PATIENT CARE THEORY 2

UNIT 2, PART 5: Burn Assessment and treatment

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You Have a Burn Patient…..

- Always consider non accidental trauma in the pediatric burn patient
- Always consider trauma in your burn patients
  - This may precede the burn assessment (its very hard sometimes to ignore the initial visual presentation of the burn)
  - Most common injuries associated with burns:
    - Fractures (50-60%)
    - TBI (20 – 25%)
    - Thoracic or abdominal injuries (4-24%)
- All serious burn patients should be receiving 100% O2 via NRB as quickly as possible. Why?
  - Assume CO poisoning, cyanide poisoning,

Depth of Burns

Depth of Burns

- Old terminology (still exists in the BLS Standards 2006)
- 1st degree burns
  - Affects only the epidermis (e.g. sunburn)
  - Healings occurs in a few days
- 2nd degree burns
  - Burn that extends down to the dermis
  - Healing occurs slowly
- 3rd degree burns
  - Extends down to the subcutaneous layer and fatty layer
- 4th degree burns
  - Extends down to the muscle or bone

Depth of Burns

- burns frequently include more than one level of depth in different areas of the burn
- i.e. there may be a burn area that extends down to the subcutaneous layer with the area outside the center of the burn only extending down to the dermis
- There is some overlap and therefore, ***new terminology has been adopted***

Depth of Burns

- **Superficial thickness (1st Degree burn)**
  - Affects the epidermis
  - Mildly painful
  - red
  - dry
  - blanches with pressure with a brisk cap refill
  - never blisters
  - **NOT CALCULATED IN BURN EXTENT (TBSA)**
  - typically heal within 5-7 days (if only the epidermis is involved)

Depth of Burns

Superficial thickness - epidermis

Depth of Burns

Superficial thickness - epidermis

Depth of Burns

Superficial thickness - epidermis

Depth of Burns

Superficial Partial Thickness & Deep Partial Thickness Burn (formally called Second degree)

- **Superficial Partial Thickness**
  - Through the epidermis into the superficial dermis
  - Pink
  - Look wet
  - more painful but still have quick cap refill
  - Can have Blisters
  - Hair follicles, sebaceous and sweat glands are damaged
  - We don't de-roof the blisters
  - Healing may take 2-4 wks
- **Deep Partial Thickness**
  - goes beyond the superficial dermis into the deep dermis
  - Look cherry red or pale
  - Sluggish cap refill
  - More or less painful depending on nerves
  - Healing can take up to 6 weeks
  - produce scarring and generally requires grafting (to reduce the scarring)

Depth of Burns

Deep Partial Thickness Burn - dermis

Depth of Burns

Deep Partial Thickness Burn - dermis

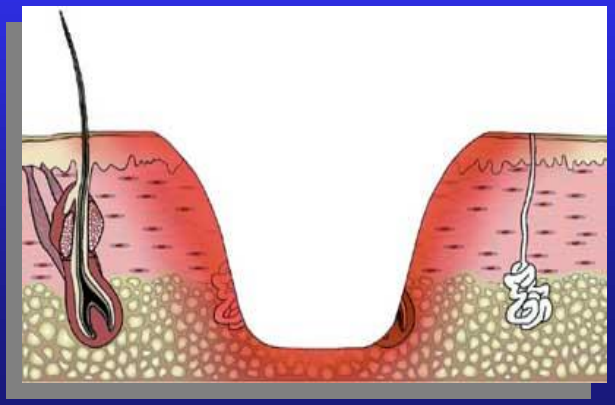
Depth of Burns

Deep Partial Thickness Burn - dermis

Depth of Burns

Full Thickness Burn (formally called Third degree)

- **Affects all layers of skin, the subcutaneous tissue and fatty layer, including underlying fascia, muscle and bone**
- Usually painless (in the immediate area)
- No cap refill
- “pearly” white or charred or various colours
- Treatment is always surgical



Depth of Burns

- Full Thickness Burn – subcutaneous tissue
  - campfire

Depth of Burns

- **Full Thickness Burn – subcutaneous tissue**
  - **bathtub**

Depth of Burns

- **Full Thickness Burn – subcutaneous tissue**
  - **House fire**

Depth of Burns

- **Full Thickness Burn – subcutaneous tissue**
  - **Scald**
  - **Various burn depth present**
  - **Produce keloid scarring**

