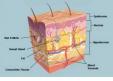
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Burns 101 Ashley Goad, MPAS, PA-C, CWS	
Texas Children's Hospital Houston, Texas	
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Disclosures	
Non-Declaration Statement: I have no relevant relationships with ineligible companies to disclose within the past 24 months.	
None of the photos used in the presentation are my own.	
Educational Objectives	
Educational Objectives	
At the conclusion of this session, participants should be able to:  • Identify the difference between 1st, 2nd, 3rd, and 4th degree burns	
Estimate burn resuscitation based on total burn surface area     Manage burns acutely upon presentation	
Develop a wound care plan for burn patients     Identify which patients should be transferred to burn centers	

### Don't be scared! Burns are manageable!



### **Function of Skin**

- Thermoregulation
- Protection
- Secretion
- Excretion
- Absorption
- Sensation
- Vitamin D production



https://www.sassyskincare.org/single-post/2016/12/03/skin-fun-facts

### Mechanism of Burns

- Scald
  - Most common children
- Fire/Flame
   Most common adult
- Electrical
- Chemical
- Radiation
- Contact
- Friction





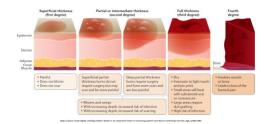






### Degrees of Burns

% TBSA = Total Body Surface Area **BURNED** 



### **Degrees of Burns**

# 1st degree (Superficial) • DOES NOT blister

- Sunburns'
  IS NOT used to calculate %TBSA
- Usually does not require IVF
   Push PO fluids



### Degrees of Burns

# 2nd degree (Superficial partial thickness) • ALWAYS blisters and blanches

- Painful

# 2nd degree (Deep partial thickness) • ALWAYS blisters • USUALLY blanches (can be slow)

- Painful
- Can be confused for 3rd degree









### **Degrees of Burns**

- 3rd degree (Full thickness)

   <u>DOES NOT</u> blister or blanch
  (no blood flow, dead tissue)
  - NO pain
  - Leather, dry, waxy, firm, white appearance



### Degrees of Burn

### 4th Degree

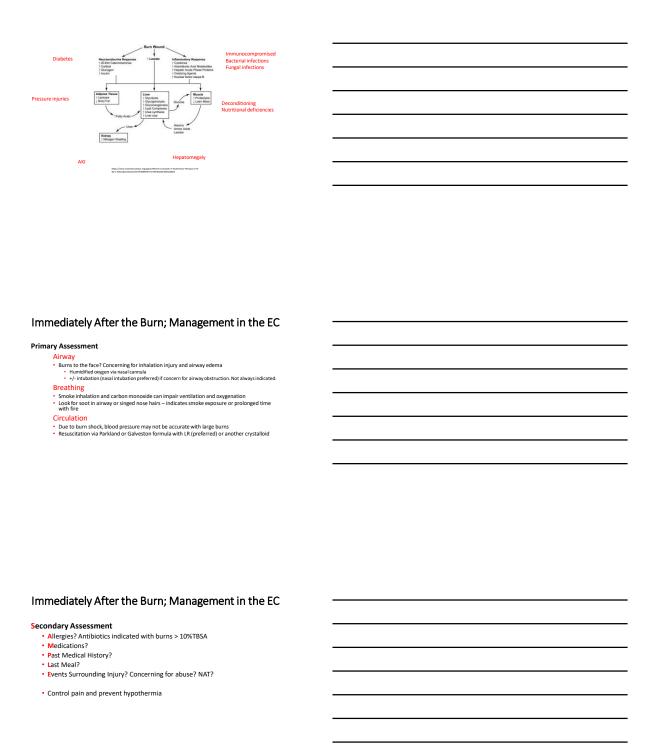
- To the muscle or deeper structures
- Usually electrical etiology
- Black, necrotic appearance
- Cannot salvage





### Pathophysiology of Burn Shock and Edema

- Hypovolemia via intravascular fluid leaking into interstitial space causing edema (leads to compartment syndrome)
- Cardiac depression due to humoral factors and loss of preload -> decreased Cardiac Output
- Increased systemic vascular resistance
- Large release of inflammatory mediators



### %TBSA Calculation



DO NOT USE 1st DEGREE BURNS FOR %TBSA CALCULATION

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### **Fluids**

- Must replace fluid loss from hypovolemia, shock and edema when burn  ${>}10\%~\text{TBSA}$
- LR preferred over other fluids
- Adults: Parkland Formula

  %TBSA x weight (kg) x 4mL

  Give ½ over 1st 8 hours, then other ½ over next 16 hours
- Children: Galveston Formula

  (5000 mL x %TBSA) + (2000 mL x Total Body Surface Area in m2)
  Give ½ over 1st 8 hours, then other ½ over next 16 hours
- **<u>DO NOT</u>** include 1st degree burns in %TBSA calculation!
- Monitor UOP! Titrate fluids based on UOP. Aim for 0.5 mL/kg/hr for adults and 0.5 1.0 mL/kg/hr for children
   Watch out for compartment syndrome!

### Compartment Syndrome - EMERGENCY

Can have one or all symptoms. There is no order to which the symptoms occur

- Paresthesia most common first presenting symptom
- Pain OUT OF PROPORTION most common fire
- Pain with passive or active movement
- Pallor
- Paralysis
- Poikilothermia (cold)
- Pulselessness (late finding), use doppler
- Leads to limb ischemia. If not treated in time = amputation

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prinability	Tissue death			

Can occur on ANY part of the body! Fingers, toes, abdomen, eyes in addition to extremities.

