Understanding Bruising in Children

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CARE Presentation
Outline

- Pathophysiology
- Evaluating Bruises
- Dating of Bruises
- Bruises in Children with Disabilities
Aka contusion, hematoma
Due to injury to soft tissue causing breakage of capillaries and leakage of blood into surrounding tissues
Variety of colors: red, purple, yellow, green
Does not blanch when pressure is applied
  Vs. petechia, purpura
Impact or shear trauma causes rupture of blood vessels
Bleeding into dermis or subcutaneous tissue
Pathophysiology

- 2 layers of vascular supply
  - Superficial layer of blood vessels surrounding epidermal appendages, such as hair follicles, sweat glands
  - Deep plexus of blood vessels in the dermis
- After bleeding and inflammation, degradation of heme occurs, leading to color changes
Evaluating Bruises

- Vary by:
  - Child’s age
  - Developmental stage
  - Location
  - Number of bruises
  - Appearance/shape
  - Consistency with caregiver’s story
Age & Development

- Consider the developmental abilities and motor skills for the child’s age
- Accidental bruising, no matter the location, is uncommon in a child prior to crawling or cruising
Abnormal

Ears – especially pinch marks involving both sides of the ear
The "triangle of safety" (ears, side of face, and neck, top of shoulders): accidental injuries in this area are unusual
Inner aspects of arms
Back and side of trunk, except directly over the bony spine

Black eyes, especially if bilateral
Soft tissues of cheeks
Intra-oral injuries
Forearms when raised to protect self
Chest and abdomen
Any groin or genital injury
Inner aspects of thighs
Soles of feet

REMEMBER
Concerns are raised by:
• injuries to both sides of the body
• injuries to soft tissue
• injuries with particular patterns
• any injury that doesn’t fit the explanation
• delays in presentation
• untreated injuries
Ear Bruising
Suspicious Bruising Patterns

Fingertip bruises

Note the oval shaped bruises on the child's upper arm and forearm.

Courtesy of Joan E Shook, MD.
Fingertip bruises

Note the oval shaped bruises on the child's trunk.

*Courtesy of Joan E Shook, MD.*
Note the characteristic bruising pattern.

*Courtesy of Joan E Shook, MD.*
Bite Marks
Ligature Marks
Cultural Practices

- Cupping
- Coining
- Spooning
Cupping is used in Middle Eastern, Asian, Latin American, and Eastern European cultures as a means to "draw out" various ailments. Alcohol is placed in a small cup and ignited; the heated cup is then applied to the skin, resulting in circular burns. Central ecchymosis or petechiae result from the suction effect of the heated air as it cools and contracts.

Courtesy of Jan E Drutz, MD.
Cupping
Coining
Spooning

Dating of Bruises

“Dating charts” are unreliable, inaccurate for determining ages of bruises

Bruise appearance depends on:
- location on one’s body
- depth of injury
- skin pigmentation
**Dating of Bruises**

<table>
<thead>
<tr>
<th>Color of Bruise</th>
<th>Age of Bruise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red (swollen, tender)</td>
<td>0–2 days</td>
</tr>
<tr>
<td>Blue, purple</td>
<td>2–5 days</td>
</tr>
<tr>
<td>Green</td>
<td>5–7 days</td>
</tr>
<tr>
<td>Yellow</td>
<td>7–10 days</td>
</tr>
<tr>
<td>Brown</td>
<td>10–14 days</td>
</tr>
<tr>
<td>No further evidence of bruising</td>
<td>2–4 weeks</td>
</tr>
</tbody>
</table>

Table 1: Determining the Age of a Bruise by Its Color

## Dating of Bruises

<table>
<thead>
<tr>
<th>Color</th>
<th>Age of Bruise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>0–2 days</td>
</tr>
<tr>
<td>Pink, purplish, blue</td>
<td>2–5 days</td>
</tr>
<tr>
<td>Blue/purple</td>
<td>2–5 days</td>
</tr>
<tr>
<td>Green</td>
<td>2–5 days</td>
</tr>
<tr>
<td>Yellow</td>
<td>2–4 weeks</td>
</tr>
<tr>
<td>Brown</td>
<td>2–4 weeks</td>
</tr>
<tr>
<td>No further evidence</td>
<td></td>
</tr>
</tbody>
</table>

Dating of Bruises

- Bruise coloration of yellow, red, blue, purple, may occur at anytime from onset to resolution
- Bruises that occur at the same time on the same person may appear different colors
- Bruises that occur at the same time on the same person may change colors at different rates
Bruising Patterns in Children with Disabilities