Depth of Burns

Full Thickness with ***Eschar***

- burns past the subcutaneous tissue to the muscle
- Painless (in immediate area)
- “pearly” white or charred
- Performed to reduce risk of compartment syndrome

Depth of Burns

Full Thickness with Eschar

BURN DESCRIPTION	APPEARANCE	CAP REFILL	SENSATION/ PAIN	HEALING	
1st SUPERFICIAL THICKNESS	ERYTHEMA	FAST	+	7-14D	
SUPERFICIAL PARTIAL THICKNESS 2nd	WET, PINK, BLISTERS,	FAST	++	2-4 WEEKS	
DEEP PARTIAL THICKNESS	LESS WET, RED, +/-BLISTERS,	SLUGGISH OR ABSENT	+/-	3-8WKS WITH SEVERE SCARRING; NEEDS GRAFTING	
3rd FULL THICKNESS	DRY, WHITE	ABSENT	ABSENT	NEEDS GRAFTING	

Eschar

- full thickness burn that encircles a part of the body or restricts breathing = code 4, CTAS 1
- dry, chalky appearance
- inelastic
- swelling beneath the eschar can result in compartment syndrome - “load & go!”

Depth of Burns

- Both deep and partial thickness burns may not blanch
- Burns are dynamic wounds – burns may continue to deepen over a few days
  - True depth of burn may not be known for 48-72 hours
  - Correct depth assessment is accurate 60% of the time on initial assessment

Inhalation Burns

- thermal burns below the glottis is uncommon
- exposure to steam may produce DEEP airway burns
- chemical burns may produce massive pulmonary edema and difficulty in ventilation

Inhalation Burns

Look for the clues to suspect airway involvement

- burns to the face/neck
- singed hairs: beard, eyelids, eyelashes, or nasal hairs
- soot around the mouth, nose, teeth, gums
- black tongue
- carbonaceous sputum
- hoarse voice
- Stridor (ominous)
- respiratory distress

Inhalation Burns

Consider need for future airway management…..

- burns to the lips, tongue, oropharynx
- Indications for early intubation:
  - Signs of respiratory distress, stridor, accessory muscle use
  - ***New onset of hoarseness*****
  - Blisters or edema of oropharynx
  - Deep burns to lower face or neck
- Not all patients with singed nasal hairs and facial burns will require intubation
  - Mild inhalational injuries in patients with normal oxygen saturations and no signs of respiratory distress can be safely observed.

Estimation of Burn Size

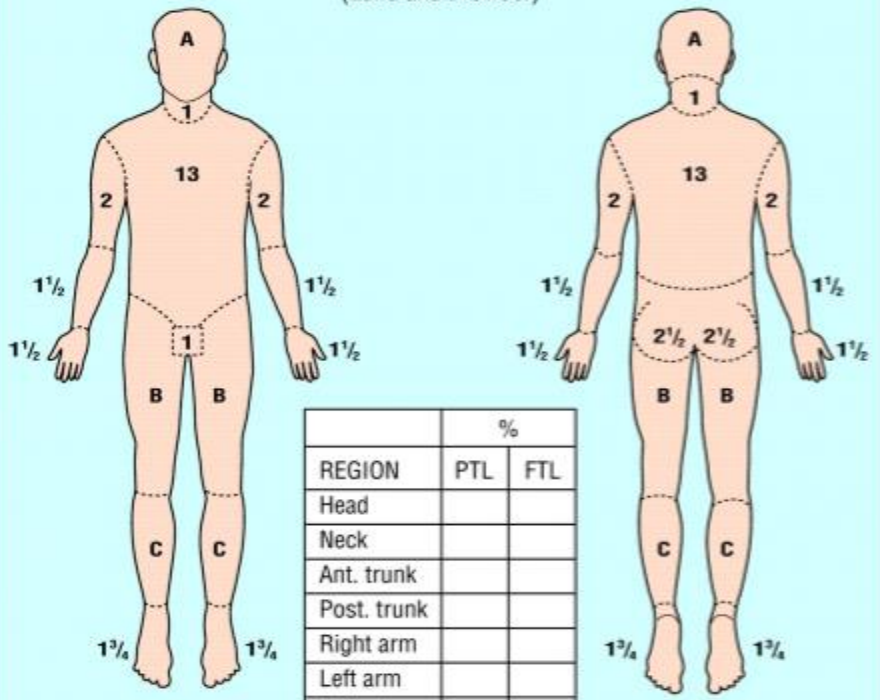
- Rule of Nine's – historically used but inaccurate and consistently overestimates TBSA by about 20%
  - This can lead to over-resuscitation
- For TBSA <15% or >85% use the Rule of palms
  - Highly accurate
  - Uses the size of the ***PATIENTS HAND (including fingers)***

