Not All That Blisters Is a Burn!
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Objectives
• To review the epidemiology of burns in children including burns caused by abuse
• To review the steps in evaluating burn injury including assessment of pattern and the pattern types that suggest abuse
• To review other skin findings traumatic and atraumatic that can mimic burn injury

Burn Injury
• Represent 5% – 22% of child abuse
• More common in children <3 years
• Inflicted burns are about 10% – 25% of pediatrics burns
• Scald burns are most frequent type of burn abuse
• 30%-45% of tap water scalds are abusive
• 85% of intentional scalds are by tap water

Quick Burn Bullets
Epidemiology of abusive vs. accidental burns
• Younger children, higher abuse
• Single-parent families, higher abuse
• Abuse burns more serious (grafting, full-thickness)
• Lower SES, unemployed
• FTT higher risk
  /**All these clearly in Reece/Christian book

Four factors that determine severity of a burn
• Time
• Temperature
• Thickness
• Type
Differentiate Between Superficial, Partial, Deep Partial, and Full-Thickness Burns

Superficial:
- Epidermis only
- Coloration from vascular plexus in dermis being irritated
- No blisters, surface is dry
- Tenderness to touch, edema
- Heals itself without evidence of scarring usually in 3 to 5 days

Superficial partial-thickness:
- Through the epidermis downward into the papillary layer of dermis
- Coloration because the dermal tissue has become inflamed
- Blanching with pressure, brisk capillary refill upon release
- Thin-walled, fluid-filled blisters develop within minutes
- Blisters break, nerve endings exposed so pain/light touch/temperature
- Moist because of loss of waterproofing of epidermis - body fluid leaks
- Edema due to dermal vascular network involvement

Deep partial-thickness:
- Extend downward into the reticular, or deeper, layer of the dermis
- Present as mixed red or waxy white
- Areas of redness will blanch with pressure, but capillary refill may be absent
- Blisters usually absent
- Exposed surface of the wound is wet or moist
- Edema marked with altered sensation

Full-thickness and subdermal burns:
- Affect every body system and organ
- Extends through the dermis and into the subcutaneous tissue layer
- Damages muscle, bone, and interstitial tissue
- Fluid and protein shift from capillary to interstitial space, causing edema
- Immediate immunologic response makes wound sepsis a potential threat
- Increase in metabolic rate - aggressive nutritional support
Soft Tissue Injury Burns
- Scald burn (immersion and spill/splash)
- Contact

Spill Patterned Burn
Scald or splash injury from liquids usually results in a single burn that diminishes in intensity from point of contact.

Dunk Burn
Typical immersion burns have an immersion demarcation line and a uniform degree of injury with interspersed protection areas where the skin has been spared by flexion.

Spill Vs. Immersion

<table>
<thead>
<tr>
<th>SPILL</th>
<th>IMMERSION</th>
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<tbody>
<tr>
<td>• Scatter or satellite lesions</td>
<td>• Sharp demarcation</td>
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<tr>
<td>• Generally less severe</td>
<td>• Uniform depth</td>
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<tr>
<td>• Can be accidental or inflicted</td>
<td>• Circumferential</td>
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<tr>
<td></td>
<td>• Typical patterns of sparing</td>
</tr>
<tr>
<td></td>
<td>• Can be accidental or inflicted</td>
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Immersion Accidental Vs. Inflicted

<table>
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<th>ACCIDENTAL</th>
<th>INFLECTED</th>
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<tbody>
<tr>
<td>• Less severe due to briefer contact time</td>
<td>• Deeper</td>
</tr>
<tr>
<td>• More satellite burns due to struggle</td>
<td>• More sharp demarcation</td>
</tr>
<tr>
<td></td>
<td>• Simultaneous feet, perineum and buttocks</td>
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<td>• Bilateral symmetric hands and feet</td>
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Spill Accidental Vs. Inflicted

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<th>ACCIDENTAL</th>
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<td>• Head, face and neck</td>
<td>• Lower torso, buttocks and legs</td>
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Contact and Flame Burns
- May have recognizable pattern or shape
- When inflicted tend to be deeper and have sharply demarcated margins
- When inflicted may be on clothing covered parts of the body
- Accidental burns from hot implements tend to be partial

Cigarette Burns
- Round
- Well demarcated
- 7 – 10 mm
- Deep central crater with raised edges
- When accidental tend to be oval, eccentric and more superficial

Burn Or Mimic
- Diaper dermatitis (particularly after laxative ingestion)
- Bullous impetigo
- Phytophotodermatitis
- Ecthyma

Laxative Induced Dermatitis of the Buttocks Incorrectly Suspected to Be Abusive Burns
- Leventhal, et.al. *Pediatrics*
- Active ingredient in ExLax – Senna
- Perianal and intragluteal skin may or may not be spared
- Straight line and diamond shaped representing absorbent diaper

Burns from stun guns
- Superficial burn without tissue damage
- 0.5 cm diameter
- Pairing of lesions 5 cm apart
- Acute - may be raised, slight erythema if acute
- After - hypopigmented circular macules

Conditions Confused with Burning
- Moxibustion
- Herpetic whitlow
- Staphylococcal scalded skin syndrome (SSSS)
- Insect and arachnid bites
- Manifestations of cold thermal injury
Cold Thermal Injury
- Acute freezing of tissues due to exposure to temperatures below freezing point of intact skin.
- Crystallization of tissue water into ice, leading to free radical formation and tissue damage
- Especially in acral body parts including the face
- Young, elderly, and intoxicated persons are at risk of frostbite
- Usually occurs at temperature of 0°C (32°F) or below

Popsicle Panniculitis
- Acute cold injury to fat of cheeks
- Red, indurated nodules
- Appear 1-3 days after exposure
- Gradually soften and return to normal (1-2 weeks)
- Caused by subcutaneous fat solidification
- Painful but no systemic symptoms

References