- Children with disability are at increased risk for being victims of maltreatment
  - If victimized, may not be able to communicate what has occurred
  - Multiple caregivers increases risk
- Difficult to interpret physical findings
Bruising Patterns in Children with Disabilities

- Are disabled children more likely to bruise due to coordination problems?
- Or, are they less likely to bruise due to limited mobility?
Examined 50 children, ages 4–20 years, at a school for children with special needs in Providence, RI

Any child with a concern for abuse by school staff were excluded from the study

Exam performed by pediatrician and nurse who specialized in abuse and development

Head to toe skin exam, including GU area, with all medical devices removed
  ◦ Repeat exam 6–18 months later for comparison
<table>
<thead>
<tr>
<th>Site</th>
<th>Labbé and Caouette (N = 1467)</th>
<th>Goldberg et al (N = 50)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower legs</td>
<td>50.1 (47.5–52.7)</td>
<td>12.0 (4.5–24.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Knees</td>
<td>32.9 (30.5–35.4)</td>
<td>34.0 (21.2–48.8)</td>
<td>.87</td>
</tr>
<tr>
<td>Forearms</td>
<td>13.8 (12.0–15.7)</td>
<td>10.0 (3.3–21.8)</td>
<td>.44</td>
</tr>
<tr>
<td>Thighs</td>
<td>12.2 (10.6–14.0)</td>
<td>32.0 (19.5–46.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Elbows</td>
<td>5.2 (4.1–6.4)</td>
<td>10.0 (0.3–1.8)</td>
<td>.14</td>
</tr>
<tr>
<td>Head (other than forehead, chin, cheeks, or ears)</td>
<td>4.6 (3.6–5.8)</td>
<td>2.0 (0.1–10.6)</td>
<td>.38</td>
</tr>
<tr>
<td>Feet</td>
<td>4.3 (3.3–5.5)</td>
<td>30.0 (17.9–44.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Forehead</td>
<td>3.8 (2.9–4.9)</td>
<td>2.0 (0.1–10.6)</td>
<td>.51</td>
</tr>
<tr>
<td>Hands</td>
<td>3.5 (2.6–4.5)</td>
<td>14.0 (5.8–26.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Arms</td>
<td>3.0 (2.2–4.0)</td>
<td>24.0 (13.1–38.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Cheeks</td>
<td>3.0 (2.2–4.0)</td>
<td>2.0 (0.1–10.6)</td>
<td>.68</td>
</tr>
<tr>
<td>Back (lumbar region and posterior thorax)</td>
<td>4.3 (3.3–5.5)</td>
<td>18.0 (8.6–31.4)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Abdomen and pelvis</td>
<td>1.7 (1.1–2.5)</td>
<td>10.0 (3.3–21.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Buttocks</td>
<td>1.6 (1.0–2.3)</td>
<td>4.0 (0.4–13.7)</td>
<td>.19</td>
</tr>
<tr>
<td>Anterior chest</td>
<td>1.0 (0.6–1.7)</td>
<td>6.0 (1.3–16.5)</td>
<td>.34</td>
</tr>
<tr>
<td>Chin</td>
<td>0.7 (0.3–1.2)</td>
<td>2.0 (0.1–10.6)</td>
<td>.29</td>
</tr>
<tr>
<td>Ears</td>
<td>0.3 (0.1–0.7)</td>
<td>0.0 (0–0)</td>
<td>.70</td>
</tr>
<tr>
<td>Neck</td>
<td>0.2 (0–0.6)</td>
<td>0.0 (0–0)</td>
<td>.75</td>
</tr>
<tr>
<td>Anal-genital region</td>
<td>Not evaluated</td>
<td>0.0 (0–0)</td>
<td>—</td>
</tr>
</tbody>
</table>

CI indicates confidence interval.

a Data refer to all skin injuries and are based on 1467 examinations; some children were assessed more than once.

b Data are based on bruises only. Children were determined to be positive for a bruise at a specific location if a bruise was detected on either exam.

c Statistically significant results (P < .01).
Conclusions

- Study population was more likely to have bruising compared to nondisabled children in same age groups
  - Greater number of bruises in children ages 10–20 years
  - Possibly due to more difficult transfers in larger children
- Locations of bruises
  - Increased bruises over back, abdomen, pelvis compared to nondisabled peers
  - Bruising over the neck, ear, and buttocks remained uncommon
- Equipment is not associated with increased bruising
  - Ie orthotics, body jackets