Estimation of Burn Size

- Lund and Browder Chart
  - Far more accurate and has excellent inter-rater reliability
  - Does NOT include superficial thickness burns

% Total Body Surface Area Burn

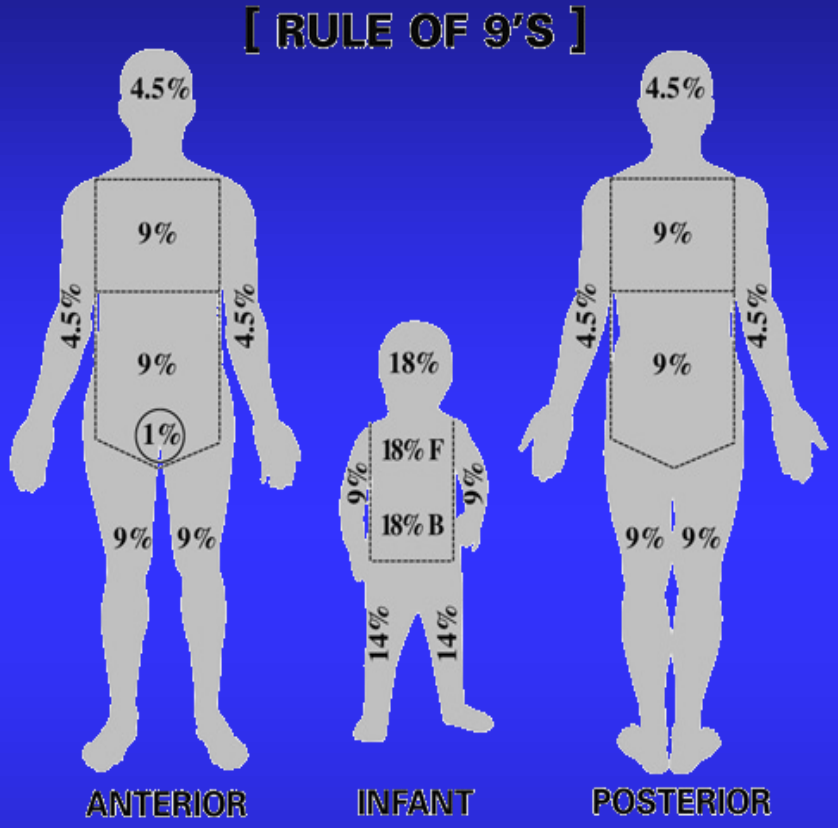
Be clear and accurate, and do not include erythema
(Lund and Browder)



	%	
REGION	PTL	FTL
Head		
Neck		
Ant. trunk		
Post. trunk		
Right arm		
Left arm		
Buttocks		
Genitalia		
Right leg		
Left leg		
Total burn		

AREA	Age 0	1	5	10	15	Adult
A = ½ OF HEAD	9½	8½	6½	5½	4½	3½
B = ½ OF ONE THIGH	2¾	3¼	4	4½	4½	4¾
C = ½ OF ONE LOWER LEG	2½	2½	2¾	3	3¼	3½

Body Surface Area – Former Method



Rule of Nine Burn Chart	
Total **arm** (1) • Anterior side of arm • Posterior side of arm • If both sides of both arms are burned	9% • 4.5% • 4.5% • 18% in total
Total **leg** (1) • Anterior side of leg • Posterior side of leg: • If both sides of both legs are burned	18% • 9% • 9% • 36% in total
Anterior Chest	9%
Anterior Abdomen	9%
Posterior Superior Back (back side of the chest)	9%
Posterior Inferior Back (back side of the abdomen)	9%
Head/neck • Anterior side of head (the face) • Posterior side of head	9% • 4.5% • 4.5%
Groin	1%