 $Common \ for \ patients \ with \ burns. \ Can \ result \ from \ normal \ burn \ resuscitation \ via \ interstitial \ fluid \ leakage$ 

### Escharotomy

- Through epidermis and dermis Can be done prophylactically 3rd degree burns Circumferential burns



### Fasciotomy

- Through fascia
  Can be done prophylactically
  Prevents and treats compartn
  syndrome (limb ischemia)





### Indication for Transfer to Burn Center

- Partial thickness burns >10% TBSA
- Burns that involve the face, hands, feet, genitalia, perineum, or major joints
- Third degree burns in any age group
- Electrical burns, including lightning injury
- Chemical burns
- Inhalation injury
- Initiation injury in patients with preexisting medical disorders that could complicate
  management, prolong recovery, or affect mortality
   Any patient with burns and concomitant trauma (such as fractures) in which the
  burn injury poses the greatest rick of morbidity or mortality. In such cases, if the
  trauma poses the greater immediate risk, the patient may be initially stabilized in
  a trauma center before being transferred to a burn unit.

### **American Burn Association Centers**

- American Burn Association Centers

   Specialized burn centers certified in providing all aspects of burn care from acute care, rehabilitation, and reconstructive to patients

   Includes a specialized team and services such as:

   Includes a specialized team and services such as:

   Burn Surgeons (requires fellowship burn training)

   Burn Plastic and Reconstructive Surgeons

   Pophology Phychiatry

   Pryori

   Phymanacists

   CU Jevel care with Pediatric Surgery/Surgical Critical Care or Pediatric Critical Care Medicine trained Doctors

   247/ Medical Staff

   24/7 Emergency Department

   24/7 Emergency Department

   Child Life

   Social Work

   Infection Control

   Ambidatory Care

   Multidisciplinary Care

ADA Dagagnina	d Burn Contorn in Tours	
ABA Recognize	ed Burn Centers in Texas American Burn Association (ABA) verified burn centers in Texas (6 total)	
· In a	Lubbock Timothy J. Harnar Burn Center	
	Dallas • Parkland Health & Hospital System, Regional Burn Center Houston	
feel date represent faculties with ABA Northeal Black Cartles	Houston  Memorial Hermann-TMC, Texas Trauma Institute, John S. Dunn Sr. Burn Center  Galveston	
Southern Projects     Southern Projects     Southern Projects     Webstern Region     Webstern Region	Galveston  Shriners Hospitals for Children  University of Texas Medical Branch San Antonio  US Army Institute of Surgical Research	
https://ameribum.org/wp-content/upisads/2014/til/da-1117_bum-contennag_c01118.pdf	• OS Alliny illustrate of Surgical Research	
Miles () the district of the d	na menantingan antifiques ("Gaperta dusto cor- to de de de de de gas apot é para ana é	
Signs of abuse	Figure 2. Burn Marks HEFFANTE LIGHTIBUS CLAR STEAM RIDN RIDN	
Burn patterns never lie!	NAME OND CHARITY FORMS INHERSON	
<ul><li> Uniform demarcations</li><li> Both extremities (held dow</li></ul>	n) ## ** ^\ \	
Circular – cigarette burns		
Liveril or helder created in the communities of the		
Translation and the control of the c		
Management: Out	patient vs Inpatient	
Burns LESS THAN 10%	TBSA usually can be managed outpatient	
Anything MORE THAN 10% TBSA  Outpatient <10%TBSA	should be stabilized and referred to a burn center  Inpatient >10%TBSA	
1' Topical Abx:     Bacitracin, Polysporin	Systemic Abx:     Vancomycin & Meropenem	
<ul> <li>Systemic Abx (larger burns, still less that &lt;10%TBSA):</li> <li>Bactrim &amp; Rifampin</li> </ul>	<ul> <li>Grafting: Xeno-, allo-, autograft</li> </ul>	
Mepitel AG     Mepilex AG     Suprathel	Wound Vac     Acticost     Consider Transfer to burn center	
<ul> <li>Silvadene and Silver Sulfadiazine not recommended</li> </ul>	Consider transfer to built offitter	
<ul> <li>Impairs wound healing</li> </ul>		

# Treatment Outpatient and Small: Supplementaries and Small

### Pseudoeschar

A thick gelatinous yellow or tan film that forms with silver sulfadiazine cream combining with wound exudate.



https://www.researchgute.net/Egure/Yout-burn-day-Y-chowing-the-thick-ber provide-exchan-on-the-posterior-arm\_figt\_REERTIES

### **Treatment**

For large burns to be transferred to burn center:







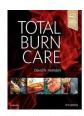
### **Healing Time**

- 1st degree
   Days
- 2nd degree
   7-14 days, up to one month
- 3rd degree
   Months up to a year
- 4th degree
   Months up to a year
- Typical healing time is 1-2 days per %TBSA burned.
- The deeper the burn, the longer the healing time.
- Infection, deconditioning, comorbidities, nutritional
- deficiencies, etc. can prolong healing

- ${}^{\bullet}$   $2^{nd}$  degree burns ALWAYS blister, are painful and blanch.
- Silver sulfadiazine causes pseudoeschar to burn wounds. Should be avoided as this is an infection risk. Bacitracin can be used instead.
- Burn resuscitation and airway management should be started sooner than later. DO NOT use  $\mathbf{1}^{\rm st}$  degree burns to calculate %TBSA.
- Source control and infection are important to prevent infections and aid in healing time
- Any question or concern regarding ANY phase of burn healing contact an ABA burn center

### References

- Herndon, D. N. (2018). Total burn care (fifth edition). Elsevier.
- Wound Certification Prep Course, 2021
- https://ameriburn.org/quality-care/verification/verificationcriteria/verification-criteria-effective-october-1-2019/



Questions?

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Please feel free to reach out!	
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