt her leg.

Is this more likely to be abuse or more likely accidental?

## The Child Abuse Pediatrician's Toolbox

1. General Pediatrics:
  - ▶ Knowledge of child development
  - ▶ Experience with childhood illness and injuries
  - ▶ Radiology, laboratory medicine
2. Child abuse pediatrics: additional training in:
  - ▶ Mechanism of injury
  - ▶ Radiologic & laboratory findings of injury

## The Child Abuse Pediatrician's Toolbox

Classic medical model for reaching diagnosis:

1. History
2. Physical examination
3. Ancillary testing (laboratory, Xray, etc)

How do child abuse pediatricians apply this model to evaluation of suspected abuse?

## Accidental vs. Inflicted Injuries

- Is the explanation given by the caregiver(s) consistent with the mechanism of injury?
- Does the explanation for the injury remain consistent through repeated interviews and questioning?
- Is the child developmentally able to perform the action the caregiver attributes to the injury?

## Accidental vs. Inflicted Injuries

- Did the caregiver seek medical attention promptly?
- Are there other concerning injuries on exam or after appropriate workup (other fractures, head injury, failure to thrive, etc)?
- Are there risk factors for abuse/neglect in the home?



Remember:

Children aren't just small adults

The developmental age of the child must always be considered

## Accident...or Neglect?



Just because the injury was 'unintentional' doesn't mean intervention isn't needed.

## Indicators of Physical Abuse by History

- No history given for the injury
- Inconsistent/conflicting history given by caretakers
- History/injury is inconsistent with the developmental level of the child
- History is inconsistent with the injury
- Delay in seeking medical care
- Doctor shopping

Data from Chaney, 2000; Herendeen, 2002.

## Indicators of Physical Abuse on Examination

- Bruises, burns, fractures, or other injuries that:
  - Are unlikely given child's developmental status;
  - Are not consistent with known accidental injury patterns; or
  - Have a high specificity for abuse

Maguire S. Which injuries may indicate abuse? *Arch Dis Child Educ Pract Ed* 2010

## Bruises

- All children get bruises
- The age of the child and where the bruise occurs is key in distinguishing accident vs. abuse
- Children move in a forward motion – most accidental bruises will be on the front part of their bodies
- Accidental injuries typically occur on the forehead and extremities

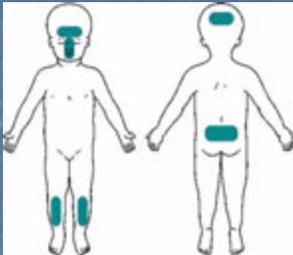


## Bruises

Bruises are more likely due to abuse if they:

- Occur on different planes of the body
- Are in different stages of healing
- Have a central distribution
- Occur on the back
- Are pattern injuries

## Bruises

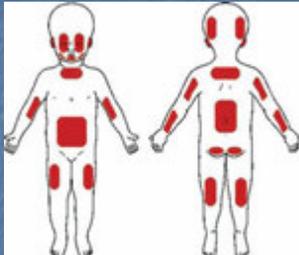


Locations of most accidental bruises in mobile children.  
NOTE: ANY bruise is suspicious for abuse in a non-mobile child (less than 5-6 months of age)  
Maguire 2010

## Normal Bruising



## Bruises



Bruising patterns often seen in abused children.

Maguire 2010

## Facial Bruises

- Contusions, or bruises, are the most common injury seen in abused children and are the most common injury to the head & face
- Facial bruises are uncommon in non-abused children, but are a frequent finding in abused children



### Bruising in the Ear



### Multiple Bruises



### Bruises in Multiple Stages of Healing



“If you’re not old enough to cruise,  
you’re not old enough to bruise”

- Bruising and other soft tissue injury is extremely uncommon in children younger than 6 months of age
- Any bruising on an infant less than 6 months old should be considered suspicious for abuse



### Belt and Buckle Marks



### Age of bruises

- Many factors influence their appearance during the healing process
- Resolution of bruises is quite variable and depends upon many factors including
  - Race
  - Location on the body
  - Prior bruising episodes
  - And other factors
- There is no certain way to date bruises

### 'Raccoon Eyes'



Accidental bruising to the forehead („goose egg“)

Tracking of blood to the periorbital region a day or two later

### What is this?



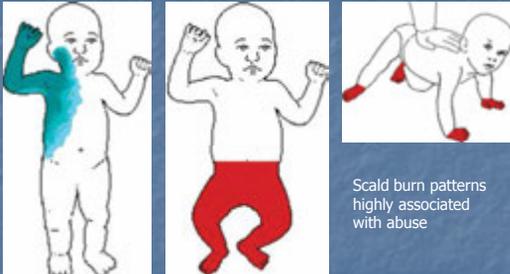
### Burns

- > 2,000 children die annually from burns due to all causes
- 20% of burns in children < 3 years of age are abusive
- Peak age of abusive burn victims 13-24 months