Body Surface Area

- Rule of Nines (adults)
- children have their own set of rules
    - * head = 18%
    - * chest & abdomen = 18%
    - * leg = 7% (child), 14% (infant)
- a hand is worth 1%
- high risk areas?
    - * face, hands, feet, perineum

Major or Extensive Burns

MAJOR BURN

- ≥ 25% BSA 2nd degree burn in an adult
- ≥ 20% BSA 2nd degree burn in a child
- ≥ 10% BSA 3rd degree burn in an adult
- Any 3rd degree burn in a child
- Any airway burn

Read BLS Standards for more detail

Assessment of Burns

- Scene Size-up
  - Fire Department
    - SCBA and protective clothing
    - Stop any continued burning on the patient
  - MOI
- A-B-C-D-E

Airway Assessment

Patients at high risk of inhalation injury

- Steam burns = highest risk
- Chemical inhalation
- patient in confined space or caught in an explosion is at higher risk for inhalation injury (thermal) for as little as a minute
- facial burns
- wheezing
- any respiratory distress

Patient Assessment

B Respiratory distress

- May indicate chemical airway burns, chemical inhalation leading to bronchospasm / pulmonary edema
- Bronchospasm can be treated with _____
- Transport lights & sirens

Patient Assessment

C Gross bleeding?

- Assess for shock
- Fluid loss from extensive burns is a relatively slower loss compared to blood loss from trauma
- Therefore assume blood loss from trauma if hypotension and tachycardia is present
- Assess for eschar that compromises peripheral circulation
- Transport lights & sirens

Patient Assessment

D Altered Neuro status

- May signal CO poisoning, cyanide poisoning, head trauma or hypoxia from partial airway occlusion or lung irritation
- Transport lights & sirens

Patient Assessment

E expose the patient

- Other obvious signs of trauma?

Patient Assessment

- HPI
- c/c
- Vitals, ECG, SpO_2 monitor
- PMHx, Rx, allergies
- assess depth and TBSA affected
- further resuscitation
- Get as much information as quickly as possible in the event your patient condition changes

Patient Assessment

Alternatives to assessing BP
when arms are badly burned

Signs of Abuse: Burns

Overview

- Burns are a common childhood injury
- Account for a large number of ER visits
- Scalds are most common followed by contact burns
- Unfortunately a significant percentage of abuse is caused by burning
- Children < 3 are most susceptible

https://pediatrictraumasociety.org/meeting/multimedia/files/2019/Presentations/Friday/0330-Ziegfeld.pdf

Risk factors

- include:
  - Premature child
  - Younger (< 3 yrs)
  - Chronic illness/ colic
  - Developmental, physical, cognitive, emotional or social delays
  - Unwanted children
  - Misbehaviour or challenging behaviour

Parental factors

- Young/teenage parent
- Parent abused as a child
- Nonbiological caregiver
- Emotionally vulnerable
- Low self esteem, Depression
- Limited ability to cope with stress or anger
- Unrealistic expectations
- Social isolation
- Poorly developed support system
- Loss of a job / poverty
- Substance abuse
- History of domestic violence

Triggers your Spidey Senses

- Delay in seeking care
- Injury attributed to the actions of other child
- Changes in story/HPI (multiple versions)
- HPI inconsistent with the developmental capabilities of the child (i.e. a 3 month old can’t turn on the hot water tap)
- HPI inconsistent with the presenting injury
- Injury claimed to be unwitnessed

Burn Patterns in Child Abuse

Inflicted/Abuse

- burn patterns consistent with forced immersion in a hot liquid (a distinct boundary line where the burn stops);
- Uniform burn depth
- burn patterns consistent with a spattering by hot liquids;
- patterns caused by a particular kind of implement, such as an electric iron;
- or instrument, such as circular cigarette burns

Unintentional

- Reasonable story
- Irregular burn margins
- Variable burn depths (initial point of contact most deeply burned
- Multiple splash marks (burn severity lessons as it flows towards dependent anatomy)

