Burn Classification

- Burns are classified by:
  - Cause
  - Depth
  - Extent (the rule of nines)

Types of Burns: CAUSE

- **Thermal Burn**: caused by conduction or convection
  - Ex. Hot liquid, fire or steam
- **Electrical Burn**: caused by the passage of electrical current through the body. There is typically an entrance & an exit wound.
  - Ex. Lightning
- **Chemical Burn**: occurs when certain chemical compounds come in contact with the body.
  - Ex. Sulfuric acid, lye, hydrochloric acid, gasoline
Depth of Injury

- **Traditional**: 1st degree, 2nd degree, 3rd degree
- We now use **Modern** terminology:
  - **Superficial**: involves only the outer epidermis; heals without scarring
  - **Superficial Partial-Thickness**: involves epidermis & the upper portion of the dermis; pain & blisters; heals with min to no scarring
  - **Deep-Partial Thickness**: complete destruction of the epidermis & the majority of the dermis; blisters, edema; may heals with hypertrophic scars & keloids

Depth of Injury Continued

- **Full-Thickness**: complete destruction of the epidermis & dermis along with partial damage of the subcutaneous fat layer; require grafts & susceptible to infection
- **Subdermal**: complete destruction of the epidermis, dermis, & subcutaneous tissue; may involve muscle & bone; often requires surgical intervention

Zones of Injury

- **Zone of Coagulation**: area of greatest destruction, tissue necrosis, irreversible cell damage
- **Zone of Stasis**: damaged tissue, area of less severe injury that possesses reversible damage and surrounds the Zone of Coagulation
- **Zone of Hyperemia**: Pink, no cell death, the area surrounding the Zone of Stasis that presents with inflammation, but will fully recover without any intervention or permanent damage
Criteria for Hospitalization

- 20% or greater TBSA (total body surface area)
- 10% or greater TBSA in child or older adult
- 5% or greater full thickness burn
- Burns to any of the 4 special areas
- Burns to the eyes or ears

4 Special Areas

- If any of the 4 special areas are burned, it is classified as a severe burn and will require hospitalization
- Special areas: face, hands, feet, groin
Estimation of Burn Size

• **ADULTS:** RULE OF NINES for calculating TBSA

<table>
<thead>
<tr>
<th>Body Part</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head &amp; neck</td>
<td>9</td>
</tr>
<tr>
<td>Anterior trunk</td>
<td>18</td>
</tr>
<tr>
<td>Posterior trunk</td>
<td>18</td>
</tr>
<tr>
<td>Bilateral anterior arm, forearm and hand</td>
<td>9</td>
</tr>
<tr>
<td>Bilateral posterior arm, forearm and hand</td>
<td>9</td>
</tr>
<tr>
<td>Genital region</td>
<td>1</td>
</tr>
<tr>
<td>Bilateral anterior leg and foot</td>
<td>18</td>
</tr>
<tr>
<td>Bilateral posterior leg and foot</td>
<td>18</td>
</tr>
</tbody>
</table>

• **Children:** Lund-Browder Classification (used for calculating TBSA)

- A child under one year has 9% taken from the lower extremities and added to the head region. Each year of life, 1% is distributed back to the lower extremities until age 9 when the head region is considered to be the same as an adult.
Burn Shock & Vitals

• Burn Shock is a complex clinical syndrome that may develop.
  • Characterized by massive fluid loss
  • Cardiac output may be decreased by 50% for the first 2-4 days
  • Decreased circulating blood volume, but the red blood cells remain and blood flow is even further slowed due to its viscosity

Burn Shock & Vitals

• Vitals
  • Blood pressure generally decreases
  • Within hours of a burn injury, patients develop sinus tachycardia in an attempt to maintain cardiac output at an acceptable level.
  • Ideally, adults should have a resting heart rate between 100-120 bpm and children 120-170 bpm.
  • This increased resting HR means lower cardiac reserves for increased activity (PT).

PT Intervention

• #1. Prevention of Secondary Complications:
  • A.
  • B.
  • C.
  • D.
  • E.
PT Intervention continued

- #2. Wound Care
- #3. Scar Management
  - Burn scars require 6 mo – 2 yrs to mature
  - Might include gentle moisturizing, gentle scar massage, compression wraps and garments, silicone pads for small areas
- #4. Therapeutic Exercise
  - ROM
  - Gait training and mobility
  - Breathing exercises
  - Aerobic exercises

PT Intervention continued

- #5. Positioning
  - To enhance wound and scar healing
  - To reduce edema
  - To prevent contracture
  - To prevent pressure wounds
  - To improve pulmonary function

Body area | Contracture predisposition | Preventive positioning
--- | --- | ---
Neck | flexion | Extension
Anterior axilla | Shoulder add | Shoulder abd
Posterior axilla | Shoulder ext | Shoulder flex
Antecubital space | Elbow flexion | Elbow extension
Forearm | pronation | Supination
Wrist | flexion | Extension
Dorsal hand / finger | MCP hyperextension | MCP flexion
 | IP flexion | IP extension
 | Thumb add | Thumb abd
Hip | Flexion, add, ER | Ext, abd, IR
Knee | flexion | Extension
Ankle | PF | DF
Questions??