### Types of Burns

- Scald (Liquid) Burns
  - Immersion
  - Splash injury
- Contact (Object) Burns
  - Iron
  - Glue guns
  - Heaters
  - Beauty products (curling irons, flat irons, blow dryers)

### Burns



Scald burn patterns highly associated with abuse

Typical accidental scald burn pattern

Maguire 2010

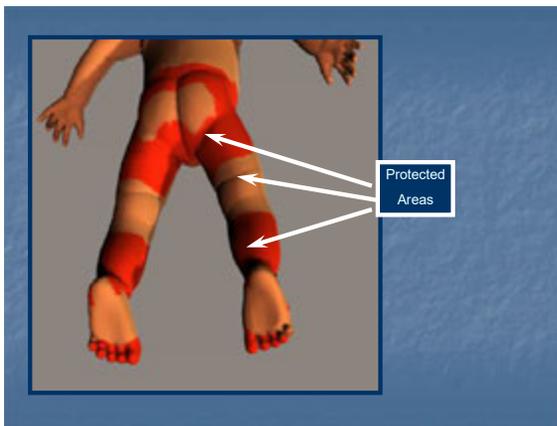
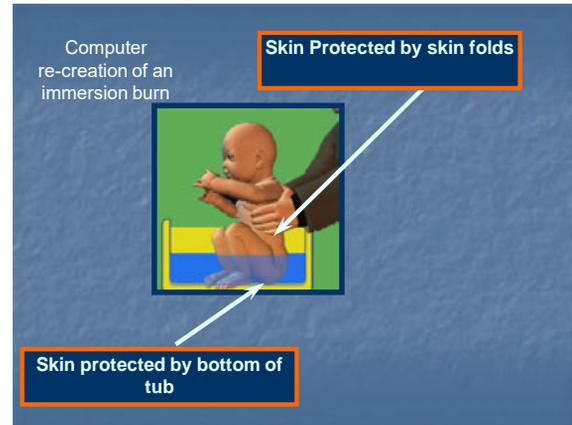
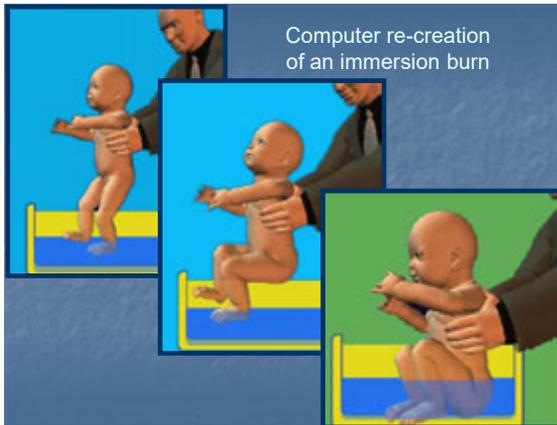


## Accidental vs. Abusive



## Accidental vs. Abusive

- **Accidental scald burns** often have an **irregular pattern** to the burn that looks like a "splash" or "drip" mark.
- In contrast, **abusive scald burns** usually have **distinct lines of demarcation**.
- Often called "jackknife" or "stocking-glove" burns.
- Occur when the child's body part is forcibly held in hot water.



## Contact Burns

- Contact burns are caused when a hot object is placed upon the skin
- Typically leaves a distinct mark
  - Cigarettes
  - Cigarette lighters
  - Irons (household, curling irons, flat irons)
  - Blow dryers
  - Heaters

### Curling iron



### Flat iron



### Flat iron



### Iron Burn



History Provided: "Child touched iron"

Any concerns?

I.S.,  
18mo grabbed cord as dad was ironing.  
Iron brushed by her leg as it fell.



What's your verdict?

### What about our Case Consultation?



A 2 year old was 'having a tantrum' and hurt her leg.



More history: child was chasing sibling around couch; foot may have planted in thick carpet.

Rest of workup (exam, skeletal survey) and scene investigation were normal.

## How can we tell if injuries are due to accident or abuse?

- Does the history remain consistent?
- Does the history match the child's developmental capability?
- Did the caregiver seek medical attention in a reasonable period of time?

## How can we tell if injuries are due to accident or abuse?

- Does the described mechanism of injury match the clinical findings?
- Are there other concerning injuries on exam or after appropriate workup (other fractures, head injury, failure to thrive, etc)?

## Dell Children's Hospital

### Child Assessment Program

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