Burn Patterns in Child Abuse

Cement burns

64% calcium oxide (also called lime) and 21% silicon oxide and has an alkaline pH of approximately 12.5

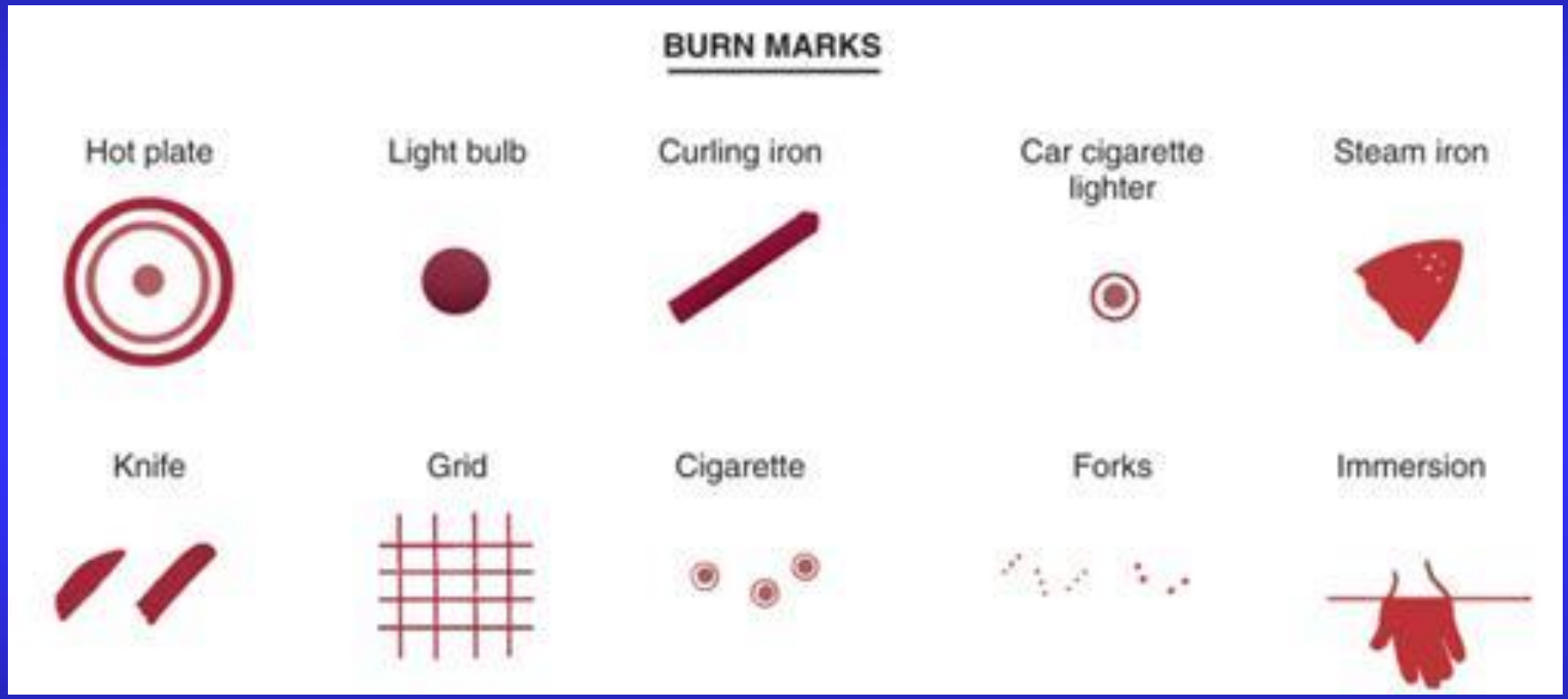
Concerning or No?

- 3 yr old grabbed a hot tea off the kitchen table

Concern or no?

- 18 month old washing his hands

Burn Patterns in Child Abuse



Key points

- Mindful consideration of potential abuse should be used when dealing with pediatric burns
- Looks for patterns and red flags
- Any suspicions need to be reported (mandatory reporting requirements)
- **Child in Need of Protection Standard**

Questions?